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ABSTRACT

The present system of education in the United States is wasteful of human and monetary resources and is organized to deny learning opportunities to most students. Education is the biggest business in the United States, and it is the most important business because it molds the character and ability of current and future citizens. Schools should be organized and managed so that the resources of students, parents, teachers, and support personnel are used wisely in an environment that stresses openness, liberty, competition, individual achievement, and social responsibility. The school curriculum and its presentation should help each student earn and enjoy a living and support the United States in worldwide competition. The following chapters are included: (1) "The Problems"; (2) "Why We Need Standards"; (3) "The University"; (4) "The College of Education"; (5) "Recollections of a Junior College"; (6) "The Learning Unit"; (7) "Our Elementary Schools"; (8) "The Public High Schools"; (9) "Public, Private, and Parochial Schools"; (10) "The Discouragement of Teachers"; (11) "Some Pertinent Remarks on Knowledge and Skills"; (12) "Academics and Athletics"; (13) "Sociology"; (14) Recommendations"; and (15) "References" (endnotes). (Contains two tables and multiple endnotes.) (SLD)

THE WASTING OF A PEOPLE

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BY

RUSSELL D. SHELTON

THE PHILOSOPHY AND PRACTICE OF AMERICAN EDUCATION

A CRITICAL ANALYSIS OF ITS SHORTCOMINGS AND PROPOSALS FOR ITS CHANGE

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The Wasting of a People

Russell D. Shelton

About the Author

After a short enlistment in the Civilian Conservation Corps as assistant to the educational advisor, Russell Dowell Shelton attended Berea College in Kentucky because a Presbyterian missionary, sent from New York state to the hills of Kentucky, decided that he "had to go". After a year at Berea, Shelton entered the Army Air Corps where he studied radio, electronics and radar and was pressured to be an instructor after each course. Under Army auspices, he attended engineering school at N.C. State in Raleigh and was approved for admission to the Engineering OCS at Fort Sill, Oklahoma.

After WW II Shelton attended Centre college in Kentucky, obtained a BS in mathematics, physics, and "education" from Eastern Kentucky State Teachers College, taught in McRoberts Junior High School in eastern Kentucky, and obtained an MS and Ph.D. in physics from the University of Tennessee while holding a teaching assistantship. Shelton is the author of over fifty scientific papers in areas of physics, ballistics, astrophysics, and management and was a visiting lecturer for the American Physical Society in special and general relativity. He taught graduate physics at Texas Christian University, Washington University, the University of Alabama in Huntsville and the Tennessee Space Institute in Tullahoma and undergraduate physics at the Illinois Institute of Technology, the University of Tennessee, and Eastern Kentucky State College. He has held positions as senior nuclear engineer at General Dynamics, executive physicist at Admiral Corporation, chief of a nuclear and plasma physics division for NASA, technical director of the Army Land Warfare Laboratory during the Viet Nam era, and supervisor of a computer operation at Monsanto Chemical Company. He has taught computer science, electronics and physics at Calhoun Community College near Decatur Alabama during the past ten years.

Dr. Shelton has experienced education as both a giver and as a receiver. As a student, teacher or user in the applied fields of electronics, physics, engineering, psychology, sociology, computers and management, he knows where the pieces fit, what is important, what is known, and what is pretended.

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Russell D. Shelton

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To my wife, Patricia,

with whom I have discussed public education
for over a quarter of a century

and

to other good teachers

in

public, private and parochial schools,
churches, military services,
industry, parenting, and scouts.

Foreword

By Dr. Henry E. Stern
Applied Mathematician and Adjunct Professor

Occasionally one comes across a book which is of singular value, in that it addresses a subject of great importance to society, and at the same time constitutes a very readable and well crafted work. The book at hand, by Dr. Russell D. Shelton, indisputably falls into this category.

Our nation finds itself at a critical juncture. Faced with a new world order, one in which very radical changes in societies are occurring around the globe, we find it necessary to meet new challenges to our way of life, our values, and the role that we should play in the community of nations. We are forced to reexamine our goals, our aspirations, and the ideals that guide us in our lives. How can we best be prepared to meet our responsibilities and avail ourselves of new and changing opportunities? What are our most precious resources and how can we best develop and utilize them? What do we, in the United States of America, really want and expect for ourselves and our descendants?

Our strength, of course, lies in our people. Our most precious resource is our individual and collective ability and our willingness to strive toward a society of both material sufficiency and spiritual achievement.

Our past successes in attaining our goals are attested to by the strenuous efforts and great sacrifices that other people have exhibited in order to enter this country.

But our society and our way of life can only be maintained and advanced if we utilize to the fullest the abilities of our people and develop and maintain our vital skills and capabilities. Clearly, our educational system is the key to our success, our well being, and our very survival as a society. But, you may say, we seem to have done all right in the past. Why need we worry now?

Dr. Shelton sends a clear and urgent call for a hard look at our educational process. He raises not an irrational alarm, but a meticulous analysis and critique of the educational system to which we have become accustomed, and which, for the most part, we have come to accept and consider to be good. He presents a closely reasoned and cogently woven picture of the system we have today and clearly demonstrates why it can only lead us into national disaster if we do not change our course.

He is fair and honest in his appraisals, and he addresses vital but sensitive issues which are essential to his thesis. He speaks to us in the light of extensive personal experience, impressive academic credentials, and keen and insightful analytical ability. And he expresses his stirring message in terms that are both highly readable and strongly convincing.

Will his presentation anger some people, or at the very least, cause them considerable discomfort? Unquestionably it will. Will it cause open-minded people to understand the dangers we face and thereby inspire them to action to avert the current imminent danger? Let us earnestly hope so. For he presents us not only a clear picture of a very grave situation but also a very straightforward prescription for a remedy which is close at hand. He has alerted us to a critical problem; he has outlined a ready solution. Let us heed his alarm and his challenge. Let us act now for the vital interests of ourselves and of those who will follow.

Preface

My wife Patricia and I have spent our careers in or on the fringes of the educational process. Our parents believed in education and made it easy for us to go to school and learn, even as they struggled on hilly farms to get beyond the hardship and poverty of the great depression. To them, education was the way up for us and the rest of the country. We still believe as they did.

This book will describe education in the United States and make proposals for its improvement. Many people will like what is written in this book and welcome the evident truth of my views. Some, having been told for years how great everything is and how it is getting better, will be shocked by the compelling and contrary evidence that I present and the sweeping changes that I propose. Others, having done well in the current educational system, may feel a direct threat as ills are identified and needed changes are proposed. I believe in kindness as a way of life, and believe that this book, although it contains passages that might be disturbing to some, has as its intention the promotion of greater happiness among students, parents, teachers, administrators and taxpayers.

Kindness does not always have a friendly face preceding an immediate gratification. Sometimes it entails work, costs money, requires changes or appears in the guise of incertitude, discomfort and danger, such as a dentist's drill or a surgeon's scalpel.

Our present system of education is wasteful of human and monetary resources and is organized to deny learning opportunities to most of our students. Its wrongs and inefficiencies have been skillfully camouflaged by pious platitudes while it garners approximately $500,000.000 annually to protect its interests via political activism. It places our country at risk in the international economic competition, divides our nation for no real purpose, wastes opportunities for our people, and costs far too much for what we get. Its greatest crime is the practiced denial of opportunity to our students and teachers. I will try to present a realistic and straightforward description of our problems and not worry too much about the feelings of those defending parasitic and petty empires at the expense of the rest of us.

Education is the biggest business in the country, not only because of our public and private schools and colleges, but also because of our industry, our churches and our armed forces, all of which mount large and effective educational programs with strong and well defined objectives. There are also relatives and friends who spend a large part of their time and resources in the personal instruction of children.

Education is our most important business, not only because of the amount of money and the number of people involved, but because it molds the character and ability of our current and future citizens and determines whether we will prosper or even survive in our competition with world populations.

Our schools should enable every child to be all that he or she can be in a safe, pleasant and kindly place. This is important to all of us.

Our schools should be organized and managed so that the resources of students, parents, teachers, and support personnel are used wisely in an environment that stresses openness, liberty, competition, individual achievement, and social responsibility

Our school curriculum and its presentation should help each student to earn and enjoy a living and support our nation in its worldwide struggle for survival.

We have the knowledge and the means to change our system of education so that it serves us far better at far less cost, and we must begin a thorough revolution in our practice of education.

Contents

Chapter 1

The Problems

The American Dream

The magnitude of immigration into the USA from all over the world is significant testimony to the fact that we live in a wonderful country. Millions of people from other nations have been willing to gamble everything, including their lives, in their efforts to secure "the American dream" for themselves and their families. Not only does America offer many freedoms, but it also offers such a high standard of living that most of the people of the world would be euphoric if they could live as well as our welfare population.

Each of us has a number of real or possible threats looming in the future for us and our families: accident, family members on drugs, poor health, marital distress, loss of income, war, crime, bad weather, taxes, new diseases, over-population, asteroids, adverse balance of trade. We want freedom, good health, food, shelter, peace and tranquillity, but these are not enough. We desperately long for excitement and entertainment. Some of us hope that the tools of prudence, foresight, science and technology can help reduce the threats, but these tools are not selling well in our current culture. They do not seem to fit among the things we want. While insisting that we are not materialistic, we spend a lot of time drooling over clothes, jewelry, houses, cars, and boats and wishing that we had airplanes. We eat too well and spend money to get the fat off, feel that we deserve to travel in style to distant places anytime we wish, and of course must possess the latest in electronic entertainment and pursue unique and expensive hobbies. Our wonderful lifestyles of affluence and self-gratification are possible only because we have a country able to compete internationally, both industrially and militarily.

How do we as a nation use what we have to get what we want? How do we both attain and preserve the American dream?

The Options

I believe that giving the best **education** possible to **all** of our citizens will be our best defense against the present and impending evils of our times.

We must acquire the material ingredients of the American dream either from within the country or from outside the country. Most of us have been persuaded that we fare better if we encourage free international trade without subsidies and tariffs.

We want to buy many things possessed by other nations and we want to pay for them by selling things available within our borders. What must we buy and what can we sell? We need to answer these questions for the purpose of long range planning.

The glue and fabric of our world is the available energy. In the beginning man supplied his own energy for hunting, traveling, tilling and fighting. Then he harnessed some of the larger animals such as the horse, the ox and the elephant. After James Watt invented the steam engine in 1763, it was applied to railroads and ships, and millions of people began to travel to distant places for opportunity and pleasure. The development of the internal combustion engine by 1875 made it possible for the earth to be covered with automobiles. There are several other kinds of engines, but all engines start with a source of heat, such as a nuclear reactor or the combustion of wood, coal, petroleum products, and natural gas. Presently most of our heat comes from petroleum products and natural gas because they are relatively clean, widely available at a low price, and convenient to use in electric power plants, railroads, ships, planes, automobiles, factories and homes. Further, petroleum is the basic raw material for the manufacture of rubber, plastic, textiles and the preponderance of our chemicals. The price of petroleum and the cost of living will be closely linked as long as petroleum is available.

Our biggest import is petroleum because we use so much and can get it elsewhere at a better price. When petroleum becomes too expensive because of depletion and politics, we must make a transition to alternate energy sources, such as coal and nuclear reactors that, from the present viewpoint, are not nearly as nice to use, transport, and store.

Energy is and will be the chief concern of the next century, and unless we can develop nuclear or solar sources, we will be importing more of it in the form of petroleum. What can we export to pay for it?

Our natural resources (food, petroleum, timber and coal) are becoming less available for export because of depletion and a growing population.

We would prefer to export manufactured products that are highly desirable elsewhere, easy for **us** to manufacture, and sparing of raw materials. Possible products might be computer software, drugs, insecticides, and entertainment. These require unusual skills and facilities and large investments, and I will refer to them as knowledge-intensive products. Poor prospects for export would include labor-intensive products typified by segments of the garment, tool, appliance and automotive industries. We cannot compete in the labor market unless we are willing to develop a population that barely survives. We never know when other countries will change the markets by tariffs, taxes, subsidies, currency control, or military threat. We do know that every nation on earth will be competing with us in manufacture and export because they, as we, have needs that can be satisfied only from without their borders.

Although fission power has been used safely by almost every industrial nation in the free world to reduce its dependence on diminishing fossil fuel, we have put off the day of reckoning by asserting, for reasons of ignorance or political histrionics, that we have **other** viable power options such as sun, wind, and water. We really should work to make our nation literate in energy technology before petroleum becomes very expensive and the big energy and raw material decisions must be made. When we had abundant natural resources like oil, fish, coal, steel, lumber, and an excess of the best farm land in the world, it was easy to sell the resources of the land to buy what we wanted in return while, at the same time, maintaining a very favorable balance of trade. The near depletion of many of our resources and the increasing expectations of rapidly growing populations here and elsewhere have begun to threaten what we call our American dream. People worldwide are having difficult times, but we refuse to accept the idea that populations cannot increase indefinitely without causing widespread human suffering [56], large scale environmental destruction, and unconscionable competition. Even now, many peoples live so close to the edge of survival that a small environmental perturbation will cause millions of people to starve. We cannot compete with these people on the cheap (but not necessarily unskilled) labor market unless we also are willing to be cheap labor living under the threat of starvation. Because we do not have everything we need within our borders and because we do not wish to fight for what we think we need, we have in essence agreed to a somewhat free trade policy and a global industrial competition with our standard of living at stake. Who knows how long the competition will remain peaceful?

Whether or not we agree to a free trade policy, we will still have the competition problem. Protectionism may provide temporary relief for the protected fraction of our population at the expense of the remainder, but will delay the essential task of our learning to compete. If we cannot compete effectively in a peaceful world or protect ourselves in a violent world, our money and jobs will go elsewhere and our lives will diminish rapidly in quality and expectancy. If we go the route of protectionism and do not buy the cheapest and best goods available, prices will increase and those of us in unprotected sectors will have a reduced standard of living. Inflation will then be a major national problem.

You may have noticed that our options for getting what we need from other nations are becoming somewhat undependable as we reach hopefully for something better. As I shall point out, we are fast removing our best option, that of using American know-how, inventiveness and ingenuity to produce knowledge-intensive goods.

"Working Smart"

Most people will agree that, if we must compete and cannot do it with abundant labor and further stripping of our land and water resources to sell abroad, we must "work smart".

"Working smart" requires a willing, inventive and educated work force immersed in a supportive milieu of knowledge, skills, enablements, recognitions and rewards. In the pages ahead I will argue that our current education system cannot help us to "work smart" because its philosophy is wrong and its administration is incompetent or unwilling for the work required. We are told (by our educational administrators of course) that our system is doing a great job, and could do more if more money were available, when in fact, the quality of learning has been steadily deteriorating for over sixty years. We may believe or pretend that everything can be cured by money, but our bankrupt philosophy of "education", despite occasional glimmerings of sanity, is a problem far beyond the cure of money.

If you go to almost any factory for a tour, you see workers rolling, bending, machining, heating, pumping, mixing, riveting, measuring, drilling, grinding, welding, soldering, moving or assembling. In physics terms the workers are consuming energy, applying force, using heat, making measurements and testing their work. Safety in such an environment requires a basic knowledge of the processes, but this important fact is ignored by the public high schools.

The single intellectual discipline that connects all these things and makes them understandable is applied physics, which combines mathematics and our knowledge of nature.

Engineering is usually physics, chemistry, biology and math applied in greater detail to a narrower area of useful knowledge. Why are the sciences most closely associated with industry missing from our schools when they are the most relevant knowledge for the system of production and distribution in which most of us spend our lives and from which we benefit the most? Is it degrading to learn useful things?

"Working Dumb"

The training that might help us to "work smart" has been effectively stripped from our high schools, colleges and universities during the past sixty years by curriculum revisions, irresponsible hiring policies, administrative practices with no vision - all reinforced by a foolish "education" philosophy. Our patent and copyright laws favor entertainers and bankers over engineers and inventors. Our tax laws and scholarship programs favor athletes over researchers. I have always thought it strange that our historians and sociologists rarely make the point that any civilization depends on a stable and broadly beneficial government and on knowledge useful for growing food, avoiding epidemics, defending against aggressors, and providing transportation and communication. The important culture of a society is that which enables it to meet these basic needs; it will cease to exist if they are not met, despite its richness in decorative culture and the art of entertainment.

A stable government permits, encourages and rewards the exercise of foresight and planning.

Almost everything important to our physical and emotional well being is based on hard knowledge and the social arrangements to make it effective. How have we managed over the years to convince the people of our country to avoid and despise the knowledge that enables the attainment of our dreams and secures our lives?

Our Irrational and Inconsistent Behavior

Let us admit in the beginning that we spend almost all of our time as irrational creatures with short-term goals and that we will believe almost anything that flatters us and resist anything that appears to threaten us.

We push to build houses with big yards and lament the destruction of meadowlands and forests. We travel incessantly and damn the automobiles for pollution. We build roads and hate the traffic. We eat well and condemn the efficiency of agriculture with its machinery, herbicides and pesticides. We hunger and thirst for every luxury and convenience imaginable and blame the technologists for raping the environment to give them to us. We do not like the nit-picking exactitudes of machines and computers; yet our civilization would collapse without them. The demands of each human being for a better life, in terms of food, shelter, security, comfort, transportation, entertainment and medicine, are met inescapably by the technological exploitation of our environment. You do not hear this often in our educational or political systems. Where do they think all the goodies come from? Our current "education" system seems to produce people who want more for less effort on their part, who do not know the source of our material wealth, and who complain about the side effects of efforts to meet their demands for more affluence. In short, we want everything fun and free with no restraints and we resent any mention of the costs, economic or social. We want lives of excess without consequence or constraint and we often criticize rather than reward those who have made the good life possible.

Most of us want more than we need and we expect to pay for it with easy, high paying jobs that require little ability and training and which are awarded with no competition because we are deserving. Higher profits, wages and taxes, along with greater government restriction and control, will make us less competitive in markets overseas when we try to sell what we have made in our factories. Because we **must** sell, we may subsidize our exporting manufacturers through higher taxes on everyone else, another way of reducing the standard of living because of our inability to compete. **Every waste or inefficiency in our society reduces our ability to compete.**

We would be frightfully unhappy if we had to be rational most of the time. On the other hand, we are approaching the point where we, despite our limitations, must recognize and deal with some of our growing problems, or be losers in a competition in which losers lose all. Thomas Paine in his "Age of Reason" thought that most people would surely seek knowledge as soon as they were able, but we surely know by now that most of us would rather be entertained. If knowledge were easy to acquire, there would not be so many of us without it.

The Need for Hard Knowledge

We must maximize our hard knowledge base to compete industrially and make good social decisions. We must do this in the sense of a mathematical optimization, for which we control the principal determining variables at our disposal to maximize a desirable distributed property, in this case knowledge which will help us to compete industrially and preserve our standard of living. To achieve this, we must agree that it is our most important action for the future, even ahead of professional sports and beauty contests. We should realize that any condition or restriction that we put on an optimization process reduces its efficiency and increases the cost of the optimum. In terms of a crude analogy, if you tie one arm behind your back, you reduce your ability to work and fight. You do not run as fast or as far if you must carry a burden.

After recognizing the need to maximize our hard knowledge base, we must force a revolution in our education system. The incumbency of an incompetent, uncooperative, vocal and politically active education infrastructure at all levels of local, state, and federal government will present formidable obstacles that we **must** overcome. We need knowledge to deal with the problems listed above. We increase our store of knowledge by giving education to **all** those who are willing and able to receive it and by rewarding and recognizing those who use their knowledge for the common good and general welfare.

We add to our store of knowledge by education, research, development and manufacture. Education enlarges our knowledge base by giving the current knowledge to a larger population. Research **adds** new basic knowledge to what we know already. Development **extends** basic knowledge to the point that it can be a basis for manufacturing operations. Applied scientists and engineers do development. Manufacture of useful goods and services is initiated, maintained and improved by engineers and technicians.

As an example of the use of technology, a medical doctor diagnoses patients with x-rays, lasers, NMR, ultrasonics, computers, optics, and chemical and electrical measurements, all from the research of physicists and chemists, and treats his patients with antibiotics and other medicines from the research of chemists and biologists. Engineering transforms research into reality to provide the medics with diagnostic tools and medicines. A medic develops skill in the use of the technology of our time and does a lot of good, which we can all witness and appreciate.

We pay the people who apply our knowledge and who sue in the courts over its distribution much better than we pay those who supply it or develop it for our use. We make professional athletes and entertainers millionaires and offer comparatively little reward for those who acquire the knowledge necessary to preserve and improve our lives. We need knowledge and the people who can use it if we are to "work smart". What do we do if we believe that we must "work smart" and that hard knowledge will help us to "work smart"? The answer is simple: **we enable each person to grow in knowledge according to his/her talent, ambition, and ability, and we adjust our legal and social structure to recognize and reward those who serve us well.** It is evident that we have not gone to much trouble to cultivate, recognize and reward the kind of people who give us cures for polio or diphtheria or invent the transistors and lasers. We reward in the short-term and ignore in the long-term in a "What have you done for me today?" outlook. There are few lobbyists or protective organizations for technicians, engineers and scientists because they are not important in terms of block votes or political action funds and are a minority in the university faculty. If we are serious in inducing bright people to train for these very difficult and **necessary** jobs, we need to think of some ways to make technical and scientific careers more attractive and available to the public through scholarships and grants and more recognized and protected by some new patent and copyright laws.

Education: Our Greatest Problem

The American education system is infected with numerous social and philosophical diseases which all add up to make our education system our greatest liability if we truly believe that we must work smart. The major problem is its extreme inefficiency. It is dominated with too much administration of the wrong kind and the wrong philosophy. It forces students with widely disparate abilities to be at the same level of learning, so that the slow students are not learning because the subject matter is too difficult and the more able students are turned off by an endless repetition of material which they already know and perceive to be useless. The "fixes" to this problem are ineffective and serve only to increase the bureaucracy. Our education system shortchanges useful and technical knowledge by either restricting it in the curriculum or providing teachers from the college of "education" who are unable and indisposed to teach these subjects in a useful way. We need our high-achievers to build our knowledge base, but our current system discourages their recognition with secrecy, a vicious leveling philosophy, and emphasis on sports and other entertainment.

It devotes comparatively few resources to the academically able. Our education system does not use for academics the elements of visibility, competition, recognition and reward that have been so effective in athletics. It has no national, state, or even local standards as do sports, commerce, industry, and many professions, and so it has no objective means to determine how well education is being applied. It has no means to identify problem areas and opportunities. Our educators have not accepted the fact that technology can and ought to change the organization of schools and the practice of teaching. A principal purpose of education is to impart knowledge and skills to a potential work force, but its personnel and managers come largely from the bottom of the ability pile, which hates competition, ability and achievement, all necessary in developing an effective work force. Politicization outruns utility. What other disadvantages do we need to reach and maintain a firm place at the bottom of the industrialized world when it comes to teaching what is important to the functioning of our society?

All the above criticisms of our education system are based on facts, which I will make available to you. Our educational problems are painfully and blatantly evident in the resolutions of the National Education Association printed in NEA Today, Washington, D.C. [74] [75].

The severity of our problems is evident daily as we see the migration to other countries of our labor-intensive manufacturing, with adverse effects such as strikes, higher wages, inflation, unemployment, protectionism, lawlessness.

As the population increases, there will be more repositories of infection and therefore more opportunities for transportation, evolution and mutation of deadly strains of virus, bacteria, and fungi, as well as new bad insects and parasites for the farmer. Medical and biological research, along with its supporting sciences of physics chemistry and engineering, should be a top priority.

Special interest groups manipulate politicians to change our legal structure so that they can avoid taxes and find new ways to accumulate and preserve wealth. We should be using our talent to find ways to **create** more wealth rather than to **dispute** over it in our legislatures and courts. Our social environment is supercharged with politics and legalities rather than with emphasis on knowledge and ability. We like copyrights more than patents. The copyright laws protect software authors for twenty-eight years (renewable for another twenty-eight).

The patent laws force all of our hardware inventors to start over again after seventeen years with nothing renewed. The great men who gave us computers have benefited far less than the great men who have learned to use them for commerce and entertainment. Bill Gates, because of his **copyrights** for computer software, is far richer than the Nobel Prize winners, Bell, Bardeen, and Schockley, because of their **patents** for the invention of transistors, which made our computers possible and affordable. We need to put copyrights and inventions on a more equal footing, at least in the areas of science and technology. We need national awards at least equivalent to Nobel prizes for applied science which benefits our industrial capability, helps our balance of trade and provides a large and evident benefit to our population.

Summary

We are faced with several urgent problems that are inseparably related. We have a rapidly growing population with rapidly growing expectations. We do not have everything we need within our borders, and must sell or trade abroad to buy it. Our greatest trade deficit will lie with the acquisition of enough oil and natural gas, at "reasonable" prices, to continue our wasteful and excessive life style. We have diminishing natural resources to sell and we are forced to turn to the sale of manufactured goods. Our labor costs and social burdens are too great for us to sell labor-intensive goods, so that our only remaining option is to sell knowledge-intensive goods produced by an industry with a "**work-smart**" capability. Because of public apathy and ignorance, our system of "education" has deteriorated, in terms of philosophy and competence, so that it has little managerial and technical capability among its personnel. Our "educators" push a strong leveling social agenda, which stifles and discriminates against the more competent students, the people most likely to struggle for more knowledge and its application in our efforts to "work smart" and meet emerging health challenges. Our patent and copyright laws favor entertainment over invention and need revision to encourage continuing contributors to our "work smart" capability. Finally, our society is more concerned with the distribution of wealth through taxation and court actions than with the creation of wealth through greater knowledge and ability. Apparently it is better to be a predator than to be an innovator. We should start honoring and rewarding the inventors who make great contributions to our general welfare.

Chapter 2

Why We Need Standards

I always ask my new college physics students "What are standards and what are they good for?" The fact that I rarely receive an intelligent answer to the question indicates that few people recognize or appreciate the importance of standards and that our system of education has missed the teaching of a most useful and necessary ingredient for the creation, efficiency, and survival of any civilization, every successful one of which has recognized the need to invent and enforce standards. Why do our citizens not know this fundamental and important fact after graduating from high school and college? In what course of study should they have learned it? Why did educated and responsible teachers not teach something that impacts every facet of our lives?

Definition of a Standard

According to Webster [71], "A standard is something which is established by authority, custom, or general consent as a model or example, or as a rule for the measure of quantity, weight, extent, value or quality. It is a means of determining what a thing should be or a means of testing a particular dimension, quality or aspect." A standard may be a unit of measure, such as a yardstick or measuring cup, or it may be a statement of knowledge and skills needed by every eighth grader. Its use may be required by government or be voluntary in a profession. The first requirement for any human civilization is that of a standard set of sounds and symbols combined to form what we call a language. Society must develop next a standard set of rules (ethics or laws) to define the duties, relationships and expectations of each of its members. This is perhaps the second greatest invention of mankind [67, p 230]. To convey precise information in business or commerce and reduce fraud [70], standard units of measurement were invented.
The efficiency of a civilization is tied directly to the definition and enforcement of its standards. Standards are concerned with observable attributes, not subjective imaginations. The most important feature of a standard is that it provides the means to make an objective measurement or comparison free of bias, prejudice and politics. Standards provide the basis for an open and equitable government.

The Importance of Standards to Education

Runners can be evaluated by measuring in standard units the time required by each to run a specified distance. The measured and recorded performances of many runners establish a standard, an objective means by which the performance of all runners can be evaluated, compared, and improved. If there were no standards or comparisons to evaluate runner performance, the "best" runner might be selected on the basis of appearance, kinship, height, sex, wealth, social status, religion or race. Once the selection process for runners ignores performance standards, it becomes politicized, inequitable, inefficient, disreputable and useless. Standards are rarely used in beauty contests.

A good standard is useful, universally available, known and understood, inexpensive, and free of copyrights and patents For example, the official yardstick was once defined by two marks on a metal rod in the National Bureau of Standards. Approved copies were made so that we all could have rulers and tape measures for our use. Businesses selling materials according to length were required by law to base their measurements on the official standard. Any careful and objective measurement or evaluation is based on one or more standards.

Maintenance and improvement of the education process is no different in principle than that for any other process. We must define what we want to achieve and devise ways and means to achieve it. As the process proceeds, we need to make measurements and acquire data to see how well it is working. We need to analyze the data with an eye to process improvement. Analysis does not mean much unless the data is relevant and reliable and the quantity of it is sufficient.

As an example, the teaching of algebra should begin with a group of professionals (such as physicists, engineers and applied mathematicians) who know and use algebra in their work. The group should develop a syllabus that lists the skills important to users of algebra and prepare a database of test questions to include all the skills included in the syllabus. The syllabus and database, now a standard for users of algebra, should be given to algebra teachers who, after a reasonable amount of study from the syllabus, can pass a test of questions chosen at random from the database. Students completing studies under these teachers should be tested to determine how well they have learned to apply algebra in problem-solving exercises. One expert man-year should be sufficient to make a beginning useful to every algebra teacher and student in the state or nation. The algebra standard will of course be improved as teachers interact with students and users and data is accumulated. Once in document form, it can be sent by E-mail to every interested person in the world.

Despite the lessons from history, commerce, science, industry and athletics, objective standards in education are almost completely lacking. They are adamantly resisted by most teachers, administrators, politicians and test sellers. The arguments by "educators" against objective standards are so universal, unlearned and specious that they seem more like dogmatic eclecticism than rational thinking. It is difficult to understand why a group of professionals would resist standards that would remove many of their onerous burdens, permit them to do more for all their students, and improve the competence of the average citizen at a time when it is important to our national survival. Why is the easy and helpful idea of an algebra standard so distasteful to our "education" establishment? It is impossible to measure or improve anything without first defining what it is and establishing the standards by which it can be measured and compared.

Common, Illogical Arguments Against Standards

The following statements against standards may seem reasonable at first glance, perhaps because we have heard them so much, but they each have at least one false assumption or serious flaw and they are all erroneous and damaging to school operation and efficacy. "Standards may be arbitrary, expensive, inaccurate, useless, and unfair. They may lead to abuses like cheating, teaching to the test, and teacher persecution. They will suppress cultural diversity and creativity and promote discrimination. They will be costly to implement and wasteful of time and money. They could reduce self esteem and may deny someone really great the chance to be all that he or she can be." We hear these foolish and sanctimonious arguments so often that we might begin to believe some of them and forget how much damage they do. They stem from ignorance and fear and are properly viewed as protectionism at any cost. Standards will be the best possible teacher protection. The discussion below lists the false premises of most of these arguments and why we are surrounded with them.

Standards: Mutual Agreements about Measurements

All standards are somewhat arbitrary, but this does not detract in the least from their value. Many useful standards have frequently improved in accuracy, increased in value and area of application, and decreased in cost. Every important civilization has recognized the necessity for enforced standards in language, behavior and commerce.

The word "cat" was chosen **arbitrarily** by someone to designate the small furry animal that frequents many households, despite the fact that "A rose by any other name would smell as sweet".

Because we all know what "cat" means, it is a standard word and is listed in all the English dictionaries, the standards for our language. We can all use this standard word when we want to communicate something about this animal. Encouraging each person or ethnic group to use a different word than "cat" makes it more difficult for people to talk with each other about cats and easier to have misunderstandings about them.

The standard meter, now used worldwide as a standard for measuring length, was arbitrarily chosen to be one ten millionth of the distance from the north pole to the equator at a time when the distance was not as well known as it is today. The meter would be just as valuable for science, engineering and commerce if it had been chosen to be some other length, e. g., the length of a yardstick or a foot ruler. The standard meter has been redefined and improved many times. A liter was arbitrarily defined as one thousandths of a cubic meter and the water it can contain is defined to have a mass of one kilogram. The national origin and spelling of the kilogram make little difference to its value and convenience. They do not change the amount of corn in a truck or its intrinsic value to a farmer. All the decisions about units of measure were somewhat arbitrary and could have been made differently, but this statement is totally irrelevant to the purpose and usefulness of these standards. Any standard is totally arbitrary until we agree on it and define the way in which it is to be used. Further, it must be publicized, reasonable in cost and available for general use. Therefore it should not be patented or copyrighted, as are some of the "standard" tests. The standard second (a unit of time) has changed many times as better ways to measure time have been invented. Likewise, we can formulate a standard for any body of knowledge and change it as more knowledge becomes available. Standard courses can provide the basis for a standard curriculum.

Those who doubt their ability, fear competition or hide malfeasance will hate measurements and the standards that make them possible. Standards of measure have always been resisted by those who did not wish to have their activities or products understood or who did not measure up. Those who hate visibility and competition will fanatically oppose standards, necessary for the objective measure of performance, which in turn is the basis for a fair competition. The blind resistance to standards by "educators" is overwhelming evidence that the teaching profession has a deep and serious problem.

Mathematics is the only exact science. Measurements in the real world always contain errors in practice or assumption. The statement that "measurements may be subject to error" could be said about any physical activity, such as measuring the dimensions of a wooden plank.

It is not a valid argument against doing something useful, like pursuing objectivity and impartiality in the measure of scholarship or teaching. Regardless of all the plurality arguments against standards, skill on the football field is established quite objectively by those who play the game, using such concepts (standards) as touchdowns, yards gained, and tackles. Pluralism is no problem in sports because performance is of paramount importance and all the action seems to be visible and understandable. Our schools need to be the same way.

Sometimes standards may not measure what they are supposed to measure or be a poor measure; yet they can still be useful if we can deal with them honestly. For example, I sold green beans from door to door in Danville Kentucky when I was a teenager. The buyer may have wanted flavor, vitamin C, iron or pleasure when she bought the beans. To help her evaluate her prospects, she could look at the beans, break a few, smell of them and even taste them. After the bargaining, I produced a set of cheap spring scales (a poor but useful standard!) and weighed out the desired amount. I had no idea how to measure what was important to the buyer, but we both assumed that it was related rather directly to the number of pounds of beans. It is often true that a measurement using a standard is useful even when it does not measure what we want it to measure. For example, if a liter of water weighs a kilogram, we can determine the number of kilograms of water in a bucket by using a measuring cup with a capacity of one liter.

In sugar cane country, the buyer makes an estimate of the amount of sugar in a load by pulling stalks of cane at random from several places on the load, weighing them, and extracting the juice. Then with a polarimeter he determines the fraction of sugar in the juice and weighs it. After a simple calculation and a weighing of the truck loaded and empty, he and the seller have a good estimate of what the load is worth. You could argue rightly that this procedure is flawed (and what is not?), but it is quick and considerably better than a human guess, weighing alone, a strong bias on the part of the buyer, or processing each load separately for a better determination of its sugar content. We could be painstakingly accurate at the cost of more bookkeeping, load segregation in the factory and long periods of waiting for pay. Both buyers and sellers like the current arrangement. It may be somewhat erratic, but it is quick, economical and convenient.

It is generally assumed that more accurate and universal standards help protect the innocent and the ignorant from the clutches of the dishonest and the greedy, but we must guard against the idealists whose penchant for unnecessary accuracy costs more than the increased accuracy is worth or who insist that students must not be evaluated unless their environments and backgrounds are equal and the measuring instruments are perfect and free of error.

Standards can be established for any human activity, and they should be established for the extremely important activity of education.

Anything Can Be Abused

Some argue that measurement of educational achievement can lead to abuse, and they are absolutely right in a useless sort of way. Unethical people can use any useful aspect of our civilization for abuse of others. We could banish automobiles, ice cream, marriages and baseballs with such an argument. In one ridiculous example [37] associated with people who make a business of fearing abuse, there is a worry that mathematics can be a "social problem [because] it tends to serve ruling class interests". It is not abuse if measures of educational effectiveness identify teachers who cannot or will not teach what they are paid to teach and administrators who have been lying about how well the schools are doing. It is not abuse to award high school diplomas that are meaningful to parents, students and potential employers. It is not abuse if standard tests eliminate the need for teachers, underpaid already, to pay for and attend courses in areas in which they are already skilled, or worse, to pay for courses from which there is no skill or knowledge available. Whatever worries standards might cause, any serious business spending large sums of money to effect change should have some objective measure of what it is doing and how well it is doing. **Measurement and evaluation are not meaningful without standards to provide objectivity.** Perceptual and subjective evaluations, even by the best of us, can quickly turn personal, erratic, arbitrary, political and abusive. Our best protection from such abuse is the availability and application of standards or a good union.

Some teacher or principal coming under criticism for malfeasance may search for ways to hide the truth about his or her performance. Wrongdoing by political people as a result of standards is insignificant when compared with the unethical and arbitrary manipulations that could and do occur because of the lack of performance standards. Just as weights, measures and truth in lending laws hinder the ambitions of unethical salespeople, visible and known academic standards would complicate the efforts of unethical students, teachers, administrators and parents.

I ran across a case involving a group of women measuring properties of cotton fiber in a government laboratory. When a new breed of cotton was introduced, a lot of the measurements changed. The supervisor harassed the workers for getting "bad" answers and they responded by giving her answers that would please her.

I came on this by accident and told the man running the experiment that his new cotton hybrid was about to go down the drain because of personnel problems. The moral of the story is that we should be extremely cautious in persecuting teachers because of test results. Class performance levels are sensitive to family patterns, statistical fluctuations, economic and social differentiation of neighborhoods, textbooks, bussing, diet, pre-selection of students, as well as instructional skill and dedication on the part of the teacher. If we have several classes of twenty each in the same subject matter proceeding at the same time, there can be large fluctuations in average class performance, especially if there is a little "deck stacking" by parents and school staff.

Almost anyone would agree that we could devise a good standard reading test such that, if a student passes it, he can be declared reliably to be able to read. Some might worry that this will "force teachers to teach to the test" [10]. Wonderful! Reading is a skill and there is nothing wrong in teaching children so that they can pass a proper reading test [41], whether the means be phonetics, or pattern recognition, or preferably both. This fear that teachers will "teach to the test" is totally unjustified in the test environment possible today and I view it as another foolish or dishonest gambit to avoid standards and accountability. It has been argued that standards cannot be fairly applied to a pluralistic society. This is pure garbage. Standards are needed because people **are** different. Physics, mathematics and other sciences, along with sports, music and art, have never had a problem with measuring skill level in the international community despite occasional political or social interference. A touchdown is a standard of football, and it seems to be immune to national origin or culture in understanding or execution. Welding to meet mechanical standards is likewise independent of the religion of the person who moves the arc.

Music is a multicultural area in which there is much that is standard. Everyone in the band or orchestra tunes up together before the concert, and the tempered scale is used on all the instruments. The improvisations may be wild and imaginative in a jam session, but you can be sure that the players are all in tune and using the same musical scale and the same beat to make a pleasing combination of sounds. On the other hand, the variety and structure of music is truly amazing. The standards of music have not repressed artistic temperament or pluralistic tastes. I have never heard a musician complain that it was unfair to his creativity and innovation to be forced by his colleagues into the common mold of scale, harmony and rhythm. The concern with pluralism is mostly an attempt by political leaders to keep the support of their constituents. It is used by "educators" to confuse the issues of standards and accountability.

All standards are discriminatory in the sense that they permit objective evaluations of people. For example, standard driving and drug tests can help keep our children safe from erratic drivers, whatever their pluralistic attributes.

Economic Savings by Academic Standardization

The costly result of not establishing educational standards will be an expensive, abusive and relatively useless education system full of unfair and arbitrary decisions and political manipulations. By contrast, the expense of providing educational standards will be minimal if we can forestall its domination by a hostile collection of "educators" who hate standards but are eager to build more empire. Everyone in the nation can use a standardized course without paying for tests, copyrights and patents. The standards will contain test banks that will make it almost impossible to cheat and teach to the tests. When I read about tests wasting precious school time and costing money [10], I remember having so many interruptions when I was teaching algebra that I wondered if I could do the job properly in the allotted time. None of the interferences were as important as algebra tests, which are instructive and motivational to the students as well as necessary for quality control and planning by the teacher.

In summary, standardization will be very useful and cost very little if we can keep it away from its opponents, who will design ingenious and pious ways to promote its death by making it controversial, expensive and useless. The cost of standardization is minimal compared to the significant savings, improvements, and benefits it could offer to the education system. Those worried about how to establish standards for necessary skills in an economic way would be encouraged by amateur radio. There is for each operating level a long list (pool) of multiple-choice questions available to all in booklet form. It is too large to be memorized but every question can be answered easily when the subject is studied and understood. The student (HAM) can easily determine for himself when he is ready to take each exam. When he goes to be tested, the examiners select from the pool 20 questions for the examination. Passing is usually set somewhat arbitrarily at 17 correct. What is so bad about this way of doing business?

Reality versus Make-Believe

Despite the risk of damaging self-esteem, which I will discuss later, one of the biggest advantages of standards is that they will expose our pretenses and wishful thinking to the glaring light of reality.

It is sobering and chilling to brag about the wonderful job Bourbon County is doing in math education and then to find that its students will be given a statewide standard test. Standards will do much to improve honesty and reduce the looting of our educational funds.

I remember competing in a countywide grade school arithmetic test and having the principal ask me later with some displeasure how I could possibly miss certain easy problems. He had wanted his school to win the competition. I told him truthfully that I had never seen problems like those before. The principal was visibly shocked to learn that the teacher had not progressed far enough in the book to encounter those types of problems. I do not know, after the confrontation between teacher and principal, whether the principal supported further math competitions, whether the teacher began to hate standard tests with a passion, or whether I had an enemy among the faculty. Reality is not always pleasant, but surely most of us like it better and can benefit more from it than from the continual make-believe to which we are constantly exposed.

When I was a student at Berea College in Kentucky, I learned that a lot of I.Q. tests had been given around the State and that one county had a significantly low average. This county had very poor farm land and steep rugged little hills with no known mineral resources, little timber and almost no social mobility. Is it surprising that resourceful people kept leaving until the brain drain was easily detected by almost any instrument, even an imperfect IQ test? This has happened to a lot of places in our country and is still happening at a rapid pace, but current "correctness" avoids facing the fact of economic differentiation of the population and its implications for the schools and teachers. Nothing is ever improved by denying the truth or turning away from pertinent facts. It is guaranteed that standards will embarrass some people, especially those afraid or ashamed to face conditions as they are, but when people know where they stand, they have a good beginning for starting to do better.

Occasionally I read that tests are an assault on the well being and self-esteem of the student and produce harmful stress. I wonder if taking a test is any more stressful than losing at Nintendo, having your favorite girl friend like someone else better, losing a baseball game, finding that your hair is falling out, or failing to get promoted from manager to vice-president. A test could be viewed as an opportunity, a competition or a threat, depending on the ability of the taker and how the test is used. The giver of the test must prepare and grade it and may not be happy with the results. This may contribute a lot to the disrepute of tests. Computers and standardization ought to solve most of this problem.

As Hoffer [18] wisely points out, testing and competition are natural ingredients of a free society and are the very life of sports. Life, liberty and the pursuit of happiness guarantee competition.

Standards may bring to focus a lot of sorrow in teaching. According to my wife, who has taught reading to first graders for twenty-three years, it is probable that about 15% of our population, mostly male, will never learn to read well. Some will worry about the loss of self-esteem by people who cannot learn to read if we get around to measuring and setting standards for it. Honest application of reading standards will call attention to deficiencies early in learning careers, thereby permitting immediate remediation of all available kinds.

The self-esteem of a student (or more likely the self-esteem of his parents, teachers and administrators) might suffer from the discovery of his reading disability, but early and effective remediation could remove a great handicap to the learning of other things later. No experienced and honest person will promise that everyone can or will learn to read [4, p XIX].

Our present method of dealing with the embarrassment of differences in aptitudes and skills seems to be to remove objective tests of skill (in everything but athletics) from the public schools. Every child in first grade knows who can read and who cannot, and it is patently foolish to try to hide it. "Know thyself" is an adage of great wisdom for all of us.

Doctrine of the Possible

Some argue that standards may prevent some wonderful person from being the best that he or she could be. Almost all standards can be viewed by the losers as unkind and limiting, and maybe this is one reason why civilizations were difficult to establish and maintain. We feel sorry for the schoolboy who wants to go to space on the next shuttle flight, and we are sympathetic with the seven-foot woman who wants to be a fighter pilot but cannot fit into the cockpit. We require that the drivers of our school buses be able to see, hear, read and react quickly to danger, an obvious discrimination against many of us.

We might fail to hire a great principal because of our stuffy requirement that he be able to read, write and do a little arithmetic. Potentially great doctors may have been turned away by the demanding requirements of medical school. Such arguments against standards are foolish, despite their piety and the sorrow we may feel when we meet a person who missed election by one vote or lost the ball game by one point or barely failed a driving test. However sad it is in widely isolated situations, we should keep our standards for elections, ball games and licenses to drive

Benefits from Standards

Despite the unfounded worries caused by standards, they will cause a lot of good things to happen. Teachers keep trying new ways to promote reading competence, and if some succeed better than others, data from reading tests might let us know who is teaching well and encourage us to examine and adopt their more successful methods. If we never measure anything, we will never really know what works and what does not, and we will fall prey, in our desperation to improve our schools, to any new fad or specious argument that comes along. You will not get much useful information by asking the reading teacher, while the principal stands at your back, how well her children are learning to read.

A friend told me about finding that one of his capable high school students in a welding class could not read. He convinced the student that he ought to go back and learn to read, but the school officials did not want a high school student back in elementary school. After all, he had been passed by the system, and acknowledging his ability to elude about ten teachers without being able to read was not flattering to the school. The young man won his case by mentioning a possible court action. He learned a lot faster on the second time around. A standard reading test would have identified his problem. Another teacher, using another method or perhaps some help from informed parents, might have solved his problem earlier and made it possible for him to have learned far more.

The lawyers, certified public accountants, doctors, professional engineers and bus drivers have their standard examinations. These groups and many others believe that a skill important to the public can be tested and that people who cannot meet the minimum standards should be excluded from public practice. Many will fail the tests, but there are several benefits. We have better practitioners from those who pass. Those who fail usually know how much more they need to learn. Those who fail miserably after much work might be encouraged to do something at which they can be more successful. Those who teach will know how well they are doing their work. When schools cannot bring anyone to a capability of passing, they will go out of business or improve. By avoiding the testing of teachers and supervisors, we seem to have made the patently ridiculous assumption that credentials should be determined by matriculation rather than by testing. We would not let anyone drive a school bus by virtue of his or her sitting in a class or even watching others drive. I want my bus drivers to be tested on their driving ability, and I am not willing to accept a grade sheet or a certificate of attendance instead of a driving test. The same holds for medical doctors.

Why not test teachers for basic skills before turning them loose on the children? Having been in a course for three months does not guarantee knowledge of anything if there are no monitored performance tests. Having watched good teaching or having taught under the supervision of good teachers likewise guarantees nothing. The local tests may be trivial, the professor may not teach the subject advertised for reasons of ignorance or irresponsibility, and the student teacher may not be capable or interested in learning. A school, because of money, may be more inclined to retention than to graduating competent teachers. Teacher evaluation should depend ultimately on student achievement measured by standard tests. Beneficial research in education should be based on objective measurements of large populations rather than subjective opinions or perceptions by a small select group of political activists.

Encouraging and Rewarding Academic Excellence

I have always been amazed by the dichotomy of scholastics and athletics in school systems. It is acceptable to compare the performances of athletes, keep statistics on their achievements, and in effect, by keeping score, set performance standards in every area, like the four-minute mile. Competition and openness are said to encourage athletes to do better. We do not worry about the self-esteem of the poor guy who fails to make the team or misses the kick, and there is an elitism (a dirty word to many "educators") that permits only a small fraction of the student body to participate in competitive sports. The star athlete, chosen by performance statistics known and visible to all, is admired and held up as an example and a leader for the rest of the student body, whether or not he has learned anything. On the other hand, achievement and innovation in academics, which I think should be more important to most of us than athletics, is supposed wrongly in most circles to suffer under evaluation, surveillance, reward, competition, and restricted choice [66 p A1]. These are the important ingredients in the very environment that makes great athletes. The learning and application of algebra to problem solving is a skill of great importance to many trades and professions. Usually algebra is taught poorly and grades in algebra are kept secret. There is no real competition possible because there are no standards for course content and no open competition, and hence no recognition for the able, as in athletics. We worry about the self-image of the failures. The result of all this is that our able scholars are seldom recognized or trained for leadership and may never win any campus elections.

In the one room schools, at least, the better students were able to learn faster, help drill the slower ones, and develop a natural and recognized leadership ability based on their obvious competence.

Curriculum Content

Curriculum standards have all but disappeared. My next-door neighbor, born in 1900, had four years of mathematics and science in a small high school. Today, that same school is many times larger but cannot get around to offering a sound course in physics taught by a qualified professional (one who is qualified to the same degree as, for example, the usual English teacher). Is it not strange that this 93-year-old neighbor, educated in a mostly agrarian society, was more ready for advanced technology than the students being graduated today from that same school? The science (physics) that explains quantitatively the working of machinery, electricity, energy use, safety measures, music, and astronomy has virtually disappeared from the curriculum. Physics is the only course in high school that can serve as a vehicle for the exercise of useful algebra, geometry and trigonometry.

English as a Standard Language

English is necessary to join the mainstream of this country, and the best gift we can give our ethnic groups is to teach them the English language at every opportunity. Standard English tests, like dictionaries, are a way of insuring a standard language.

My wife came home upset one day because the school where she taught was considering the fad that first graders might learn to get into writing more quickly if their experience stories were written in their own vernacular. She was determined that she was going to teach good English from the beginning so that greater reinforcing of bad language habits would not make them more difficult to break later. The minority professionals with whom I discussed this vernacular proposal, which was not implemented because of minority opposition to it, all showed a strong preference for good English from the beginning. Why could the education "professionals" not have anticipated the reaction to their foolish proposal? How can civilized people talk to one another if there is no common (standard) language? We might avoid being a Yugoslavia down the road if our people utilize a common language for communication with each other [35]. The people in India would not have been able to communicate with each other if the British had not introduced a common language. They could not have survived as well during famine and epidemics if they had not been able to communicate the knowledge of agriculture and hygiene in English.

I read a lot about the desirability of establishing special schools for immigrants and teaching all courses in their native tongues. There would be a much smaller "educational" empire and a lot more efficiency if we taught English first so that our new citizens could learn everything else in the schools that we have already. Many retired citizens are teaching English to minorities on a volunteer basis. We could also avoid the tremendous expense, waste and inequity associated with duplicating classes and curricula in multiple languages. We cannot (and should not) afford a special school for each minority, or offer this questionable advantage, if that is what it is, to large minorities and not to small ones. While the "educators" are flirting with ethnicity as an excuse to avoid standards and to demonstrate their broad-mindedness and "concern" for the students, practically every unschooled immigrant knows that his children will fare better if they learn English, which is the language of science and commerce throughout the world. At every international meeting, those who wish to be understood by the most people speak in English.

Enemies of Standards

If standards are so great, who can be against them? Those who think they would lose something, of course. Those paid to deliver the goods might feel the need to be a little more responsible if the goods are to be measured, weighed or counted. Those who learn with difficulty or who are not doing their jobs do not like tests or standards. Those whose fields are unsubstantive and highly subjective, or who spend their time in indoctrination, story telling and politicization, have nothing to test and will fight the idea of standard syllabi and tests with ferocity and seas of pious nonsense. If visibility is kept low in an aura of arcane double-speak that admits no standards, it is easier to hide malfeasance, push a leveling social agenda, keep parents at a convenient distance and avoid some unpleasant consequences for ineptitude or irresponsibility. Those who want every aspect of life subject to political patronage will not like standards. I have talked to several school superintendents about standards, and not one of them was in favor. Remember that standard tests do not pass or fail people. They measure **objectively** what people can do. The thresholds for passing are chosen by political, managerial or social considerations. Passing and failing are useful concepts in some narrow situations but they should be avoided in schools. Test scores in specific skill areas are more useful to a prospective employer. It would be better for everyone to consider specific student performance, not thresholds, in multidisciplinary areas.

Many leaders of ethnic groups would lose their power if people respected each other as they should, so the leaders abrade the old sores and get offended every time they can. Groups are easier to control if they can be alienated from the main stream, and every demagogue knows this. That is why hate rhetoric is all over the place and why those profiting from division hate a common language and other standards. Standards limit the ability of power-hungry people to reward and control adherents by dispensing goodies from the public till. For example, they cannot hire all their worthless kinfolk if they must first meet knowledge and skill standards.

Of course, wars are fought over standards, if you wish to view religious practice as a standard for morals and beliefs and language as a standard for communication. Representative capitalistic democracy might be viewed as the standard for an efficient and benevolent society.

Politics Associated with Standards

Alabama is not unique in that it has colleges, which grant degrees and teaching certificates to people who are obviously incompetent. In a recent news story, a mathematician told of being a straight "A" student in mathematics and graduating from his school without the skill to do graduate work in mathematics at another nearby school [11]. The state has tried recently to prevent incapable teachers from being certified by requiring new teachers to pass a general test, which half the seventh graders in the state could pass without a sweat. The test was declared illegal by the courts because a greater fraction of blacks than whites failed the test. On the same basis we could strike down, in any part of the country, the examinations for lawyers, bus drivers, doctors and professional engineers, but we leave these professions alone and damn the public schools, which are in desperate need of improvement, by forcing even more incompetent teachers on them.

It is interesting that the state cannot force its schools to maintain reasonable standards rather than resort to tests after prospective teachers have their degrees. The offending schools are accredited, of course, by an association of schools like themselves, and I can assure you that their administrators worry less about performance standards to protect the interests of the public than they do about their empires and public images. Enrollment and retention are more important than standards because enrollment starts an income, retention keeps the income and standards for admission to the teaching profession would certainly reduce the income.

I hope you believe that a good standard test in the major field of study before degrees are granted could prevent a lot of abuse, like that of a math degree at one school being equal to the sophomore level at another school. If a public school cannot transfer enough knowledge in a standard area to enable students to pass a standard test in the prescribed time, it should be closed down to protect the public from incompetent graduates and to save the taxation to run it.

The first concern of minority parents should be to have competent teachers for their children. Differences are soon forgotten when people work together for a cause, like better education. Knowledge and skill know no color or sex. A little thought should convince you that it will be impossible to devise any test that will show equal performance by sectors for any sectoring of humanity, whether it be by race, height, eye color, sex, bank accounts, religion or politics. Even wealth is a factor in educational success. An August 1993 issue of USA Today illustrated that recent SAT scores have a direct correlation with family income. Higher family incomes mean higher SAT scores. Why do the children of wealthier families have higher scores? Many people would rush forward to say that it is because of differences in families, schools, teachers and social status. On the other hand, it may be that people who are quicker to learn make more money, and because of genetics, have children who are quicker to learn. Regardless of the reason for the disparity in scores (nature, nurture or societal expectation), all excuses are irrelevant to the process of education and the objective measurement of its success.

I am hoping that poor people will learn that a meritocracy based on performance standards will serve them and the country better than pushing quotas on the good old boy network. In a meritocracy, I feel sure that the ranks of the poor will have more and better representation than they now have. Let the children of the affluent and the influential work for their place in the sun by the same rules as everyone else. If we have stringent job standards, the politicians cannot loot the system as easily by hiring unworthy people for political payoffs. For this reason they may join the "educators" in resisting standards. If we lose the world industrial competition because of the sorry education of our people, there will not be much for the politicians to loot.

Standards of Behavior

Permitting each person to have his own standard of behavior is like letting each person carry his own elastic yardstick which can be stretched to whatever length that suits him, or having a football game where each player formulates his own rules as the game progresses.

E. O. Wilson [22, p 288] probably has as good a definition of ethics as anybody: "Ethics are shared standards, [.... with some] arbitrariness for good, [and] overrule of law where law is harmful". Ethics were invented by society so that we would all know what to expect of each other when we interact in business, profession or politics. They are usually not needed at parties and among friends. Law is a statement of behavioral standards that are important for the efficient functioning of society, and may be viewed as enforced standard ethics. As a rule, those who do not understand the value of standards do not understand the value of ethical standards. They manage to borrow relativism from physics and uncertainty from physics and existentialism, but never recognize that the world requires standards. For example, Van Wyk [26] states in the preface to his book on ethics that "the more the assumptions of dominant cultural trends can be challenged ... the more likely it is that people will give open-minded thought to alternatives and make rational and autonomous decisions". If Van Wyk is talking about ethics, which have no meaning or utility except as a group property, I do not agree with him. Being a scientist of some standing, Wilson knows that standards of behavior, or standards for anything else, often can need change and perhaps challenge when they result in wrong. Every challenge of ethical standards encourages people to be irresponsible and should be accompanied with rational criticism and a reasoned proposal for something better. Scientists often adjust their standards by logic and mutual agreement, but knowing their value, they do not attack or destroy them without sufficient reason.

Young upstarts pushing for a new standard without a compelling argument are quite rare in hard science. "My rules are as good as your rules" can never be the basis for a ball game, a civilization or a profession, and the teachers of ethics should spend some time on this primary truth. We must teach that standard rules are necessary for a society, that they should serve a common good, that we do not break them because they are inconvenient or inimical to our current interest, and that we can change them in a democratic society as changing circumstances justify change. Remember the traffic light. Its rules are arbitrary. It is there for our common good and we are expected to obey it whether or not we are late for a date. We can mount an effort to remove it if it does not serve us well.

Our schools must have enforced behavioral standards to protect the teachers and students. To a criminal mind, any standard for behavior is oppressive.

Summary

Standards, like laws, are resisted most where they are needed most.

Most of the arguments against standards are unlearned protectionism.

Standards can help students, teachers, parents and administrators.

If we wish to be subjective and arbitrary, we need to oppose standards.

Political patronage will be diminished by standards.

Some highly specific skills affecting public safety, such as driving busses or operating radio stations, need performance thresholds.

The process of education, like sports competitions, needs to focus more on visibility and individual achievement in specific areas.

The process of education can be remarkably improved and reduced in cost by the introduction of curriculum and course standards.

Chapter 3

The University

We expect knowledge and its encouragement to be found at the colleges and universities, but we also find a number of other things like political indoctrination of captive students, advocacy of strange causes, and unsubstantive fields of study. To support my general contention that much of the university system has suffered a serious decline in the quality and distribution of education over the past sixty years, I will spend some time in discussing its operations, foibles and deficiencies.

A Short History of University Degradation

In general, the history of education since 1930 is one of diminishing quality, reality and usefulness. After World War II the colleges and universities were unable to admit the great number of interested students with the G.I. Bill. Schools could still have plenty of students while demanding excellent academic performance and racing to enlarge their staffs and facilities. Suddenly the veterans and their money decreased drastically and the schools were over-staffed. However, business and industry demands for trained personnel were increasing at a rapid pace and it became popular, partly because of publicity campaigns by schools trying to save their bloated empires, to believe that everyone could and should have a college education. To recruit and graduate more students, the colleges reduced the requirements for academic performance and started removing barriers that might stand in the way of graduation.

Some departments could not acquire and graduate nearly enough students if the liberal arts requirements remained in the curriculum. Many colleges threw away their standards and emphasized enrollment and retention, which are related directly to the income of the college. The university system was the focus of political action to use inferior degrees as the basis for exclusive credentials in various "professions".

Mathematics, physics and foreign languages, being difficult for many, were the first to feel the ax in the liberal arts and doctorate programs. When I was doing graduate work at the University of Tennessee, I was required to read technical French and German and translate them into good English. One department, for which much of the important recent work had been done in Germany, had trouble getting its doctoral candidates through the German department, but its graduates were in great demand in industry. German was quickly abolished as a requirement.

Engineering and most of the sciences kept applied mathematics and physics as their point of embarkation for useful things. Medicine weakened somewhat in the physical sciences because more attention was required for the knowledge explosion in other areas such as genetics, biochemistry, bioengineering and antibiotics. The liberal arts and the behavioral sciences began to remove mathematics, physics and chemistry as general educational requirements. Today, these useful and universal fields of knowledge are often not among the list of courses required for college graduates in the US but are given more weight in other industrial nations. It is convenient for many to believe that they are no longer necessary for a well-rounded education, as are English, history, psychology, sociology, economics and philosophy. I remember well how a psychology professor argued that one could not organize and interpret data without the concepts of statistics and calculus. These areas of skill, as taught by the mathematics department, did not endure long as requirements for psychology majors.

In 1950, for example, every teacher in training at the University of Tennessee was required to take a course in physics. Today students, even math majors, can avoid physics entirely by taking "sciences" that require only memorization but no quantitative skill or critical understanding. The result of all this elimination of physics, mathematics and languages has been a lot more college graduates with narrower degrees and less understanding and appreciation for the important ingredients of an industrial society, which could not function without standards and hard knowledge. The people receiving these narrower degrees were on the average less competent because the intellectual requirements had been reduced. For example, considerable intellectual ability is required to learn thoroughly another language. Most of us still struggle with English. When the language requirement was removed, the schools retained a lot of people with poor language capability who were probably also weak in English and vocabulary acquisition and who would probably not succeed in medicine, law, science or the humanities.

Today there are colleges, which will give degrees in something to anybody who shows up [1, p 186]. Accreditation does not guarantee anything either as I shall point out later. Standards for college graduates, other than time and money, have almost disappeared. Except for education, there are standards for almost everything that we do, eat, drink, breathe, buy, sell or trade. By law, food must have honest labeling in specified standard units, but universities can and do give any label they like to whomever they please without any standards whatsoever, except perhaps those of money and matriculation. A lot of smoke is blown and the school catalogs imply standards, but there are usually no objective performance standards for graduation [1, p 186].

I would have you note that applied mathematics and quantitative science, the areas of knowledge most needed to "work smart", have disappeared as general educational requirements in the public schools and colleges of our country, but **not** in other industrial nations, and that even the "educated" person of today (only in the US) is likely to be without them at a time when their need is critical. I will not advocate a return to the practice that all students take applied mathematics and physics, but I will try to make the case that, for the sake of all of us, these studies should be ***available***, encouraged and recognized at all levels in our public schools and that they should be promoted by competent teachers and administrators if we are to have any hope of "working smart". If these subjects are not encouraged in the colleges and universities, they are not likely to be present in the public schools. If they are not encouraged in the public schools, students will arrive at the colleges without background and interest and be unable to begin scientific and technical careers without remediation. This lack of preparedness causes many students to move into areas that can be completed in four years without a delay associated with the insult and expense of remediation.

The Meaning of the Quiet Invasion

The legislatures of several states have been perturbed by the large numbers of foreign aliens in their graduate schools of mathematics, science and engineering, which have now been largely de-Americanized in both students and faculty. I visited twenty- four graduate students in an engineering department one day and found one native-born American. Less than half of the professors were native-born Americans. One legislator with whom I talked about this fact suggested that we ought to close the graduate schools since our own citizens did not seem to be using them.

I told him that, if we did, we would have very little research in the "hard" sciences from which most of our industrial prowess comes. A lot of these alien students will wish to stay in this country, and we had better hope that they can and do stay if we want to keep some semblance of competitive technology. By the way, I have nothing against foreign aliens, but I do decry the educational, political and social environments that make Americans scarce in the science graduate schools at a time when we are in industrial competition with the rest of the world for jobs and trade balances. Technical knowledge creates industries, markets and jobs, and any history of the industry in this country will show that most of our industry began with practicing scientists.

I found out the other day that some universities have quotas for alien students to make the science graduate schools look more "American", but this lowers the quality and amount of learning ability. Our graduate schools need to encourage American citizens, not limit aliens. In practice, **any** constraint lowers the optimum for anything you choose, e.g., quotas on foreign aliens reduce the competency level of the school of mathematics below its possible maximum.

Graduate schools in science and engineering recruit the best students available, and they take in enough foreign aliens to stay in business when qualified American citizens do not enroll in sufficient numbers, either because they perceive that they can do better with less work in another line of business or because our school system does not cultivate interest and ability in science and engineering, a condition easily explained by my later exposition of what has happened to our high schools.

The University as a Sorting System

Concrete that is low in cost and high in strength requires an aggregate of strong rocks with a selection of sizes such that, when the rocks are mixed, smaller rocks fit into the spaces between the larger rocks so that you have almost solid rock. This provides greater strength, saves on cement and provides a greater surface area to which the cement can adhere. To obtain rocks of the right sizes and proportions for the best mixture, a sieve system is often set up to sort rocks by size. The university, together with the rewards and demands of society, may be viewed as a complex and somewhat probabilistic sorting system for students and careers. The sorting parameters consist of requirements for the successful completion of a number of courses.

Whether a student will complete a given course will depend on a number of necessary factors like health, academic ability, interest or perseverance in the subject matter, tuition availability, motivation for status or economic reward. With the course outcome depending on so many factors, it is unlikely that a ***single*** factor such as a SAT or GRE score can ***predict success***, but a single factor, like an automobile accident, could certainly ***predict failure***. "A chain is only as strong as its weakest link" is the kind of logic needed to predict academic success. It is a property of probability that a success must survive every possibility of failure. The people who argue against the SAT, ACT, GRE and other tests because they are poor predictors of academic or business success are either ignorant of the way probability works or else they are dishonest. Tests predict the probability of failure, for lack of academic ability, in a demanding curriculum.

There is no reason to expect scientific testing to predict success in a highly political environment, such as our system of "education" that resists **any** objective measure of student and teacher performance. The end result of the academic sorting process, really a social process that associates intellectual ability, interest and reward, is expressed by how many degrees are produced in what fields [28]. The intellectual aptitudes being sorted to each field of "learning" are defined somewhat by studying graduates with SAT, GRE, IQ, or CBEST tests. The results are often interesting, insulting, or frightening, depending on the vested interests of the reader. As a general rule, intellectual ability migrates to the academic areas associated with money, prestige, intellectual challenge, and defined knowledge and skill. It avoids the areas of indefinite knowledge, little utility, public disfavor and low pay [14-16], as shown in Tables 1 and 2 which follow. The university sorting machine puts the people with the least average academic ability into education and social work, where we spend a large part of our money and see our greatest problems. ***Of course there are many exceptions !*** Students are not compelled to go with the flow. A bright student can go where he wishes. It should be obvious that, if we wish to have high achievers in education and social work, we must have incentives equal to those of the professions that now attract them, namely good pay, public esteem, substantive knowledge and a pleasant workplace. I do not blame our university sorting machines for what they do or belittle the people who are sorted into less desirable categories. We are talking about **our** children and the children of our friends and neighbors. I am merely pointing out what is happening because of our value system and societal attitudes, and that I think the consequences will be disastrous to our way of life if we permit it to continue.

Table 1

Test Performance by Undergraduate Major
Standardized Test Scores of College Graduates
(1977 - 1982)
Rank by Average Mean Differential

Rank (1 = top score)	LSAT[1]	GMAT[2]	GRE[3]/ Verbal	GRE[3] / Quantitative
1	Mathematics	Mathematics	Philosophy	Physics
2	Economics	Philosophy	English	Mathematics
3	Philosophy	Engineering	Anthropology	Engineering
4	Engineering	Chemistry	History	Computer Science
5	Chemistry	Economics	Foreign Langs.	Chemistry
6	Other Humanities	English	Physics	Other Science
7	Foreign Langs.	Computer Science	Other Humanities	Economics
8	English	Foreign Langs.	Journalism	Biology
9	Anthropology	History	Political Science	Philosophy
10	Biology	Other Humanities	Biology	Anthropology
11	Other Sciences	Biology	Psychology	Business
12	History	Other Sciences	Chemistry	Psychology
13	Psychology	Political Science	Other Sciences	Foreign Langs.
14	Journalism	Psychology	Mathematics	Other Humanities
15	Art & Music	Other Soc. Sci.	Art & Music	Political Science
16	Other Soc. Sci.	Art & Music	Economics	Other Soc. Sci.
17	Political Science	Sociology	Computer Science	History
18	Speech	**Education**	Other Soc. Sci.	English
19	Business	Business	Sociology	Art & Music
20	Sociology		Engineering	Journalism
21	**Education**		Speech	Speech
22	**Social Work**		**Social Work**	Sociology
23			Business	**Education**
24			**Education**	**Social Work**

[1] Law School Admissions Test

Notes: 1. The LSAT does not report separately for Computer Science majors, and the number of test-takers with a Physics major was too small to include in the tables.

2. The GMAT does not report separately for Journalism, Social Work, Speech, or Anthropology majors, and the number of test-takers with Physics major was too small to include in the tables.

[2] Graduate Management Admissions Test

[3] Graduate Record Examinations (Verbal or Quantitative Sections, as noted)

Source: Standardized Test Scores of College Graduates, 1964-82, Institute of Education, compiled by Clifford Adelman, Associate of the National Institute of Education.

Table 2

Graduate Record Examination Mean Scores
by
Undergraduate Major Field

for the years 1977-1978, 1982-1983, 1986-1987, 1987-1988

Field of Study	Verbal				Quantitative				Analytical			
	'77 to '78	'82 to '83	'86 to '87	'87 to '88	'77 to '78	'82 to '83	'86 to '87	'87 to '88	*	'82 to '83	'86 to '87	'87 to '88
Physical Sciences	506	493	492	493	633	637	644	658	*	556	575	581
Engineering	453	445	464	470	651	670	675	686	*	528	557	564
Life Sciences	499	480	478	483	541	538	533	543	*	520	524	531
Social Sciences	506	497	501	502	503	511	514	521	*	512	527	533
Humanities & Arts	540	534	543	548	490	505	509	522	*	518	533	543
Business	439	436	455	460	506	516	512	520	*	485	503	510
Education	434	433	440	450	439	447	452	461	*	462	473	481

Source: Examinee and Score Trends for the GRE General Test: 1977-78, 1982-83, 1986-87, 1987-88,
pages 89, 90, 91

*Analytical scores for this time period are not comparable to later scores because the analytical portion of the test was revised substantially in October, 1981.

Most of the people sorted out to the bottom cannot find a better career than education and social work, and most of those with the ability to make choices do not volunteer for the low pay and intellectual abuse, in college and on the job, associated with the fields of education and social work. Until we change this, education in this country will continue to be of lower quality than that of any other industrial nation and we will not be able to "work smart" enough to keep the American dream.

Remarks About Drawing Conclusions

After my remarks about the statistics of the sorting system, I should say something about statistics, anecdotes and exceptions. A statistic is anything you can say about a collection of numbers, such as how many there are, their sum, their average, their median, their standard deviation, the shape of their distribution. Statistics **do not** tell us whether any of several highly correlated variables in a random collection of data are cause and effect. Experiments usually must be **designed** to tell us that. A lot of alcoholics smoke. Does smoking cause alcoholism, or is there a hidden factor that causes both? Many statistics dealing with humans have such a wide spread in many attributes that they cannot be used at all in making decisions, especially those involving individuals.

An anecdote is a story told to make a point and anecdotes, like statistics, do not necessarily prove anything. In fact, if we have no statistics to support our arguments and wish to push them anyway, we can always fall back on anecdotes or fables, which are often the exceptions to the rule. If we are not careful we may let anecdotes and exceptions cast doubt on a perfectly valid conclusion or cause us to draw a wrong conclusion. A valid conclusion may be true for 99% of the cases considered, but opponents of the conclusion will work very efficiently with the 1%, especially if they can drag in emotion and bias.

People like to explain their observations, and some do not worry about the accuracy of their explanations as long as they have one that sounds plausible or fits with their prejudices. If Bill wears a red shirt, some might think it reflects his politics or philosophy. Others might think that he looks better in red or that he likes to attract attention. The truth might be that he received the red shirt for Christmas and it was the only one that was clean.

It should be pointed out that testmakers have many gimmicks to modify the distribution of test scores so that the tests will sell well. They can reduce or increase the numerical difference between the top and bottom performers, or they can spread out the scores of the top and bottom performers and compress the middle, depending on the desires of their customers. An "equal outcome" school might want everyone to make the same score, and this can almost be arranged by making all the questions either extremely easy or extremely difficult.. It is even possible to introduce gender bias into tests, for example, by choosing skills more prevalent in females, and such an action has been discussed in the media to change the distribution of scholarship awards in special areas. I will consider this later.

The Nature of Science

A large part of our useful education is concerned with science and the scientific method. There are some fields of knowledge for which the quantities (variables) of interest, such as time and distance, can be understood, defined and agreed upon. Suitable standard units (all arbitrary like the second for time and the meter for distance) can be established for measuring these variables, and schemes for measurement can be invented. Mathematics can be used in the struggle to define and establish relationships among the variables of interest, like distance, time and speed. The key activities in science are defining variables of interest, measuring them in terms of standard units, and relating variables of interest in a logical scheme, usually through the medium of mathematics. Perhaps even more importantly, the aim of the sciences is to harness nature more effectively in activities like medicine, engineering or agriculture. Natural phenomena do not conform to opinions, care about our self-esteem, yield to public relations, or respect vested interests and "correct politics". Physics, applied mathematics and their engineering offshoots are prime examples of applied sciences. All now make extensive use of computers and are called the "hard" sciences, not because they are difficult, but because they have tangible definitions, techniques and standards for measurements, and relationships almost universally agreed upon by practicing professionals in the field. Chemistry usually is not as mathematical as physics and engineering, only because the mathematical problems are so difficult, but its concepts and definitions are quite exact and standards and techniques are available for careful measurements. Biology and medicine are more complex and less amenable to mathematics, but require careful definitions and measurements, in addition to much standard vocabulary. The relationships among measurements, however causal, are often not amenable to other than broad statistical treatment.

When the hard sciences wander off into error, they can be checked against nature. The recent exciting speculations about cold fusion were settled rather quickly for most of us by careful measurements. Some of the ancient Greeks had great wisdom and they contributed much to philosophy, theater and mathematics, but they never realized the importance of checking conjecture against careful measurements. There are many like the ancient Greeks at our colleges and universities.

The science and engineering departments compete for students like anyone else, but their standards are often built into the coursework. The courses are logically sequential, with much learned in prior courses being necessary for the current course. Each course is a test of performance in the preceding courses, and students who cannot learn or retain what they learn seldom make it to the advanced courses required for graduation. I have heard doctoral candidates complain "They expect me to know everything I ever learned." A poor performance by one teacher in the chain becomes readily apparent to the other teachers. As students transfer from one school to another, the professors come to know each other quite well in terms of student performance. I saw a student print-out the other day that said, "You will be in the top 10% at school 'X', the top 25% at school 'Y', and the middle 50% at school 'Z' ". If a field of study has no logical structure and no logic, you can forget each course after its final examination and start on the next course in the list of requirements. If there are no comprehensive tests in the field when you graduate, you can forget everything when you have passed each course and pick up your diploma without carrying with you any real knowledge. If your memory is poor and short-term, you may find it convenient to major in such a field. You could claim that your education did you a lot of good even if there is not one shred of evidence for the claim. Like the scare-crow in The Wizard of Oz, you will acquire your self-esteem as soon as you receive your diploma and you will be worth as much as anyone else, especially if you never need to do anything that requires specific knowledge or skill. With your degree and the self-esteem that accompanies it, you are fully educated and can discuss every subject authoritatively.

Behavioral Sciences

In the behavioral sciences, for which there are only vague definitions, few standards, uncertain instruments with which to measure what is defined, and only conjectural relationships among the definitions, reliable knowledge is difficult to acquire [20, p 192]. There are enough disagreements in behavioral territory to convince most of us that there is no way to settle disputes and arrive at a consensus.

For this reason, the knowledge base often is not uniform enough to show that graduates in these areas, at various schools across the country, have a common body of knowledge. In psychology there are some standards such as a widely known and used IQ test, but there is a lot of posturing about its validity and application. Sociology, for example, has been referred to from within as "a field in disarray" [50, p 70]. For every assertion it seems that there is a counter assertion [39, Inside Back Cover]. No issue is ever settled and people believe what they wish (that which enhances their fortunes or self-esteem) in the absence of means to extract knowledge and refute nonsense (usually called paradigms) favored by vested interests in politics and philosophy.

To me, the behavioral sciences are very interesting and enjoyable to contemplate, and I can understand why a scholar might wish to spend his life enjoying high adventure in these uncertain areas. I hope that you will not think me unkind if I point out to you that uncertainty often reveals and brings forth the best and worst in humanity. If many of our people perceive a need for knowledge in an area where knowledge is scarce, someone will appear and claim to have the knowledge needed. For example, if the end of time is impossible to predict and a lot of people would like to know when it will be, someone will claim to know exactly when it will be and encourage money to change hands. Many of the claims and counter claims in education, economics, sociology, philosophy and political science are driven by self-interest and the need for self-esteem, and the pretenses to knowledge are more obstreperous in the areas of greatest uncertainties and needs, such as the issue of economics in the last election.

Surely you will agree with me that charlatanism, academic pretense, intellectual dishonesty and stupidity can be better concealed in areas where quantitative truth is hard to come by and everyone can believe what he likes. As you might expect, a large fraction of the people in the behavioral "sciences" hope to avoid anything that smells of measurement, standardization or utility. Many professors talk about what they wish, assign grades by whim, and engage more often in political and philosophical indoctrination and opinion than in fact [1, p 181], [52, p 25]. This is all justified by the policy of academic freedom. As a rule, the areas with the least demonstrable knowledge contain the most people who are absolutely certain that they are right. They have the characteristics of a cult (authority figures, arrogance, alienation, clannishness, intolerance, and exclusiveness) and they are deep into indoctrination and politicization [50, p17]. This is all that remains for those without sure knowledge and the means to obtain and test it.

By the way, I enjoy reading in these uncertain areas and I have no desire to reduce speculation on the campus. Astronomers speculate and call it cosmology. Biologists speculate and call it evolution or mutation. Physicists speculate and sometimes come up with useful inventions or nonsense that fails the test of nature. I believe that people in the knowledge business should and must speculate and that the areas of least certain knowledge can have the greatest variety of speculations. There should be some critical evaluations before their promoters ride off with a political agenda to visit nonsense on their students in the name of academic freedom or claim unique and useful knowledge to justify inclusion for their students and exclusion for others in the struggle to control access to certain jobs, such as education or welfare work.

General Education Requirements

If you wish to obtain a degree at most US colleges and universities, you must take about two academic years of general education in areas that teach little or nothing supportive of your aspirations. There are courses in English composition, surveys of world literature, economics, political science, history, sociology psychology, philosophy, and natural science. All of these are "necessary" to produce a well-rounded scholar and they are all said to be "good for you". Math majors are often given memorization courses without problem solving and many of them cannot survive a rigorous course in a quantitative science with a high math content. Every listing here, except mathematics and possibly natural science, is widely adaptable to intense indoctrination, politicization, and brainwashing [20], and it often **is** "adapted". What else can a professor do in a climate where one man's opinion is as good as another's and differentiation is impossible? In English composition [24], the student can be assigned writing areas in any subject of interest to the teacher. In literature surveys [52], every reading can be aligned with a political or social viewpoint [24, p BB3]. The social and political flexibility of psychology, political science, economics and social science are obvious [50]. There is a philosophy with eloquent advocates for every folly conceived by mankind. There is a lot of political activism and little "hard" knowledge in the usual first two years of college. Even natural science usually has a course in politics called environmental science, which generally is too shallow to advance solutions other than repression of industry by big government.

University Politics

When you read the following statements, remember that I am talking in terms of averages and generalities, explaining why they are true and appealing to your reason, and expressing why you should be concerned. You can always find exceptions to an average or know people who are far from the average for any group, which includes them. I want to say up front that I have no objection to people pushing their favorite brand of politics as long as they do it on their own time to people who are not forced to listen and act as if they believe it to get a grade. The words "left" and "right" have been much abused and misunderstood, but I will use "left" to describe people with generally unmarketable skills who are pushing large social programs beneficial to their survival and status, and "right" to describe those who have knowledge and skills worth money on the current market and are more likely to pay taxes. Those in demanding disciplines lean right and those where knowledge is uncertain lean left. The "left" wants change and the "right" wants status quo or change away from what the "left" wants. This is reasonable and forgivable, and I have been in both places with no apologies for my leanings. I attach no honor or opprobrium to people pushing for what they want. I feel that we as a nation must occasionally pay heed to the damaging things that we are doing to ourselves in the long run and try to arrive at a better way to do business. Recent scholars [19] put both communism and fascism (de jure and de facto collectivism) in the left and have equated the left with violence. How else, other than by violence (or the threat of it), do you radically change or destroy a society and take everything a person owns in collectivist schemes like those of Stalin, Mussolini and Hitler? Think about this when you hear the prejudicial words "right" and "left" in a political harangue. I have always felt that it was unethical to force politics, philosophy or religion on people under my supervision, even when I "knew" that I had all the right answers and that they did not, whether they were students in school or subordinates in industry or government. Further, I do not believe in selling Amway or insurance to coworkers or subordinates. I strongly condemn hecklers who interfere with the right of others to speak at scheduled meetings of people who want to hear them, whether or not I agree with what is being said. The political action at universities and colleges often is not very nice, and the average American would recognize strong elements of totalitarianism in it [24, p B4]. This has also been summarized in an article presented in Readers' Digest [13, p 99]. If you wish to know how bad it really is, go to a college campus library and read the Journal of Higher Education.

Perhaps you think what transpires on campus is not important to you. I wish to point out that those in the education and social sciences, by virtue of the indoctrination and politicization received during their education, lean mostly to the left. If you like that, be happy. If you do not, remember that your children spend a lot of time being educated by people trained by the left and that the news you hear comes from a free press, owned mostly by the right but dominated by reporters who lean to the left. The sociologists and psychologists now dealing with welfare recipients are solidly left and many of them are using their positions and our money to promote political action. If you doubt what I say and care for the truth, read their literature [50].

Will and Ariel Durant are good examples of the many people whose politics shifted from left to right with their increasing income and age. I had an uncle who worked in the coal mines to save enough money to start a truck mine. I kidded him about shifting from a strong union man to a strong anti-union man when the union tried to close his mine during a labor dispute. He laughed and said that we all have philosophies tied to our pocketbooks. I myself leaned left when I was a poor teacher barely getting by in the coal fields of Eastern Kentucky. I had nothing, did not expect to have much, liked my job of teaching, and was ready to divide the wealth. I wanted to tax the rich (anyone more fortunate than I) and pay the teachers quite well. I found myself president of a union local when I voiced my anger at the way some employees were blatantly mistreated. (Management mistakes make strong unions.) When I enjoyed a little good fortune, I began to worry about the tax and spend programs of the left and I oozed right over the years, not in opposition to making opportunity available through government action but in resistance to supporting those who believe that they are entitled to live as they wish while I pay their bills. I still believe in unions as the only way to deal with certain kinds of management abuse and I still believe in paying teachers enough to get more competence into our profession.

Eric Hoffer [18] has done a masterful work in delineating the characteristics of the people at the bottom and their readiness for mass action. The teachers' union in Germany supported Hitler more heavily than any other [58, p 325]. The Russian revolution is claimed by some to have been a revolution spawned and guided by teachers. The National Education Association (NEA) and its state affiliates, of which I have been a member, line up consistently with the left wing of the Democratic party, the tax and spend group often mistakenly assumed to be the best refuge for those who are poorly educated, unskilled, underpaid, unemployed, and mistreated.

Citizens with flexible time, such as retired people, welfare dependents, part-time college students and lawyers, can riot, protest, run for public office, and lobby with their elected officials more than those who work for wages on a regular schedule or have a demanding profession. They are therefore more likely to be heard and on a per capita basis have a much bigger clout in determining how the country runs, especially if the politicians view them as single issue or block voters to be bought by plums paid for by the rest of us. Those who spend their time in the people business, without the worrisome necessity of standards and accountability, can influence politicians and clients more than those who are tied to a demanding workplace. Opinion polls suffer from the fact that some of us do not answer questions about our personal opinions over the telephone. These facts account for a lot of the strange and abusive tilts in our current social landscape.

Why do the people sorted to the bottom lean left? I suppose that they know that they cannot really feel equal as long as there is competition, based on recognition of knowledge and skills, that shows that people are unequal in some important attributes. I personally want to see liberty, equality, fraternity, and equal opportunity on the political and social landscape, but I am not willing to sacrifice the nation, the enablement of the competent people in it, and the advantages that competent people can give us, just so that those who cannot or will not compete can have a level view.

Summary

American universities are heavily into politicization and indoctrination.

Most students waste one or two years taking unsubstantive courses that are "required" to make them "well-rounded" and "sensitive" to the "important" issues of mankind.

Most of the "required" courses are highly subjective.

Many professors teach what they like and assign grades by whim. They view themselves as righteous critics of the establishment and inhabit the areas of academia "where one man's opinion is as good as another's " unless you are a student.

The university and society work together to sort students of high ability into areas of greater rewards and salable knowledge. Some students valiantly resist being sorted and do what they like.

Weaker students are sorted into areas of low pay and uncertain knowledge, and many find themselves in education and social work

Much of the university is self-serving in that it forces "good for you" courses on students who do not benefit from them.

The university colleges dealing in reliable knowledge are not nearly as able to force courses into the "required list" as those whose wisdom is doubtful.

As a rule, the university seethes with political activism and those disciplines with less to sell compensate for it with greater coercion

Chapter 4

The College of "Education"

I will describe in the following pages my direct experiences with the college of "education". I put quotes around the word because education is not usually an important part of what goes on there. It should be called the college of extortion, indoctrination, politicization, and eclectic rationalization [31, p28], [52, p 25], [64, p213]. My concern for our nation and its students and my personal experiences will lead me to discuss at length the sorry consequences of the philosophy and practices of our colleges of education, whose graduates dominate our public education system. In most states each university has a college of "education". Teachers, principals, supervisors and administrators cannot hold positions in the public school system without an "appropriate" degree from a college of "education". Except for the school boards, graduates of the college of "education" control every aspect of public education, directly or indirectly.

Political Orientation

When I was taking courses in "education" to acquire a teaching certificate in the state of Kentucky, I often heard that the purpose of public education was to effect social change, but I could never quite find out what change we were supposed to effect or how we were supposed to do it. John Dewey, the darling of American educators for over fifty years, was a socialist and an agnostic [2, p 24], which are possibly euphemisms for words which some of us would like less [7, p 158]. He was not outstanding as a teacher [2, p 27], but he told several generations of us, through the teachers' colleges, how teaching ought to be done [7, p 158]. If you wish to know the truth about Dewey, look at biographical material in the 1930-1945 time frame **before** he had a biographical facelift.

Mortimer Smith [6] thoughtfully documented the strange practices in American education in the thirties and forties.

He was careful not to attach any names to the various philosophies, mostly homegrown, being pushed into the schools by the teachers' colleges, but he did object to the practice of discriminating against superior students, which practice I will call "leveling". In their sports, most Americans like the idea of competing and winning. They do not mind the intense publicity accorded to some sports hero as he excels mightily in home runs or touchdowns or to gymnasts and skaters who receive gold medals. It is surprising that they have accepted without protest the furtive and vicious leveling of public school students in the realm of academic performance.

After the class annihilations in Southeast Asia (a very effective and complete leveling), the bloody repressions in Europe by Stalin and Hitler, and the disastrous economic collapse of the communist and socialist systems (dedicated to a classless [leveled] society), you might hope that the criticism of our capitalistic democracy and the advocacy of a leveling philosophy by educators and sociologists would be somewhat muted. I believe, however, that the leveling philosophy is still firmly in place in "education" and social "science". It hates the visibility, achievement, competition and testing of a free society [18, p32] and it will eventually destroy our free society and our industry if we permit it to continue in its narrow course without a determined input from mainstream America [52, p 25] [50, pp. 17,28,31]. There is little point in name-calling or in showing parallels to other destructive political philosophies, and there may be no coherent philosophy other than that of the self-serving protectionism of incompetent administrators and teachers. I will list the symptoms and leave it to the reader to name the disease.

A former school superintendent told me the other day that he had done enough research to know what John Dewey was advocating, but that he was made to understand that he must swallow the Dewey philosophy or get out of education. This kind of tyranny is typical of our colleges of education. As I was looking through a job application the other day, I saw that a rather scholarly man had done well in his chosen career but had flunked out of the college of "education", no doubt because he had the intellectual acumen to gag on the nonsense [60, p 19] but was too honest to pretend to believe it. Looking at the test scores of "educators" on any test ever given, I find it hard to believe that an intelligent person tried the system and failed for any reason other than not believing the "right thing". John Leo, in a recent article, exercises considerable incisiveness in describing what goes on in the college of "education" [31, p 28]. He is far too kind in describing the damage being done. Rita Kramer [64] does a highly credible damage assessment.

Degrees without Knowledge

It is charitable and often self-serving to pretend that all college degrees at a given level are equally worthy in any definable virtue. I will say at the outset that this is not so, and that I and many others believe that there is not enough substantive knowledge in the field of "education" to justify an academic degree in it [1, p 181], [31, p 28], [64. p 222] and that most of the colleges of "education" are more into dictatorial indoctrination than into knowledge [64, p 213], [60, p 19]. Testing over the years has shown that the colleges of "education", as a general rule, have no standards for their incoming and outgoing students and recruits most of its students from the bottom of the academic pile [15, 46]. The school catalogs show that the curriculum requirements for "education" degrees are sub-professional.

When a state tests its teachers in the fundamentals, there is shock and horror for a few days and the air is filled with silly excuses and denials. The most laughable proposal of all is that the deficient teachers need to spend more time in the college of education.

The public education system of our nation has over three million employees each of whom contributes over two hundred dollars a year to teachers' organizations. This is over six hundred million dollars a year for political action funds. In addition the teachers' colleges extort roughly a billion dollars a year for mostly useless courses required for those working to obtain and retain teaching credentials. The State Board of Education and its enforcement arm are populated with doctorates of education and quite a few are state legislators. Every county school system and every junior college is bulging with them. Our nation produces each year 6783 doctorates in education, 3852 in physical sciences and 882 in mathematics [28].

Not long ago, those running for legislative offices in my county were called to a meeting on the courthouse steps and queried by AEA and NEA officials about what they would do for teachers. Those who "believed the right thing" or lied about it were well rewarded. Is money before an election less a bribe than money after an election? The colleges of "education", through their highly indoctrinated and politicized graduates, control every aspect of our public education system. I believe that this control is very harmful to all of us.

Seeing science, mathematics, and problem solving abilities go down the drain, some cities like Mobile and New York have started schools for the "gifted". This is a misnomer for that portion of our population interested in useful things. The NEA opposes these schools as "elitist", a dirty word in "education" circles, and argues that the other students need the leadership and challenge of the able ones.

A nice argument perhaps, except that the management in the public schools, trained in the colleges of "education", is generally hostile to the gifted [8], [34, p 59], both in curriculum and in recognition, and is willing to sacrifice learning and achievement by the "gifted" students for the elusive self-esteem of the less able and the advancement of its leveling philosophy.

The cheap degree per se would not be so bad if it could be viewed as just another academic aberration, but it is in total control of our education system and it seems to come indelibly stamped with a "dumbing down" philosophy and a strong bias against the recognition of knowledge and achievement. This book is full of examples of this philosophy in action.

The college of "education" confers degrees in "education" management at the master or doctor level to those who aspire to be principals, administrators, supervisors and superintendents, and these degrees are promoted as **requirements** for positions in school administration. As my references show [pages 36 & 37], these people consistently average lower, in any measure of ability by any test, than any other scholarly group. Many would have trouble passing an arithmetic test and very few of them have any quantitative ability. This was true in 1950 and it is still true today. These are the people in charge of our education system.

At present there are no standards of any kind (other than a stay at the college of "education") for principals, supervisors, and superintendents. Any comprehensive test will demonstrate this shocking truth. In one well-documented case, a principal (with a doctorate from a prestigious college of "education") was dismissed after two years because, even with tutoring, he could never learn arithmetic. Some high school students graduate with straight "A" averages without avoiding the demanding courses. Why not insist that principals, and all other educational supervisors, have a knowledge and competence level equivalent to that of a superior eighth grade student before they start running our high schools and colleges? It seems evident that an eight-year stay in the college of "education" does not improve the basic skills of its graduates. What does it do?

It was not uncommon seventy years ago to hire bright graduates of the first eight grades to teach the first eight grades in one-room schoolhouses. It was assumed that one skilled in a subject could teach it, and there was little doubt that these people were effective in imparting fundamental knowledge. Today the colleges of "education" pretends that there are superior methods of teaching and managing (concentrated in the college of "education") that can be taught and readily transferred to any subject matter.

It is claimed that a person who knows these methods can teach, better than anyone else, any subject at hand [29, p 147]. A common corollary to these assumptions of the college of "education" is that you can teach people without intellectual competence to manage knowledge areas about which they know and understand nothing. All of these assumptions are patently false; yet they are the basis for the existence of our colleges of "education", the like of which no other country has [55]. In Europe, many countries do not have colleges of "education" and there are no doctorates given in "education" and "education" management and administration. Germany and France do not appear to recognize "education" as an academic discipline [55].

Most education reformers [5, p 227], [60, p 20] have hesitated to demand outright dissolution of the colleges of "education", but their suggestions for improvement could hardly be realized with the current structure in place [65, p 113]. Others make recommendations, such as parallel licensing paths for needed skills, which would produce much the same effect in a small sort of way. No other industrial nation has a superstructure of bureaucrats whose license to lead education is a cheap degree from a college of "education".

Under various headings, the book you are reading lists numerous and widespread examples of academic abuse promoted by the graduates of the college of "education". We are supporting an educational structure that actively discriminates against its best and brightest with a deadening leveling philosophy. The real scholars drift lethargically through our schools with little recognition and a lot of discouragement.

Faulty and oppressive organizations usually do not rush forward to reform themselves, and the worse they are, the more viciously they resist change. Therefore we should not expect useful input from our colleges of "education" and our teachers' organizations when we dare to implement the needed reform of our schools. The NEA [75] very effectively resists, by volumes of sanctimonious rationalizations of the worst kind and ridiculous conditions that can never be met, any **objective** means by which students, teachers, administrators, schools and methodology can be evaluated. This guarantees that there will never be any firm evidence of malfeasance unless the public forces a test. We need a national or state commission of industry, trade and professional users to develop a useful curriculum for the public schools.

Arguments against the General Methodology of "Educators"

I have 24 semester hours of credit from the "educational" curriculum of a teachers' college.

I have never read or heard anything that would cause me to believe that the colleges of "education" possess some general methodology or pedagogy important to a teacher but unknown to the general public. I will state further that methodologies for specific disciplines, such as mathematics, are best advanced by the experts who know and love the discipline and not by those who can never do well at it. Each knowledge and skill area has its distinct intellectual challenges and exerts considerable effort and insight to develop effective teaching methods for its constituents. If this is true, why do we need a college of "education"? Do the people who really love a field of knowledge need to have the school of "education" advance their interests? Musicians developed and traded their skills and techniques long before the colleges of "education" invented degrees to "help" them. The explosion of mathematical methods in the time of Sir Isaac Newton did quite well without doctors of math "education". Our great people in computer hardware and software exercised their genius without the curse of methodology from the colleges of "education". Many of our great university teachers have never been debased by being required to learn their teaching skills from our colleges of "education", but it seems that they will find it harder to resist their bludgeoning in the future. I have been exposed to many great teachers and I doubt that they or I would have benefited from the intrusion of educational pedagogy.

I have noticed for years, as a mathematics and physics teacher, the increasing hostility and claims of "You didn't teach that" when I plunged into problem solving and gave a test. Problem solving is not the memorization of something taught and it is not susceptible to simple recipes. It is attacking a perplexing problem never seen before by using every available skill and technique to develop a solution. Many math textbooks have at the end of each chapter a collection of word problems to exercise the students in the math that they have studied recently. These problems cause deep anguish in some students and exuberance in others. Some cannot read problems, some cannot do problems, and some are delighted to see that math can be useful. This reaction of the students to problem solving is well known but seldom mentioned among math teachers because it presents a severe management problem with no happy solution and implies an "elitism". The public rightly reverences mathematics because it is a powerful tool for the formulation and solution of problems, but unfortunately, only about a third of the students and teachers can learn to solve problems. The easiest and safest fix to this embarrassing situation is to teach all mathematics as pure math (or new math) which, by definition, is not concerned with utility and problem solving. In summary, any math is pure math until it is used to formulate and solve problems. Then it becomes applied math, which is much more difficult.

The extreme irony of the above discussion is that the schools push math because the public believes it to be useful, but are coerced to teach it so that it is not useful because many students have difficulties with applied math. The requirement to **use** math eliminates about two thirds of the students from the ranks of those wishing to major in physics and engineering, which emphasize problem solving by using math. This rate of failure is unacceptable in public schools. The colleges of "education" usually deal with the math difficulty by permitting their prospective teachers, even the doctorates of math "education", to avoid applied math. There are many students who can memorize every proof and theorem in a pure math course and still be unable to solve a simple reading problem that requires the use of that math. The difficult part of engineering, physical chemistry and physics is the applied math.

What does a school do with subject matter that is too difficult for some of its "best" students (the memorizers) but is relatively easy for some of their "average" students (the analyzers)? The answer is that the offending material is eliminated eclectically so that the analyzers always lose to the memorizers, who are much more numerous. The current practice is to eliminate any subject matter that is a barrier to the average student or that severely differentiates the students. The needs of our country seem to be irrelevant compared to the need to enforce leveling and to fight elitism.

Anyone who has dealt with the parents who visit school knows that they often blame the failures of their children on their teachers. In an applied math class, properly taught and tested, at least two out of three will experience great difficulty. The first victim is the teacher because, "if she were a good teacher, everyone would pass". The administration will blame the teacher because it is ignorant of or uncaring about the problem with applied math and knows that "anything that does not fit its leveling philosophy is unfair".

The math teacher must deal with the math problem early in his teaching career or lose his job. If he has a math "education degree" and cannot solve problems or does not dare face the cruel onslaught of a number of complaining parents, he finds a "math made easy" book, passes everyone regardless, or ignores all the reading problems so that in effect he has only a memory course in pure or new math. There are a few math teachers who want both to keep their jobs and do the right thing. On their own, they divide the class into two or more groups and try to present to each group all that they can easily absorb. Each member of a group receives a **relative** grade, there are few failures, and **some** of the students even learn some applied math.

I do not like any of these solutions because they do not permit every student to be all she can be and fail to recognize and reward the high achievers.

Engineers would know better than "educators" how math should be taught, since engineering degrees are almost all applied math. Credential-oriented people will never permit an electrical engineer to teach math if her math is listed as engineering on her transcript to show that it is useful. They would like to require every math teacher to have a degree in math "education". Knowledge-oriented people will have no problem with math teachers from the ranks of engineering. A lot of "educated" people, even in mathematics, do not know (or are not willing to admit) that degrees in physics and most engineering are almost all applied mathematics labeled as physics or engineering. I have taken senior and graduate courses that were listed as math and/or physics. The student could have the course listed in the transcript in a way to fit his major. I taught a graduate course named "Mathematical Methods of Physics".

I pass by a biology lab often and I see students looking through microscopes at slides of various kinds of tissue and microorganisms. What more can a methodologist from the college of "education" add to this scene? The students look until their brains record patterns and structures, an ability associated with being human. The biology teachers probably never took a course in pedagogy and they and their students will be better off learning more in their rapidly expanding field than taking a course in "Teaching and Learning Biology" in the college of "education". Good microscopes, live samples, photographs and videos can help this learning process a great deal, but I doubt if much help will come from the college of "education", where there is neither a love of technology nor knowledge and interest in biology. A biologist must acquire a large and precise vocabulary (which always intimidated me), and it is doubtful if education majors, who average at the bottom in language ability (Table 1, p35), will ever become good biology teachers in the sense that they will know the subject and have real enthusiasm for a body of knowledge that generally is beyond them.

All of my sophomore physics students must develop certain skills to survive their more advanced courses in math, engineering and science. They must learn to use the arithmetic, algebra, geometry, trigonometry and calculus, which they have been taught but which they often have not been taught to use, for the purpose of problem solving in the real world. They must master the skills of using their calculators and reading technical material carefully. A reasonable beginning problem might be "Gold sells at $360 per troy ounce, of which there are 12 in a pound. Gold is approximately nineteen times as dense as water, which weighs one pound per pint.

Estimate the weight and volume of a million dollars in gold and whether you could carry it off in your briefcase." (Answer: 231 pounds and 12.2 pints, difficult to carry away but easily contained in the volume of a modest briefcase.) One famous problem for physics students was "Estimate the number of piano tuners in New York City."

The ability to develop language skills is important for the success of English scholars. The standard tests show that "education" majors in general are at the bottom in verbal skills [Table 2, p 35]! Are these people, who could not master their native tongue in twenty years, likely to bring a useful tool to English? If their methods were worth anything, their students would use them to help themselves develop verbal skills, which are certainly important to the teaching profession.

We hear and read a lot about the teaching of critical thinking in the colleges, and naturally there is disagreement among those volunteering to be in charge of it to justify and further their empires. There are those who believe in recipes and those who believe in analysis, those who look for it in the classics and those who look for it in data [36, Table of Contents]. It is unlikely that our present culture will recognize that critical thinking is perhaps the major component of problem solving, innovation and invention, activities common to applied mathematics and the hard sciences. Restivo [37, p 171] would even separate puzzle solving from ingenuity, creativity and insight! It is interesting that the people with a paucity of hard knowledge are gearing up to divide the empire created by a demand for critical thinking. How will they know when they are right? Who cares if they are right if they arrive at a popular viewpoint that supports a "correct" theme?

There are numerous other examples of learning and skill areas for which a general educational methodology, if there were such a thing, would be useless. I cannot think of anything for which an "educator" could do better in teaching than a superior practitioner of the art. The great travesty of all this is that the people least capable of learning (on the average!) claim to have a great methodology that could help us all to learn, when it obviously has done them no good. Nevertheless, they have built a huge empire on the myth that there is a useful educational pedagogy, that they possess it, make progress in strengthening it, and that all teachers must have it. The college of "education" has enough muscle to force prospective teachers to swallow more than a year of its "professionalism" and pretend that they like it. The college of "education" demands devotees and punishes those who do not evince unreserved enthusiasm for its nonsense. It is run in the manner of a religious or political hierarchy. This problem is growing rather than receding as "educators" develop more political power at the state level.

We who have spent 12 to 20 years in school have been exposed to many graduates of the colleges of "education" who surely made learning easy by their wonderful pedagogy. When we had to do our latest bit of tedious learning, did we have help from some marvelous new educational principle, or did we resort to something as ancient as the Pyramids? Technology has made learning easier, more pleasant and certainly more accessible, but it or its application did not originate or improve in the college of "education". Is there something enabling and qualifying taught in the colleges of "education", or something without which a teacher would be at a disadvantage? I have not seen it yet because it is not there. The best way to teach each academic discipline is developed with the discipline by people who love it and wish to promote it. I asked an European educator and lecturer how he was faring in his visits to American colleges and universities and in particular how he dealt with our colleges of "education". He said that he was received quite well except at the colleges of education "where they cast imitation pearls before real swine." This statement was viewed by some as an unkind and callous remark by a guest, but it expressed well the opinion of many foreign and domestic scholars about our colleges of "education".

Resistance to Performance Standards

Most professions opt for governmental protection and exclusion to "protect the public", but they also work on standards for improving their work. The resistance to standards goes well with the philosophy of the losers, the people whose lack of ability excludes them from a wide choice of careers. Eric Hoffer [18, p32] says that "The frustrated, oppressed by their shortcomings, blame their failures on existing restraints ... but they want to eliminate free competition and the ruthless testing to which an individual is constantly subjected in a free society." Many of them are where they are because society, in some situations, must have, and insists on, standards. Losers will naturally hate competition and the standards and measurements by which competitions are judged. Invariably, they "sorrow" for the students taking tests.

There are multiple disadvantages to basing our education system on incompetent people. They are less able to do the required work and they fear and detest, with almost fanatic zeal, three of the principal ingredients of a free progressive democracy, namely achievement, competition, and evaluation [69, p 1]. They hate visibility and openness, all necessary for an honest and capable government, and they have fabricated an effective catechism of pious rationalizations for their harmful practices. It is interesting to compare "liberty, equality, and fraternity" with "life, liberty, and the pursuit of happiness".

"Equality" has many dimensions: height, weight, intelligence, respect, opportunity, income. I believe that we should have equality of opportunity and equality before the law. We will all never be equal in every dimension until we die and turn to dust, i.e. become nothing. Liberty, on the other hand, permits people to excel if they wish, and does not require that a free competition produce no inequalities. Any attempt to prevent inequalities infringes on our liberties. I assume that it is generally understood that a free society lets its citizens better themselves by working harder, if they wish, to achieve knowledge and use it to produce and accumulate wealth. As some do well, others will see it and try it for themselves, sowing the seeds of competition. To reap the maximum benefits from competition, the government sets rules, standards and measurements, and taxes for defining the limits of competition. A football game has rules and winners and losers with their problems of self-esteem, but widespread enjoyment and excitement are still there for both the participants and the spectators.

The losers populating our schools have arrived at a duplicitous way of eliminating competition by removing all objective measures of performance from the academic scene. This obscures the "dumbing down" and the leveling and denies the academic high achievers the recognition that enables athletes and cheerleaders to be leaders. As I will discuss later, the high achievers suffer in several ways under our current system of "education".

I keep reading in the literature how we ought to work toward teaching immigrants in their native tongues. As I have said already, most immigrants want their children to learn English because it will serve them better in this country and elsewhere.

The National Education Association and its state affiliates, along with the colleges of "education", should be the people most interested in establishing academic guidance (standards); yet they are the people most against them. There are objective national (or state) standards for almost everything important to us, but none for education.

We need standard syllabi for each major subject of study, and teachers and administrators need to take extensive standard tests in subjects that they intend to teach or supervise. Students need to take standard tests to determine their needs for placement, remediation or advancement. Standard tests are the best way to measure teacher effectiveness and coverage of assigned material and are the only objective means to evaluate schools, new methods of teaching and new textbooks. Standards should be promoted and owned by the colleges of "education".

The Path to Reform

It is unrealistic to expect that colleges and universities will rush forward to implement objective performance standards, which are sure to reduce the number of students and expose a myriad of abuses. The cardinal rule is "enroll and retain", which maximizes the intake of money, the amount of empire and the graduation of incompetents. A large fraction of the people sorted to the bottom will eventually work for local and state governments in education and sociology. There will never be real reform in our institutions of "higher education" until minimum standards are set for education and social workers, as they are with medical doctors, professional engineers, lawyers and bus drivers, many of whose futures are largely determined by standard tests made by experts in their fields. It may be that we should consider a civil service, at the state or national level, for school personnel, with hiring and promotion tied to measured ability to teach rather than to serving time in the college of "education". Ability, of course, would be determined initially by measuring what the teacher knows about the subjects that he is to teach. He would then have a trial period during which his effectiveness in transferring useful knowledge to his students would be measured. Teacher tenure and pay should be tied to effectiveness. This, according to Dr. Peter F. Drucker, is called "Managing for Results", the title of one of his management books. Widespread testing of teachers by objective standard tests would quickly identify those colleges deficient in the admission and training of teachers. They know this and that is why they resist standards.

In most places a teacher or principal must obtain a degree from a teachers college and be certified by the state board of education. It is claimed, of course, that this is done to protect and benefit the public. This claim loses credibility if you examine the material taught in the "education" courses or give general competency tests (reading, writing and arithmetic) to the people graduating from the college of "education" and acquiring teaching credentials.

Training Teachers in Science and Mathematics

The above observations are strengthened by examining in some detail what three colleges of "education" in North Alabama have done to train physics and mathematics teachers. These schools may actually be above average in their curricula for teacher training but I quote from their catalogs because they were readily available. Their graduates are widely known and accepted by states north of the Ohio River.

They require a minimum of 124 semester hours for a BS degree that is the basis for a class B certificate from the Alabama State Board of Education. Their training is usually accepted in other states after a slight demurral by their colleges of "education. A full class load is 32 semester hours per year. It is not unusual for a competent responsible student to graduate in four years if she attends summer school, works hard and plans ahead. The next page (58) is a summary table of requirements for math and physics teachers training at these schools.

Each school demands of its students at least 72 semester hours (or 2¼ academic years) in general education requirements and "professional" education requirements. Teaching interns may spend a full semester in school (ordinarily 16 semester hours of credit) for three semester hours of credit. Sometimes the required courses cannot be taken without prerequisites that do not count toward a major. This is more of a hazard in the sciences, which often are highly sequential. Academic majors and minors are loosely defined: a major may be 24-42 semester hours and a minor may be 18-24 semester hours.

Only UAH, whose catalog is most straightforward and easily understood, requires its prospective math teachers to study physics. Only UNA and UAH require computer science taught as such in an undiluted fashion. The UAH is surrounded by a large scientific and technical population and its students average quite well on the ACT and GRE. Its cautions to its prospective math teachers are insightful and worth reading. "Students who elect this curriculum may not be adequately prepared for graduate study in mathematics." This means that the teaching major is substandard. Prospective physics and math teachers are advised that "This curriculum will probably require more than the minimum total of 128 hours". This means that there is so much "good for you" in the curriculum that there is not time to take important courses. These statements, true for most other schools in the business of teacher training, imply that the demands of some schools in the University are so great that there is not enough time left, within a 128 semester hour limit, for a decent major in a math or science teaching field. The UAH seems to be the only school around that knows that physics majors need math and math majors need physics. There is a "science" degree at ASU, requiring 52 semester hours of "science", which includes elementary courses in biology, chemistry, geology and physics, but with no real math requirement. I suppose that this degree, in the eyes of the usual "educational" administrator, would "qualify" a person to teach any science, including physics. On the other hand, a sociology teacher must have 30 semester hours in sociology. The math requirements listed for the "qualification" of math teachers would be insufficient for a solid major in physics at the usual college level.

Teacher Education in Three Schools

The University of North Alabama

	Teaching Major	
Course Requirements In Semester Hours	Mathematics [78, p255]	Physics [78, p256]
General Ed.	41	41
"Professional" Ed.	37	37
Mathematics	37-39	8
Physics	0	30
Computer Science	6	
Other	12	11+ 30?
Total (Class B Cert.)	133	127

Athens State University

	Teaching Major	
Course Requirements In Semester Hours	Mathematics [76, p 68]	General Science [76, p 61]
General Ed.	39	36
"Professional" Ed.	33	33
Mathematics	43	0
Physics	0	24
Chemistry	0	8
Biology & Earth.	8 (electives)	24
Total (class B Cert.)	123	125

The University of Alabama in Huntsville

	Teaching Major	
Course Requirements in Semester Hours	Mathematics [77, 268]	Physics [77, p 278]
General Education	44	36-42
"Professional" Ed.	33	33
Mathematics	39	27
Physics	8	40
Computer Science	4	
Chem. & Biology		8+4
Second teaching Area		27
Total (Class B Cert.)	128	148

A UNA student hoping to teach physics must have two majors. If he chooses math as the other major, the most sensible choice for a physicist, he must have 31 hours in each major plus 41 hours in general education and 37 hours in "professional" education, a total of 141 hours. This is well over four years of college to acquire two weak majors. Ordinarily, physics and math majors require 41 hours each. Surely anyone teaching applied math and physics needs 8 hours of computer science. The point of this exercise is that certification requirements for a physics teacher with a weak major may require an extra year of school. I do not think that this is fair for the teacher or helpful for the nation.

Does the college of "education" know or care that you cannot obtain a decent degree in physics without first exceeding the applied math requirements for a math teacher? Do they know that this natural requirement means that a physicist cannot be trained adequately in four years if he must meet both the general education requirements and the "professional" courses from the college of "education"? Naturally the college of "education" and the departments in general education will not reduce **their** requirements. The result of this folly has been that you can count the number of qualified physics teachers practicing in the state of Alabama on the fingers of one hand. I am confident that other states have the same problem. Of course the college of "education" does not know or care that it has eliminated the discipline most important to "working smart" and exercising useful mathematics. It is composed almost entirely of people who have never had any training in physics and engineering and they do not know the importance or application of these disciplines. When this problem of training physics teachers was brought to the attention of a state committee on which I served, one doctor of "education" is reputed to have remarked that she would not have any more technical types on her committees.

By its demand for so much useless pedagogy, the college of "education" has reduced the skill level of our teachers in general and made it almost impossible to obtain good physics and math teachers for high schools. They have also added their bit to reducing the knowledge base of the nation's teachers by loading the curriculum with junk instead of having the teachers take more demanding courses in their areas of specialization. This would keep them from appearing to be so uneducated when their state forces them to take a basic skills test. Worse still, this is another of the many examples of how the college of "education" reduces the quality of teaching. No amount of "methodology" or indoctrination can make an adequate teacher if he lacks basic knowledge and devotion for his field and a respect for the varied talents of his students.

When I was earning a teaching certificate in Kentucky, a first major in math permitted me to take any electives I liked, but a first major in physics had to be accompanied by six semester hours each in chemistry and biology. To do right by physics, I had to take a first major in math and every possible elective in math and physics. Of course, if I had taken a first major in physics, I would have been "qualified" to teach any "science" offered by the public schools. It should be evident, by looking at what the college of "education" has done to math and science, that teacher curricula in math and science should be planned by the applied math and science departments rather than by the college of "education".

A Step in the Right Direction

The University of Alabama in Huntsville [73, p 117] is taking a step in the right direction by making it easier, for holders of the bachelor (or more) degree in English, history, biology, chemistry, mathematics, and physics, to obtain an MA degree and a "Non-Traditional" class "A" (full pay) certificate in teaching by taking 15 semester hours in "education" and 6 hours in practice teaching. The practice teaching entails 300 clock hours (a full semester) of observing or teaching, far beyond reason for a person who has spent most of his life in school. Nevertheless, this package is considerably better than the 36-39 semester hours of "professional training" usually required for undergraduates and the 45 semester hours being threatened in some quarters for a class "A" certificate. Dare we mention that the people under this program will take graduate courses in "education" without undergraduate preparation (which normally would be required in a real science, such as engineering or chemistry)? I am glad that this new program permits the entry of a solid degree in physics and math into the teaching profession with just one year of waste. I wonder how many bright people will give up the idea of this new path to teaching after they are flooded with **insistent** nonsense in the "education" courses or when they realize that they must return periodically to the college of "education" for "updating". Most of us resent indoctrination, especially if it violates our common sense or our belief in what is right. I have seen bright students avoid teaching or leave teacher training because of the insistent nonsense which is the major content of most of the courses in "education" [60, p 19], [1, p 181], [31, p 28]. I have been told (and you can see for yourself by examining the school catalogs or Table 3) that UAH has the most demanding and enlightened teacher training program in the area and is beginning to suffer for it as students flee to less demanding nearby schools. This is what happens if the standards are local.

After you graduate and start teaching, most systems insist that you go back to the nearest teachers college for further mental abuse ("continuing education") while your time is wasted and your bank account is diminished. It does not matter that your teaching is superior and that you know the junk already. Maybe some people need to go back to school for some further learning in their teaching area, but no teacher should be forced to spend time and money in school unless an objective measure of an important skill shows that he needs a well-defined kind of remediation. No course should be required or accepted unless it contains enough useful knowledge or skill of some kind to provide the basis for an objective test. If you can pass the test without further schooling, you should not be required to go back to school. What is wrong with learning to pass a test by study from a book? It does not cost as much and is just as effective if useful knowledge is the primary concern. The blanket requirement that everyone go back for a refresher at the college of "education" is based on the leveling assumption that everyone is the same in their needs and in their abilities to learn and retain. This is an obviously stupid and unfair assumption to anyone that ever went to school or took a demanding course. Maybe we should call this practice of "continuing education" by the name of extortion, the use of power to extract money without giving a benefit, similar to a "protection" racket.

Repression of Able Students

If you were an incompetent teacher with little knowledge you might feel resentful and insecure dealing with very bright young people interested in everything. My wife Patricia told me about a second grade teacher at a school where she taught first grade. This second grade teacher would come into the teachers' lounge area bragging about how she was going to bring some of her students down a peg or two. She named names, and my wife noted that they were her brightest and best-behaved students of the year before. This is the price we pay for incompetence trained by the college of "education". It hates brilliance and starts a vicious leveling and discriminating pattern even in the lower grades. This unconscionable behavior is often disguised as cultivating humility, fighting elitism, being democratic, promoting social development, or preserving the self-esteem of the less able [30, p 28]. "One man's opinion is as good as another's" is an effective rationalization for the repression of the talented students, whose studied knowledge in their areas of interest is worth far more than some uninformed opinion, even that of a teacher.

I had a physics teacher once who had difficulty solving the problems, a common occurrence in math and physics classes, but another student and I could do well at them. We both received "D" grades one month to show us that we "did not know everything". This kind of teacher response is common when the subject matter is beyond the teacher but is in easy grasp of the more capable students. You and I might succumb to that same behavior if we were threatened in the same way. This particular problem seems to be on the way to solution by simply removing everything requiring thought from the curriculum, thereby making all students "equal" and all the teachers competent. This action is justified of course by a "sincere" concern for those who cannot do the work There is no sorrow that achievement and recognition are denied to all the students who **can** succeed.

One of my grade school teachers had always been kind to me until she heard that I had made the sixth and seventh grades in one year. She waylaid me in the hallway as I went by, grabbed a choking hold on my shirt collar, pushed and pulled me back and forth, and berated me severely for "thinking I was smart". I had done nothing to provoke this assault before she grabbed me from behind.

Computer science is another area where talent is important. I knew a bright high school student who was a computer enthusiast. He became the neighborhood expert by studying on his own with friends and family. To get some easy credit in something that he liked and already knew, he took a beginning course in computer science in the local high school from a teacher who was far behind him in operational capability. He was graded cruelly for not doing tedious exercises at which he was already expert, and was denied admission to the "advanced" second year course because he was too "troublesome". Any teacher who knew and loved computers would be overjoyed to have such an aficionado in her class and would have gone to considerable effort to use him to help and inspire the others, but this one felt threatened and she retaliated in the pattern typical of losers.

Our most effective way of repressing able students is to tie them by virtue of age and grade to the progress of the bottom quarter of the class, the performance of which is always declared to be acceptable. Even in "tracking" the same pattern prevails. We pass everyone along together and end up with students with eighth grade ability in the sixth grade combined with students of second grade ability, or produce high school graduates who are functionally illiterate after being immersed in an "enriched" curriculum. To remove the injustices and inefficiencies of our current system, we must divide our learning into units defined in terms of subject matter and let each student move through to the next unit after demonstrating sufficient knowledge and skill.

The so-called college track, with its emphasis on language and "soft science", will usually do nothing for "working smart". Further, tracking often results in an abuse of equity and is subject to manipulations unjustified by academic ability or educational effectiveness.
There is a lot of talk about special classes for the gifted students. One parent I know took his children out of a "gifted" program because they were not learning as much as students in the regular program, possibly because a below-average teacher was given the assignment after it was found that she could not manage a regular classroom. This kind of foolishness can be avoided by removing the grade-age lock and letting gifted students move to the next unit or grade when they are ready. We do not need multiple programs in school for rapid advancement and remediation. We need **one** well-defined program with student mobility determined by performance. Able students in the hard sciences and mathematics are repressed because of a lack of competent teachers in these areas.

Use of the Schools for Political Patronage

The lack of objective standards makes the schools more vulnerable to political influence and payoff. The school system cannot be coerced to hire just anyone if applicants must first pass tests and meet standards. The US and British civil services were respected as long as they gave examinations and maintained standards, and corruption was very rare. Bright people who earn and deserve their jobs are more difficult to corrupt. When the great Isaac Newton went to Cambridge to begin his education, the professors were mostly appointed for political or religious reasons [48, p 161], and many drew their pay while never doing scholarly things like teaching or publishing. I mention this as an encouraging example that schools **can** be changed. In the communist systems, party members, with no qualifications other than "believing the right thing", were given top supervisory jobs. That is one reason why socialism failed. Believing the "right" thing will usually get you through the college of "education" whether or not you are competent in any definable skill. Competent and responsible teachers do not need a stuffed bureaucracy to waste their time with demands for reports and with promotion of "innovations" which have been demonstrated in the past to be patently useless.

Sexism and Feminization in the Schools

Any physiologist can look at a brain and tell whether it is male or female by the way the two sides are connected.

Any surgeon who has dealt with disease or accident to the brain knows that women apparently recover better from loss of a part of the brain than do men. Any IQ test measures several abilities, some more prevalent in men and some more prevalent in women, and the test makers weight the number of questions in each area of ability so that male and female populations each have an average IQ of 100. It is amazing how many psychologists pretend not to know this and how fearful they are (they say) that the truth might support bigotry or promote mistreatment. The head of the Brain Institute at one time said that everyone in the business knows that the male and female brains are basically different, but no one wants to fight the vicious politics greeting those who say so [50, p29]. Recent improvements in brain scanning have removed any doubt that the male and female brains are remarkably different in organization and function, but any mention of sex differences in the distribution of mental abilities usually triggers raised eyebrows and often evokes a tirade of abuse [13, p 99], [17]. It would be most unusual indeed if two computers wired differently could do a variety of tasks all with equal speed and accuracy.

The American Physics Society appointed a committee of women physicists to discover why women were so scarce in physics. They came back with the answer that physicists are nice people but that women are so intimidated by mathematics that they never get to physics, which demands [applied] mathematics as a prerequisite (not to exclude women, but because physics cannot be done without it). More mathematics means fewer women, whatever profession you consider [28, p 12]. I do not think that bias, culture and societal expectation contribute more than a small fraction to this trend. I will argue later that sexual differences can be advantageous to the extent that we ought to recognize and use them instead of denying them, spending money on equal outcomes in every area of endeavor, and blaming society. We do not need another class of victims because some women are said to lose their self-esteem and interest in hard science and mathematics in their adolescent years [72].

I can say truthfully that I have helped and encouraged (almost to the point that I could be accused of partiality) every woman who attended my classes, and I have seen colleagues do the same. My top two students this last year were women, despite their cultural disadvantage of not driving as many nails and working on as many hot-rods as the average male. I supported and encouraged one daughter in obtaining her degree in chemical engineering and my daughter-in-law has a degree in civil engineering.

Lest you feel too sorrowful about women in math and hard science, let me tell you about the problems of men in biology.

On the average they are much weaker in vocabulary acquisition and pattern recognition, which are severe handicaps in biology. I have heard them complaining bitterly in the hallways about having to identify thirty microorganisms by their shape, size and colony configuration, and I see that women almost always make the best grades in biology. We have fairly solid evidence (statistics) from thousands of students that applied math is biased against women and biology is biased against men. Should we declare both men and women to be victims? At my college, 16% of those in Who's Who were male, 10% of those named as outstanding students were male, 34% of those rated as best in an academic discipline were male. Valedictorians and salutatorians from the local high schools seem to be preponderantly female. The high-school dropouts are mostly male. I have heard loud cries of discrimination based on statistics less one-sided than these. I am beginning to believe that all of us could find conclusive evidence that we suffer from discrimination.

Using what we know about the composition of IQ tests, we might try to develop a curriculum with which men and women could do equally well. This has been discussed in the media by testmakers whose tests are used to award scholarships, and I know that it can be done. Is it worth anything to have the genders equally distributed in **every** selected population? I hope not, because it cannot be achieved within the bounds of openness, honesty, equity and common sense.

You may not agree with my attention to low male achievement or my explanation of it, but if the male-female numbers were reversed in the political climate of today, this imbalance would be considered as de facto evidence of gross discrimination against women. By the way, I abhor any kind of discrimination (or reverse discrimination) that keeps any person from an equal share of opportunity, but I do not view as evidence of discrimination the fact that some people do better than others in some areas. The Readers' Digest [17] recently published a little test to determine the sex of our brains. I am sure this angered people whose politics have closed their minds on the subject or who see it as a threatening resurgence of male chauvinism. In actuality, the test made women appear to be a lot smarter than men (the only safe conclusion) because it was based on skills that are more abundant in women.

There have been many books written about different methods of teaching reading, and each claims a great secret [4]. The school systems flip the methods every few years to keep the teachers confused. My wife, who has taught first grade for many years, pointed out to me long ago that male students on the average have more difficulty than female students in learning to read.

When her school started pushing "see-say" [sight] [pattern recognition] reading instead of phonics [phonetics], she told me that she was going to keep phonics anyway because males usually learn better that way. She had always taught by both methods to give all the students every chance to learn to read and never worried about there being a possibility that males and females, on the average, faced different problems in learning to read. Both sexes need to learn to read!

A difference does not imply an inferiority. As a do-it-yourselfer, I have a hammer and a screwdriver. It would be foolish for me to worry about their equality. My choice of one or the other depends on the kind of work I am doing, and many tasks require both. I am glad that they are different and the difference is an advantage to me.

Most biologists view bisexuality as a survival advantage, since most of the big animals are made this way. Some view it as a curse to both sexes, but I say that, if you have a variety of things to do, a mix of tools usually lets you accomplish more than having them all alike.
Several studies have been made of scholarships and who gets them, and every identifiable group seems to have an excuse to cry "foul". Relatively speaking, mathematics, physics, advanced science and engineering have a lot less women than men. Women do better in chemistry, which has less math, and much better in biology, which usually has little or no math. These rankings seem to be determined by the prevalence of mathematics in these courses. Women do not rush to apply for the scholarships in math and physics but they are quite competitive in chemistry and biology. This exercise of choice by women (and men) not to compete in certain areas is often construed as bias in scholarship awards. There is little concern that men do not compete in certain areas. You can use your favorite arguments of culture, bias, discrimination or expectation in explaining why men like some areas of study and women like others. My explanation is that their brains are wired differently and, given a choice, they each gravitate to what they do and like best. Is this bad? My wife recently attended a lecture by a well-known scientist who told how her engineer father tried to teach his son "all the things a man should know" and that she learned them better than her brother by tagging along unnoticed and uninvited. After the lecture, two sisters told my wife on the way out how their parents always pushed mathematics and how they hated it; they felt persecution rather than opportunity. They were supposed to leave the meeting feeling that women were mistreated by the denial of opportunity, and they left recalling how they had been mistreated by the coercion of unwanted opportunity. It is time we started worrying about people as individuals rather than as members of groups.

We should worry when **any** student is denied useful learning that he or she could easily absorb rather than worry when some do better than others when all opportunities are equally available.

To me, all this talk of sex difference or sameness is irrelevant. Each person ought to do what he/she does best in an honest unbiased system with equal opportunity. If you choose any definable attribute that you want to measure you will find two things: a difference in the averages for men and women and a large overlap in the distributions of the attribute. Operationally this means that no intelligent and honest person would base any hiring decision on sex alone, and that no informed and honest person would argue discrimination on averages alone. When you compare and make a choice between the abilities of two individuals, sex and averages from populations are unreliable indicators. What I have just said is that it is wrong to use averages from any two populations to claim bias, but it is more right but still tricky to use averages from a selected population to argue bias. As an example, if we choose the twenty best spellers in school, we cannot argue bias if there is a smaller fraction of males than females in the group, but we **can** argue bias against males if the average proficiency of the chosen females is less than that of the chosen males. Even this is suspect if you **really** wish to be careful. Most of us find it easier and more pleasant to keep a prejudice than to do a careful and honest analysis.
As I tell my students after a little discussion on statistics, the amount of money in **your** bank account is a lot more important to you than what is in the **average** bank account.

I have always felt that women (on the average) would make better medical doctors than men. Russia has more female than male medics. The politics and philosophy in Russia may have been bad, but they seem to have followed their revolutionary tenet of sexual equality, in medicine at least. Why not admit our possible differences, view them as a symbiotic complementarity, and use them for a greater mutual happiness, rather than insist, against a multitude of facts, that there are absolutely no differences in any definable attribute? Let females play football if they wish, but let us not insist that half the players on every team be women or that less women than men on the football team is de facto evidence of bias. We could argue bias honestly if a team of women could be collected and trained to beat the Crimson Tide. Numbers often show choice rather than bias, and you cannot in every instance tie the difference of male and female choices to society rather than to hormones [50, p 29]. It is probable that we who have descended from the survivors of prehistoric hunts, battles and diseases are not the best choices for our current society. The differences between the sexes may have been optimized for another time and place, or may not have been optimized at all.

The best we can do is to try for an understanding of what we are as individuals and use it to our best mutual advantage. It would be laudable if we could learn to do this without defining a class of victims and without the usual alienation which makes rational thinking and cooperation difficult. It is a chore to work with people who let the past cloud their opportunities for the present.

Egalitarianism as a Philosophy

I am in favor of equal legal and political rights for all citizens. I do not make a religion of insisting that any two given individuals are equal in every possible attribute. If they were, we would need to vacate our claim to uniqueness. Some people claim that everyone is the same and that everyone is equal while they pursue sports and ambitions whose purpose almost always is to demonstrate inequality, either as teams or as individuals. All cars are equal because they can be driven on the road, but price and performance are far from equal. All students are equal because they can go to school at public expense, but how well they learn or how fast they can run is anything but equal. Similar statements could be made for civilizations, lifestyles, college degrees and trees.

Thirty per cent of our casualties in Viet Nam were attributed to land mines, little gadgets that explode when you walk or drive over them. Among a lot of other scientists and engineers, I was given the assignment to look for ways to reduce mine casualties. Among the several options that looked promising were dogs and we found ourselves in the dog training business.

Some of the psychologists and some of the military officers immediately were in a dispute over training methods. The psychologists rightly wanted to use operant conditioning, after B. F. Skinner [21], and some of the military men wanted to include punishment because it was cheaper and easier to manage in many field situations. Some wanted to keep the dogs on a leash so as to have total control at all times, but the old coon and rabbit hunters knew that this was foolish. Some wanted to use German shepherds and one of our psychologists insisted that all dogs were alike (a naive extension of egalitarianism). I was amazed to learn that dogs and horses can be bred for loyalty, a surprising and repugnant idea to many. Working with animals makes us thoughtful about a lot of the social wisdom being rained on us by our colleges and universities. Out of an inauspicious beginning we all learned a lot. All dogs are not alike, even within a group of thoroughbreds. The most efficient and useful training consisted of reward **and** punishment.

If you want the dog to use all of its considerable resources to get the most done; you use a reward system with maximum freedom. Any mathematician should understand this and any administrator deserving her pay should know this. If the dog wanted to take time from work to chase rabbits, no feasible reward on earth would deter it from an occasional fling at that sport, so if you wanted to be sure that it never did that again, you punished it severely. Does this make sense? When my helicopter landed at one base camp in Viet Nam, about a hundred dogs rushed the helicopter begging for a ride or a cooling under the rotating blades. It was the only way the heavy-coated German shepherds could get cool, and the kindness of the troops had obviously trained the dogs to appreciate helicopters. The moral of this shaggy dog story is that it may be polite or nice to deny differences or to have a single approach to a problem, but the human costs are too great if you must solve a real problem. We also learned that soldiers would accept a greater but equal battle hazard better than a reduced battle hazard unequally distributed. The dogs at one place were actually mistreated to the point of ineffectiveness because some of the soldiers surmised that the dog handlers would be shot first

Egalitarianism in the classroom should extend to opportunity but not to outcome. It is inefficient and unethical to tie the progress of the class to the slowest individuals and reduce learning opportunities for the more competent students. This leveling policy works against the maximization of knowledge, will never produce high quality professionals, and fits quite well into the philosophy that ruined the communist economic system: "Do not reward the able for accomplishing more, but reward those who follow the party line."

The Trap of Self-Esteem

For years I have been troubled by "educators" trying to preserve the child's self esteem and make him feel important. I want the child to **know** that he is important, but he and his guardians need to know how well he is doing. More importantly, it is better for everyone to have self esteem based on reality. Let me explain in detail how the "educators" botched the school system with ostensible concerns for self-esteem [30, p 28]. In reality, this was just another scheme to promote leveling and equal outcome. I taught under an S-U-F system. "S-satisfactory" was supposed to mean that the child was working up to his ability, "U-unsatisfactory" was supposed to mean that he was not, and "F-failing" meant that he did not care.

Note that a grade depended on an assessment of the child's ability and the amount of effort he put forth, two very difficult things for any teacher to determine objectively, especially for those who have no standards. Achievement, the attribute most easily and accurately measured and the most important, was never considered in the S-U-F system.

Teachers, children and parents, after they compared grades, could not explain or understand why the child with a near perfect paper made a "U" and a child showing a third as much knowledge made an "S". The kids quickly learned to pretend to try hard and we trained little dissemblers and hypocrites for a few years. All this was done supposedly to preserve the self-esteem of the children doing poorly! As is usual with something so obviously foolish, "S" reverted back to good performance, "U" to average performance, and "F" to failure to perform, based on test scores or whim, whichever the teacher found to be convenient. **You have a good excuse to do whatever you wish in an admittedly subjective situation, and you are less likely to be accused or criticized.** The major effect of this policy was confusion and maltreatment of the able, promotion of a leveling philosophy, and a strong doubt by teachers, students and parents that this method of grading was honest, useful and edifying. Who would think of giving the blue ribbon to the runner that tried harder rather than to the one that ran faster? Only "innovators" from the college of "education"!
The S-U-F mentality is back [80] with the Alabama State Board of Education. The SAT (Stanford Achievement Test) measures the amount learned. The OLSAT (Otis Lennon School Ability Test) measures the ability to learn. The quotient of test scores (SAT/OLSAT) for a student is presumably a measure of student motivation. As discussed above, we can use this datum to punish a student for being lazy or being competent. If the average of student quotients for a school is low, we can blame the teaching staff, the parents or the community.

The development of standard achievement tests, based on large databases and prepared by the colleges of "education", would be a great service to the nation. Testing would cost less and cheating would be much more difficult. Everyone knows that there is a wide spread in ability among humans, whether we are considering music, art, or athletics, and that we really cannot bring all the students along together or prevent the slow ones from finding out about themselves and others.
Some schools organize groups according to ability and call them blue green and orange teams. Note the careful choice of colors. After about two days, the parents and kids have learned what the colors mean and we are back into stigma and self-esteem. The kids also learn that the system is secretive and dishonest.

Like everything else poorly defined and managed, the system called tracking often degenerates into economic or social bias rather than ability grouping. I am against tracking because it still treats everyone in a track as if they were the same in interests and abilities. We should assign individuals to classes along specific subject matter lines, not by generalities. Why keep everyone on the same track when some excel in math, others in biology, and others in language?

In many places we are throwing away ability groupings and arriving at small groups with a wide spread of abilities. This shows some sanity, at least, for the able children, with their direct and impolitic approach (so hard on self esteem!), can help the others get in a lot more drilling and practice than the teachers could arrange if they had ability groupings and did it all themselves. On the other hand, the leveling instincts of the "educators" [30, p 28] will probably insist that all members of the group get the same grade (to show that they are all in the same boat), in direct agreement with the Marxist maxim, "From each according to his ability, to each according to his need." A group grade will probably require less work on the part of the teacher, especially since we know that the group grade will be good. Some kids may learn that work is unnecessary. Self-esteem may fall by the wayside when kids with widely different capabilities confront each other with one knowing, so that he can teach (without credentials!) and the other knowing that he is behind. It is hard to have a perfect world!

Of course, there are good reasons to teach at the lowest level: No one fails and there are fewer bellicose and critical parents. You can treat everyone the same, regardless of needs or abilities. Finally, you do not need to know as much to teach to the bottom. Other unfair and inimical philosophies of the college of "education" will be pursued in more depth later.

Evaluation of Education

Few of us like to be evaluated, but we cannot avoid it if we live in a free and open society. If we sing, converse, buy, sell, exchange glances, or interact with another person, we find ourselves under observation and evaluation. If we go for a job interview or work in a profession, we are still vulnerable to strong and sometimes disturbing emotions when we are evaluated. About all we can hope for during an evaluation is a friendly, competent and honest environment. We soon establish our own evaluation of the environment if our pay and status depend on it.

As a supervisor in government and industry I used (and was subject to) a lot of different personnel rating schemes, most of them totally subjective.

At one place I had to rank secretly 30 scientists, engineers and technicians in order of their value to the company. The chief engineer and I used the list to determine raises, promotions and terminations. The US Army, with the leadership of a 5-star general, once tried to do this kind of thing openly but it was resented so thoroughly that the general wisely retreated before it was implemented. The US Civil Service tried several cumbersome schemes that were open but nebulous enough for the hierarchy to be as subjective as it wished, the way we all want to be.

As a teacher in areas of science and technology, I tried to grade objectively by performance, whether or not I liked the appearance, attitude, behavior or demeanor of a student. I informed each class by means of a syllabus how a grade was earned and I struggled to be consistent and impartial. I sympathized with good efforts but the correct answer was all that mattered. Effort and good intentions do not matter if your mechanic leaves your brakes in a dangerous condition because he is incompetent.

I remember a long debate about the best way to evaluate tools and service organizations. The final wisdom was reasonable. You don't ask the postman how well the mail is delivered. You ask the users, the senders and receivers of mail! In evaluating tools, you ask the people who use the tools, day in and day out, to earn a living. In evaluating schools, we need to ask the users: the industries, professions and trades who employ their graduates. We, as users, need to know if the schools are teaching useful things and if they are teaching them well. We ought to tell them what is important to us and what we expect of them. There is a management adage that the important thing is the thing that is checked.

Our largest business needs standards for performance. We need openness so that we all can know what is going on. We need efficiency to reduce the tax load. Above all, we need knowledge and skill for the benefit of each citizen and the industries for which he works. Every public employee needs to know that he works to benefit the public and that he is accountable to the public for doing the assigned work. For a teacher in any subject, the job assignment should be in the form of a standard syllabus defining the knowledge and skills to be delivered to the student. To be hired, the teacher and supervisors should be tested on the material described in the syllabus. Every student should be tested when the course of instruction is completed. The teacher and supervisors should be evaluated by the performance of the students. What other objective means of evaluation are there?

Summary

The philosophy and practice of the colleges of "education" are concerned mostly with indoctrination and politicization that support the unethical processes of leveling and "dumbing down".

Each academic discipline develops its own best way of teaching its followers.

There is no general pedagogy useful to all, nor is there any need for or benefit from the offering by the colleges of "education" of "how to" degrees in other academic disciplines

Degrees in "education" are easier to obtain than any other kind, are based on erroneous assumptions, and on the average are obtained by the less able. They are by far the most plentiful academic degree in the country.

The college of "education" has demonstrated amply that it cannot be trusted to plan a curriculum to train and certify teachers for mathematics and science.

The present management practices of the colleges of "education" heavily discriminate against useful math and science.

The graduates of the colleges of "education" practice overt and covert discrimination against our high achievers.

Teacher colleges and teacher unions are solidly against any objective means for organizing, testing or evaluating educational processes and personnel.

The use of standards will provide solid evidence of malfeasance by our "education" system as well as by the colleges of "education".

Objective performance standards will remove much of the politics and arbitrariness from the management of school personnel.

No teacher should be coerced to study in the colleges of "education" unless objective tests determine that there is a need and a benefit.

Many countries do quite well with no degrees in "education" and "education" management. They promote from the ranks of competent teachers.

Egalitarianism is the wrong philosophy for our schools. It can be achieved only by stifling the able.

Male and female minds are different and the difference is good. What is so bad about that?

The bases for educational credentials should be knowledge and performance, not residence in the college of education.

The country would be better off without our colleges of education if they insist on leveling, "dumbing down", resisting useful standardization, extorting money from teachers and ignoring the users.

Advancements and promotions for teachers should depend on knowledge, skill and student learning, not more expensive trips to the college of "education".

Chapter 5

My Recollections of a Junior College

Purpose and Practice

The junior colleges are doing a great service for the people of this country in that they provide more affordable education close to home. They have dealt with the poor quality coming from the high schools either by lowering standards or by offering large numbers of remedial courses, not for college credit, at the high school level. They usually offer courses in the evening or on the weekend for those who work during the day and have hopes of bettering themselves in their spare time. There is little doubt that the junior colleges are adding to the knowledge base of the nation and are reducing the waste of American talent by giving it an affordable place to develop close to home and by providing instruction at times available to almost everyone.

In my last place of work as a physics teacher at a junior college, the administration, until very recently, was almost entirely a product of the college of "education" at the University of Alabama. As I did my work I had ample opportunity, some of it unwanted, to observe first-hand the actions of quite a few administrators and teachers with doctorates in "education". My managerial experience and training in industry and government over the years made it possible for me to compare the operation of the junior college with that of other organizations with highly trained professionals.

Despite the several instances of poor management which I will discuss candidly below, most of the management people were the sort that you would like to have for neighbors. They were kind and helpful with good character and a concern for others. I will not criticize their character or their good intentions, but I will argue that their academic management was inimical to scholarship in general and to "working smart" in particular, either because of a poor management philosophy or the lack of a well-rounded education.

I intend to show that their management decisions were consistent with the leveling and "dumbing down" philosophy of the college of "education". My personal knowledge of the students officially honored by the institution told me very clearly that mastery of academic subject matter was not high on the list of things deserving notice by managers from the college of "education". This is a strange statement to make about a college, but I will present later the statistics that gave me little choice but to believe it.

Spending in the Wrong Places

To the managers from the teachers colleges with a firm background in leveling, a course is a course and a student is a student, despite the fact that some students must do laboratory experiments and use expensive equipment. A good example of this might be a machine technology student using a $200,000 programmable milling machine It was rumored that $50,000 was spent in redecorating the administrative offices and $50,000 was spent for a new bus, used mostly to haul athletes around. Like the people who worry about image rather than knowledge, the administration has spent a lot on the accouterments of office, much more than Sam Walton or Robert Townsend [23] would have permitted at an equivalent level of responsibility, and considerably more than enough to provide the $10,000 I needed, but never received, to have a physics laboratory sufficient to satisfy the physics courses advertised by the college.

My general opinion is that every student needs physical activity and some physical education [3] and that the money we spend on specialized competitive athletics could be better spent on real students with real learning objectives. We give a lot more and better scholarships for athletics than anything else, we have none earmarked for science and mathematics, and we shortchange those athletes who might want an education by causing excess absences when the team plays away from home. As far as I can tell, the athletics program at my college has not seriously compromised the institutional integrity, but it is a poor way to spend the academic dollars if there is not money available to support science laboratories at the level of $5.00 per student per quarter after the labs have been brought to a functioning level. This is a small fraction of the money charged for tuition.

"The More Things Change the More They Stay the Same"

I should point out that we acquired lately a new president and vice-president with doctorates in education, but not from the University of Alabama.

I was naturally critical of the objectivity of an administration that had everyone from the same school, even if it had been Yale or Harvard rather than the University of Alabama. I think also that having all administrators from the school of "education" is strong evidence that the best available talent for administration has not been chosen. I would have had the same feeling, but less so, if the administration included only physicists and mathematicians. I worked for a nuclear engineering department once in which, after a reorganization, almost every supervisor had his Ph.D. in physics from the University of Texas. Quite a number of competent personnel left soon thereafter to work for a competitor. I expect this kind of behavior in a political spoils system where competence is unimportant, but not in educational or scientific organizations where knowledge should make an important difference. I believe in merit promotions from the ranks, and I believe further that this practice will result in a dispersion in geography, academic discipline and minority groups. More and more organizations are becoming skeptical of trained "managers" who are ignorant of the company business and are lacking a skill of any kind [23, p 71]. The new president is said to have earned part of his education as a skilled musician, which tells me that he has been part of an exacting, demanding, and standardized art. I respect the general ability package of a practicing musician much more than I respect a trip through the college of "education" to get a "management" degree.

Science and Student Registration

In the registration of 7,500 students for one quarter, there were 162 in physics, 357 in chemistry, and 1,113 in biology. The physics equipment budget for the year was $2,200, which averaged about $3.40 per student per quarter for equipment, materials, and repairs, most of which I have done myself at no cost to the school. The tuition has been raised markedly to include "instructional costs" but, as far as I know, none of the increase has been spent on laboratory equipment for science and technology. The number of students in biology and chemistry mostly represent the expectations of students who hope to work in the health industry, with some few in chemistry and physics going to science and technology.

Technology

Part of the college is dedicated to the trades, such as air conditioning, beauty shops, welding, machine technology, industrial electronics, office training.

Those training in manufacturing technologies needed applied mathematics and physics, but there were not enough quality students to keep some areas alive, especially if there were losses because of math and physics, which is always the case. Physics, the course needed to connect everything together and relate math to nature, was dropped as a requirement for the technology program. Math was kept more for the sake of image and taught in pure form, and the last time I looked, the students were not being taught to use it because of the limitations of the instructor, who could not apply math to technical situations.

Without any background in science and technology and with a strong desire for retention, the "educators" do not understand that considerable intelligence is required of industry technicians, and that we cannot make useful technicians from academic flotsam and jetsam. One student, taking physics with me while in training to be an electronics technician, had a father who was employed as a technician at a nearby factory. One day this ingenuous student came to class with the story that the father had said, "I would not hire you as a technician because you do not know anything." He was right of course because the student had little technical interest or ability and could not remember simple physics lessons from one day to the next. We need to give our industry bright educated technicians able to support an engineering effort. Many companies are using engineers for technicians: the total employment package is about the same and technicians of sufficient quality are not being educated properly by the trade schools and junior colleges. Even the engineering degree is becoming somewhat uncertain as colleges without standards are beginning to offer degrees.

Oppression of the Faculty

For a long time at our school, the faculty could not copy instructional material on copying machines or make long distance telephone calls without management approval. Managers were often not available to give approval and they in effect delegated it to the secretaries, so that the faculty was down the chain from the secretaries. What organization, other than an educational one, would treat its key professionals in this way? The excuse for this kind of demeaning and damaging restriction was that someone had abused their privileges. If this had been true, that someone should have been penalized without reducing the effectiveness of the organization or demeaning the faculty.

At one time in my career, I was looking each month at the phone bills of 150 scientists and engineers doing a lot of contracting.

It was easy to spot the problems and take care of them without taking a tool away from people with a job to do, or calling a meeting to include everyone on problems concerning a few, a favorite practice among "educational" managers, as my wife and I have observed over the years. Personal copying under the guise of preparing instructional materials could be dealt with in an easy and effective manner by reviewing occasionally the work sent to the copy machines and penalizing offenders, or by making spot checks on large jobs. Recently, with the arrival of an interim president, who had spent some time with technical people, the restrictions on phone calls were lifted. May he be blessed. Teachers still must obtain approval for copying material (tests, instructions, syllabi) for classroom use, but it is no trouble in my department because the secretary does all the approvals and handles all the paperwork kindly and pleasantly.

We acquired a new telephone system, and there were several mass meetings to teach the faculty to use the new system effectively. The meetings were far enough away from our work place to cause people to drive and have no parking place when they returned. Surely one page of well-written instructions would have enabled the faculty to learn how to operate the system, save gasoline and time, and provide notes for the future. It seems that many "educators" believe that literate people cannot learn by reading, but must have "tutoring." It turned out that the oral and written instructions were erratic and incomplete, and I had the feeling I often have when I grade the papers of students who did not do their homework.

Consulting

The management requires that professionals obtain approval for any consulting done in spare time. We have people among us who farm, preach, run stores, and sell insurance and Amway with every spare minute they have, and the administration does not care. It only wants to control what we do with our professional training, as if that would be more damning to the institution than selling insurance on the side. A former president seemed to be offended when I asked the reason for management interest in spare-time consulting and in no other spare time activities, and he made a sarcastic remark about "administrators have nothing else to do but think up ways to harass people." With one administrator for every four faculty like we have here, I almost believed him. Because of trade secrets, industry might have a valid reason for knowing about outside consulting, but a public school should encourage it as a benefit to local industry by leaving it alone if it does not interfere with school business.

The real reason for control of consulting, I suspect, is probably because the college wants to collect overhead on any paying relationships, a thing hard to do with Amway salespersons or preachers.

Mentoring

Some of our administrators heard of the glories of "mentoring", and the faculty was given a series of lectures by "education" doctorates on how it should be done. One advised sitting on the same side of the desk as the student during a mentoring interview to promote greater trust and imply friendliness. I remarked that, in my office, there was not enough room on the other side of my desk for two people to sit without physical contact. Fortunately, very few students signed up for mentoring and the great scheme fell through after a considerable waste of faculty time. Graduates in "education" like to push these little "innovations" without enough market research to determine student interest and need or faculty competence. I am always willing to talk with students before and after class and I do not need sensitivity training by "educators" in advising potential scientists and engineers. I have worked among them for years and I know, much better than the "educators", their problems and aspirations and how the material I teach fits into the greater scheme of things.

Recently I have heard a few words about "proactive intervention", which I interpret to mean the aggressive implementation of faculty "development" by those who "know the right methodology".

Help from the Management

After designing complex electromechanical equipment for years, I found that the head of the business and accounting department was dictating how many electrical outlets and experiment tables I could have in an electromagnetics laboratory. We are still inconvenienced by his decisions and have about a third of the capability we need to handle the evening school enrollment. Fine surplus lab tables, with hardrock maple tops, were already on site from another program, but I assume that I could not get them because someone wanted them to show up as surplus to be sold to the general public as kitchen counters.

I believe that the administration understood the injustice and folly of the action by the accountant, but did not wish to tackle an entrenched specialist who knew where the bones were buried. At another time the same man balked at installing an ice machine for chemistry and physics experiments at an extension site until I showed him in detail how the plumbing could be done within his building maintenance guidelines.

Almost anyone with some quantitative science in his background knows the value of laboratory measurements to a generation of TV watchers. For the past ten years my school has been unable to find the time and equipment for a physics laboratory advertised in our catalog as part of the physics training. At the main campus during the day, we have small classes and can offer all the laboratory exercises advertised. In the evening classes, neither time nor equipment is scheduled or available. In the Huntsville extension, partial laboratories are offered for some courses but no course offers the laboratory exercises to the extent advertised in the school catalog. The obvious needs for institutional integrity or for laboratory work in physics training are not sufficient to cause the administrators to do the right thing, but I believe that they would do better if they had a little hard science in their backgrounds or appreciated the problems facing the nation.

I have in my career taught a number of courses in math, physics, electronics and computer science. In some courses, you lecture in a room and go home after class. You usually need to work outside class to prepare lessons and tests and grade papers. If you teach a physics class, you must in addition acquire, maintain, and operate equipment in lab situations and interface with bean counters in acquiring and accounting for it. You must set up each experiment, see that it works, supervise and help the students during lab, and grade the resulting lab reports. For all this extra work my teaching load is reduced 10%. The adjunct physics professors have shown a great reticence to do twice the work of other instructors for the same pay. Most schools have attacked this problem with full time lab instructors or extra pay, but the egalitarian stance of "educational" administrators is to give the students less than a standard course if it costs a little more money.

Furthering Education for the Faculty

As far as I know, every single advanced degree obtained by the instructors during their teaching careers at my college, came from the college of "education" and not from departments in their areas of specialization and not one degree of any kind was acquired by a degree holder in applied science. How can you explain a college climate that makes it worthwhile to get degrees in "educational" administration rather than in the knowledge areas where the teaching is done? Are the teachers interested in knowing more about their fields? I believe that they are. The problem is that they are more likely to get promoted if they have a degree in "education" administration, and they are paid by degree and years of experience.

So they get the cheapest, fastest, least troublesome degree available, which may have more promotion potential and certainly a higher salary. I do not blame my colleagues for taking the fastest way to a raise in pay, but I am sorry that it leads through the college of "education" and does not strengthen the knowledge base of the country. This practice insures, over a period of years, the degradation of knowledge for both the school and the country and for both teachers and students.

The promotion and reward system ought to encourage knowledge, but the college of "education", by its outright bribery and the incestuous hiring and promotion practices of its graduates, practically guarantees that a teacher will not get an advanced degree in the area in which he teaches. The college of "education" makes it as easy and as convenient as possible for teachers to acquire advanced degrees whereas some of the other colleges, in addition to their greater academic rigor, often do not seem to care about part time students. I view our "continuing education" for faculty members as adding nothing to the useful knowledge base of the country or in helping us to "work smart".

Credit for Teaching

Pay at the college depended on degrees earned and time taught there. A new ruling by the state gave credit for teaching time at other places from kindergarten through high school, but no credit for teaching in college. I had accumulated teaching time in the Civilian Conservation Corps, the Army Air Corps, junior high school and undergraduate and graduate schools. It seemed strange to me that a college teacher would get teaching credit for kindergarten but not for college. Later the rule for credit was amended to give credit for part-time college teaching except for graduate fellowships that included teaching. I argued unsuccessfully that I held a teaching certificate from Kentucky while I was teaching engineering students and education majors at Tennessee, at one third faculty load, and should get credit for this teaching. It was interesting that part-time teaching was accepted, except when one was working for an advanced degree!

Teaching Good Citizenship

As at most schools, there were not enough convenient parking places on the junior college campus where I taught. There are generally three kinds of parking places, staff, faculty and student.

A lot of students do not bother to register their cars, and they park anywhere they wish, especially on rainy days. Parking rules are not enforced, and if a member of the faculty has an errand to run, like attending an unnecessary meeting on the other end of campus, he usually has no place to park when he returns. Most colleges and universities rigorously enforce parking and library rules, but I have had the feeling that the administration was reluctant to encourage students to obey the rules for fear that some student might become angry and quit if the rules were enforced. The inconvenience to the faculty did not matter. In one flagrant case, a student borrowed quite a few books and did not return them. The library demanded return or payment before grades could be transferred to another school. The student stated belligerently that he knew the president and that he was not about to pay for books overdue and not returned. The library staff and its faculty committee, of which I was a member at the time, were disappointed and angered to find that the student had predicted the outcome rightly. We should never see this kind of corruption in a college.

Rewarding Academic Excellence

When the top students are chosen for the college, all sorts of criteria, having nothing to do with scholarship, are considered. Such things as student government, school activities, church leadership, community service, and cheerleading are weighed heavily [49, p 2]. I have known several of these students personally, and I have the strong feeling that some have learned to play the game without any real commitment to the niceties for which they are commended. I caught one of them willfully throwing classroom equipment down the hall, and he tried every way he knew to obtain a grade without earning it. I knew several of the others and only one was outstanding academically. The standards of the college are such that above average and outstanding students, (even in my classes) may all have 4.0 averages.

There are about 7,500 students at my school this year, of which 85 were listed in Who's Who, 41 were scholars chosen by professors as tops in an academic discipline, and 10 were chosen as most outstanding by a broad-spectrum management committee. Only one student listed as tops in an academic discipline made it into Who's Who or Most Outstanding. This shocking exclusion of knowledge people from institutional recognition shows the hostility or indifference to learning practiced by those politicized by a leveling philosophy in the college of "education" [60,64].

The instructors sit on bleachers or hard seats in academic attire while the names of top scholars, chosen by the faculty, are read for each discipline.

Later on, the student government, cheerleaders and student hostesses are invited to a free sit-down dinner in their honor, and the Most Outstanding students, chosen mostly for reasons other than scholarship, are honored. As I have pointed out elsewhere, the product of the college of "education" is not about to believe that academic achievement is worthy of honor for itself alone, as are football or cheer leading, and we have a further example of academic leveling.

Another factor not likely to be considered by a teachers college mentality is the fact that students planning to enter a rigorous profession work so hard at learning what they must that they do not have time for anything but work, and cannot get points for extracurricular activities. Consequently, the really superior students are rarely named as most outstanding. For example, only about one in three students hoping to be engineers will actually be able to do so. My pre-engineering students are loaded with physics, math and computer courses, and often with jobs, and they do not have time for any extracurricular activities. The same is true for the few pre-meds. They will never be chosen as the top student at our school, unless external factors intervene. This virtually complete elimination of students aspiring to engineering and medicine makes a mockery and fraud of the choice of most outstanding students. Then there is the honors program with little or no commitment to the useful arts. Again, this may be due to the fact that some professions demand so much of their students that neither students nor faculty have time to support an honors program.

There are better ways to choose outstanding students. The mathematics department of the University of South Alabama gives each year a competitive and comprehensive math exam to juniors and seniors, with about $1,000 given to the top performers. This contest often promotes good graduate fellowships and rewards a strong desire to learn. It also separates the students who acquire and retain knowledge from the short-term memorizers.

For my school, I would recommend a major test, like the GRE or one prepared by the faculty with some questions from every discipline taught, as the sole means of choosing the most outstanding students. Those who ranked high in the first year would have preference in scholarship awards for the next year. This testing would make academics as honest as basketball, whose honors are rather obviously based on merit.

Evaluation of the Teachers

At the end of each quarter I am evaluated by my students who use a form prepared by the college. As you might expect, the form has behind it the assumption that all courses are memory courses.

A couple of statements seem to be slanted against those who teach problem solving. For example, one statement on the evaluation form, "The tests reflected the material taught." is graded by the students at five levels, and they can honestly give me a low grade. I do not teach a problem which I intend to use in a test on problem solving. Problem solving requires facing a set of conditions never seen before, and a lot of students dislike such a course because it has no recipes and does not yield to memorization and regurgitation, which describe too much of our education. A better statement might have been, "The instructor encouraged problem solving and critical thinking." On another statement, "The teacher presented the material in an understandable way.", I would get the lowest possible marks. The student must listen, read, and work problems to reach understanding and skill, and I cannot impart the skill and knowledge he needs with an introductory lecture any more than you can create a great tennis player by just telling him how to hit the ball. My more able students have mostly overlooked these discriminatory statements and given me a high grade anyway.

Engineering physics requires the continual exercise of math from algebra through differential equations. A lot of people drop early in the course because they never learned to use their math and fear, often mistakenly, that they cannot learn to use it. Others have plotted their courses carefully to achieve a 4.0 average with mediocre abilities and they are afraid, often with good reason, of losing to the challenge of physics. Most of the students have never had any experience in solving problems, for reasons discussed too much already. Some of the "new math" advocates, like some of the early Greek scholars, feel that math is sullied by application to anything practical [48, p 88].

These unlearned, inexperienced, and often frustrated students are the people who rate me as a teacher. They have had at least one course in physics at rating time, which puts them ahead of most of the people in the upper administrative hierarchy, who have never had any physics at all. You could say that I am lucky to be rated by the most knowledgeable people around. I really would like to be rated by the students who are successful at a profession and who can appreciate what physics and applied mathematics did for them, and quite a few do come back to express their appreciation for what they learned from me.

You will realize, I am sure, that I will never be the Teacher of the Year. On the other hand, many young Americans have the ability to look beyond their sufferings and gain the understanding that it is difficult to describe Nature with mathematics, which makes engineering possible. After all, sophisticated math had been around for nearly two thousand years before Isaac Newton made the big leap that tied physics and math together and established a strong base for engineering.

Physics provided a strong stimulus for the advancement of math and the continuing growth of the industrial revolution. Most applied math has been done by physicists, or stated another way, most of theoretical physics has been developed by applied mathematicians. Historically, these two subjects are tied very closely and have much in common, but the college of "education" does not seem to know this when they permit their math teachers in training to avoid physics and take an elective in non-math "science". To the college of "education", physics is just another "science", and it is more often equated to biology rather than to mathematics.

The case against teacher evaluation by students, who have very limited experience and short term goals, has been made well by Thomas Whissen [43], but it will make little difference to a teachers college administration. Student evaluation of teachers is easy and a lot of schools are doing it because it sidesteps a confrontational process. The evaluation of teachers by students will be coercive in the lowering of standards, because the easier teachers will be given higher ratings by students unwilling or unable to meet the demands of a useful profession. This further erosion of standards will please those whose first concern is retention and whose last concern is hard knowledge useful to the nation in its industrial competition.

"Professional Development" and Improving Instruction

The college has days set aside to give the instructors training in how to do their job. The idea that doctorates in "education" can "develop" faculty is irritating and degrading to anyone with a true profession. This has been discussed already in the chapter dealing with the false assumptions on which the college of "education" is based. From the people trained by teachers colleges I expect every course to be treated the same. One "educator", invited in at a nice fee to motivate us during a "workshop" session, told us that the battle for more effective instruction was lost when we approached the blackboard with a piece of chalk. He obviously had never taught (or taken) a math or physics course, where the emphasis is on innovation and you draw your own pictures. Another made the startling statement that the people going into teaching were intellectually at the bottom of the professional scale. Of course he was right, as I have demonstrated by the data which I have quoted to you from my references, but I am always shocked to hear it from an "education" professor who was invited in to "instruct" the rest of us.

There is a committee acting to improve instruction.

We have one administrator for each four faculty positions, according to numbers in the local newspaper, and the administrators from the school of "education" will want to bring their "skills" to the problem of faculty "development" by "proactive intervention". Typical videos will show a great teacher of history yelling "bang-bang" to illustrate the gunfire in the American Revolution, or a lovely woman having a chummy grouping with some students planning what to carry if they might be lost on the moon. There will be some teaching of critical thinking in a social context where there is no way to determine whether or not the thinking is correct or has any value other than serving some political end. Then we will be coerced to try some expensive and nice innovation, costing much more than the equipment we actually need for our laboratories, to show how creative we are as teachers and as a college.

The intellectual effort to learn all the muscles and bones in the body requires a different approach than reciting the wonders of existentialism, and maybe even a different kind of brain. Teaching students to apply mathematics to the description and understanding of nature requires something different than learning in a criminal justice course the behaviors calling for an arrest. Finding answers to the puzzles of nature is different than enumerating the causes of the Civil war. Each course impacted by "proactive intervention" will probably need to be tailored as a compromise among the pedagogues, the students and the money available for support of advanced teaching methods and equipment. The doctors of "education" will add little, other than irritation and confusion, to the process of better teaching, which should be the responsibility of the top people in a discipline.

The junior college where I worked was lucky to have had early in its life a good administrator who, I have been told, hired a lot of good people and fired a few who thought that they were called to political advocacy rather than to teaching. I have no doubt that my colleagues in the science departments are doing a very good job for the country. I look at the posted grade sheets, listen as I walk down the halls every day, talk shop with them, examine their teaching models and listen to their students. They have standards tied to reality (the human body for physiology and the world of industrial production for chemists), and I doubt that any of them need to be, or will be, into indoctrination and politicization in order to have something important to tell their students.

There is no doubt that there are computer techniques available that can make teaching more organized, easy and effective. I am presently into automated data processing for interpreting the meaning of experiments and into automated tests extracted randomly from a database of several thousand test exercises.

Protection of Turf

Most of the course work in engineering and physics is applied math, pure and simple. At the doctorate level, it is almost all applied math, but the math department will not accept it as such because the transcripts label it as engineering or physics instead of math. Most of our "educators" do not seem to know that physics and engineering are mostly applied math and, as one applied math professor once told me, physicists are among the very best applied mathematicians. I believe that the average mechanical or electrical engineer at the bachelor's level knows more applied math than most math teachers at the master's level, who are required to take a lot of pure math which is not known to be useful [44, p 168-70]. The exclusion of hard scientists from the teaching of applied math is unjustified, as any comprehensive testing or course analysis of the two groups would show.

Scholarships

We have scholarships for areas in entertainment, such as music and athletics, and we have scholarships for those whose parents did not attend college, for displaced homemakers (usually divorced women), for those whose family income is below the poverty level, and for the children of veterans, but none specifically for anything to help us "work smart". I have had some disadvantages in my life, but I never felt that anything, other than the ability and willingness to learn something useful to society, made me a good investment for tax dollars set aside for scholarships. I have no liking for scholarships for which poverty is an important criterion. I started to Berea College with nothing but the offer that I could work twenty hours a week for room, board and tuition. I have known parents with means who would not give their children anything for college. Some of these kids, with real ability, spent half their time in college slaving at minimum wage to pay for their education, while kids with far less ability received scholarships because their parents were poor. I view our present policy as one which discriminates against the children of the "middle class" and against competent scholars whose parents have good incomes but who, for reasons of past debts or misfortunes or disinterest, do not or cannot pay for college education. In some states, a high school graduate is an adult and there is no reason to tie a student's fortune to that of his parents. I want to put our tax money on people who can help our country the most and who are more likely to repay their loans, and I do not care if their parents are rich, poor, minorities or foreign aliens.

Downhill in Hiring

Some of the selection committees for math and science teachers are loaded with more "education" types than with teachers knowledgeable in the area for which the hiring is done. Any person who knows and loves his subject will not hire an incompetent to teach it, but the members of an "education" staff, often will, especially if they neither know nor care about the subject and feel that they must satisfy a political or leveling agenda.

A well-known company decided to move from an engineering base, mostly at the bachelor level, to considerable research at the doctorate level. After a couple of years of looking for doctorates in engineering without hiring anyone, they engaged a consulting firm to tell them why they were so totally unsuccessful. The firm told them to hire one such person at a high position in the management and let him do the hiring. They did so and were immediately successful. I suspect a lot of this same kind of problem when I see a management structure that has only degrees from the college of "education". The moral of this story is that a lot of people are most reluctant to hire anyone apparently more talented than themselves and managers need to be aware of this problem in "education" circles.

No physicist at our school was included on the search panel for the hiring of another physicist until I told the personnel officer of the mistakes a few other people had made. Out of the several applicants interviewed by our search panel, only two spoke understandable English. One of them was an astronomer from Czechoslovakia whose father had spent two years in England as an engineer, and the other was an American who was not considered because he had accepted a job with us before but did not show up when he learned that to do so would cause him considerable economic hardship. Fortunately, no one was offered a job.

Accreditation

The faculty input during a recent accreditation exercise came from a rather tight committee structure dominated by the college of "education". The purpose of the committee chairpersons appeared to be that of insuring that no disturbing or disruptive information leaked through to the visiting team of "experts". In the initial statement of mission, the student was the only concern, and I may have been instrumental in persuading the institution to include a statement of responsibility to the community at large, the people who pay the bills. I did not recognize anyone with a strong academic discipline (history, law, engineering, English) in the collection of visiting accreditors.

In the exit interview, it appeared that institutional effectiveness would be evaluated in terms of the **perceptions** of teachers and students! American parents **perceived** the math education in this country to be good, even when their children ranked at the bottom in math among the major industrial nations [51, pp 21, 53]. You could write the entire accreditation exercise off as mutual back scratching by "educational" administrators from equivalent institutions A little later, several of our doctorates of "education" traveled to other places as part of an accreditation review team. It appears that accreditation is a mutually protective activity for the benefit of excess management.

Summary and Recommendations

The junior colleges are doing a great job for the country in terms of making instruction available at a reasonable cost at a convenient time.

The real problem of junior colleges is their total domination by a strong "union" of graduates from the colleges of "education" and the strong commitment of this "union" to a leveling philosophy.

The number of "management" personnel needs to be drastically curtailed and reconstituted to achieve academic balance.

The management appears to be disinclined to support the math and science necessary for a "work smart" capability.

The management does not give fair and proper academic recognition to high achievers.

Junior colleges need a new kind of administration with a sensitivity for standards, visibility, and faculty competence.

Chapter 6

The Learning Unit

The Struggle for Purpose, Equity and Efficiency

The primary purpose of our public schools should be to give to our citizens the knowledge and skills useful to themselves and to the nation. We wish to balance kindness, efficiency and utility in our educational process because we love our students, teachers and taxpayers and must have some concern for the ability of our nation to survive in terms of food, shelter, medicine, industrial capability and defense. The lessons of recent history have surely taught us that industrial competence and military prowess have much in common. It is not far from an automobile to a battle tank, from explosives for moving earth to bombs to discourage enemies, or from television to radar and guided missiles.

It is troublesome, inefficient and damaging to have students with a wide range of aptitude, interest and skill in the same class for long periods of time. The slow ones cannot keep up and the fast ones are wasting their time. Both kinds of students develop antisocial defenses against this intolerable situation. The slower students are overwhelmed to the point that they may give up, become discipline problems, and drop out. The better students are bored and may become cynical malcontents as years of their time are wasted. The teacher is always under stress as she struggles to pull the bottom 25% along while retarding the top 75%.

It is morally and ethically wrong to force the top 75 % of our students to be less than they can be, especially since computer and communication technology is forcing into our hands the means to solve many of our current school problems. We need to revolutionize our system of education in the public schools in terms of social purpose, organization, curriculum and administration. The revolution should be slow and kind. We can almost ooze from where we are to where we ought to be. Notwithstanding, the revolution should proceed apace because of the rampant injustice, inefficiency and misdirection in our current system. Every citizen needs to be able to earn a living in a way that benefits the rest of us.

The **social purpose** of our schools should be to enable and encourage **each** student to learn **all** that he can to help himself to earn a living and to improve the industrial strength of our nation. We are all better off when students learn more. The school **organization** should place every student where he can learn most rapidly i.e. where there is a match of knowledge, learning ability and subject matter. The **curriculum** should be designed to serve our students in their job aspirations and serve our nation in its worldwide industrial competition. The **administration** should be willing and able to accomplish our social purpose through competent staff, proper classroom organization and a wise choice of the school curriculum.

Our armed forces in WWII were unusually successful in imparting the knowledge and skills important to the war effort. They **tested** the large population available to them, **grouped** potential students according to military needs and individual ability, and **transported** them all to suitable learning locations with few distractions. Motivation was provided by ample evidence that survival, promotion, and quality of life depended on the acquisition of knowledge and skills. The usefulness and relevance of the instruction was clear, and it was easy both to determine whether an instructor was doing his job and to send him elsewhere if he was not. Courses were usually related to other courses in a logical sequence, and weak links were obvious. Students who excelled were often invited to teach ***without being taught to teach*** or sent to more advanced schooling. Class disruptions were very rare. The students were mostly young men taken from their homes by the military draft, and their training decisions were made for them. They helped in the feeding of the troops and in the maintenance and repair of the schools, and did what was necessary for the general welfare. The US Armed Forces chose the subject matter for a class by considering their needs and chose the students for a class by testing for probable success. The students passing more difficult courses were often given higher ranks. The public schools should be run in much the same way.

Recent technology has made it possible for public schools of modest size to achieve the class uniformity and instructional efficiency of the armed forces during wartime **if** they have the same defined urgency of purpose and the support of the population. Our current "education" system has been able to force children to waste their time on long bus rides to attend large schools that subject them to danger as well as to foolish and useless instruction. Today, even the military would have trouble committing these atrocities with impunity.

Efficiency, economy and educational depth, the usual justifications for the large schools, have been lost in a wasteful organizational structure, excessive administration, questionable social purposes, disruptions to learning, incompetence in the useful arts, and fiscal extravagance in activities having little educational value. Our present practice of tying students together by age, grade and schedule rather than by knowledge, skill and ability is extremely inefficient from the teaching and learning viewpoint and fits well the foolish assumption that all students are equal in learning ability and have the same distribution in their several aptitudes. This obvious organizational defect is certainly the root cause of many of our school problems.

A student may learn well in some areas and need more time in other areas. It is foolish to educate, as we do now, as if we believed that all students are equally apt and that a given student will learn equally well in all areas. There are students in the sixth grade who are performing at the second grade level in math and who cannot learn efficiently because they are so far behind in the subject matter being presented. There are bright students bored stiff because they must listen to the same old junk for days, after they have already learned it, while the teacher works on the bottom 25% of the class in the effort to bring everyone along together. Time is wasted for the student exposed to subject matter that is too difficult and time is wasted for the student who needs less time than is available. The wanton waste of our time depresses and angers most of us, and neither students nor teachers should be degraded by having their time wasted. Discipline problems are augmented both by boredom and by learning difficulties.

A student who is slow in reading will be unnecessarily disadvantaged for the rest of his life if he can be helped but is not helped, and really should spend most of his time reading. A student having trouble with simple numerical skills does not benefit from being promoted with the rest of the class to an advanced arithmetic class where basic arithmetic skills are needed. It is wasteful of time for the teacher and the rest of the students to have in the class students who are not prepared to learn at the current level and who require extensive remediation during regular class time. **Remediation should occur when and where it is needed and not in the wrong class some years later.** If a student is slow in reading and fast in arithmetic, he is disadvantaged in both skills by being kept with the herd and subjected to the common treatment. The severe problems mentioned above have been widely recognized and publicly discussed. There are all sorts of ineffective and expensive "fixes" for the shortcomings of the lockstep in age, grade and scheduling (LAGS).

There are special programs (often farces) for the gifted, advanced placement courses, Chapter I for the learning disabled, social promotions, general ability grouping, tracking and remedial instructions, all the way from kindergarten through junior college, for those ahead or behind in their learning. In many of the current "fixes" for the shortcomings of LAGS, students are removed from regular classes and returned with a disturbance at each transfer. All these "fixes", including mainstreaming and teaching to the "middle" of the class, waste time, money, and learning opportunity. Current politics is creating more "fixes", each with an unnecessary administrator, rather than removing all the problems with a sensible scheme for assigning students to classes and managing the instruction.

There are several other poor solutions to the problem of training a diverse population having wide spreads in interests, aptitudes, knowledge and skills. One solution used in many countries of the world is grouping for common labor, skilled labor, trade and profession. This wasteful and unfair practice, like ours, does not deal with the fact that a given student may be very competent in one area and very incompetent in another. Some students mature later than others do and I hate to see the decisions for a lifetime made immutably at a very early age. If a student is in a class learning something useful to himself and the nation, I see no need to assign him to a category and limit his choices to do what he does best.

The one room schoolhouse had a broad spectrum of subject matter covering eight grades and a broad spread of student ages and aptitudes. Each student worked at whatever level he could in the subjects offered. He could be ahead in reading and behind in arithmetic. There was nothing to prevent his listening to advanced or retarded instruction as needed. Some graduated in five years and others became interim teachers while they pursued a certificate. A lot of states had standard tests for its graduates of the eighth grade, once the terminal level of education for many, and the tests were good indicators of the quality and extent of education over different parts of the nation. The one-room school was remarkably flexible and it had no artificial barriers to prevent the able students from moving ahead. Students helping students under the management of a capable teacher made possible the miracle of the one-room schoolhouse. Some high schools put their students into two tracks, college bound and otherwise. Often the criteria for track assignment were parental social status and general aptitude, more often the former. The track system had the same problems as LAGS, namely a mismatch of subject matter, time, and ability, as well as a lot of social injustice.

I have had elementary teachers tell me recently that their students may receive instruction in ten subjects on a given day: reading, writing, listening, vocabulary, numbers, family, music, physical education, geography, history, nutrition, computers. Then there are interruptions as students under various special federal and state programs, like Chapter I, are herded into and out of the classroom. Confusion, pushing, and loud voices often accompany each ingress and egress. I have heard teachers remark that they were disturbed so much on some bad days that they could not instruct properly in even a single subject.

In summary, the lockstep in age, grade, and schedule (LAGS) is wasteful, unfair, and ineffective for most of our students, is responsible for many of our school problems, and should be replaced with a more equitable, flexible and efficient system, which I will now discuss and promote in considerable detail.

The Definition of a Learning Unit

School reform necessarily involves a choice of what should be taught and how we should organize to teach it. This can be expressed partially by the **curriculum,** which is a list of the **classes** and **activities** available at a school, e.g. geometry, biology, baseball and hygiene. The fundamental building block for the curriculum should be a classroom or gym with a teacher, a number of students, supporting equipment and something worth teaching. **This is a learning unit.**

The concept of the **learning unit** guides us to a better way to organize and manage classes and improve learning opportunities for **every** student. The subject matter or activity of concern to a learning unit is a convenient portion of what we have declared in our curriculum to be useful to our current and future citizens and to our country. It is managed quite differently from the usual classroom in that a student enters the unit when he is ready and able to benefit from it and leaves it when there is so little left to learn that he is beginning to waste his time. His performance level at exit time and the amount of time he spent in the unit will be a part of his permanent record. In summary, the **curriculum** is composed of **learning units,** each of which has associated with it a teacher, something useful to be learned, a group of students, a classroom with supporting equipment and materials, and a **different style** of classroom organization and management. The purpose of the learning unit is to enable **each** child to learn **all** that he can. Any unit will usually have students at several closely spaced levels of advancement and skill, so that the ones ahead can help the ones behind.

Educational reform can be built around the learning unit and the computer technology to support it. It can be done quickly and rather painlessly while we save a tremendous amount of money, help all our students and teachers, and raise significantly the average level of education of our graduates.

Helping the Teacher

The success of the learning unit will depend on the effectiveness of the teacher. Any reform that burdens the teacher further will fail and should fail. The teacher should be relieved of **all** the onerous tasks of record keeping, reporting to the front office, preparing lesson plans, making tests, grading tests, recording the results of tests and keeping lunch money. The teacher should spend **all** her time in managing her learning unit. To illustrate how we can help the teacher, I will describe what computer technology should be doing for a classroom.

The teacher unlocks the door to her classroom and turns on all her equipment by pushing a button. She and the students insert magnetic cards into a card reader and the data of name, date, location and time are transferred to the right place in a file in the teacher's computer. This computer is connected in a "read only" mode to the front office so that it can get attendance and student status data and do data backups, all without wasting the time of the teacher. Some schools plan their menus and run their lunchrooms by the card system so that the teacher is not bothered with collecting money and keeping records of payments. The burden is compounded if students pay according to family income.

The teacher's computer, preferably portable, contains a detailed syllabus of the material to be taught in the unit. To begin with, the syllabus might be the table of contents suitable for a good textbook, which can also be stored in the computer. This syllabus is the lesson plan for each student in the unit, whatever his learning status in the unit might be. The student uses his lesson plan to keep track of his studies and may take a short test on each skill as he develops it. The computer can quickly print a unique test, of any style, length and difficulty level chosen by the teacher, covering any material highlighted in the syllabus. The computer can grade the tests and post the grades to the right students in the teacher grade file. This makes cheating and "teaching to the test" much more difficult. Several textbook publishers now give the teacher a free disk with this capability when she chooses their books. If a child has her own computer, she can test herself at any time to see how she is doing. The unit approach to learning can be better than a lecture course because students can study alone or together in groups.

When the student has progressed through the unit, he is tested on the entire unit. If he does well he leaves the unit. If not, his areas of weakness are easily pinpointed and he studies them again. Some students will move quickly through the unit and others will stay longer. Students who already meet a major part of the unit requirements should be subjected only to what they need. Students switching from home study to public schools should be tested and placed without prejudice in suitable units.

It is not absolutely necessary for each child to have a computer, but it would be great to be able to use easily some of the wonderful teaching aids now available on the market. Computer driven tests are widely available and used to test professionals in several areas. I myself wrote a computer program several years ago to teach and test the factoring of algebraic expressions.

In summary, there are hardware and software all over the landscape to give us confidence that we can and should automate and standardize the classroom for the benefit of the teacher. One good innovation, designed and configured properly, can be sent by E-mail to every classroom in the nation. Further, the teacher and any child in the room can easily learn to use it in fifteen minutes. The learning unit obviously has great flexibility.

One of the fallacies of our current educational philosophy is that we seem to think that all knowledge must come from the lecturing of a teacher in front of a classroom whereas we ought to be teaching students how to educate themselves by using the several means at their disposal. Industry uses this method under the title of "reference-based learning", which certainly works well for adults, and I believe that most children can adapt to it with advantage after they learn to read minimally and to follow directions. If you doubt this watch a small child with a hobby as he goes through his literature. Students develop socially by helping each other. Textbooks and computers are excellent tools for individualized instruction.

Students can study from their textbooks whenever they wish for as long as they wish and spend more time where it is needed. A good textbook is truly a wonderful aid for those who wish to learn and can read. The learning unit helps students to study on their own and to know where they stand at any time. A well-designed learning unit should provide the capability for an energetic student, if she wishes, to study a textbook and pass a final test on the unit without ever receiving any lectures from the teacher. A word from the teacher, however, is often a great help and encouragement to a technical reader who may be struggling with many new and difficult concepts. In working her learning unit, the teacher is more of a learning manager than an instructor.

She will assemble the learning media, give individual and group instruction in how to use the unit media to learn, assign some students to help others, group students for oral review, lecture and evaluate learning progress. Her bookkeeping should consist only of admitting and dismissing students, and this should also be automated. She should spend her time in helping students to enjoy their learning.

Assigning Students to a Class

One of the advantages of the learning unit system is that any school professional can examine immediately a student's past performance record and give a test, if needed, to determine which learning units are best for her. Tests should be much like drinks of water to a workman on a hot day: frequent, of short duration, and no "big deal". An athlete may be tested hundreds of times during a game. Tests have been given a bad name because there was a lot of work in creating, administering and grading tests and recording the results. This can all be automated.

Educational Reform

Listed below are powerful tools for education reform. They should each be considered as school standards that are owned, protected, maintained, and improved by the schools with no restrictions or costs such as patents and copyrights. They are somewhat independent and are useful alone or together.

Establish a standard school curriculum over as wide a geographic area as possible. The curriculum should consist of courses known to be useful to students in earning and enjoying a living and to the country in its need to "work smart" and govern itself.

Give each teacher a computer loaded with a **very** friendly software package designed specifically for teachers to deal with their databases.

Prepare or acquire for each course (learning unit) in the curriculum a syllabus sufficient for teacher and student lesson plans. A good beginning could be similar to the table of contents of a good textbook.

Assemble a large test database (perhaps 3000 questions or problems in several formats) to accompany the material described in the syllabus. Some writers of textbooks use their students for such tasks.

Choose or assemble textbooks so that each learning unit in the curriculum is included in at least one of the textbooks.

Establishing the Curriculum

The **users**, those in our society who hire and train the graduates from our schools, should establish the curriculum for the schools. These **users** would include major industries, the Armed Forces and large professional groups. We **must** give curriculum control to the people where the jobs are. I would recommend that the curriculum be established under the supervision of the National Bureau of Standards or the US Air Force. These groups have a long experience with working with industry and dealing with standards.

Development of the Database Software for Teachers

Over three million teachers are active in the USA. Each of them should have a portable computer loaded with the software to manage the information and hardware used by the teacher. It should not be copyrighted or protected, and it should be documented and written in a language and form so that the software could be modified and exchanged.

The US Army has run effective schools for many years. Its leaders are broadly educated and believe in education for survival. They have no unions with axes to grind and they appreciate standards. The US Army should design a database that permits the installation and daily use of a textbook, a detailed syllabus, a few thousand test questions in a variety of forms and data on each student. The database should automate the teacher's work associated with lesson plans, attendance, testing and reporting. The software should be compatible with most home computers and simple attachments such as printers, scanners, magnetic card readers, networking and communication modems for fax and Internet. It should permit the teacher to devise a unique test by highlighting items from the syllabus, choosing the length, type and difficulty of the test, do random sampling by category from a test database with several thousand test questions, and print the test with a student's name on it. Computers should grade the tests and enter the results in the correct student files.

Hardware Requirements

The teacher needs a networkable, portable computer with a magnetic card reader attached. The hard disk should have a capacity of roughly 5 GB, and the floppies should be state of the art. There should be a printer to print tests, syllabi and other materials. Printers, copiers and scanners can be combined as one unit. There should be scanners to grade tests and acquire data. Tests may be computer driven.

A computer for each student would be a great asset and should be easily available within the tremendous budgets we now have for education. The yearly salary of one useless administrator will buy sixty computers. The school reforms described in this book will reduce administration by over 50%.

Data for the Databases

The teacher databases should span the entire curriculum. Much of the data easily available for teacher databases is copyrighted in the form of textbooks or test disks. The databases for teachers should be like standards, which are never copyrighted. One competent scholar could prepare the data needed for a good database for one applied algebra learning unit with one man-year of effort. **It could then be used for every algebra course in the country,** with each teacher selecting his coverage of the course. Since it would not be copyrighted and protected, it could be changed, excerpted and improved, like the standard meter, by anyone with the knowledge, energy and ambition to do so. All the databases do not need to be done at once, but they should be done as soon as possible. Maybe the colleges of "education" will volunteer to develop and maintain educational standards if the reform looks real. Until then they will fight anything that smacks of objective standards.

Philosophy for Designing the Curriculum

The following is a brief summary and rationale for the educational philosophy that should be used to design and manage a curriculum.

Society is the means by which people divide labor and responsibility and work together so that people in general are much better off together than they could be working alone. Some societies are a lot better than others in terms of individual freedom, safety and living standards, and one cannot believe rationally that all societies are equally worthy and that differences are just a matter of taste. We should examine everything in sight for better ideas and methods but we should steer clear of the foolish idea that all opinions, lifestyles and cultures are equally worthy.

A "good" society is stable so that people can plan ahead for themselves and their families and has a set of rules to distribute the work and the rewards of work. It must deal by force or persuasion with those who do not follow its rules. It must prune itself of willful parasites and predators and defend itself from inside insurrection and outside aggression.

It must **adjust** its rules and promote its **efficiency** if it is to maintain a majority of loyal citizens who are convinced that they are part of a good thing. It must recruit its most capable and dedicated citizens for leadership positions and possess enough social mobility to reward those who contribute. The schools must be run, as much as possible, as the society should be run. This promotes good citizenship and social development.

The purpose of our education system should be to maximize the benefits of our capitalistic democratic society to its members by encouraging learning, patriotism, conservation, cooperation, efficiency, invention, innovation, industry, productivity and satisfaction. We need to know how our society was founded, what its tenets are, how it has evolved, how it works, what its problems are, and how it could be made better. There is a great diversity of opinions about some of these things, but education should be directed toward a balanced perspective supportive of the best in our society and should be used sparingly as a forum for ignoramuses advocating strange and untested schemes and failing to appreciate their good fortunes. Change is not necessarily good **or** bad.

The education system must be sensitive to the needs of society and produce skills that benefit society as well as the individual, who is benefited by learning to do something for which society is willing to pay. Disruptive students should be removed immediately from class. Students should not be in classes from which they receive no benefits. The teacher has enough to do without baby-sitting and dealing daily with behavioral problems. Parents should be held responsible for the behavior of their children.

Children present a wide spectrum in interest and learning ability with varying degrees of motivation from social contacts with teachers, family, friends and neighborhoods. We should give to each child the opportunity to learn what he is able in areas useful to himself and society. However much we would like for it to be so, we cannot honestly believe that equal opportunity and equal exposure to education will result in equal outcomes for all students [64, p 213]. There is no wisdom and a lot of unkindness in force-feeding the slower students beyond their power to absorb and endure. It is inefficient, unethical and damaging to the capability of the nation to deny knowledge, for the purpose of dragging everyone along together, to those who are ready and able to learn more. Within the constraints of our resources, we should try to place each student at a level at which he can learn most efficiently. No society under competition can afford to restrain the able and put unlimited resources on the less able in the hope of equal outcomes. Music and athletics should demonstrate most clearly the futility and wastefulness of such an attempt.

It is difficult to believe that some "educators" are so insistent on equal outcome that they are willing to suppress totally the able students, but there are many "equal outcome" people pushing the leveling philosophy in "education" circles [34, p 59] [64, p 213]. We are in a competition with other world populations for survival, and we have declared, for the time being, that the competition will be in the economic arena rather than in the military. We need knowledge and efficiency for this competition as well as for what this competition could possibly become. Incipient losers tend to become violent. This is all that remains for those who cannot compete to their liking in a civil and peaceful society of controlled competition and equal opportunity.

In any system, however efficient, fair and just it might be, there will still be misfits and failures. Any "educator" who insists that "every child will learn to read", [4, p XIX], will lose credibility with any intelligent and experienced person. The pupils who cannot read, after all the possible medical and psychological remedies, should not be subject to stressful harangues at great public expense for several years. They would rather be where they can do something useful within their abilities. We should go to some effort to find these better places for them. Reading is great, but it is not everything. Some students mature with age and can learn to read later with less trouble.

The diploma given at "graduation" should list student performance in every subject studied. There should be no designated "failures". This will do more than anything else to spread the idea of accountability and help prospective employers in hiring the people they need.

Everyone who has hated his schoolwork likes stories of successful drop-outs, many of whom were very talented and dropped out because they could not tolerate having their time wasted and could learn faster on their own than in school. Some students can learn everything in high school in one year. Why should they waste their time plodding through?

Some students love practical and specific things but suffer with uncertainty and generality. Why not let them work more in areas that they can enjoy if the learning is useful to society and rewarding to them? What other ends do we need to serve?

How much time should a student spend in a unit each day? Students rebuilding a marine engine will need time in larger blocks, for cleanup if nothing else, than students studying communicable diseases. A student who has finished every unit but one should be permitted to spend his time in that unit.

Every citizen should be required to donate a certain amount of service time to his country. The use of superior students to help the teacher run a unit should count as service time.

Choosing the Critical Components of a Curriculum

Knowledge has been stored and distributed for centuries by written material, and our industrial strength relies heavily on quantitative measurements and their documentation in written form. Computers should now do this work. The information for an academic discipline (course or subject) can now be stored easily and economically on disks in a form designed to fit the local situation and to be exchanged with others.

There is no doubt that fun and games, communication skills, mathematics, and science should be in the public school curriculum continually from the beginning to the end. Until other universal and reliable means for data entry are invented, keyboarding should be taught to every student as soon as possible **after** basic reading and writing. Science, through better hygiene and medicine, has preserved billions of human lives by making mankind safe from many major epidemics. The food and water supply has likewise been protected and improved through science to support the several billions of people now on the planet.

Switzerland, with few resources except its people and its mountains, insists that its students study science and math every year that they are in school and that all teachers have a degree in some substantial academic discipline. Math is a basic tool for commerce, manufacture and science and should be taught with this in mind. Science would include subjects like sanitation, hygiene, nutrition, economics, agriculture, biology, sex education, chemistry, physics, electronics, and computer use and repair.

Every person needs physical activity and it should be scheduled every day at every school and be available for teachers as well as students. So we have communication skills (reading, spelling, writing, keyboarding, listening, speaking, and vocabulary), applied mathematics, science and physical activity as critical core curriculum requirements, defined as knowledge and skills **without which a citizen would be seriously disadvantaged.** It is easy to describe what should be learned and to test whether it is actually taught and learned.

Choosing the Noncritical Curriculum

After we get past communication skills, applied mathematics, science and physical activity, there are a host of fun and useful things to do and they are all said to be good for us. I view the entertaining things like literature, music, drama, storytelling, sculpturing, painting, and sports as culture or entertainment, sometimes called the humanities.

We all enjoy them in some fashion or other, talk of literacy in this and that, pretend that life would be unendurable without them, and spend a tremendous amount of money on them. Sports, music, drama, reading and conversation seem to be our mainstays, and are our most dominant and durable kinds of culture (entertainment). Few people seem to read anymore, we sometimes think, but the bookstores do well with science fiction, fantasy, adventure, intrigue and romance. Culture is often educational as well as enjoyable.

Students will learn social skills and good citizenship during every minute of work and play as they interact with each other under school supervision. They will learn by doing and observing, and they will get the right messages if the school is run fairly, kindly and efficiently as a place of learning. It is not boring, plebian or sinful to learn useful skills. We might argue that carpentry, metal fabrication, woodworking, mule shoeing, stone masonry, house wiring, and auto mechanics are also good for us.

Music has been popular in our schools, especially in dancing and marching bands that support the pageantry of sports. I would be more for local performances than for thousands of miles on busses. I think that group singing would do much for our self-esteem and vocal articulation. Also I would push for more standardization in the musical menu, so that we as a nation might have some more music in common. Physical training and games should benefit everyone during the regular school time and not just the few who specialize in some game, travel great distances, and miss classes, as well as most of their basic education [3].

School officials should not advocate their particular brand of religion, philosophy or politics on school property during school time, nor permit it to be done. I object to forbidding the advocates of religion while permitting, in the name of academic freedom, the partisanship of all sorts of **other** viewpoints because they happen **not** to be religious. If we can have academic freedom for socialism, anarchy and free love, we can have it for religion. I do not consider all social viewpoints equally worthy or all lifestyles equally admirable. Hitler and Stalin had social viewpoints and lifestyles, which they supported with the widespread murder of millions of their own people. We fought WWII and the Cold War because we thought that their socialism was inferior to our capitalism. We were right, we should not forget it, and we owe no apologies. Designing units for the nonessential curriculum can indeed be a problem. In general, I would not put anything in the curriculum unless it was hard knowledge generally agreed on by practitioners in the field. If there is no standard knowledge in an academic area, there is a good reason for it, and we should not teach it or insist that our students study it.

There are those who argue for an "enriched" curriculum, but I would argue that the schools should be more concerned with useful basic skills. I would save enrichment for those who have learned the basics, who are interested, and who have some time available. We have too many enriched students graduating with a second grade reading ability and too many in college who cannot read anything carefully.

We need to know the history of western civilization because it has done more for humanity than any other has. Billions of people are alive on the earth today because the emphasis on knowledge in the Western culture has made possible the food, sanitation, and medicine to permit them to survive. It has produced great nations and stable governments to permit progress. Our present capitalistic democracy has done great good for the world in terms of science, agriculture, medicine and relief from deadly oppression. It has outstripped collectivism in customer satisfaction by providing the highest standard of living in the world. Despite its power, it has shown tolerance and forbearance toward other viewpoints. Surely we can prepare for the public schools a respectful and truthful history of western civilization and capitalistic democracies and the tenets which underpin them. We should teach history that tells truthfully about the past so that we can have guidance about the future.

We should not spend all our social time pointing out the ills of a free society, such as the poor, the homeless, the unemployed, the addicted and the lawless. Many of our shameful statistics result from the fact that people are free to do as they wish, however foolish, wasteful, irresponsible or self-destructive it might be.

Summary

Public schools should be organized loosely by knowledge, ability and subject matter rather than rigidly by age, grade and time schedules.

Our current school organization is wasteful, unkind and unfair to **all** of our students, and militates against our national industrial capability.

The classroom should be automated to the extent that testing, grading, record keeping, lesson planning and reporting are **easy** to do.

Public schools should be organized around a curriculum perceived to be useful in earning and enjoying a living. Our need to compete industrially with the rest of the world should be evident in the school curriculum.

All the students in a classroom should be ready and able to learn before they arrive, and should be permitted to leave when they receive only marginal benefits by remaining longer. Students leaving a unit should be tested for knowledge and proficiency, and their grades and residence times should be on their diploma when they leave school. No students should be designated as failures and all should "graduate".

Each learning unit should have at least one computer and standard hardware, software and database to support the teacher and the teaching.

The principal's office should be able to access the teacher's database for backup, attendance and performance records for each student and any other reports needed from data held by the teacher.

If a lot of records must be kept on special students, there should be a means for data entry.

Computer technology should not be used to oppress teachers and students or to waste the time of either.

Administrators and supervisors should know and practice the business of the school, especially what is taught in the school and the social purpose of the school.

Management philosophy should emphasize enabling and consulting rather than ruling and controlling. Operational costs for management should not exceed 5% of the operational costs for the schools.

Chapter 7

Our Elememtary Schools

The Good Side

The elementary schools are the bright spot in American education. The teachers and administrators know their subjects, students are easier to manage, the parents can still talk to their children about what is being studied and learned, and the material taught is generally known and respected as being useful. We are concentrating mostly on skills and it is easier to assess how well a child is doing. The parent-child relationship is still friendly rather than combative. Parents are more concerned about the welfare of smaller children, and the teachers somehow seem to be more dedicated and friendly than in high schools, perhaps because the schools are smaller and the teachers are connected better with the community. There is less opportunity for politicization but the number of advocates appears to be increasing. The distractions of bands and sports and sex and drugs and cheerleading are more distant. There is usually less bussing. Relatively speaking, our time in elementary school is happy and peaceful, and a great deal of learning occurs in a population that has a good attitude toward learning.

Elementary schools are usually small and close to home, so that the parents and teachers can work together in a friendly neighborhood setting and the travel problems can be minimal.

It takes great management skill and social ability to deal with a group of children, and the author and his wife have known a few young teachers who never made it, despite their good intentions, the help of other teachers, and certification by the school of "education".

Continuing Problems

As I have discussed in some detail elsewhere, the teaching of reading has suffered from the mistaken idea that there is one best way to teach reading, and this has caused a great disadvantage to many children, mostly male. The leveling disease that disables our high schools and colleges has trickled into the grade schools when we think that there is one best way for everyone.

The structure of our schools does not permit a student to spend more time at school in the areas of greatest difficulty unless there are "special" programs with their attendant problems. If I believed that every seven-year-old had the same interest and ability in every subject, I would organize schools as we now do. I believe that every child should be in a learning situation suitable to his abilities and I would organize the schools in terms of learning units. The current organizational structure of classes assumes that "normal" children all have the same distribution of abilities and should, for example, spend the same amount of time in arithmetic every day. If this assumption were a good one, every child would have the same ranking in every subject. I can assure you that this is not true.

We now have in many places something called team learning, where a heterogeneous group of children is assigned to work together and receive a common average grade. It has the ostensible advantage that it teaches everyone that we are all in the same boat and that we sink or swim together. The brighter kids must help the slower ones, and some of them are very effective teachers, despite their lack of credentials or time at the college of "education". Team learning could be excellent in terms of student interest and having those ahead help those behind, but if it used as a leveling tool to contain those who try harder and learn more, I would still use it for its benefits but change its practice and orientation.

All the children develop social skills as the more able teach the less able in the group and take over from the teacher some of the onerous drilling and repetitious work as well as some "individualized" instruction. Unfortunately, the lazy kids are quick to learn that working does not change the outcome and that it is easier to take their minds out of gear and daydream while someone else struggles with the problem. The high achievers will soon learn that they are carrying the load and that there is no reward or recognition for their greater abilities and efforts. They will resent being given the same grades as the loafers and may then join the lazy kids. This is what happened to the communist industries when the system most effectively taught that there was no reward in learning more, working harder, and doing more. Their classless society had developed into a caste system.

"We are all in this boat together" is an unjustified leveling argument. If every child receives the same grade, the teacher can give a good grade without adding up columns of numbers.

It has been proposed that every school child should use a certain fraction of his tenure at school as service time, time spent in helping others. As soon as a child masters a skill unit, let her receive credit for service time as she helps others, or go on to the next unit. It will not take long, as other service tasks are assigned, for the idea to develop that service time as a teacher's helper is a good way to go. It is possible to have the benefits of group learning, without penalizing the achievers, by using the learning unit as the basis for class organization in elementary schools.

For those who push the myth that you cannot teach until you have learned how from the college of "education", it will be a surprise for them to discover that some children are very capable at teaching what they have learned. By the way, this group learning idea is precisely what was practiced in the one room schoolhouse where all eight grades learned together with students helping each other. Students graduated when they had learned the required material and developed the necessary skills. There was no foolish demand that all students at the same age had to be at the same level of learning or that every student spend exactly the same amount of time reading. Some graduated at the age of eleven and some graduated at the age of twenty. The achievers were rewarded, and each student learned at his own pace with recognition at each stage of his development. I am not advocating a return to one-room schoolhouses, but I think that we could incorporate their effective techniques into the schools of today and be way ahead. In pursuing the great leveling trend according to the current doctrine of education, teachers and administrators find it easier to beat down the top than to bring up the bottom. In the process they are removing from our schools what we need most, the high achievers. By the time they enter high school, they have been squelched and "dumbed down" beyond recovery. When I taught algebra in junior high school, I found that it was very difficult to change the performance level of those at the bottom but much easier to raise selected students to a considerably higher skill level.

Some Elementary Problems

At one time it was avant-garde to grade students on their effort rather than their achievement.

The top of the class in skills often received lower marks than the bottom and many students learned to be little lazy dissemblers, pretending to try hard to escape persecution and to earn a good grade while doing as little work as possible. The parents and children together can figure out any consistent system!

No honest person would claim to know what grades really meant under such an impractical scheme, but we may have argued that such a system preserved the self-esteem of the inept. Many teachers found it easier to exercise biases under such a system: the harder something is to measure, the easier it is to be arbitrary. It is a lot more difficult to determine if children are living up to their full potential in learning to spell than it is to discover how well each child can spell. When you have your car tire repaired for a leak, you worry about whether it is done right, and all the effort in the world on the part of the mechanic will not help you if he does not know what he is doing. We need to think performance instead of effort and self-esteem and encourage people to do better rather than hide in the herd. For the reasons cited at the beginning of this chapter, our elementary schools are likely to survive and do well even under our current "educational" philosophy.

The practice of enslaving and retarding able students for the dubious benefits to the bottom, using as excuses such words as "preserving self esteem", "ensuring good social development", and "we are all in the same boat" must be eliminated if we are to permit everyone to be all he can be. Why does it seem so good to strangle our best and brightest, the ones most likely to be Salks and Bells? How can any intelligent person believe the myth that the bright children must spend more time in grade school to become well-adjusted like the others? Are the slow ones by definition well-adjusted? Cannot a bright child adjust sooner? Does the school, with teachers lecturing from the front of a class, do more for social development than playing organized and supervised games or providing other student interactions, such as one student helping another?

We should define the knowledge and skills expected of those who complete elementary schools and divide them into learning units defined by subject matter. When a child has mastered a unit he moves on. When he has mastered all the required units he should either start to junior high school or else contribute some service time. A comprehensive test at the end of elementary school and a computer analysis of the results by some intelligent informed teachers could be very helpful in many ways.

At first glance it might appear that organization into learning units might produce a problem because of a spread of ages in a given unit.

The family, a very natural unit, almost always has a spread in ages, and it is good to have larger children learn to play with and protect smaller ones. Almost every human activity in a family or neighborhood seems to be populated with people of widely different ages, and I doubt if it does anyone any good to associate **only** with people the same age. Peer association reduces the sense of respect and responsibility and promotes unreasonable competition. A level playing field only makes rivalry worse. The most violent competitions appear to be between twins and close siblings. We all fight more vigorously if we think we might win, but avoid a fight if a loss is certain or a win is obviously so easy that there is no glory.

It is better to have in a class a spread of ages rather than a spread of abilities: It is likely that a student at the right learning level will learn more efficiently and be happier than one who is above or below the current learning level. Which is better, having everyone at the same age with most students unequal to the subject matter and not learning what they should or having disparate ages with each child at the proper learning level? How can we talk so gloriously of "pluralism" and pretend that children of different ages cannot deal with each other? If they cannot, perhaps that is another thing that they should learn as part of their social development.

If a child is unable to learn a given unit well enough to pass it after a reasonable amount of time, he should be able to discontinue that unit and move to a unit in which some success is possible.

Syllabi and sample tests should be given to anyone who wants them, including parents who wish to participate in the education of their children. All children, however they are educated, should be measured by the same academic standards. If parents or relatives can help in the teaching, a child can learn faster and complete the current unit sooner. By keeping score, like the people in sports do, we will know where everyone stands and there will be competition, recognition, and reward for learning more, and the knowledge base of the country will be increased.

Dividing the work into learning units will permit each child to spend time where it does the most good, rather than being tied to a group which has the right match for only a few individuals. Keyboard skills should start as soon as possible **after** reading skills are mastered.

Physical training and recreation, with emphasis on fun and games, should be a part of the daily routine. Students should dress, perhaps in standard uniforms, so that clothing changes are unnecessary and the regular teaching staff should be in charge so that they can benefit from both a change of pace and the exercise.

There are some elementary schools to which the above discussion does not apply.

The parents are unwilling or unable to take an interest in their children, but are very quick to protect their children from correction. The tools of classroom management have been stripped from the classroom teacher to the extent that classrooms are often a loud frenzy of yelling and screaming which obscures any teaching that might be done. The "nicer" neighborhoods help the teachers to control this sort of thing, but the neighborhoods most needful of control and learning are skilled at harassing the teacher.

The principals and supervisors, operating in the true "Spockian" fashion with which they are brainwashed at the college of "education", do little to help. The main concern of the principal is to avoid having a group of irate parents appear before the school board with a complaint against her. The confusion is further abetted by a multiplicity of state and federal programs ("fixes" for ineffective classroom organization) that require groups to move into and out of the classroom at several times during the school day. Every input and output has its fallout of pushing, shoving and loud talk. The learning unit approach would eliminate most of this nonsense and reduce the bookkeeping and staff associated with "special" programs. No special program can possibly be better than placing each student in a unit suited to his needs and abilities.

The teachers cannot teach without order and in many places they cannot maintain order. If they want to do their job, they are under stress all day long, and many of them just try to avoid persecution in their interactions with an insane system. These teachers have heartbreak every day if they are responsible and caring about education and have a genuine love for children.

The teacher must have control of the classroom. She must be able to stop disruptions immediately, either by removal or effective interdiction. While you are wondering how this must be done to observe all the niceties reserved for reasonable people, do not forget the principal thing: the teacher must have control of her classroom and she may be dealing with highly unreasonable people! It may be possible that she will sometimes, like policemen, use poor judgment or abuse her power. This argument is irrelevant unless you want anarchy, and it is the responsibility of the principal to help the teacher maintain order and prevent abuse of the students by the teacher. He does not need to attend useless meetings all the time in this age of fax, closed circuit television, and electronic mail. This attendance of endless meetings by administrators and supervisors is most compelling evidence that the administration needs to be reduced and given a change of philosophy. No other business with a purpose has first-line supervisors absent most of the time.

There are several totally effective ways of enforcing enough discipline to permit effective teaching; but they must be applied in an expeditious and consistent manner: corporal punishment, sending the troublemakers somewhere else, or enjoining parents to send to school only students who know that they must obey the rules. Belgium simply removes the troublemakers from class, and when the parents bring them back, everyone is sure that there will be no more problems. If you do not remove the problem children from schools, you must control them.

We have become so "Spockian" that we do not permit corporal punishment in a lot of places because of the unjustified paradigm that "punishment breeds violence". Violence in schools has increased markedly as corporal punishment has decreased. When I see a larger kid abuse a smaller one, I am absolutely sure that nothing stops this problem better than the certainty of a good paddling administered at once on the scene. My personal approach to discipline is that parents should be responsible for the proper behavior of their children and that if they are held to this, they will be more cooperative with the teachers. If we start this at the beginning of elementary school, there will be fewer criminals in high schools. I do not agree that corporal punishment for just and understandable cause promotes violence, but I can agree that child abuse for no compelling reason is reprehensible.

A lot of elementary teachers tell me that they try to teach six or more subjects each day along with the interruptions. There should be only three subjects for the first three years: language arts, science, and arithmetic, done in unit form. The people yelling for more diversity and enrichment in elementary schools should be reminded that a lot of students get to college without learning to read and write.

To establish the unit system in a small school with one teacher for each of the six grades, you would take the teachers of your first three grades and put one in charge of language arts, another in charge of science, and another in charge of mathematics.

The teachers could share physical training. Each child would spend two or more hours in a subject area each day until he has mastered the subject through the third grade level. There could be 15 or more minutes of play between each learning session. If a child were more apt in one unit than in another, he could spend more time in his difficult unit after he has mastered his easier units. A child who did not learn what he should in three years might receive a social promotion or stay longer at the first level if it is useful to him. More capable students would move through and proceed to the second level or serve some time in the first level as teachers' aides. Progress could be measured at any time by computer tests, if that method is convenient. Computers should do the testing and keep the necessary records of attendance and achievement.

This way of imparting the basics has several advantages. Each child can be at his most efficient learning level. Each child can move to the next level when he is ready, or put in some service time as a teacher's aide. Parents will take more interest in helping children reach the next plateau if they know specifically what must be learned, rather than wait for another year to go by. Teachers will have fewer interfaces with preparation and equipment and fewer disruptions.

Record keeping should be by computer, and all teachers should have (or acquire) the requisite keyboard skills and operational understanding of the computer software. The game of education will be more deserving of interest and support if promotions depend on learning and score is kept. Children can learn the joy of service and teaching at an early age as well as sharpening their academic and social skills. Educated parents know enough to help the teacher and work with her, despite the current inefficient practice of age grouping. They can put pressure on principals and parents of disorderly children to deal with class disturbances. In the poor neighborhoods, especially if there is extensive bussing, the parents seem to be unable or unwilling to work together effectively to insist on order in the classroom. Lack of discipline and its associated violence are the number one problems in poor neighborhoods, where severe home and health problems are also more numerous. Good teachers work very hard to escape the problem areas, and the poorer areas are often stuck with problem teachers. Occasionally a principal gets revenge by sending some unfortunate teacher to a hellhole where there is no discipline and no learning.

We must take the responsibility for social work and welfare (except for meals) out of the schools. The schools should be promoting knowledge and skill, and baby-sitting and disruptions should not dilute them. Let me tell you of a few cases that I know about.

The Threatening of Teachers

A family on welfare had several problem children in the school system, and the father, a white male, threatened the teachers with violence each time one of his children was disciplined. He was able to do this with impunity to several teachers because the principal was one of those spineless men who left such problems to the teachers and blamed them if they could not deal with their discipline problems. It is very hard to protect even a president from violence, and the average person is very ineffective in dealing with the threat of it. Finally, the troublemaker threatened the wrong woman. She was extremely upset and naturally passed it along to her husband.

He had the acumen and connections to collect the school administration and the villain before a "law and order" judge who made it understood that teachers were not to be harassed and threatened. The family moved to another county and no doubt visited misery on the teachers there.

Uncontrollable Children

In another case a reasonably bright eleven-year-old boy in diapers and a wheel chair showed up in class at the beginning of the year. The child was totally undisciplined, and yelled and screamed obscenities all day long. The principal gave no help and the aggressive parents wanted their child in a "normal" environment. The teacher, a skilled veteran, had to see the board of education and threaten to resign and sue to get the problem removed from her class so that she could teach. There are some human problems which are unyielding to a fairy tale solution. In this case, I believe that such students should not be unloaded on the teacher, who has enough to do to manage a normal class of twenty-five students. Although our society agrees that such a child must have all possible advantages, the right to disrupt a learning environment should not be one of them. With crack, nicotine, caffeine, and alcohol abuse by parents, such children are showing up in greater numbers at our schools.

The parents, who could not curtail these damaging addictions during conception and pregnancy, are very loving and demanding when they present their mistakes to the schools. I do not know what is to be done with this kind of problem, but I am quite sure that the public schools should not be further degraded by this social burden. When we build another empire to deal with it, I hope some vigorous attention is paid to reducing the sources of the problem.

Terrorizing of School Officials

After one teacher paddled an abusive youth, two older brothers appeared on the school grounds and pistol-whipped the principal. In this case there was a protective mama and one older brother who was already in trouble with the law. Once while I was giving a play in junior high school, I allowed the students to choose the cast and we practiced after school at a local church. A younger brother of a member of the cast created a disturbance while perched in a sycamore tree outside the church, and when I asked him to stop, he told me I had no authority except on school property. I told him that I had authority at a school function and I jerked him out of the tree and sent him home with a belligerent look on his face.

A few minutes later the mother showed up with the youngster bawling at her side and gave me a lifetime of verbal abuse. The next day she met with the principal, who knew that she had two other children facing discipline at the local high school. Confronted with this, she began to cry and apologized to me until I was sick of it. The students had chosen a cast which contained some troublemakers and some unable to learn their parts. When the incompetents quit and I had to drop one young lady who behaved worse everyday because she thought I was too close to curtain-time to replace her, I replaced them with my brightest students, who learned their parts almost overnight. The play was a great success.

One elementary principal, with an intention to harass several young teachers, told them that she would give them a test on school regulations at the end of the week. Several of them were so upset that they took sick leave the next day to prepare themselves, and then were not given the test. At evaluation time, the teachers gave the principal a very low rating, which was read by the principal in front of the teachers and the supervisor of principals. The principal then said that the teachers had been harsh in their evaluation of her and that she would be equally harsh with them. She said that she had great influence with the front office and that she would root out the malcontents. At the end of the year, this school, one of the most popular in the district, had a 30% turnover in its teachers. The principal stayed and had the full support of her supervisor, who knew all about the mistreatment of the teachers.

Summary

Elementary schools seem to be the best part of our public education system, but they are beginning to suffer from some of our massive social problems and the wasteful leveling philosophy from the college of "education".

The curriculum should be divided into four major areas, language skills, math, science, and fun and games. Each major area should be divided into learning units of convenient size.

Every effort should be made to solve discipline problems while the children are small, and parents should be involved responsibly in the process.

No disruptions of the learning process should be tolerated, and the learning unit should not be burdened with students unable to benefit from it

Chapter 8

The Public High Schools

The Big Switch

Almost every reason I gave in explaining why our elementary education is so good is reversed in the high schools. Many teachers are not competent in the academic discipline in which they are teaching, and some are into politicization and indoctrination and appear to view teaching as only a job. Much of the subject matter is not perceived to be useful by either the parents or the students and is not taught so as to be such. Many of our adolescents and teen-agers do not communicate with their parents about anything, and if they tried, many parents are not educated well enough to discuss what the students are studying. Sex, drugs, gangs, athletics, bussing, cheerleading, bands, beauty contests, and computer games function as major perturbations to interest in scholarly pursuits, which are not respected, recognized or rewarded by those managing our education. The schools are larger and farther removed from the parents, and there is a lot more time wasted by bussing and poor organization (LAGS) for teaching and learning. As a rule, the management is inept and indifferent to learning.

The Purpose of High Schools

High schools should prepare our young people to live happily and helpfully in an advanced industrial society. Students need to learn how to benefit from society by learning, earning and avocation, and how to contribute to society in terms of work, knowledge and civic interest. They should be exposed as much as possible to that which is useful and known and as little as possible to clandestine incitement to rebellion. High schools must adapt the interests, aptitudes and abilities of our students, in a realistic way, to serve their needs and those of our nation. We want each student to know that he will be ahead if he takes his schoolwork seriously, and we want the curriculum and its exposition to deserve being taken seriously.

Federal, state and local governments can help education in our high schools if they do the right things. Education, as well as interstate commerce, needs standards for quality and measurement, and these are best supplied by the federal government. Certification of teachers and managers should be done at the state level just as it is for most other professional groups. State and local governments should provide funding. Teacher pay should be influenced by market value as it is for every other profession. In the pages below I will discuss the application of these concepts to our high schools.

The Generally Useless Curriculum of High Schools

Students in high school need challenge for their active minds and bodies. They need physical exercise and training in social discourse. They need to be civilized so that learning can proceed, and they need to develop passions for activities useful to themselves and society. The curriculum and the classroom environment should be as close to reality as possible and free of dull abstractions. We need to think more of laboratories, shops and gyms than of conventional classrooms with desks and chairs.

Useful subjects have been gradually eliminated from the public schools over the past seventy years. There are lots of unctuous excuses, of course, for removing them from the high school curriculum, but the basic reasons are associated with the decline of quality in college "education" in general and the rising influence of the college of "education" in particular. Stated simply, the college of "education" and the local school boards cannot or will not recruit enough talent to promote a useful curriculum in the high schools. Even worse, the personnel policies now in place work against knowledge and utility. Science, politics and technology are changing the problems with which education must be engaged. "Education" is now big enough and organized enough to be a political force directed toward protectionism and self-interest rather than self-improvement.

The Demographic Problems

In 1950 the State of Tennessee required every teacher and administrator in training to take physics, and I taught "education" physics to prospective teachers and administrators at the University of Tennessee in Knoxville. I was impressed by the high competence of the women going into the career of teaching and dismayed by the low quality of the men, who probably gravitated to most of the school management positions via the coaching route. I was cheered by the idea that Tennessee would have a lot of good teachers for the next thirty years.

A small fraction of students, mostly men, did not do well in physics because it required a little applied algebra and trig. One of the women could hardly read and was headed for failure. One day the dean of "education" called to tell me what a wonderful person this student was, not to influence her academic standing of course, but to let me know about her intentions to teach in poor neighborhoods. This is typical of the stance that will help you get by in the college of "education". Even the most inept students learn to use it where it works. This call disturbed me, but I finally decided that kids in poor neighborhoods also need competent teachers. After the student received her grade of "F", there was a tearful and embarrassing confrontation. I was unyielding and the tears suddenly turned to profanity which shocked even me, with three years in the Army.

During this time, a wonderful but terrible change began. There was a growing perception of opportunity for women in the professions and many jobs became available for those wishing to work in industry. Many capable women, whose best jobs were once in teaching, were now free to do a lot of other things with greater earning power and respect. They did, with the result that today the very bottom of the academic pile is left for education and social work [16]. Several of my best students in college physics have been women in their thirties who could not tolerate any longer the growing nonsense in our high schools and were going into other professions. It is shocking to think that the increasing opportunity for women has been an important factor in the deterioration of our schools.

While a lot of bright women were moving out of schools, industry was becoming more complex with high technology, television, computers, communications and automation. The field of "education" faced greater challenges with a smaller talent pool. Industry demands for skilled personnel made it more difficult to retain teachers and students in the field of "education", and the public schools found that it was more difficult to be useful and relevant. Recent testing of teachers in several states makes it evident that the education level of our teachers is shockingly low. We need to change this, but the teacher unions, now politically active and highly effective, will fight viciously to deny the data, confuse the issues and block any effective reform.

The Starting Place

Our first action is to study the industry of our country and decide what our system of education must teach to assist and improve it. The National Bureau of Standards provides quality and measurement standards for industry and commerce.

The schools need a standard curriculum that will serve to relate the schools to what the country needs in the way of education. Then we will know what to teach and be able to describe it in enough detail to define requirements for facilities and personnel.

It is important to look at the big picture to establish long term goals for the future. On the other hand, we are at a good place in time to improve our current system tremendously in efficiency, equity, usefulness and flexibility. In the pages below I will describe current ills with which I am personally acquainted and make proposals for change.

The Training of Teachers

The usual teacher in high school spends four academic years (124 semester hours) to obtain a bachelor's degree. There is usually a requirement for 41 semester hours in general education and 33 semester hours in the college of education. The remaining 50 semester hours (1.5 academic years) is available to learn something to teach. The general education is said to be essential for a well-rounded citizen and the "professional education" in the college of education is said to be essential for every teacher. With all this required "education" how can our teachers and administrators average so poorly when they are tested on the basic skills taught in elementary and junior high schools? Is it not likely that this deficiency will impact more on high schools than on elementary schools? Were our institutions irresponsible in not being more selective in their certification of teachers for our schools? Would education cost a lot more if we insisted on better teachers? Could we do something to make teaching more attractive?

Recognition of Market Value

When an industry has a job to do, it pays whatever is necessary to acquire the mix of skills needed and the fact that some skills cost more than others on the labor market is expected and accepted. Industry pays what is necessary, and no more, to obtain each skill in the amount needed. Public schools should incorporate enough of industry practice to guarantee that all the school curriculum is taught effectively. The first step must be to transfer the certification system from the colleges of "education" to a state "bureau of standards for educators". This bureau will emphasize the objective testing of knowledge, skills and ability instead of courses in "education" and will be run much like the licensing of professional engineers and medical doctors, for whom knowledge, skill and ability are the essential attributes. Certificates and diplomas are worthy if there is something worthy behind them.

This action will immediately open the teaching profession to a larger population, and more competent people will apply if they can avoid the expense, indoctrination and nonsense in the college of "education". This can be phased in over a four-year period to prevent severe and immediate disruptions to large numbers of people. It will be amazing to see how quickly current teachers can adjust to a knowledge skill and ability system and how much happier they will be about it.

Most high school teachers in physics, math, chemistry, biology and computer science are unqualified in terms of criteria used for other academic disciplines such as history or English. I have already discussed at length (Ch.7) how the college of "education" prevents the proper training of qualified math and science teachers and causes them to graduate with a weak degree or no degree at all in their teaching area. How do you justify the decision that chemistry can be taught with less training than history? Can you really expect a teacher, unqualified in science and math and not interested or capable enough to acquire a sound degree in these areas, to recruit students for science and math [29, p 147]?

How Most Science Teachers Are Hired

Many schools, not being able to find or retain anyone qualified to teach science and math at the salaries offered, either drop or weaken the courses or persuade unqualified teachers to fill in. A student recently told me that his physics teacher in high school was trained in biology but that the only opening was in physics and she took it. I wonder if she had ever finished a single course in physics. If you must have physics taught by someone untrained for it, you should choose someone very good in applied math or chemistry, the closest disciplines to physics. Most school administrators do not know this. Why should they if they never had any of these courses?

The result of the current salary and training policy is that there is practically no one in the high schools capable of teaching quantitative science and technology, and there are practically no administrators who have had such courses, understand their importance, or care that they are missing. The school administration, because of its personnel and pay policies, cannot retain its qualified people. On the other hand, students who might enjoy something obviously useful are frustrated by the lack of substantive courses which, if offered, lack competent teachers, and are taught as memory courses rather than lab courses. Maybe this accounts for part of the dropouts: Students know when their time is being wasted.

The lack of standards makes malfeasance possible.

Fair Pay

Most teachers agree that some degrees are more difficult to obtain than others and about half are willing to admit that qualified mathematics and science teachers ought to be paid more [1, p 180]. They are not as willing to admit, for reasons quoted earlier, that talented people should be permitted to teach without the brainwashing "professionalism" in the college of "education". Letting a neighbor get a deserved raise in some other area is not quite the same as declaring that someone can do your job without your special training in the college of "education".

When the "state bureau of standards for educators" is in operation, any citizen can apply at any time for objective testing on the knowledge, skills and abilities useful to educators teaching or managing in various disciplines. There will be a general education portion of the test and a specialist portion of the test for teachers in high schools. Managers must show a general knowledge plus knowledge in all the areas under their supervision. This system permits aspirants to study on their own, take tests when they think they are ready, and plan the best way to remove their deficiencies.

Getting a Raise in Pay

A teacher in most states is certified by the state board of "education" after earning a bachelor's degree in whatever from wherever and spending time in the college of "education". The amount of pay usually depends on the highest degree earned and the years of service. Suppose that you are a young teacher with a Class B certificate based on a weak bachelor's degree in biology and 31 "professional" semester hours from the college of "education". Your most direct and immediate route to a raise in pay is probably a Class A certificate based on a "Master of Arts in Education" degree with 33 semester hours, 21 from the college of education and 12 graduate hours in biology [82, p32, 63]. Tuition will be about $100 per semester hour. If you really love biology and want a master's degree in it **plus** a Class A certificate, you will be required to take at least 33 semester hours of biology plus 21 hours from the college of "education". Some schools have an alternative plan for acquiring a master's degree **and** Class A certification [81, p133] [82, p66] if a student starts with a strong bachelor's or master's degree in an academic discipline: One year must be spent with the college of "education". Ordinarily, one academic year is 32 semester hours. **There are no raises associated with what you learn and know or how well you teach. All that really matters is more time at the college of "education".**

The system creates the earmarks of a bribe: give us a kickback and we will see that you get a raise in pay. I would rather that you, as a biology teacher, kept your tuition money and had a better vacation, had been promoted because you did a good job, and was helped to get an advanced degree in your area of expertise if you wanted one and was able to get it. So, tying your promotion to more "education" at the teachers college cost you money, wasted your time, and did not increase your knowledge in your teaching field.

In qualifying for a high school teacher's certificate in Kentucky, I had twenty-four semester hours of "education" courses. I can tell you unequivocally that, with the exception of part of practice teaching, they were mostly intellectual garbage.

I had a course in psychology whose main purpose seemed to be a haven for football players who needed to improve their academic average. They were handed out final tests with their names and the answers already written on them, and the rest of us were given blank tests and graded on a curve starting with several perfect scores. The athletic department could then brag about the academic abilities of its football players.

There was a course in educational psychology where at least fifty percent of the time was spent discussing pottery (yes, pottery!) and the rest of the time was spent copying clichés ("Every golden hour has sixty diamond minutes...") into a notebook, the neatness and organization of which determined the final grade. I do not really blame the elderly lady for failing to teach the "educational" junk popular at the time, for she was said to have graduated *sumna cum laude* from a prestigious school in Europe, where "education" is not a recognized academic discipline. There was no similarity between the course actually taught and the one described in the college catalog.

Then there was a course in educational philosophy where we sat around and "shot the bull"about everything and anything. This was a course in indoctrination. A friend advised me to tell the professor that I was an "A" student and to be clever and hypocritical enough to parrot his opinions and act like a disciple. Nevertheless, I rather liked this professor. One day he asked if we should have academic standards for teachers. I said "yes" but there was a lot of silence from the others while they waited for a signal to tell them which way to lean. He then asked, "Should every teacher know what one half of two thirds is?" There was absolute silence and the tension increased in all of us. Then he asked, "Miss Brown, what **is** one half of two thirds?" Poor Miss Brown said nothing and turned a deep red. The subject was changed abruptly. This particular instructor pushed the idea that the needs of the individual were paramount and that groups were made up of individuals. Hurrah!

[Now I read that it is more 'correct' to subordinate individualism to ethnic groupism!] I sat there thinking of all the ways society limited the rights (freedoms) of individuals for the general good. There is a bill of rights but also provisions for the general welfare. For defense, the government may draft us into the army against our will. It may exercise eminent domain to take a family farm for an industrial park. It may levy confiscatory taxes on people with good incomes, or punish motorists who do not stop when the light turns red. I had refused to tell the "education" professor that I was an "A" student or that I thought his course was wonderful. "You had some interesting viewpoints", he said as he explained my "B", "but you did not learn what I wanted you to know." As young and naive as I was, I knew that there was something wrong with what was being taught. We all could benefit from refereed discussions occasionally but who needs to spend a year studying junk like this, which changes from year to year, from place to place, and from teacher to teacher?

For some reason, the typical school board does not appreciate what has happened to our system of education, and the graduates from the college of "education" are not about to tell it anything except how well the children are being educated.

The Licensing and Evaluation of Professionals

We all know that medical doctors, lawyers, and professional engineers have nice protective associations, backed up by state law, to protect themselves and the people from incompetent practitioners. These people have a huge knowledge base that is relatively standard and somewhat transferable from one state to another, and they subject their incoming associates to a demanding curriculum and unbelievably thorough tests. The professional engineers' test in Alabama, for example, takes all of two days. **Anyone can take the test whether or not he/she has a degree in engineering.** It is believed that the knowledge and skills necessary to be a professional engineer can be measured better by tests than by degrees and courses. The medical profession follows roughly the same practice. Tests to evaluate professional ability are usually taken after degrees are earned because most aspirants believe that the knowledge necessary to obtain a degree is useful in passing the test.

A judge recently struck down a competency test for teachers in Alabama. It was argued that the test was discriminatory, that there was no demonstrated relationship between test scores and teaching ability, and that it was unfair to test a person after that person had invested his time and money in a degree. There are a number of logical and practical errors in these arguments.

All tests are supposed to discriminate against those who do not meet the basic requirements of a profession, and our social landscape should have no more influence on the qualifications of educators than on those of dentists.

I have hired quite a few scientists and engineers and I know how easy it is to make mistakes. I have always checked with previous employers and looked at resumes and college transcripts. These have their pitfalls. If I were to hire a math teacher, I would want to be sure that he/she knew the subject thoroughly and was of good character. These necessary attributes do not guarantee a good teacher but their absence guarantees a poor teacher. I need to know if the right material is taught and if the students are learning it. I can walk down the hall occasionally to observe the teacher in action and I can chat with students and informed parents. These are highly unreliable but often very valuable indicators. By testing the students at the end of the course, I can determine **objectively** what was taught and how well it was learned. The problem with the reasonable procedure described above is that there is very active and effective resistance against it from the colleges of education and the teachers unions. A college of "education" and the state board of "education" have certified the teacher, and teacher unions are against the use of standard tests for teacher and student evaluations unless a host of impossible conditions are first met.

Who Gets Promoted?

In industry and most school systems of the world, an employee can work her way up through the ranks from any professional starting point. I went to a retirement party for a man who expressed his gratitude to an army that had enabled him to work his way from a private to a lieutenant general. The military services are sometimes accused of promoting a caste system, but they let me as a twenty year old corporal apply for and get admitted to the engineering officers candidate school at Fort Sill, Oklahoma after I had passed a number of tests and engineering courses. The military forces are truly dynamic meritocracies.

Some companies will not hire anyone who has a management degree [23, p 71]. Schooled managers who never did any relevant work are frowned upon, and there are quite a few stories floating around in the industry about the damage they have caused. The general viewpoint is that you need to know something about the business to manage the business and you do not pick the dumbest people in sight to tell the others what to do.

In the "education" business, knowledge and performance make no difference.

You cannot aspire to promotion to a management job without a management degree from the college of "education" and certification by the state board of education. This strange personnel policy was justified under the argument that the schools would have better managers if the candidates were properly screened and "educated" for management. They have been screened to remove critical thinkers and "educated" to hate academic achievement and its reward and recognition. You will not find many math, science, engineering and computer science majors among those chosen to manage our system of "education". Why?

Consolidation and Bussing

Consolidation and the bussing to achieve it have had a destructive influence on individual students and on neighborhoods. It wastes time for the child and money for the public. It ensures that the parents and teachers will never know each other, increases the exposure of the child to the dangers of accidents, pollution, contagion, and drugs, and makes the schools unsafe because the hoodlums find anonymity in large numbers. Troublemakers seem to flourish better in large populations [37, p 41]. The presence of a school does much for the cultural and social life of a neighborhood, and schools should be dispersed rather than consolidated if there were no reasons other than this one. As energy becomes more of a major problem, transportation may be an impossible burden and we may be forced to decentralize after all the nonsense of centralization. Crudely speaking, the total cost of transportation in a four school district will increase by a factor of two (in miles driven) if you consolidate its four schools at the geometric center. Twice as much student time will be wasted on the bus.

The most telling argument against bussing and consolidation is that the best schools, in terms of student achievement, are small schools with relatively modest budgets. It is possible in many rural areas that teaching jobs are the best in town, and that the brightest people compete for them. This would tie the superiority of small schools to the superiority of their teachers. We should be thinking of consolidation by communication rather than by bussing. Administrative staff could be eliminated in small schools and all reports to the central office could be made electronically as is done with modern bank accounts. (This will require only modest lessons in computer / keyboard skills for teachers and administrators). An English teacher does not need three tiers of administration to insure that she teaches English in the correct way (surely not after having been certified through the college of "education"). She does need a detailed course syllabus and her students should be tested to determine if she did her job.

Money, Money, Money

The constant wailing that money is the answer to the public school crisis is pure hogwash. We need a new philosophy of education on the part of the schools and the public. There will be plenty of money when the perturbations to education are removed. Lots of small rural schools in the Midwest have little money but manage to educate well with what they have. The quality of the people, the interest of parents in their children, the elimination of bureaucracy and waste, the focus of community activities at the school, a solid work ethic, a lower cost of living in better social environments, all work for the small town and rural schools. In some rural areas, teaching is the best job around and there is no problem in getting good teachers.

One small school in our county always surpasses the other schools in its performance, and it has been fighting consolidation for years. It has had good teachers and counselors and has seemed to be a continual affront to the larger central school, which has a much lower percentage of high achievers. Good citizens and interested parents are more important than more money and the latest nonsense from the college of "education." I am in favor of more money for teachers who meet solid standards and against more money for the expensive fringes of surplus administrators with few academic interests and little ability. If you treat your teachers well, make your community a good place to live, and hire by market value, you will have no problem in attracting and retaining good teachers in every area.

Excuses For the Public Schools

We seem to have developed a systemic public apathy to learning, perhaps because much of it is perceived as useless. Not long ago my wife and I were going to beauty walks at schools to hand out cards and display posters in a race to elect Patricia's brother William as the county superintendent of schools. The parking lots were covered up with people coming to see small children dressed like adults with a lot of attention to hair styling, cosmetics and fancy clothes. I have never seen even a small fraction of this many people at PTO meetings, except perhaps at schools with a large military population. The military services manage to instill in their people an appreciation for learning, perhaps because their lives will depend on putting competence in leadership positions. Our country could use more of that same philosophy because we are all in a competition similar to that of the military, just as deadly but more difficult to perceive and identify.

Various pressures force the public schools to teach for the bottom quarter of the class.

We do not wish to fail anyone, especially the athletes. Parents with failed children often have a way of being nasty and getting even, so the best path seems to be to carry everyone along together while the more able students become bored and disinterested. When the able students do not learn all they can, the average score for the school is lowered and the amount of knowledge in the nation is decreased.

We hear a lot about keeping students in school, regardless of how they behave, how much havoc they wreak, or how much they cost the general public. How much abuse should the teachers and students doing the right thing tolerate from the hands of hoodlums? The "experts" from the college of "education" come by our place during "in-service training" and tell glorious motivational stories of teachers who never gave up, but I think of the cost of this kind of "Spockism" to teachers and students. I would guess that the Panglossian professors did not have much teaching experience. You cannot teach amid noise, confusion and physical violence.

What do you do with a student who cannot remember anything from one day to the next? Have you ever thought of how cruel it is for this student to be exercised every day all day long in a game at which he always loses among students who are all doing better? Teachers are depressed when they see no progress. It is a joy to teach children who can learn and a sorrow to teach those who cannot. A lot of teachers start their careers with poor learners because that is where the jobs are, but they plan to migrate out as soon as possible after tenure. I often see them in my classes working for a change of career because they can no longer endure teaching to students who cannot learn and cannot get a transfer to a position with better students.

One excuse **for** consolidation is to have a place for the problem students without bankrupting the school. Many parents of problem children will move heaven and earth to push them into the main stream whether or not there is a benefit and regardless of what it costs the teacher and the other students. The learning unit approach will take care of many such problems, but not all.

Recognizing Academic Ability

The athletes and cheerleaders receive a lot of recognition in high school, and the valedictorian usually receives a good scholarship. Often the valedictorian is a person who carefully plotted a path through the teachers without standards and the subjects without challenge. One superintendent in our county endured much criticism when he gave more academic points for the hard subjects than for the easy ones in the hope of recognizing some of his real scholars as valedictorian for a change.

Several profound scholars of my acquaintance received no honors at all in high school because of their rebellion against some of the inane and vacuous courses. How do you explain why a school, the purpose of which is learning, puts academic ability and achievement so far down on the list of things for public recognition? I believe that, if we started reporting grades as percentages of right answers on standard tests and put everything on the diploma to be given at graduation, students, parents, teachers and administrators would have more favorable attitudes towards school. This can be arranged easily in this computer age if we can manage to institute a few standards. There is no relationship between standards and the number of failures. A standard test lets you measure something but it does not tell you what action to take or where to draw the passing line. I personally would not "fail" anyone. If I were responsible for teaching students to run, my final exam would be a timed run down a measured track. Each runner would have entered on her diploma something like "Running: 100m/15s". A potential employer may need a runner, and these numbers tell him what to expect. Likewise, I would enter "Arithmetic /87" to show state percentile standing in arithmetic or to show the percent correct in the final test on arithmetic.

What Did You Expect?

When we look at the knowledge and skill levels of high school teachers and their supervisors, the procedures for awarding pay raises and promotions, the aversions to standards for learning, the legal and social problems visited on the schools, and the insulting and demeaning politicization and indoctrination of teachers by the colleges of "education", we cannot be surprised that our schools have steadily gone downhill to the extent that our people are less educated, especially in the sciences and probably in other areas, than those in any other important industrial nation.

We, the public, created the sorting machine that gave us this mess. We permitted (or caused) the schools to avoid standards for courses, students, teachers and administrators; we took away the teachers' ability to control the classroom; we placed the teachers at the mercy of a petty political machine called the school board; we lowered teachers' pay, relatively speaking; we created a very poor work environment at schools with bullying parents and uneducated administrators. We permitted the college of "education" to grab the certification system, force insulting nonsense on the teachers, and fill the schools with a leveling philosophy, which discriminates against high achievers.

We, the public, did all these terrible things, and the evidence against us is that competent people do not perceive the schools to be good places to work and our students perform very poorly in all areas, especially those which might help us to "work smart".

Technology and High Schools

As I have mentioned, many high schools seem to have the idea that anything universally useful is unworthy of attention. We hear a lot about English, history, mathematics (pure and taught like another memory course), social studies, athletics, foreign languages, and the sciences most removed from technology. We sometimes push in a little environmental science, highly politicized and uninformative, about how to solve our major environmental problems by discomfiting our industry. We need to learn more about production processes, hazards of pollutants and measures of emissions. There is little in high school to suggest that some people might want to major in engineering or help the country work smart as a good technician or as a skilled and safe factory worker. There is entertainment (literature, competitive sports, band, cheer leading, drama) but little to attract a young male or female interested in finding a job in industry, where most of us eventually try to earn a living. We devote much of our high school activity to entertainment and the things that have no foreseeable future or application. Then we act surprised at the dropout rate and promote all sorts of things (except a useful curriculum) in the name of retention. We are afraid that our youths will go into crime if they drop out of school so we keep them and their crime in the schools. We pretend that they cannot go to college and do well unless they spend their time at all the things that they dislike. I have mentioned elsewhere that high schools, aside from sports, have little of interest to young men and that most of the academic recognition (I would estimate 80%) goes to women. Does this say something about the integrity of the system, the male character, or the curriculum content?

I would favor organizing high school instruction into units like literature, history of our industry, algebra, applied geometry, trigonometry, vector algebra, calculus, welding, maintenance, construction, physics (largely experimental), chemistry (useful), biology (useful), music, physical education for all (not competitive sports for the few!), auto mechanics, keyboard skills (everyone needs them). I would let students attend high school for a specified time and permit them to choose learning units important to them. There would be something for those poor in math and language. A capable student could stay in a unit (even one run continuously) until he mastered it or received little benefit by staying longer. He could take as many units as he wished.

A diploma that means something for a work application would reduce the dropout problem by taking away the idea that school is just killing time. The few not interested in anything because of learning or behavior problems need to be somewhere else doing what they can in an effort to be useful.

There should be no learning tracks in high school to discriminate against those with an applied orientation. The high schools should recognize that it is not dishonorable to know something useful or to labor at a trade or on an assembly line, and this recognition should manifest itself in terms of more teachers in useful disciplines. High schools should be organized around learning units useful to our society, especially to our capability to "work smart".

Tech Prep

There is a movement afoot to try to put some more "work smart" capability in our high schools under the guise of Tech Prep. When I look at the curriculum and the equipment, I see "applied physics, data acquisition and computers" as accurate words to describe what is going on. We could have had "Tech Prep" for years if our school administrators had possessed the understanding (education) to associate useful math and physics with computers and measurement capability. Now applied physics is back as Tech Prep. Maybe our "educational" administrators will let it live if they do not find out what it is or discover that it is highly differentiating of the student body. I can see "Tech Prep" being drained of its lifeblood by administrators from the college of "education" who will view it as a source of money and empire rather than as a means to help our young people, our industry, and our country. How can Tech Prep retain teachers who would do well in industry? Presumably, "Tech Prep" is for the neglected middle 50% of the student body, but I predict that our brightest students will migrate to it when it gathers momentum and students find that they can avoid nonsense and learn something useful and exciting. Again it is evident that our "education" administrators cannot admit that many of the best and brightest among us are those with an interest in applied science, namely medical doctors technicians, dentists and engineers, and they will pretend that the upper 25% will stick with the uncertain knowledge of the "college track" if they have a choice. Tech Prep will support training in many technologies such as machining, air conditioning, equipment maintenance and repair, electronics, applied sciences and medicine. All of these technologies will provide ample opportunity for the exercise of applied mathematics if we can bring ourselves to teach it.

Summary

The public high schools need a curriculum standardized to support our commerce and industry.

The college of "education" should be removed from the process of teacher certification and replaced by a "bureau of standards for educators" to which **anyone** could apply for a teaching position..

We need a standard syllabus and a **qualified** teacher for each course taught in junior high and high school.

The curriculum should be broad enough in scope to permit each student to discover what he can do best to earn a living and enjoy his leisure.

We should organize and manage our high schools by learning units as described in Chapter 6. .

High school diplomas should have recorded on them every learning unit studied, the time spent in it, and the exit level, so that prospective employers can have information and the students and teachers can recognize an element of responsibility and accountability.

All able students and teachers should exercise in a fun and games atmosphere every day.

Academics should enjoy the visibility, competition and recognition that now go into athletics and other "activities".

Every student should be encouraged to learn all that he/she can in a pleasant environment.

There should be only reports of achievement as every student is placed where learning is optimum. There should be no failures.

Everyone should "graduate" when he has expended the school time allotted to him at public expense. This is equal opportunity.

Students and teachers should not have their time wasted; neither should they be coerced to perform under undue stress.

Chapter 9

Public, Private, and Parochial Schools

Public Schools

Nowadays, if you want to see your child get a good education, you look for a private school [25] or an "elitist" state school [53, p 43]. Why is this such a common perception? If parents know and care enough to look into their public schools, they know that their children are at a disadvantage. With all the obvious waste and forced retardation, more and more people are concluding rightly that any alternative to the public schools is better for their children, and many are willing to pay dearly to acquire what they perceive to be a great advantage for their children.

The public perception of the public schools is so bad that many parents are seeking alternatives for which they must sacrifice much but from which they have some assurance that their children can learn without being subject to the excessive waste of their time, harassment, extortion, gang violence and drug pushers. When I lived in Aberdeen Maryland, my twelve year old son attended a local school where he was bullied frequently, came home often with stories of being struck, pushed, and pinched in the hallways, being called every name in the book, and having his money taken from him forcibly by gangs. A neighbor's little girl said that she never went to the bathroom during the day because of the way in which she was treated by older girls who were permitted to hang around there. The legal system had taught the teachers well not to be too attentive to, or intervene in, the harsh bedlam around them, and the principal, who did not want the boat rocked, never admitted that **his school** had any problems. Our son suffered so much that we moved to nearby Bel Air where the schools were reasonably free of violence but drugs were sold during school hours and sex education was said to be an invitation to participate.

This story about my son depicts circumstances that are not at all unusual. The hoodlums and the legal profession have reduced many schools to sham operations where little learning can take place because of noise, disorder and violence. The management always **insists** that the problems are not there. We cannot even begin to talk openly and honestly about how bad our public schools are and how to reform them. Parents know that something is terribly wrong, but they do not know how to make changes.

It seems that all we hear is the need for more money to pay for a service that is rapidly deteriorating every year because of consolidation, lawlessness, and the inability to hire worthy people who will accept low pay and abuse in dangerous and unrewarding places.

There is serious consideration in some states of giving portable tuition vouchers to permit parents to have some choice in where their children attend school. The general feeling is that we do not have the will to face an entrenched and powerful bureaucracy in our efforts to clean up our public schools, but must try to escape them if we can for the sake of our children. If many public schools collapse in their present condition, not much will be lost. They are open drug markets and training grounds for young criminals who can do anything they like with impunity. All the tools of discipline have been stripped from the teachers, who are smothered by "due process" and a do-nothing administration. In some areas, every high school teacher should be deputized. If this is bothersome, maybe we should give the police the credentials to teach.

We should free the public schools from incompetent political appointments by insisting on education and performance standards for its employees. This will increase public respect for the school and permit school employees to respect themselves.

We should free the public schools from students who do not wish to be there or who cannot benefit from being there. People who cannot or will not learn, or cannot or will not teach, should be at other places. Schools should provide educational opportunities, not baby-sitting or social services. The schools now have so many fringe responsibilities that they cannot remember their primary purposes: increasing the useful knowledge base of the nation and training young people to better themselves through knowledge for better jobs and good citizenship. If private and parochial schools can remember their purpose, they can do it better and cheaper than the public schools by eliminating the competitive athletics, disproportionately expensive learning programs for the disabled, the budding criminals, and the bloated and unlearned administration.

Parochial Schools

A lot of people wish to have their children in a controlled environment and have them receive some moral training along with their education. Over much of the world, the church schools have perpetuated the alienation of religious groups from the mainstream. This may appear to have its good features when you contemplate the mainstream, but I am saddened when I see a history book made up of a list of wrongs for the past thousand years. People do not seem to need much urging to harbor grudges and persecute other people unfairly because of real or imagined wrongs far in the past. Occasionally a religious leader will fire a teacher to illustrate his great distaste for some sin which most of the people in the denomination would consider as less than a just cause. This kind of thing happens much too often because the leadership of many religious groups do all they can to give their people a special identity and keep them alienated from the mainstream by preaching hate and recalling abuses, presumably to maintain control and prevent loss of members by intermarriage and exposure to heresies.

Despite some justifiable criticisms of the parochial schools, they manage to maintain enough order to promote a learning atmosphere: they can refuse to admit the unscholarly and they can send the troublemakers home. They maintain standards of behavior and are prime examples of the usefulness of an ethical system shared and known by the students, whether they like it or not. They have not bought "self-esteem" at the expense of honesty, openness and efficiency and they are usually glad to have a little elitism rear its head in scholastics as well as in athletics. Many people may not like too much stress on religion in parochial schools, but they make the financial sacrifice anyway because they perceive that their public schools are dangerous and useless as far as education and values are concerned.

Private Schools

If parents can get their tuition money back from the states, there is little doubt that the private and parochial schools will flourish. They can avoid, I hope, the high costs of students who cannot or will not be educated, and they can evict the troublemakers. These two facts together will do much to insure their success and enhance their reputation. They can eliminate the frills of athletics and excessive bureaucracies and hire, at market value, teachers who can do their jobs. I fervently hope that the colleges of "education" can be bypassed in the process, and that a school can survive by the knowledge it imparts, measured of course by suitable standards.

Summary

There really should be no reason why the public schools cannot do what the parochial and private schools can do to cut costs, control the school environment, and promote learning. I favor good public schools over any other alternative, but we can never achieve them as long as they are dominated by the college of "education", which puts leveling ahead of education and are used by the public for baby sitters, social service, and another form of political patronage. Schools should be for those who want to learn and can learn.

Perhaps the main difference between public and private schools is that private schools are run as a business for public service rather than as a public patronage system catering to unions with a lot of political clout. Everyone is so well protected in the public schools that the school cannot evaluate and discharge personnel not doing their jobs. Hoodlums and disruptive misfits have their "rights" defined by lawyers and overly protective parents that care little about other children. Despite a lot of paralysis when effectiveness is needed, the public schools exercise a lot of power over their employees by harassing them with new "programs", foolish fads, unnecessary paperwork, endless meetings, and more trips to the college of "education". The private schools depend on the fact that parents are willing to suffer economic cost and inconvenience for the sake of their children. The private schools would disappear for this reason alone if the public schools were not so terrible. Without a strong union, teachers in private schools have sacrificed seniority, security, and pay but have escaped an unlearned but autocratic bureaucracy and can spend more time at teaching. At some times and places they may escape the stranglehold of the college of "education". It would be interesting to compare the performance of teachers with and without the "professional education" from the college of "education". I believe that the teachers without it would do better because their degrees are stronger and because they come from a better talent pool.

Chapter 10

Why Teach? The Discouragement of Teachers

Some Nice Things about Teaching

Teaching is a universal profession. There are positions in every small town and all over the countryside. While your children grow up you can work close to home and live where you want to live, a big plus for a lot of us. Of course your professional credentials and retirement contributions may be more difficult to transfer from one place to another than those of doctors, lawyers and engineers.

A common myth is that you can work nine or ten months a year and have a nice vacation with your children when they are out of school. This is disappearing for a number of reasons, like "continuing education", lengthening school years, and more "duty days" before and after the official school period. Year-round schooling is often discussed.

You can be proud of helping the human race by giving them something they desperately need: knowledge and skill. Often you can inject a little helpful politics and philosophy along with the knowledge. I taught mathematics, physics, computer science and electronics for years without knowing that I could or should do this!

If you are a good teacher, you can develop a following of appreciative people who love you for the great benefit you gave them.

Teachers live longer. At least it seems longer in the schools of today. Teachers make just enough to live on and they cannot afford killing pastimes like tobacco, alcohol, cocaine and promiscuity. I have noticed that many teachers are good at running the show, wherever they are, and love to talk and have everyone listen.

I sometimes accuse my wife, who spent many years teaching first grade, of treating me as a first grader.

Why would anyone not want to teach?

Financial Rewards

My first teaching job at a junior high school in the coalfields of Eastern Kentucky paid ten dollars a day. The local miners made twenty-five dollars a day, and a few of them reminded me that they, with only an elementary education, earned more than I did. The coal operators wanted fifty dollars a truckload to dump coal at the side of my two room shack, so I climbed up the mountain, dug my own, and carried it home on my back in a tub. You will recognize that there is a quadruple economic penalty in teaching: lost pay while being educated, paying for an education, getting less pay after an education, and having to spend money on "continuing education" at teachers colleges to retain a license.

What really angered me most was that I was "leaned on" to attend the annual meeting of the Kentucky Education Association. I had to pay my own way and my pay was docked while I was gone. Vice President Alben Barkley and Senator Margaret Chase Smith were each paid what was equivalent to about six months of my salary to make a twenty minute talk about how great education soon would be with the upcoming federal aid to education. Worse still, I was being threatened with the need to go back to take and pay for "education" courses during the summers off. I had a part-time job wiring houses where the jobs were too dirty to interest the local electricians' union and I wanted to work for the Kentucky Utility during the summer by clearing trees under transmission lines.

I will say that the coal miners were better informed on what interested them than many suburbanites with their "better neighborhoods". Miners did hard dirty and dangerous work, were paid better than most workers, were union oriented, and had a good sense of justice. They resented my remarks on the perils of alcohol, caffeine and nicotine in a health science lecture that I made to my students and told me to mind my own business. People still feel the same way despite the thousands of traffic fatalities and birth defects. They helped me find part time work and were genuinely good neighbors.

I saw a flyer advertising teaching assistantships at the University of Tennessee and quickly calculated that, with my remaining G. I. Bill and the teaching stipend, I could earn more going to school than I was earning by teaching school.

My principal had been elected county superintendent and he had offered me a job as principal if I would work for him in his new position. He never forgave me for going back to school, and gave me a bad recommendation thereafter. Since then I have seen several instances of this kind of thing by unethical supervisors, who hoped to keep key people by never saying anything good about them. You are great while you are advancing **their** cause but unworthy when you decide to advance your own.

Today I am teaching physics at a junior college and am at the top of my pay scale. I make $32,000 for nine months and $9000 more if I teach summers. The average factory worker across the street at GM Saginaw, with a little overtime, can make $60,000 per year. His fringe benefits are better than mine are and I have twenty years of education ending with a doctorate in a difficult field. He can choose the time of his vacation and I cannot. I am de jure excluded from most management jobs in "education" because I do not have a doctorate in education. In industry there is no such problem. I cannot get a job in the public high schools in Alabama with my Kentucky certificate because, among other things, I have not had a course in the history of Alabama. My pension is generally not portable.

By the way, I am explaining, not complaining. I made my choices and I do not regret them. I am just pointing out from personal experience some reasons why competent people do not enter, or are quick to leave, the teaching profession.

The Management

You can tolerate a lot of abuse if you like and respect your boss and she is fair and reasonable and helps you over the rough spots. In the public schools, your boss may be one who managed to get an administrative degree without ever having taught a year in a classroom. He may be incapable of passing with high marks the courses being taught in his school. He may resent the fact that you majored in English and he barely made it through English. He wants to get as far from the learning scene as possible and he is absolutely determined that the head office is not going to hear anything bad from disgruntled parents whose children are in his school. He spends most of his time somewhere else attending interminable meetings and is never available when you need him. What other enterprise would cause or permit an immediate supervisor to behave this way?

Every teacher is confronted at some time or other with an incorrigible child, either because he is mentally disturbed or more often because his parents have told him that he can do what he wishes with impunity.

Many principals will not share this problem with the teacher. Instead, they will penalize the teacher for having a problem. Principals who have been teachers for a few years are immensely more helpful.

I had a principal tell me once, "Every first grader will learn to read this year." As every first grade teacher knows, about 15% of the children, mostly boys, have great difficulty in learning to read the first year. The best you could say for that principal was that he was either ignorant or dishonest, and you knew that some poor teacher would be under pressure to dissemble if she worked for him. This kind of foolishness, sometimes called esprit de corps, is common in "education" circles [4, p XIX]. The argument is sometimes made that you cannot admit the possibility of failure, or the teacher will not try hard enough. Is this the way we treat professionals? Only in the field of "education".

My wife had a supervisor once who had more rank than the principal and who acted as if she had never taught a day in her life. She would read about some new and worthless fad (the journals are full of them) and try to push it on the teachers under her supervision. In case you do not know it, you must work every minute if you have 30 first graders and it is dismaying to be loaded down with nonsense by a person who has never taught and who occupies a position that should not be there in the first place. An elementary principal worth having does not need three separate supervisors over him to see that his teachers do reading, writing, and arithmetic properly. Too much administration is always bad administration.

The Management of Management

Most performance-driven organizations, both industrial and military, promote up through the ranks. This practice produces people who know the business, have a greater rapport with the people reporting to them (they have been there!), and have demonstrated **some** ability and appreciation for the work at hand. People have better morale and work more responsibly if they know that good work may bring a promotion. Formal education is important in many situations, but performance on the job is usually more important.

There is a growing disenchantment with trained managers who know nothing about the business and who expect to move to positions of responsibility by virtue of their education rather than their performance on the job. A recent documentary on public TV told of an automotive parts company started by a bunch of hotrodders. It did so well that a prestigious management company bought it as a real money-maker and imported their team of trained managers to run it.

So much money was lost so quickly that they sold it back at a great loss to the man from whom they had bought it. He assembled all of his old executives that he could find and quickly started making money again. This story illustrates the importance of managers who know and appreciate the job being done [23, p 71]. The school systems in most countries promote from the ranks, but we have somehow tied promotions to the horrible requirement of a degree in administration from the college of "education".

Continuing Education

Depending on where you teach, you may be forced, if you want to keep your paycheck coming, to return to the local teachers' college for more nonsense courses. This takes care of that fabulous three-month vacation that teachers are supposed to enjoy, and uses up the last two raises. It also takes what little money you might have saved. Quite a few teachers endure this kind of thing and even work toward a master in "education" or some further certificate that is just below a doctorate in "education". The system forces useless training, gives extra pay for it, and then expresses its disdain for the value of the training by coercing teachers with too much of it to leave the system so that they can hire two young inexperienced teachers for less money.

The least we ought to do for teachers is to let them take tests to see if they need "remediation" or "updating" at the college of "education". If they pass, they should not be forced to spend their money and time on courses which they do not need and which do nothing to help them with their work. If a need for a course is identified, presumably by reliable observation or testing, the system should pay for it and have some means of determining whether or not the training was beneficial. As a rule the management does not care what courses the teacher takes as long as it dumps money into the college of "education", and there is no follow-up to determine the efficacy of the training. This supports the idea that the training had no educational purpose, did not result in an increase in a knowledge or skill, and had no benefits other than to support the college of "education" and to maintain a thin aura of "professionalism". So far, no other profession is harassed about their education like teachers are. Nurses go back for professional updates on new drugs and techniques, but you can believe, and certainly hope, that their further training conveys useful information and does them and their patients some good.

The things that teachers can do to satisfy the "continuing education" requirement vary with the school system. There are "workshops", college credit in "education" courses, any kind of college credit, or an advanced degree in "education".

An advanced degree in the teaching area is unlikely because the system guarantees that it will almost never happen. A veteran teacher and friend told me recently of going to a science workshop on simple machines, about which he knew quite a bit. It was presented by an enthusiastic but uninformed young teacher many years his junior but it satisfied the system demand for further training. It was obvious to my friend, who had never had physics but who had worked with ropes for years, that the young person did not know the first thing about the pulley system being explained. This is the typical kind of nonsense that occurs when the administration is totally ignorant of the work done by its teachers. Any administrator with a course in basic physics could have spotted the problem. My friend was looking for the easiest way to satisfy a workshop requirement and he had become inured to the fact that it was useless and wasteful of his time and money.

Discipline

A common myth is that a good teacher will not have problems with discipline. This self-serving philosophy lets the administration escape responsibility and puts it all back on the teacher. You cannot teach with a massive disturbance in your room, and you must do something, with or without the principal's help. If nothing else works you may need to organize parents, who want their children to learn and be safe, to put pressure on the administration and the parents with problem children. I recently talked with two teachers working in a poor neighborhood, and they said they did very little teaching because they spent their time and energy trying to keep order and prevent the children from injuring each other. They had heard several pre-teen girls talking of getting pregnant so that they could draw money from welfare.

During a question session after his talk, I asked the Belgium minister of education how he handled his discipline problems. He said that he did not have any, and went right on talking. A little later on he stopped talking, apologized for the brevity of his answer, and stated that, in his country, education was a privilege. The schools do not tolerate misbehavior and the parents try very hard to keep their children in school because education is important to them. In the US we force school attendance and tie the teachers' hands so that they find it difficult to maintain enough order to teach. Along with the hoodlums, the lawyers have invaded the schools, and teachers are increasingly subject to violence in the classroom while their cars are locked in a special lot outside the school. I spend $220.00 per year with the education associations, whose politics I detest, just so I will have legal and liability protection.

I had no discipline problems while I taught in junior high school. I could inflict corporal punishment when needed to control the trouble-makers, but because I could and would, I rarely needed to do so. You may not have this advantage because it is now more civilized to permit the kids to punish the teacher. I may have been critical of my principal in some areas, but he maintained discipline. He and I visited each classroom at the beginning of the school year and he singled out the bullies by name and told them that he would not have the women teachers abused. He persisted until he received a respectful confirmation. If not, he and I advanced slowly on the bully until he agreed. I doubt if the principal averaged one paddling a year. He pointed out during my first week with him that a lot of the ninth grade girls would be married before the school year was over and that I must never ever permit myself to be alone with any of them. We read frequently of male teachers suffering because they forgot this simple rule.

Climbing the Ladder

You work your way up the teaching ladder in a variety of ways, depending on what is important to you. You can work for a position closer to home or aspire to a more affluent neighborhood where the problems with discipline and learning are less severe and the parents are better educated. You may need a better principal. Usually you can take "education" courses at the nearest teachers' college to increase your pay. As a senior teacher you may manage to be assigned classes with students having greater competence. I can assure you that it is more fun to teach apt pupils. There are less discipline problems with students with high achievement, despite all the pious tales to the contrary, and all of us love to see students learn and hate to see them waste our and their time with no appreciable results. Parents of successful students usually like the teachers, and parents with failing children often blame the teachers. A lot of teachers in "special ed" suffer rapid "burnout" in the sorrowful atmosphere of teaching without learning, and I have talked to several recently who felt a great compulsion to get into some other kind of employment.

If you do everything right, you may climb to the top salary in your profession, about twice that of a beginner. I know teachers who arrived at this great situation only to find that the school board, in times of bad budgets, wanted to replace them with two beginners. They were transferred to worse neighborhoods and given the slow learners (a guarantee of greater discipline problems) which the principal, who knew where his salary came from, could criticize and write up in his evaluation reports.

Unless teachers have developed a following with considerable political clout, they are vulnerable to this kind of harassment. Unions, of course, are one answer, and perhaps the only answer under our current style of management to this kind of treatment. We need to reward merit rather than seniority, yet the management may be so bad and so opposed to objective standards that it cannot be entrusted with merit decisions. The rank and file choice of a seniority system over a merit system is strong testimony that the system has something bad wrong with it.

You will note that the system is not geared for an increase in knowledge in your academic major. Even a cursory study of the system will convince you that knowledge, skill and job performance are not important in the teaching game. You take "education" courses because they are easier, are usually more available and open the paths for promotion. With an atmosphere like this, the students may never see anyone with a burning desire for knowledge in some specific field and the enthusiasm to encourage it in others.

Summary

The joys of teaching are many, and the sacrifices are many. You can do a great service to society, despite poor pay, incompetent administration and a critical public. You will not be encouraged to acquire more knowledge in your chosen field, but will be coerced into the college of "education" for reasons of retention, salary and promotion. Many of your colleagues are people who could not make it in any other trade or profession. Your pension and professional standing are generally not portable and your seniority may be lost if you cross a county line. Despite all the mistreatment of teachers, many capable young people ignore the career sorting system now in our universities and abetted by our culture. They decide to teach despite the inequities perpetrated by public education. They mostly inhabit the better schools in the smaller neighborhoods, but we should hope for enough of them to cover the country and bring us a revolution in our current system.

Lastly, the teachers have credit unions, health and retirement plans, travel groups and professional insurance. Teachers make great friends.

Chapter 11

Some Remarks On Knowledge and Skills

Some Pertinent Questions About Skills

Knowledge and skills that cannot be measured are figments of the imagination. Beauty is in the eye of the beholder, but we can usually manage to put a price on the performance of an artist when we wish to hire him.

There are a lot of skills that we acquire by endless practice. A baby learns to walk with a lot of effort, determination and practice but without a lot of instruction, and learns to speak words and sentences with a lot of help from others. The development of language skills requires the mental equivalent of a dictionary plus a set of rules and some accompanying visualization. Reading permits the use of symbols to trigger specific thought processes. Tennis requires physical stamina, alacrity, and an appreciation of strategy. After you are in the learning business a while, as we all have been, you find that some skills come more easily than others. There are huge disparities in talent and ability from person to person. Some areas, such as music and mathematics, are virtually impossible for us to master unless our brain is connected in such a way that these talents are present.

As a teacher I have heard many discussions among students trying to figure out which courses to take. Some design their coursework around their jobs. Others avoid anything quantitative or exacting. Others try to look at employment prospects, job satisfaction, or job progression. Some want to maintain their grade point average and others want to be with their friends. Some have no interests other than being entertained.

I tend to divide fields of learning into several categories by asking a number of differentiating questions. Is there a defined body of knowledge such that a student can take a course in Kentucky and pass a test in California? Reading at first grade level, a course on Shakespeare, or piano playing might be good examples of such fields. Is the field standard enough so that people in the field have a body of knowledge not expected of people outside the field?

Welding, machine technology and physiology might be good examples. Is the course political or philosophical to the extent that each teacher does her own thing and no standard test can possibly be used to test for achievement in the course? Such courses are usually not worth much, especially if it is found that students who take the course do no better on tests given in the course than those who have not had the course. Yes, there are such courses! Does the course require physical and mental precision, like computer programming, surgery, typing, musical performance, or tennis? If you have the attributes of a good tape recorder can you get by? Is mathematics required in the course?

A lot of courses are classified as science. I ask the following questions about a science. Can the things studied be defined such that there is general agreement on the definitions? We might think of temperature in physics or power in mechanical engineering. Can the things being talked about be measured in terms of units or standards? Sound intensity in watts/m^2 or an amount of gasoline measured in gallons might be examples. Can the things being talked about be firmly related to each other with logical or mathematical structures? The diameter of a piece of steel in a lathe and its speed of rotation for optimum cutting, or the pressure, volume, and temperature of a confined gas are examples. All these questions about sciences can be answered with a solid affirmative in physics, mathematics and engineering, less so in chemistry and biology, and hardly at all in the behavioral sciences. Some people like to deal with the definite and possible; others do not wish to be limited by realityor objectivity.

The requirement for mathematics is a stumbling block for many people, but it is a great tool in many trades. A master machinist must often use sophisticated geometry to plan and lay out his work. To get a degree in physics or engineering, you first need an equivalent degree in applied mathematics.

Most of our useful knowledge was developed to deal with our natural environment, and is independent of race, sex or creed. If someone develops a better way to deal with heat transfer, a very important consideration in most industrial designs, there is no concern about the origin of the knowledge and much concern about its effectiveness, cost, durability and versatility.

Schools, Knowledge, and Skills

Many of us want to spend our time being entertained. If we cannot be entertained, we want our time to be spent in ways perceived to be useful to us.

We can usually justify reading, writing, arithmetic, science and physical education in the elementary grades, but the history, literature, language, sociology, and civics of high school are resisted by many teenagers, especially by males, who are beginning to see that earning power is important to their dreams and that a lot of the subject matter in high schools is "good for you" but nobody knows why. The utility of applied mathematics is obvious when it is taught in the right way. Necessity caused the invention of most of mathematics.

With teenagers, it may even be difficult to justify algebra, geometry, trigonometry and analytical geometry if they are taught by people who emphasize pure math and procedures (memorization) and cannot demonstrate their usefulness (application) in problem solving.

Biology and chemistry in high school are often memorization courses, and if physics is taught at all, it is usually taught with math and problem solving both kept at a minimum. Some schools might even teach welding and carpentry in a way that might not be fully useful by talking a lot about them but not doing any. In summary, a lot of courses in high school have no perceived usefulness; a lot of courses might be perceived as useful if they were taught that way; and some courses might obviously be useful even if poorly taught.

It is likely that retention of males in high schools will be greater with programs like Tech. Prep. Students can be taught organization, safety, problem solving and courtesy as they learn to work responsibly toward a useful goal. The choice, preparation, and serving of food could come under the science learning unit called nutrition.

Our local high school is concerned about the lack of foreign language training in the curriculum, but the population works mostly on farms and in small factories and businesses. They do not need foreign language and literature, but they do need good English and keyboarding for technical and office skills. There should be something in high school that prepares people to work (be useful) and to care for themselves and others.

I sometimes hear that some studies teach people to live together, and the underlying assumption is that social skills have nothing to do with useful work. The real exercise of social skill is at the workplace and in the market place. Those of us responsible for building on time something that must function as promised have learned to appreciate people who are knowledgeable, dependable, responsible, honest and industrious. These qualities ought to be valued everywhere in the school curriculum, and embodied in activities like serving palatable and nutritious food on time to a hungry student body. A good rule to remember is that two realities may be equivalent by definition or agreement but never in fact. For example, we may agree that typists and welders should be paid at the same rate.

On the other hand, welders may be harder to find and better unionized so that you cannot find any at the typist rate. To be egalitarian (but not necessarily more fair) you could raise the pay of typists to equal that which you must pay welders. The welders may then claim that they ought to be paid more than typists because of their harsher work environment. The best solution to such arguments is to pay market value (whatever is necessary and no more) to obtain the required skills in the right amounts.

There is a lot of talk about self-esteem and its importance to all of us. I think that the esteem of others and self should be earned by acquiring knowledge and developing skills, so that the poor as well as the rich can enjoy esteem. I think that it should be based on reality instead of wishful thinking. I see little value in a worthless person (one lacking capability or willingness to do anything for anyone) having a pile of self-esteem. He is defined to be equal under the law, but that is all the self-esteem he deserves until he does something worthy of more esteem. Further, it is dangerous to believe that you can jump across a ravine if you cannot or whip any bully in the room if you cannot. A lot of evil in this world is caused by people who have the self-esteem to believe that they can when they cannot. The antithesis of this, not having the self-esteem (confidence) to do what can be done, can be a serious problem for some, but it is easily remedied by recognition, reassurance, and experience. We know how far we can jump after a few measured trials.

I have seen a quite a few students come through my classes with intentions to be engineers, and I tell them that they will fare far better in the workplace if they develop some of the skills common to their subordinates. If a mechanical engineer is talking to a machinist, she needs to appreciate that it takes a bright person to be a good machinist and that many of these people have better minds than the average engineer. She needs to know enough about machine operations to avoid giving him foolish assignments. The esteem with which she is held by her coworkers and her self-esteem depend ultimately on her knowledge and skill. Her subordinates will not be kind or helpful if she does not know what she ought, or worse, pretends to know and does not. I would replace self-esteem with real esteem earned with honesty, respect for others, skill in the work at hand, and knowledge to do a necessary job.

Elementary Skills

The schools need to offer opportunities for students to earn esteem, which we will call self-esteem, by acquiring useful and interesting knowledge and by developing relevant and admirable skills.

If we are both fair, realistic, and well-acquainted, what I think of you should be roughly equal to what you think of you. If there is a large difference between my esteem of you as a musician and your self-esteem as such, it may arise from my inability to perceive your skills or your inflated opinion of yourself, or a little of both. If we are both knowledgeable and have been taught to be honest kind and realistic, we should have no serious disagreements about esteem. If a student does not know how to drive and there is no reason for his disability, I tell him to learn at the first opportunity because his employment opportunities and self-esteem may depend on it. He should learn how to type (enter data rapidly into a computer) because many jobs interface with computers. Knowing FORTRAN will not help much if you cannot enter information rapidly into a computer via the keyboard.

The basic elementary activities are listed below and should be organized into learning units described by syllabi.

Developing communication skills (speaking, listening, reading, writing, keyboarding, storing and acquiring information) should be the first opportunity to earn esteem.

Learning to use arithmetic in dealing quantitatively with our environment (buying, selling, measuring, planning, building, repairing, traveling, computing) should be the second opportunity for esteem.

Acquiring the scientific knowledge to be safe and healthy should be the third opportunity for esteem. Every child should learn the basics of hygiene, nutrition, disease, and safety from experienced teachers.

Developing physical capability with play and exercise should be a welcome opportunity for most. Some of this could be necessary physical labor, singing in a choir, or playing in a marching band.

The interpersonal skills, such as sharing, helping, caring, persuading, bullying ... can be learned in any collective activity, from serving food to playing football to learning arithmetic. Practical demonstrations accompanied with descriptive words are better than vague brainwashing. Interpersonal skills are learned best while pursuing an activity that demands its development, such as operating a drink stand at the fair.

With these basic skills, we are now able to acquire knowledge and specialize in whatever we wish, limited only by our talent, industry, and the availability of learning opportunities.

The elementary schools should be primarily concerned with the foregoing list of enabling skills. Every attendee should have the opportunity to be skilled in the English language.

High School Skills

High school offers many roads to esteem: drivers-Ed, competitive athletics, academic prowess, beauty contests, band, cheer-leading, sex, drugs, gangs, trade school, crime... The public school has the responsibility, in every activity, to encourage the paths that benefit society and to discourage those that do not. We push science and technology first and then the peripheral skills that enable us to use them. Entertainment should be a part of high school because we are all human, but entertainment is not the primary purpose of school. There should be no place for non-knowledge. Everyone should have some exposure to entertainment skills, such as music, athletics and drama, but the schools and the nation cannot be built around them.

High schools should be preparation for a trade or a profession and be oriented toward earning a living in an industrial society. Students should have opportunities to work with mind and body to determine what they like and what they can do, and there should be no divisions into tracks for trades and professions. Each unit of knowledge should stand on its own, and each student should have a broad exposure so that she has a basis for choosing a life work. There should be one or more units in English literature, history, Spanish, US and industrial history, economics, psychology, algebra, geometry, trigonometry, analytic geometry, calculus, biology, chemistry, physics, electronics, welding, word processing, woodworking, metal working, automotive mechanics, power plants, merchandising and gardening. We need to overcome the problems produced by people growing up in an industrial civilization without knowing what makes it work or what its problems are. **There should be no required units in high school.**

Teenagers have a special need for physical activity, play or labor, and they need to be connected to reality as much as possible. It is easy to preach against pesticides until you try to grow a cabbage. Units of study will be variable in length, depending on the amount of knowledge available and on the industry and aptitude of the student, and some specialization should be permitted if there is a passionate interest. There should be opportunities for drama, athletics, and music, but they should not grow into the principal school activity of any student. If he likes music, he can do more at home. Some apprentice time should be spent in local businesses if possible. All performance data, academic or otherwise, should be written on the diploma for the perusal of potential employers. In summary, our schools need to be tied closely to the realities of knowledge and skill and the course work should demonstrate the social structure of a stable, productive, democratic, capitalistic society that does more for its citizens than any other in the world.

Chapter 12

Academics and Athletics

Everyone Should Enjoy Sports

Athletics and academics have an uneasy cohabitation in many universities and public schools of this country. Competitive athletics are not an important part of schools in many other countries, some of which love competitive sports as much as we do. In England, for example, the goal [3] for the public schools is stated as "Physical education and games, combined with health instruction, should play an important part in school life, with the aim of general participation rather than the development of 'crack teams'." If athletics are good for people, every student and school official should have a part of the action, not just a highly visible few.

The Appeal of the Game

Most human beings love a competition, either by direct participation or by observation as spectators. There are football, scrabble, bridge, chess, Nintendo, golf, parlor conversation and numerous others with various physical and mental challenges. Each competition has a set of rules, awards and penalties, and is in fact an understandable and visible microcosm of a specialized civilization. There is often division of labor, cooperation, and individual as well as group achievement measured by scores. There are occasional altercations and authority figures in the form of referees to settle disputes and penalize unacceptable behavior. A game has many of the ingredients of civilized living and is in fact an imitation of a real society, "the way it ought to be". Each sport has its definitions and standards, shared by the participants and spectators, just as a code of ethics ought to be, and a means of evaluating the performance of the teams and their individual members. Intense enjoyment appears to be undiminished by the equitable enforcement of rules and standards. Ballgames have all the ingredients that should be present in our educational system: visibility, competition, shared and known standards for procedure, action and evaluation, awards and recognition for excellence, and authority figures.

These attributes make athletics great, and they can do the same for academics. Some teachers resent this kind of world and promote leveling by permitting only activities that have no winners.

The rules of athletics share with other standards the ability to undergo change to enhance the interest and image of the game. The rules for a baseball game have many of the attributes of a good code of ethics: known, shared, understood, enforced by mutual agreement, and efficient. They could be a model for a national code of ethics.

The Eternal Struggle

The schools struggle to maintain what few academic standards they have, and the athletic departments, in an effort to maximize their capabilities, invent new ways to scuttle or circumvent the academic requirements. The abuse is widespread, as every student knows and almost every teacher or professor knows, but the sports enthusiasts deny it so vigorously that it takes a brave soul, even from the level of college president, to tackle the problem of pushing academic requirements on the athletes. It has been tried many times but it never works.

The Power of Versatile Funds

A lot of the seeming nonsense and hypocrisy in college athletic programs is explained by the fact that some money must be spent according to certain rules with strict accountability and other money has much more versatility. Money given by the state to hire teachers or to build laboratories is not nearly as versatile as money acquired on the local scene by solicitations and "sports". Often people are hired with the rigid kind of money to collect the flexible kind of money. It may not matter that there is no net increase in money as long as there is an increase in versatility. The versatility of athletic money often shows up as a higher salary for the coach than for the school president and as higher pay for athletic directors than for distinguished professors. It more often makes the news when it is used to pay athletes under the table

Not long ago I found that I needed some more RAM for my computer to handle some new software I had bought. I was out of department funds, so I asked our Foundation, the source of our versatile funds, for $385 and received it immediately. I might have waited another year for state money. Now you know one reason why people like versatile funds.

There is often great publicity when money moves from athletics to academics but little is said of what athletics really cost the schools in terms of money and damage to the academic program.

At most schools, money collected from public attendance at athletic events is minuscule compared to the cost of athletics. I know a lot of people who will engage in fisticuffs to protect the athletic program and never have a concern for the real purpose of a university. I have always wondered how we could defend our silly behavior if we had to explain it to a rational being.

Personal Experiences

I once attended a school whose academics are widely accepted as being very good. It has had a football team for many years but it does not act as if the team is the most important attribute of the institution. It is not large enough to provide the team with the degree of segregation from the rest of the student body that is possible with the larger schools. While I was there I ate with the football team occasionally in the dining hall and knew some of them well enough to invite them out to my home. I worked a great deal on one course which I took with several of them and made a "B" while each football player in the class made an "A". I pressed my athletic friends about this singular state of affairs and was told by them that they had received copies of the final and only test with the names and answers already filled in. The professor graded on a curve and his secretary handed out the tests. I thought a couple of days about what to do about this gross unfairness and decided correctly, I thought at the time, that I could do little to promote justice and might get a very bloody nose. I tell this story that I know about personally, not to embarrass a great school, but to point out the nature of the problem of mixing athletics and academics. It is even possible that the athletic department did not know what had occurred. I consider it highly probable that subordinates in a high-pressure organization will do questionable things to promote the common cause without telling the boss. The subordinate thus protects the boss if there is a slip and brags about it later if there is success. The boss can, of course, promote this kind of entrepreneurship by telling stories of victories where ethics were lost in the battle or by being very gentle with "loyal" violators.

While I was a graduate student in Tennessee, I knew reasonably well one football player, a large kindly honest man whom I admired very much. He came to me on his last day there and told me very straightforwardly that he was worried about what he was going to do because he "did not know anything". When I asked if he could get a coaching job, he told me that he probably could but that he might be asked to teach as well. I told him to go ahead and get a job, and that he could probably learn what the school wanted him to teach and perhaps do well at it.

I believed that the man was capable and honest enough to do a good job or get out. The system is sometimes very careful about who teaches what unless he is a coach. In talking with one of my top students, who was good enough in sports to get an excellent scholarship, I told him that he had a good mind and that I hoped that he would gain an education with his scholarship without being sidetracked as so many were. He told me that education came first and that the school to which he was going would provide him a constant personal tutor on all of his travels as well as when he stayed home. This is the power of versatile funds! What other scholar would have a personal handholder paid by the school?

A young man I knew really depended on his athletic scholarship to get an education. He told me that his great hope was that he could graduate without a serious injury. I asked what would happen if he were injured so that he could not continue to play. He thought that he could keep his scholarship but would suffer harassment and persecution because his school needed all the scholarship slots to recruit players. I watched him play his last game with a cracked jaw and a lot of aspirin. My companion for the game was a professor appointed, I believe, to promote support for athletics within the liberal arts college. He kept yelling that the players were holding back because they were scared of getting injured and that he wanted to see some real action (violence).

I was told that Berea College in Kentucky had a student die as a result of a football injury. The school was offered a large endowment to give up football and it took the money. There were no academic soft spots evident to me while I was a student there. I did notice that the people majoring in physical education seemed to make "A" in physical education and that the rest of us did not, even if we tried hard and were good athletes. I am sure that there is a good explanation for this. The athletic department did not have enough muscle to subvert the other departments to a significant degree.

Some Sleazy Practices

There are a number of other borderline actions by the athletic department. In many places it creates vacuous courses where the athletes always make "A" and then brags about the grade point average of their players. In other schools, it places the students with professors known to be "friendly".

Where this kind of help is not well assured, the athlete registers for an excessive number of courses and, as the semester progresses, drops the ones most likely to be troublesome.

In some universities in the same town, two schools have common courses taught in both schools and accepted in both schools. This academic fraternalism seems laudable at first sight, and is good cover to promote athletic eligibility for one school and academic acceptance for the other. The end result of this chicanery is that the athletes are cheated out of their education and the academic side is often browbeaten, harassed, compromised and deprived of needed funds. It is possible to pass enough well chosen courses to remain eligible to play but never have enough in any one area to obtain a degree. This is especially easy in junior colleges where career choices often need not be made.

Why We Like Sports

All of us know that many popular sports are largely controlled violence with a good measure of deceit, dissembly, and showmanship thrown in. Some of us enjoy this kind of thing even if we are frightened by it. Eric Lustbader, Zane Gray, and Agatha Christie gave us what we liked and we paid them handsomely. Considerable business is stimulated when the big game is held in town, and thousands are entertained. The heroes are recognized and idolized, the cheerleaders are adored, the bands march smartly, and there is mass enjoyment with eating, drinking, and gambling. Elitism is a virtue, over-confidence is admired as team spirit and self-confidence, and personal statistics on the players are paraded as community property. There is great interest in keeping score, and although it is said "the game's the thing", no one would think of a game without keeping score. One great philosopher has said, "Winning may not be everything but losing is nothing."

Covert Academics

Over on the academic side, there is a great disparity in the operational philosophy. The action is concealed. There is little admiration of scholars for what they know or what they can do. There is little competition or public score keeping or lauding of individual knowledge or skill. In "education" circles, "elitism" and "competition" are bad words for a scholar but not for an athlete. The students all know which courses are easy and which are difficult, which professors require work and dedication and which talk about anything they wish and grade the same way. Grades are not published with names attached whereas athletic achievements are given much exposure in newspapers and on TV. Students are recognized more for extracurricular activities than for academic prowess.

A big banquet with attendant publicity is held at my school for student leaders and cheerleaders, but the top students in academic disciplines are lucky to have their names read on honors day. There are no standard tests, like a football game, to choose the winners, and academic awards are often an uncertain and political process.

Each year my school chooses ten "top" students by considering such things as grades, church work, community involvement, school activities, and who knows what else. Do you think the athletic department chooses its ball players this way? I think athletic programs are more honest than academic programs because performance is standard, visible, amenable to statistics and unsullied by few subjective considerations unrelated to performance. On the academic side, performance in learning is measured and valued so little that other factors must be considered in order to choose the "top" students. There would be open rebellion if we tried to impose this facet of academic behavior on the football team. Are honor, openness and honesty more abundant on the athletic side? It appears from cursory observations that they are.

Perhaps some of the people in academics are expressing a deep-seated feeling that the knowledge which they know and impart is not worthy of openness, standardization, measurement and recognition, and I worry that they are right.

Athletic Ascendancy

I often get a note from the dean asking me to excuse the members of our basketball team from class while they are on the road. Have you ever heard of an athlete being excused from practice to get his lessons? My approach to grading is that students get what they earn, no more and no less. If they are gone a lot, whatever the reason, they usually learn less. I should add that I try to be kind to students who miss work for reasons of accident or poor health, through no choice of their own. I often give the athlete a choice in how he is graded. Grades are based on knowledge skill and an athlete gets credit for it if he has it.

Academic Privacy and Athletic Exhibitionism

Why is it unthinkable for the school to list openly the academic performance of its students but laudable to bombard the public with runs batted in or yards gained per carry? Why is open academic competition so bad and open athletic competition so good? Why is visible academic performance less desirable than visible athletic performance? Why such a divergence of philosophy between academics and competitive sports?

The athletic side of the school never mentions the "loss of self esteem" by the guys who lose or do not make it to the top, whereas the academic side hides everything to protect the "self esteem" (privacy?) of every student. Visibility in athletics is sold to radio and TV to maximize the versatile money. If you say that this difference in treatment is because athletics and academics are so different, I will suggest that they not be tied together in schools. If they have a lot in common, they should have more common philosophical and operational practices. I personally think that a little visibility and the standards to make it possible would do much to insure that the academic side is more responsible about what it is doing. Self-esteem and privacy are dragged into the academic scene as excuses to hide what really goes on.

Most sports enthusiasts make a big thing of competition, and they claim that publishing all the statistics on teams and players is good for everyone. The fans have more to bet on and talk about. The players, knowing that everyone can see how good they are, will try to do better. Visibility, they say, is the life of the sport. This openness would be great for academics and would add integrity to the award of scholarships, which now seem to be awarded for everything else **but** scholarship.

As a taxpayer and a parent, I might want some visibility given to the way that the academics are run and to the academic prowess developed by the students. A little light might expose some of the foolish junk being taught, and a standard test based on a known syllabus might reduce the educational farces at most schools. I suspect that real visibility in academics might cause some drastic changes (for the good!) in our schools.

What I would like to see in our public schools is physical training and intramural sports for every student and teacher able to receive it. After all, I have heard that they build character and develop leadership abilities. There should be no specialization that interferes with a rigorous academic schedule. Scholarships should be reserved for scholars, or at least there should be some monetary equivalence between athletic and academic scholarships. Teenagers in many places have a problem finding an affordable and decent place to meet. Let them have free admission to all college and high school athletic events, which would of course be held after school. Some of the schools in Alabama were so upset with proration (budget reduction because of revenue shortfall) that they threatened to drop the competitive sports rather than the academic programs. They have been claiming for years that sports made money for the schools, so why drop them if money is needed? Of course this is a ploy to get the public so aroused that it will accept a greater tax burden.

Sports and Violence

There are many who feel that violence in spectator sports encourages violence in our society. Others argue that the urge to violence is relieved or lessened as we see it exercised in others. It does not take long for a playground bully to learn that violence is an effective tool for achieving dominance. Counter attack with violence seems to deter violence better than turning the other cheek and submitting to tyranny. Regardless of how strongly violence is condemned by the feminist cult, there are still many males who will desert their families on New Years day to watch the violence and mayhem of football or who will gamble with jail to watch and bet on a rooster fight. The excitement of the chase and the glory of personal combat seem to be deeply rooted, despite the possible injury and suffering, in the activity that we call sports. We watch playful kittens and sometimes forget that they are training to capture and kill something as well as to develop offensive and defensive skills. Violence seems to be a pervasive part of the human scene, and many males feel that there is a social gain if criminal violence can be sublimated into the loosely controlled violence of sports. Is it possible that bloodthirsty entertainment will reduce criminal violence? If we snack while we view the frenetic activities of the athletes, will we need less exercise on our part?

Summary

Big sports are great to provide versatile money for school administrators, to enhance local businesses, and to bring fame and fortune to a few specialists. Individual and team achievements are recognized and rewarded.

Physical training and exercise are good for all of us who live sedentary lives at school and every student and teacher should have some every day in the form of competitive games.

Most importantly, the athletic games give us a good example of how our schools and our civilization should be run.

The top student in school should be chosen because of her school ability, and the top athlete should be chosen for her athletic ability. Compared to athletics, it devalues academics to choose the outstanding students at a school on any basis other than academic performance that is open and visible.

Chapter 13

Education and Sociology

The Benefits of Society

Humans should organize into societies and divide labor so that each person has more of what he needs and desires than he could have alone. Rules (laws, morals and ethics) are made to govern the production and distribution of wealth and services and to define the social responsibilities of individuals and groups. We should not forget that the second greatest discovery of mankind was the benefit of a standard set of rules enforced for the common good [67, p 230]. There were enough bloody kings along the way through history to throw doubt on "for the common good", but the social structure nevertheless made possible the survival and advancement of the people. Even a bad society can be better than anarchy. Individuals in general cannot provide their own food and water, deal with epidemics and widespread calamities or maintain their own personal security against marauders. The world today contains ample evidence of what happens to populations when their society is destroyed. Even the Russian Socialists, however oppressive and shortsighted they may have been, had a society which permitted basic human survival. The transition to and from socialism has been full of suffering.

Every society must promote, mainly through its system of education, its ability to provide efficiently the needs of its members. Moreover, our educators should be the principal apologists for the sanctions which society imposes against those who disrupt its functions or resist its processes. They should know and teach the origins, strengths, and weaknesses of our civilization, appreciate what it does for us and how it does it, be concerned about its improvement, and be willing and able to contribute to its defense against its enemies and subversive critics.

The competition for the wealth and services generated by society may manifest itself by the growth of unions, guilds, associations, special interests, and privileged classes which try to incorporate new rules to give them additional advantages. If this occurs to excess, the society becomes inefficient, dissatisfied and corrupt. If it cannot recognize, fight and correct the strangleholds of special interest groups, the society will be weakened and perhaps destroyed. A society must be stable enough for farmers to plant, harvest and market with confidence and producers of goods to expect recompense for their risks.

Long range planning for defense and education is possible only when there is social stability. Society must be dynamic enough, hopefully without war, epidemics, and famine, to draw the best possible leadership from all elements of the society and to reward these leaders for their service. If the energetic, intelligent and competent people do not believe in a society, it is in trouble. The collapse of a social structure, as in Yugoslavia, leaves in its wake suffering, anxiety and death for millions of people as they struggle to establish a new social order based on different leaders and principles. A society that supplies our basic needs is a most valuable asset, and we should not be reckless with it. We must support our society by promoting its fairness and efficiency and defending it from external and internal predators. We in the US have progressed to a democratic capitalism which, with the blessing of great natural resources, has evolved into an opulent and kindly society envied by the rest of the world.

Social Maladies

We have on the increase several social maladies that reduce the efficiency of our system and our satisfaction with it: crime, poverty, ignorance, cupidity and disease. All of these maladies waste resources, disgruntle the citizenry, and generate at a staggering cost several parasitic industries that have become a major part of the problem. Every waste reduces our ability to compete on the world market and makes all of us poorer.

Managing Crime

Crime is very rare in places that do not tolerate it or make excuses for it. I heard our ambassador to Poland tell a group of Americans that they would be safe any time day or night on the streets of Warsaw. When I looked at the people I met on the street, I believed him. When I returned to America and told this to a police chief in Baltimore, he was sure that the ambassador was lying or that the Poles must be covering up the extent of their crimes. The simple truth was that they did not tolerate crime and therefore had very little.

When I was in Maryland in 1975, the politicians and behaviorists were having a big debate over corporal punishment in the schools. The governor kept repeating that punishment was no deterrent to crime, a "fact" presumably found in some behavioral study. I must be odd, because I confess to you that when I learn about a speed trap, I watch my driving in that area much more carefully. Even the remote possibility of punishment changes my behavior. I believe also that the governor felt deterred after he had spent some time in prison.

I hear a lot about corporal punishment making people more aggressive and violent. My experience with dogs and people tells me that this is utter nonsense. A lot of bullies with bad tempers are perfectly nice when a bigger bully is around. Aggression in dogs and people increases when they find that it is safe (no punishment) and rewarding. The Army had a problem in training attack dogs to guard facilities because the dogs were not aggressive enough. How did we teach them to be aggressive after they had been loving and subservient to humans from birth? We contrived irritating situations and let them win when they growled and showed their teeth. When they "learned" that they could attack with impunity, they enjoyed it. Of course it is futile to plan ways to prevent crimes by the insane by any means other than cure or incarceration. There is no scientific or moral basis for arguing against corporal punishment as an effective means of training. Corporal punishment does not promote learning and innovation as well as recognition and reward, but it is cheap and quick and prevents the recurrence of disruptive and highly damaging antisocial behavior. When we have about half of the total population in jail we may realize that whipping posts are cheaper and more cost effective than more prisons. One science fiction author contrived a lecture which blamed the failure of civilization on the discontinuation of corporal punishment, a most effective and economic way to stop the repetition of a bad habit, and much better than arrests, courts, probations and jails. I have done a lot of heavy manual labor in my life, and I can tell you that a little pain goes a long way in teaching me to be careful of my fingers. I doubt if I will be more violent because I learned the hard way to watch where the stumps were when I was chopping sassafras sprouts with a hoe. Of course I do not believe in making a habit of beating children. I paddled only one child during my teaching career in schools that permitted it, but the fact that I could use corporal punishment helped me avoid what might have been a continual disturbance by the local miscreants.

We now have a general situation where the country is overrun with violence and we pretend to have removed all violence from our penal and corrective systems. I see violence all over the entertainment world, from movies to video games to football. I see shoving, hitting, pinching and gouging whenever two or more small boys get together. The denial of violence as a social tool has resulted in a marked increase in violence.

As I have argued in detail elsewhere, reward is much more efficient than punishment for promoting learning and discovery but pain is more efficient in preventing the repetition of very damaging behavior. Most of us would be far less tolerant of crime if we knew what it cost in terms of judges, lawyers, bookkeeping, jails, jailers, policemen, parole officers, transportation.

We pay for this with an oppressive tax structure. In addition, crime controls where and how we live. We buy guns and electronic security systems, install locks everywhere, and build fences. We must be careful of where and when we travel, walk, and shop and how we carry our money. Crime is a waste of manpower for not only the criminals but also for all the people who deal with them and inconvenience themselves because of it. If crime were eliminated, millions of our people could start doing something productive. A man residing in a jail or guarding it consumes wealth and resources but does not produce any. A farmer or factory worker increases our national wealth. Crime costs us at least 100 billion dollars a year in taxes and a lot more in fear, private loss and personal injury. We have carried criminal rights to the point that we cannot control children in school without the full exercise of all the legal machinery in sight. Our jails are so full that we are publicly embarrassed and most states avoid building more jails by releasing dangerous criminals. It is obvious that criminals do not fear or respect our justice system. They might be a little more frightened if they were forced to work under the same conditions endured by many of us on the outside.

The management of Poverty

Poverty may have many causes, such as crime, natural calamities, individual freedom, disease, ignorance, over-breeding, or social inefficiency. Like crime, poverty wastes our people and costs us money through taxes to support a large bureaucracy, the costs of which are comparable to the help that it dispenses. All the manpower associated with poverty is wasted in the same sense as with crime.

People who come to the state and request needed aid should have it given to them, but the state should start active intervention in their lives by tying their aid to work and training. Even the most benevolent welfare states in the world require that able people on welfare do useful work and train for better jobs at the end of the workday. Their governments have the good sense to know that people will work to leave welfare if they are enabled by training and know that they are better off not on welfare.

In some nations, a citizen loses all adult privileges when he becomes a ward of the state, it being understood that a person unable to support himself needs some firm guidance in his life.

We have guaranteed the growth and continuation of welfare by making it a better option than work at minimum wage and by permitting large scale but preventable fraud. A married couple with several children and a hard time with meager employment could all be better off if the man left and the wife went on welfare with the children.

I do not believe that it serves any useful purpose to penalize people just because they are married, or to reward people for becoming unmarried. We should make it advantageous for people to stay married if we value the family. Even the Soviets, after they passed the revolutionary stage, recognized the value of the family and tried to preserve it by restricting divorces. Even they could see that one-parent families had too great a social cost.

By the way, millions of Americans do useful work at low pay with very little training and much close supervision. It should be obvious that people will learn and work only if this becomes the best option or stay on welfare if that is the best option. I estimate that 75% of the welfare money is wasted because it does not have associated with it the training and control needed to get people off the welfare rolls. Except in cases of great hardship, every able person on welfare should be working and training to do better and should receive pay only when showing up, properly identified, at a specified time and at a designated place. To reduce fraud, this time should be the same for everyone everywhere. Those of us who work must follow the rules of our establishment or suffer penalties, but it seems that like rules for welfare people are viewed as cruel and inhuman.

When people try to climb out of welfare and find their first jobs, they must face immediately the additional hassles of work: baby sitting, clothes, transportation, taxes, as well as the losses of leisure time, food commodities, food stamps and low cost housing. Some have much less while working hard, even with fairly good jobs, than when they were on welfare. It is a wonder that any poor person works! If families and jobs mean more than election harangue, we should insist that people be better off financially if they work and stay together, either by boosting workers' income or examining the multiple fringes of welfare and cutting it enough to make working worthwhile. The minimum wage people, by going to work and staying off the dole, should be well ahead of **anybody** on welfare. The people on welfare should work for less wages than those who find their own jobs, and should put in additional time training to get a better job.

People will not work if they can earn more in real wages by not working, and they will be destructive if they do not work. Children need motivation and recognition in their learning and they need the help of two parents. Teachers have told me of overhearing sixth grade girls planning to have children and go on welfare. Evidently it is the common wisdom among many of the poor to plan to draw welfare rather than to work. We cannot blame people for optimizing their day-to-day living if we are stupid enough to pay for the wrong things. We must blame ourselves for our social follies.

Welfare and Crime

It should be evident that there is a short pipeline between the welfare system and the drug pushers. How else could the people in a welfare neighborhood get money for drugs? Welfare people cannot afford to buy drugs or support the drug habits of other people unless they are cheating or being strongly coerced. It is possible that most of the illegal drugs result from the dumb way we deliver our welfare money. If welfare people were forced to work, like the rest of us, in return for our supporting them, they would not have the time and energy to scheme and plan and rob and steal to support their drug habit. They would sleep at night instead of running around and causing trouble. The job system would be cheaper than the social, legal, penal, and police system now associated with idle people, with the further benefit that we could be training people for useful work. Two-parent families will increase again when we get smart enough to make them the best available option. We must remember that many of our welfare problems stem from poor people who collectively are wise enough to work the system for its maximum benefit, namely free time, shelter, plenty to eat, and a happy breeding ground.

Education is also a Social Problem

Our "education" system, with the acceptance of a passive and uninformed public, seems determined to promote ignorance and confusion. It "dumbs down" our young people by promoting a leveling and equal outcome philosophy. It fights standards and measures with the fanaticism and dogma appropriate to a religious sect. It refuses to make standards of its own, as do other professions, but forces the public to buy tests at considerable cost to measure what is learned and taught. It is fearful of objective standards of measure and therefore cannot recognize, encourage and reward academic achievement.
I estimate that our "education" system, because of its organization and philosophy, wastes 75% of its budget, measured against the standard that every student should be enabled to learn all that he can. Only a few in the bottom 25% learn all that they can, and the remainder have their time and ability wasted. This ought to worry all of us. Our "education system should organize by subject matter and ability so that every student can learn all that he is able to learn.

The Health Industry

The path to socialized medicine is almost complete as more and more groups are included at no cost.

Anything totally free is almost certain to be abused both by the giver and receiver because the abuse costs them nothing. To avoid a continual rise in cost and a drop in efficiency, everyone with any income should pay **something** for his medical help. The news reports make it seem likely that fraud and overcharge abound in our rapidly growing healthcare system.

Responsibility

Everyone is so afraid of lawsuits that they cannot be caring human beings any more. One college teacher was sued successfully after an accident because he handed out safety instructions without specifically telling the students to read and follow them. It seems that no one is responsible for himself. We blame our siblings, our parents, our schools, our government and our society for the mistakes we make, and we look for the nearest "deep pockets" after we have made a dumb decision. In one case, a man on a lunch break sitting on a car (not his own) fell off and broke his arm. He sued and collected from the people who owned the parking lot and their insurance went up. I personally believe that we must let people suffer the consequence of their choices. People surely know about the hazards of smoking, drunk driving, using heroin and having children without a visible means of support. Why should we pay their bills for them after they have knowingly violated the common wisdom of society and fallen through the cracks? If we quit paying the bills, some of our expensive behavior would change. One news commentator told of a man chasing a purse-snatcher and tackling him for the police. The snatcher was released with a suspended sentence while the tackler had to pay $25,000 to the snatcher for a leg injury caused by the tackle. We will not be able to pay for all the irresponsible behavior in the world if we do not do something to discourage it. How can we discourage it if we never let people suffer or be inconvenienced for their mistakes? I quit riding a motorcycle in the streets after I had lost enough hide on sandy corners, and I figure that purse-snatchers ought to bear for themselves whatever injuries are associated with their pastime.

Why Reward and Encourage the High Achievers

I believe that the cure for aids will come from someone who had good science teachers and learned all that he could, not from a good old boy who earns his money by singing in bars. Manufactured goods to sell abroad will come from shrewd inventors like Edison, who worked incessantly on everything in sight and talked with the leading scientists of the day.

They will not come from the best-paid football player in the NFL. We need to discover our high achievers by open and visible competition in our schools and enable them to do the great things that benefit all of us for long periods of time.

Summary

Our "education system should organize by subject matter and ability so that every student can learn all that he is able, and high achievers can be discovered, recognized and rewarded.

Those who seek jobs and perform useful work should be better off, with no exceptions, than those on welfare.

Every able person on welfare and in prisons should be a part of an organized working community and engaged in training to earn a living for himself.

We should educate our people about the responsibility that goes with freedom.

Irresponsible people should not be permitted to run up bills for the rest of us to pay.

We should work to develop straightforward standards of behavior for all of our citizens. Call them laws if you wish.

We should change our social outlook from predator to inventor. Government is too preoccupied with dividing the pie rather than with educating and planning to have a bigger pie.

Chapter 14

Recommendations

General Statement of Conditions

Discussions in preceding chapters have documented the following deplorable state of affairs in our system of "education".

Most of our students are being "dumbed down" and "turned off" in schools that promote a strong leveling agenda and waste student time. Technology is now available to make this practice inexcusable.

The personnel policies of our "education" system tie advancement and promotion of teachers and supervisors to degrees from the college of "education" rather than to job performance, knowledge and skills.

There seems to be a determined effort to remove anything useful or intellectually demanding from the school curriculum. Courses that might be very useful are not taught so as to be useful.

There are no definitive objective standards at any level of government for a useful public school curriculum or for the courses and activities that constitute the curriculum.

There are no objective standards by which to measure the knowledge and skill of individual students, teachers and supervisors.

The teacher unions and the colleges of "education" are determined that there will be no objective standards for the evaluation of students, teachers, supervisors, pedagogy, or management.

Teachers suffer the waste of their time and money without valid reasons and they suffer unnecessarily from incompetent management.

Teacher and supervisor certifications need a major reform.

Goals

Maximize the learning opportunity for every child.

Teach that which is useful for earning and enjoying a living.

Make it easy for everyone to know what the schools are doing.

Free the teacher from paperwork and unproductive coercion.

Promote the ability of the nation to compete industrially.

Organize and manage the schools by knowledge and ability.

Incorporate technology effectively into teaching and managing.

The Ideal Classroom

Every class is conducted in a safe, comfortable, friendly place equipped to support the teacher and students.

Every teacher has a computer notebook with the peripheral hardware and software necessary to automate attendance, testing, reporting and bookkeeping. She should have a detailed course syllabus and textbook immediately available as a computer database. The syllabus should serve as both the lesson plan and the teacher's contract.

Students enter a class only when they are able to benefit from it and leave it when they no longer benefit from it.

The teacher manages the learning by assembling instructional materials, making work assignments, giving instruction, and arranging for some students to help others. She is evaluated preponderantly on her ability to transfer required knowledge and skills to students in her classroom.

Beginning the Reform

Reform is a lot like a religion. It does not need to start everywhere at once, but it does need to start somewhere with a hard core of competent and dedicated supporters.

It is probable that the first experiments with better school organization will occur in educated communities that care about the education of their children and believe in visibility, standards and competition. Every step of the reform should involve objective standards.

The first step is to use computer and communications technology to relieve the teacher of the burdens of establishing class rolls, keeping attendance, testing students, reporting to supervision, maintaining records, handling student money, preparing lesson plans and attending useless meetings and classes. This will require the development of **friendly** software capable of storing classroom data and using it as needed. When completed this work should have all the earmarks of a good standard: universal availability, low cost, adaptability to new knowledge and technology, and exchangeability among all teachers without the hindrance of copyrights and patents. The software development could be done by a competent software firm supervised by the National Bureau of Standards or the US Air Force. This database software has nothing to do with academic standards as such but is a means for a teacher to do her usual work easily, happily and efficiently.

The second step is to design a school curriculum that will benefit our people and our industry. Representatives (users) from industries and professions, those who hire and train the students graduated from our schools, should establish the curriculum for our schools. The US Air Force or the National Bureau of Standards, both with long and successful associations with standards, industry and education, could be entrusted with the design of a useful standard curriculum for the entire nation or any state that wants it.

The third step is to collect data for each course of study listed in the curriculum. This data should include a textbook, a detailed syllabus and testing material with thousands of test questions. This information also should be viewed as a standard for the course.

For example, everything important to teaching Algebra I should be included in its database. When it is done, every algebra teacher in the nation can use all or part of it for the cost of a disk. The users should be able to advocate changes in the syllabus or text as need and reason dictate, just as with any other standard. The syllabus should be viewed as a binding contract between the teacher and her supervision. It should be available for perusal by anyone but is used primarily by teachers, students and parents as a lesson plan and guide. It and sample tests should be examined for relevance on an annual basis by industry professionals from outside the school.

The fourth step is to organize and manage the schools by subject matter and skill, not by age, grade and schedule. When a teacher has sufficient hardware, software and database for a course, the transition to a new learning and management style can begin. I favor a gradual but certain four-year evolution. The databases can be the basis for a "Bureau of Standards for Education" at the state or federal level.

We can easily use the databases to certify teachers and supervisors who are sufficiently knowledgeable to do their work, and we can test students to place them where they can learn best. The philosophy and practice of the schools will change rapidly as knowledge and skill become important. Everything needed for education reform is solidly within the state of the art. Education costs will fall considerably as the system starts working and the special programs and their managers are no longer needed. We should be able to eliminate 50% of the bureaucracy and all the "fixes" for those ahead or behind. After the new system is in place, we should save enough in one year to buy computers for the use of every student in the nation.

Many of the evils listed above will disappear and at least one of the great inefficiencies of our society will fade away rather painlessly. This will save us much money and give us better citizens.

Surprises and Shocks

There will be many surprises, and most of them will be wonderful. The diploma will mean something because it will be a record of achievement. Parents and students will respect education more and everyone will know what an education means. Industry can dispense with many programs for selecting personnel because it can trust the schools. Most importantly, students, teachers, parents and users will be happier and wiser when they see how well schools can work for all of us.

Education will be much like a pleasant walk with soft limits on time and distance. The time may be a maximum of twelve years of school and the curriculum is analogous to distance. The student may complete the curriculum in less than twelve years or use twelve years without completing the curriculum. There are no failures. The achievements of each student are listed, in understandable terms, on his diploma when he leaves school. Everyone profits by being all that he can be.

One major surprise will be how quickly most people, with the means immediately available for guidance, learning and testing, will remove their deficiencies.

Supervisors, teachers and students can use the databases to discover their needs and learn more easily what they should know. School personnel who are not far from qualifying should be permitted to learn on the job. Those hopelessly ignorant or those unable to qualify within a reasonable time should be employed elsewhere.

Teacher hiring should be based on teacher knowledge and capability, as determined by the course standards. Teacher retention should be based on student performance. This will not distress the good teachers in the least. The most casualties will be in science, technology, mathematics and communication skills, the areas of greatest current deficiencies and of most importance to industries and professions.

Preventing Abuse

Criminals can abuse any wonderful capability. There is no escape from the need for good citizens in our schools. There should be severe penalties for deceit, dishonesty, duplicity, falsification, cheating, destruction of records, and damage or sabotage to equipment.

Neither students nor teachers should suffer from the ease of dealing with information. One teacher complained to me that E-mail capability subjected her to greatly increased interference and harassment from management. Let us work for a new style of management.

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p. 180: "Teachers voted overwhelmingly for ... tightening the requirements for teacher certification."
p. 180: "Half indicated that they would favor a differential pay scale for mathematics and science teachers ... "
p. 180: " ... 61 to 37 per cent oppose the hiring of talented people who are not certified teachers." "Such programs have the core of something identified by practitioners as valuable ..."
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p. 181: "The college of education has become the dumping ground for the weakest students in the arts and sciences."
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Where the Doctorates in Education Are

Country	University	Number of Professors	% Professors in"Education"
U.S.A.	Harvard	5,500	0.30
U.S.A.	MIT	1,021	0.00
U.S.A.	U.of Mich.	3,069	1.4
U.S.A.	U.of Texas	2,338	2.48
U.S.A.	UCLA	3,000	0.93
Japan	Tokyo	3,700	0.46
Japan	Osaka	2,177	0.00
France	Bordeaux	360	0.0
France	Dijon	240	0.0
Germany	Heidelberg	1,208	0.00
Germany	Bonn	2,050	0.40
Swiss	Zurich	1,670	0.012
England	Oxford	1,500	0.007
England	Cambridge	1,500	0.00
England	Exeter		0.60
China	Taiwan	2,264	0.00

As far as I can tell, the U.S. universities are unique in offering doctorates in "education" or "education" management and pretending that they are useful. Most countries promote from the ranks and have no school of "education" or requirements for teachers to attend it. In general, each branch of knowledge (math, music, science, geography) trains its own teachers and there is no mention of a general "methodology" Frills, like competitive sports, bands, cheerleaders, and long bus rides, are very scarce in Europe.

55. (cont) "Special classes, psychological sensitivity, reduced class size, audio-visual equipment, cultural enrichment outings, attention to the values of other cultures, AIDS awareness, new math, look-say reading instruction ... have neither raised the level of underperforming students nor prevented the brighter ones from advancing."

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p. 20: "We must hope that some state ... will take the lead in breaking the monopoly of schools of education by passing a ten year moratorium on certification requirements." "A prospective teacher of mathematics who cannot pass a freshman algebra, geometry or calculus test with the grade of A is certainly not prepared to teach at the high school level." AMEN.

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p31, D16, "The NEA believes that competency testing should not be used as a condition for employment ...".” The association also opposes the use of pupil progress [as measured by] standardized achievement tests, ... for teacher evaluation." Every person interested in education should read this and other NEA resolutions. They are overwhelming evidence that we have a severe problem.

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ABSTRACT

THE WASTING OF A PEOPLE

Russell D. Shelton, Ph.D.

Our best option for competing effectively with growing world populations and preserving the American dream is that of developing a superior work force and a knowledgeable citizenry. To do this we must educate all of our people to the maximum practical extent. Our current system of education is not equal to this task in organization, knowledge, or philosophy.

At the present time, society and the university system sort the bottom of the academic pile into education and social work, the areas where we have our greatest problems and spend the most money foolishly. Most of us arrive at a philosophy, which serves our interests and increases our self-esteem. The people sorted to the bottom do the same thing by promoting a leveling philosophy, which discriminates against anything that might indicate that the social and academic landscape is not level. It follows that they are against competition, recognition of individual achievement, and the standards by which achievement is measured.

Our schools promote equal outcome (forced leveling or "dumbing down") by pushing a curriculum designed for the bottom of the class. This practice ensures that "everyone" can move along together and is said to preserve the self-esteem of the less able. This practice wastes the time of students who are able and eager to learn more or who cannot keep up. It damages all of us by promoting waste and ignorance and forcing children to be less than they are able to be. Further, the public school curriculum neglects knowledge useful in the workplace and emphasizes "knowledge" for which no standards are possible and no utility is definable. The studies that might be useful are usually taught in a way that avoids usefulness. Finally, the teacher is harassed and defeated by unreasonable demands on her time and money.

The wrongs listed above can be corrected by using the technology now commonly available and learning to develop and use standards for curriculum, instruction and evaluation. There is no honest or rational excuse for the continuation of the malpractice now built into our system of public education.

EDUCATION REFORM

We want to be proud of our public schools,
but we can't.

They cheat our children.

They waste our money.

They mistreat our teachers.

They shortchange our industry and our nation.

****

Our school administrators need guidance.

Our schools need a revolution in social purpose, curriculum planning, classroom management, and measurement and evaluation.

Money is not the problem!

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If you care about our public schools you should read this book.

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