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# PRESIDENTIAL ADDRESS

## "A DANGEROUS THING"

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"... You will know the truth, and the truth will set you free." (John 8:32)

I suppose that of all the quotations I might give from the Bible, this one is most likely to receive the approval of scientists, and I should like to recapitulate very briefly some of our interpretations of it. But in reality, I have not quoted the Bible; I have misquoted it. I have given you only half a sentence, separated from its context.

We can all cite many an instance wherein the fruits of research, the scientist's means of learning the truth, have given us greater freedom in one way or another. I think, for example, of our freedom from poliomyelitis today. Those of us who were raising our children 25 years ago, when the local newspapers kept a daily running score of the polio cases in the county much as they list the holiday week-end traffic fatalities today, remember very well the dread of those long summers and the dull, aching apprehension we felt when we learned that a child in the next block had been stricken.

In our own land and times, we are so familiar with our freedom from hunger, from menial tasks, and from ignorance of all that is going on in the world that there is really no need to discuss the details of the advances that have been made in agricultural practices, mechanical and electrical power, transportation and communications. The many liberties provided by our science and technology are taken for granted.

The gaining of these liberties, however, has involved the paying of a price. In achieving some freedom from hunger by learning the secrets of plant cultivation and establishing agriculture, man gave up the freedom to roam when and where he pleased and became tied down to his plot of land. We have gained freedom from much work because of our electric motors and gadgets, but we have become almost completely dependent upon our public utilities companies—have you ever thought of the consequences of a week long total power failure in a large city? [I have deliberately left that sentence as I wrote it late last summer.

Since that time, many people have thought very seriously of the consequences of such a power failure, because on November 9, 1965, starting late in the afternoon when many thousands of workers were homeward bound, New York City and a large adjacent territory did experience about twelve hours without electricity.] Many a person has been freed from some of the manual chores of housekeeping, only to be enslaved by the television set. We have released the energy of matter, and now find ourselves captured by the greatest fear that man has yet confronted — the terror of atomic war.

But when we look more closely at some of these fears and enslavements that we pay as the price for our freedoms from discomfort and toil, we notice an interesting fact: we do not fear nor mistrust our mechanical and scientific gadgets. We have confidence in the dependability of our power plants and transmission lines. We recognize, of course, that storm, flood, and earthquake may cause their disasters, but our linemen soon restore the service, and life goes on. We like the comforts and safety of our snug homes so much that we would not trade these features for the freedom of a nomadic life, no matter how much we glamorize that kind of existence in our daydreams. We are not afraid of our automobiles, although we are rightly apprehensive about the way certain careless or irresponsible people handle them. We point with some pride to the achievements of our plant breeders, our entomologists, and our agronomists in vastly increasing the productivity of our food-growing acres. We would not be afraid of famine if it were not for the fact that we can see the startling rapidity with which our populations are increasing. We do not fear atomic power as such; but we are mightily afraid of the complete and utter disaster that will surely result if that power is not used wisely. In short, we do not fear our science or technology; we fear people. We, as human beings, are scared to death of ourselves.

Yet we say that knowledge is the key to solving our difficulties, and it has become almost a by-word in our language that education is to be the salvation of mankind. Our troubles are inflicted upon us, we say, because we do not have sufficient education—if we just knew more about the universe around us, if we only had more of the truth about things and people, we would know how to live together peaceably and safely. And this is obviously true, if we define education as the learning, understanding, and application of all those things we need to know in order to avoid our troubles. But have we defined it thus? What can our present status teach us on this point?

We may be sure, I believe, that if each one of us were to keep his car, to the best of his ability, in sound mechanical condition, and drive it at all times in conformity with the existing laws and with due courtesy to the other drivers on the highways, the killing and maiming tragedies that occur by the thousands each week would be largely eliminated. We have the knowledge, but we do not use it.

I believe that one of the most important lessons we can learn from the history of civilization is that just and lasting solutions to problems are seldom if ever formed in the flaming forge of war. Misunderstanding is fostered, and hatred is deliberately fanned by propaganda and atrocity stories, and an all-pervading feeling of goodwill cannot be achieved instantaneously with the signing of a peace treaty. We know these things, but we are men, not mice, and as human beings throughout the world, we ignore them and continue our fighting ways.

Let us come back to that which is closer to our individual lives, and is fundamental to our larger, more obvious problems. We know the principles of brotherly love, and as a "Christian" nation, we pay lip service to them. Yet the evidences of our selfishness and greed are manifest in many tell-tale actions that are so small that we think them insignificant. We strive to get "our share of things," even though we deprive another citizen of his. We are litter-bugs on the highways; we manipulate pay telephones ("If it rings twice and stops, put the roast in the oven — I'm starting home. And I get my dime back."); we evade taxes; we misrepresent merchandise. We smile graciously at someone near the head of a long cafeteria line, ask politely, "May I step in here, please?" and blithely cheat every person in the remainder of the line out of a half-minute of his time. We really know better than to do these things, but we do not use our knowledge.

All this, I hope, will let us emphasize one point: we make a serious mistake when we take for granted that an increase in knowledge will automatically confer upon us a corresponding increase in wisdom. Knowledge and wisdom are by no means synonymous, and facts are but a part of the truth for which we seek.

We hear much about the exponential growth of knowledge that is taking place today, and I would agree that the providing of food, energy, and shelter for an increasing population requires an increase in knowledge. We must cause two blades of grass to grow where previously there was but one.

But what of our need for wisdom?

Perhaps it would be well to pause here to define wisdom. My dictionary gives as the first meaning, "accumulated philosophic or scientific learning." I am not using the term in this sense, but rather in accordance with the next items given: "ability to discern inner qualities and relationships," and "good sense." Under synonyms for the word "sense," my reference states: "wisdom implies sense and judgement far above average."

Let us picture one human being, living by himself in an isolated tract. To survive, he needs some knowledge of what to eat and how to get it; knowledge of how to protect himself from various dangers. But he has no problems of coexistence with others of his kind.

Next, let us imagine the arrival of another human being in the same territory. Now they will require twice the food that our one man needed, and perhaps twice the shelter space. Protection, on the other hand, may be less difficult, if they are wise

enough to help each other. For now we have problems of personal relationships that require the exercise of wisdom. If they are to live together, they must be able to cooperate, and to avoid personal conflict.

Suppose that our tiny community again doubles in population. Four people will need twice the food that two required, but where we formerly had only one personal contact (A with B), we now have six two-way combinations (AB, AC, AD, BC, BD, and CD) where friction may arise, where warmth and friendliness may exist, but where, in any case, the exercise of wisdom is needed . . . It would not be surprising if, at this point, some of you have thought of the Biblical story of Adam and Eve, Cain and Abel.

To double this group again and consider only the two-way interactions would involve calculating the possible combinations of eight things taken two at a time, and we find that although the food requirements would only double, the binary contacts would go up to 28. With 16 in the community, these would mount to 120; with 32, 496. Thus the village in this last case would require 16 times the food that two persons would need, but provide nearly 500 times the opportunities for personal conflicts and trouble. And this is vastly over-simplified because only the binary contacts are counted—no "triangles" are considered.

Who can say that doubling the knowledge of the facts of agriculture is needed to double the food supply, or that the distribution of necessities to a doubled population requires double the knowledge of transportation? Who can say that the total quantity of wisdom needed is directly proportional to the number of human contacts that occur? These involve concepts that defy measurement. Yet it does seem that while the need for certain physical items may increase linearly with an increase in population, the human contacts that need the sound judgment and good sense that we call wisdom tend to increase at an increasing rate.

Thus we have an ever-growing need for wisdom; a need which we may not be able to fulfil for our present adult population. Can we hope that our on-coming generations may develop greater wisdom than that possessed by their parents?

It is relatively easy for a person to gain knowledge by attending classes or by reading, but how can we impart wisdom to our growing youth? Is wisdom gained from the lecture room, from the television set, or from the printed page? Certain foundations may be laid thus, of course, but we really cannot give our students wisdom, ready-made, to be dropped into their lives for immediate use like a battery into a flashlight. Each person, by devoting time and effort to deep pondering and serious thought, must develop his own concepts, ideas, and evaluations that lead to wisdom. A relatively ignorant man can be wise, and one who possesses a great fund of knowledge may be pathetically lacking in wisdom.

Are we today engaged in such a rat-race of education that we are shortchanging our youth in the wisdom-gaining pursuits? Are we try-

ing to crowd so much of the newly discovered scientific information into our high school and college courses that we leave our students (and ourselves) no time to think? Are we pushing them so hard that they consider it appropriate to blow up in foolish revelry when a brief vacation arrives?

We tell our students that their time is precious, and that it should be budgeted so that none is wasted; so that they may study their text assignments, work their problems, and learn their lessons. We require that they take certain courses in physical training, and encourage their participation in athletics, because they need physical as well as mental exercise; because their bodies must be kept strong and healthy. We urge them to attend festivals of music and the arts, because a rounded education should include an appreciation of "the finer things of life." We schedule, or expect them to do so, various social activities, dances, parties, and entertainments because they need some "recreation." It is good, we say, to keep them busy, and to see that even their leisure time is filled with activity.

It may not be accidental that some of our greatest works of wisdom and our highest types of religious teachings have come from inhabitants of arid, semidesert regions. In those areas there is solitude. There the people can see the heavens through a clear and unpolluted atmosphere; they can get unobstructed views of the distant hills. In such surroundings, people can realize more easily how small they are, after all. For example, the Psalmist said (Psalm 8):

When I look at thy heavens, the work of thy fingers,
The moon and the stars which thou hast established;
What is man that thou art mindful of him,
And the son of man that thou dost care for him?

Jesus of Nazareth, according to the accounts we have of his life, spent several weeks alone in the wilderness before he started his career of ministry and teaching. There he faced and overcame certain temptations to misuse his abilities, and he set the course he was to follow so steadfastly.

Other cultures have taken steps to meet this problem. We are told that certain American Indian tribes were wont to send each boy, as he approached manhood, out into the wilderness to fast and meditate until he had received a vision of some significance. He had no books for entertainment; no games to help him while away his time. He was alone with his thoughts. Longfellow portrayed it in his "Song of Hiawatha:"

You shall hear how Hiawatha
Prayed and fasted in the forest,
Not for greater skill in hunting,
Not for greater craft in fishing,
Not for triumphs in the battle,
And renown among the warriors,
But for profit of the people,
For advantage of the nations.
First he built a lodge for fasting,
Built a wigwam in the forest,
By the shining Big-Sea-Water,
In the blithe and pleasant Spring time,
In the Moon of Leaves he built it,
And, with dreams and visions many,
Seven whole days and nights he fasted.

Our own culture is not completely devoid of all vestiges of such a custom. Within the framework of the Boy Scouts of America there is an organization known as The Order of the Arrow. Each boy taken into it

must spend a night alone in the "wilderness," which is usually some lonely spot in the back acres of his Council's camp area. One young man (who happened to be an Assistant Scoutmaster rather than a Scout) came in the next morning with this poem as evidence that he had been thinking during the night:

Who, in the night,
Under nothing but the trees,
Has ever been alone?
He, perhaps,
Who, for his light,
Depends upon his brother's torch,
And not upon his own.
But he,
Who down inside,
Carries warmth enough,
And pride,
Can light the living forest
So that nothing there can hide;
And then it is he sees
Where they dwell among the trees
That a hundred thousand friends are shown,
And that here he cannot be alone.
—Harlan K. Corrie
May 10, 1952

Most of us, as scientists, believe in using laboratory methods in teaching. Although laboratory work is costly and time-consuming, we acknowledge its worth because the actual handling of objects and the seeing of results impress the memory more firmly and stimulate reasoning more surely than the mere reading of descriptions of work done by others. Perhaps we should consider quiet and undisturbed meditation as the laboratory work of evolving one's own philosophical outlook, or at least the testing and evaluation that should precede the acceptance of material one reads. And perhaps the temptation to do a lot of reading should be resisted at times; we are too much prone to look for profundities in the words of "recognized authorities," and too little prone to dig them out for ourselves.

What effect would it have on our lives if each one of us, starting at about the age of the college freshman, were to spend a week each year alone with his thoughts? Given a plain but comfortable cabin for shelter, with a picture window overlooking an isolated lake, a landscape of mountain fastnesses, or the solitude of a Grand Canyon vista; given simple but adequate food and drink; but given no books or papers to read, no radio or television for entertainment, no puzzles for pastime, what would be the result? Would it be madness nurtured by boredom, or would it be a revised and wiser outlook on life? How many Thoreaus do we lose for want of their Walden Ponds?

Or, on a far simpler scale, how many potential thinkers are stunted in their development because they ride to school in crowded buses amid the chatter of trivial conversation rather than walk a mile or two alone each day?

You may wonder, by now, what all this has to do with science. Simply this: we, as scientists, need to be "taken down a peg or two." We have too much of a tendency to point to our science as the deliverer of mankind; to hold up our education in science as the hope of human salvation. Too many of us have made Science our God, and Scientism our religion. We have vastly increased our knowledge, and we have emphasized our need for yet more of it, but we have forgotten wisdom. We need to stop and think of the folly of this negligence.

But please do not misunderstand me; I am not making a plea for curtailing our scientific efforts. And I am aware that some of our better colleges are indeed instituting programs designed to meet this problem and give their students new opportunities to think.

I should like to read a paragraph that I found in an item entitled "Scientific Understanding and the Chief End of Man" in NATURE, Vol. 207, p. 1070 (September 4, 1965): D. M. Mackay, in *Man and his Future* (Churchill, London, 1963) ". . . has already pointed out that it was concern for truth which begot science, not science which begot concern for truth. It is argued that to continue to pursue the truth, which is, in its essentials, the pursuit of a moral goal, by means which have already successfully brought material wealth, food, healing, and understanding of Nature and of man himself, is a worthy end for human endeavour."

A man or a woman who has gained wisdom bids fair to be an excellent citizen, regardless of his or her attainments in the fields of factual knowledge. But the person who has a great deal of knowledge without the necessary wisdom for using it may well be the unrecognized enemy in our midst, for it is not just "a little knowledge," but rather knowledge without wisdom that is truly "a dangerous thing."

Wisdom is attainable. Not by the application of thermometers, polarimeters, spectrometers, or cyclotrons housed in multimillion dollar laboratories, but by the appropriate use of equipment that is so commonplace that it is quite unspectacular, and so long in the possession of the human race that it has never held the glamor of novelty—our own brains. These are more readily available to us than coffee breaks, more marvelous than computers, more portable than transistors—and much more neglected than they should be. They can be tricky, and they require the expenditure of effort to operate them. To use them can be productive; to leave them idle is tragic.

Perhaps religion deserves our earnest attention here, for as I see it, a serious and thoughtful pursuit of religion is in essence a striving for wisdom. Many people, by blind acceptance of dogma, make it much less than this, so I am using the phrase, "thoughtful pursuit of religion," advisedly.

When we succeed in attaining the proper balance of wisdom with factual knowledge, we may well find that this is the goal we seek, and that this is the real meaning of the complete sentence, part of which I read at the outset: "If you abide by what I teach, you are really my disciples, and you will know the truth, and the truth will set you free."

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