



*THE ROLE OF IOWA STATE UNIVERSITY IN THE
SCIENTIFIC AGE: TOWARD A NEW HUMANISM* ∞

*Inaugural Address
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One evening last October, I was reading to my younger daughter from that remarkable book by Sir James Frazer, *The Golden Bough*, about the mystery of Halloween—the mystery of why the ancient Celts of Europe's Land's End were most superstitious, not about the great day of the sun, the summer solstice, but about the eve of Allhallows' Day, a time of transition from fall to winter when, in Frazer's words, "the harvest has long been reaped and garnered, the fields lie bare, the fruit-trees are stripped, and even the yellow leaves are fast fluttering to the ground. . . a day which heralds. . . the cold and barrenness of winter."

It is significant, I think, that Frazer found his explanation of this mystery in the ecology of the superstition and magic of these ancient people. They were a pastoral people, herdsmen, depending upon their flocks for subsistence. Thus, the time when the herds returned to the homestead was the most important in their year. It is not strange, therefore, that the pagan Celts chose to exercise their most powerful magic, chose to burn their great festival fires, on the eve of such a day.

The Golden Bough—which is essentially a monumental account of man's long history of trying to cope with, to control, his environment through magic—closes with the thought that the dreams of magic are gone, replaced by the awakening realities of science. To use Frazer's imagery, the white thread of science has replaced the black thread of magic as the dominant thread in the developing web of man's thoughts.

The idea that the successive epochs of man's history have each had its own cosmology—a way of looking at the world, interpreting its meaning, identifying the purposes of life—is, of course, not a new one. Nor is it a new concept that man's cosmology takes its form and content from the dominant human interests of a particular period. Nor is the view that man's life over the past three centuries has been increasingly dominated by an emerging modern science, a new understanding of history. Yet, somehow, set against the dark sweep of man's long experience with magic, Frazer's concluding thought leaves one with a perspective on the gravity of this moment in man's development which is ours—this moment in which man must adjust his life and his institutions to the realities of science. Moreover, it leaves one, whose preoccupation is education, with a feeling for the imperative which the human condition in a scientific civilization is placing upon the modern university.

Therefore, over and over again, during the past few months, as we have sought to identify and articulate the goals and purposes of the Iowa State University, I have tried to think through the role which education

must play in a scientific society such as ours. Particularly have I been concerned with the kind of educational responsibility which Iowa State, as one of the leading scientific and technological universities in the nation, must assume. This, then, is the concern to which I would like to address myself this morning.

The imperative which the human condition in the age of science places upon education could be defined in terms of the humanistic consequences of science—technological, economic, social and political. However, if I may be forgiven the fiction of generalization and abstraction, I would like to define this imperative in terms of what I believe is the great root problem of our scientific society, a problem from which derive the humanistic consequences which are challenging education today.

There is, I think, a great unresolved inner conflict within our society, a great schism which exists within our thinking as a society. This schism is not the separation of the intellectual community into the two cultures of which C. P. Snow has spoken so effectively. Nor is it the atomization of knowledge into specialized disciplines—although what Alfred North Whitehead described as "knowledge in a groove" is certainly at its source.

Rather, this great schism lies within the thinking of each of us. It is the division we set up between our thoughts on our science and our thoughts on our culture. Science, if you will, dominates our cosmology; but, at the same time, it is not a part of it. Unlike that of the ancient Celts, our cosmology is divorced from the "irreducible and stubborn facts" (to use William James' famous phrase) of our existence in a scientific civilization. It is, I think, this polarization of science within our culture, and the humanistic consequences which flow from it, which create the generic responsibilities of education today.

The "irreducible and stubborn facts" are that science is the creator of our modern world. As the Industrial Revolution once did, science, today, structures and powers our society. We live by the apparatuses of science. Its engines and its skills permeate our lives and our institutions, altering the very terms of our existence. It has created the massive restlessness and instability of a world in change. At once it is holding out the dazzling promise of a material abundance which can free our society from the dehumanizing poverty to which the masses of men have always been condemned. At the same time, it holds the terms of man's viability.

Surely, therefore, science, as C. P. Snow has said, "must be the passionate concern" of all of us. And we do concern ourselves with science. We both love and fear it. We have an almost insatiable appetite for its technological fruits—abundance, convenience, leisure. We are

preoccupied with its gadgetry. We have even included its specialized jargon in our vernacular. Our belief in the miracles which science can work has become almost limitless. We have lost the capacity to be amazed at its most spectacular accomplishments. Science, it would seem, has become the magic of our modern world. And in our awe of science, lies our fear. For, unlike the ancient magics, science is a magic which seems to be without feelings, without values, purposeless and neutral, a magic over which man, like the sorcerer's apprentice, has little control.

Perhaps it is because we are involved with science emotionally, because we fear yet love science, that we have not made the necessary intellectual adjustment to it. In a sense, we are all Luddites. If we do not wish that science with all its potentials for dehumanizing our lives would pass away, at least we seek to banish it from our thoughts. Because of this psychology, science is seen, as through a veil dimly, as a force neutral, alien and apart, which is bringing a temporary maladjustment into our lives and into our institutions. We do not try to understand the impact which science is having, and will continue to have, upon our lives—not only at the vulgar level of the bomb, but upon the whole business of life, our habits, our values, our ethics, our patterns of conduct.

We cannot, however, continue to be Luddites. For, if we do, we are going to have to continue to take science on its own terms rather than upon ours. The span of understanding may not be the span of control. But, certainly, the span of understanding determines the outer limits of the control and utilization of science and its technology to promote human goods and values. We cannot, therefore, continue to have this cultural failure, this cultural lag. Rather, we must integrate science and its cultural dynamic consequences into the philosophy which guides our lives, our ways of living together.

We must, if you will, accept science into our cosmology. We must adopt a cosmology which will permit intelligent social decisions on such technological consequences of science as modern warfare, missile capability, space exploration, industrial use of nuclear power, automation, population explosion, population control. We must adopt a philosophy which will equip us, as a society, with the capacity for making these decisions through democratic processes. Above all, we must adopt a philosophy which will permit us so to adjust our lives and our institutions that science, rather than being a dehumanizing threat, can become a liberalizing and liberating force opening up our lives to new ideals, new values, higher human goals.

It is said that the British universities slept through the Industrial Revolution and the first two hundred years of the Scientific Revolution,

divorced from the needs and interests of their times, unstirred by the great scientific discoveries and technological developments which their society was accomplishing without their aid. In contrast, it is the intention of the modern university to stand squarely in the center of the needs and interests of its society. In its sincere effort to relate to the life and problems of its times, the modern university has been courted, flattered, and bribed into assuming an ever-widening variety of roles. In fact, so particularized and proliferated have its activities become that one sometimes wonders what the essence of the modern university really is, and whether the ethos of the university as an institution is being lost amidst all of its activities.

It has been almost forty years since Alfred North Whitehead, one of the very few truly original educational philosophers, suggested that the basis of education had become too narrow for the interests of mankind, and that only by going back to the break-up of the medieval traditions of learning could a time be found when education so poorly fit the shifting human interest. During the years since Mr. Whitehead voiced this view, and particularly during the period since Mr. Whitehead's death in 1947, the universities, at an accelerating pace, have sought to relate their programs, their curricula, and their activities to the life of their times.

Yet I wonder if Mr. Whitehead would not still issue his same challenge today. For the universities' accommodations and adjustments to shifting human needs have been largely to make themselves more effective producers of the professional skills and competencies our scientific and technological society so truly needs. The educational result, however, has been largely to perfect and make more efficient our "knowledge in a groove," to establish a whole series of narrow bases of knowledge. It has resulted in the failure of the modern university thus far to develop that broad and unified knowledge, that dynamic intellectual outlook, which will permit the integration of our science into our culture on terms which best serve the human interest.

Last fall, in my convocation discussion with the faculty, I attempted to identify three large goals for the Iowa State University, goals which grow, almost automatically, out of its personality and experience as an educational institution. They were the goals of excellence, diversity, and service. Today, I would like to identify another goal, a fourth goal, for Iowa State. It is the goal of bringing all of our disciplines in the sciences and the humanities together into a new educational unity, achieved through a broad concern for the human and the humane. Today, I want to commit the Iowa State University to the task of working to develop what might be called a "new humanism" as the philosophical basis upon which its educational programs can be built.

The concept of a "new humanism" is not a new one. It has been in the public domain of ideas for a long time and has developed a variety of meanings without taking on definite form and content. Therefore, it is one of those useful concepts open to almost any meaning one may choose to give it.

The "new humanism" whose meaning I wish to develop this morning, takes its basic tenets from the humanism of the Renaissance. For that fresh, new spirit which awakened mankind after the long, dull tedium of the Middle Ages, put man, for the first time in his history, squarely in the center of his own thinking. Moreover, this Renaissance man was a man in nature, a many-sided, yet total individual, relating harmoniously, even joyfully and zestfully, to the world about him. His goal was the full and rounded development of his personality in all of its varied interests and facets. His concern, therefore, was for enriching the quality of his existence and with the human conditions which help to make life worth living. In short, he was preoccupied with the human and the humane.

These were the best ideals of a world long since dead—a world swept away by the science it helped to spawn. It was a strange and foreign world filled with color, imagination, creativity; a cruel and violent world; an insensitive, vulgar, poverty-ridden and unkempt world. But, above all, it was a world filled with the passion for living. Perhaps it was because it was so filled with the gladness of life, that this pre-scientific world provides, I believe, the basic assumptions for a modern educational philosophy broad enough to fit the changing interests of men in the scientific age.

They are the beliefs: (1) that education should be man-centered; (2) that it should be based upon a concept of the individual as a total entity, whose personal development to be complete must be a rounded, integrated development; (3) that the end of education is this complete development of the individual; (4) that education, to achieve such personal development, must relate to the needs and problems the individual will face in his environment and to the decisions he must make within his culture; and, (5) that it should be concerned with those conditions of man which affect the fulfillment of the goal of the optimum development of the individual, wherever he may live, whatever may be his race or creed.

It is ironic that for the realization of these humanistic ideals, men have had to await on science; that it was first necessary for the goals of humanism to be overlaid by science. The second assumption of a "new humanism," then, is that science can be, as John Dewey pointed out quite long ago, a liberating and a liberalizing force in the development of human goals and values.

Herbert Muller, in his fascinating book, *The Loom of History*, described history as the "whole process by which man came to realize his humanity." It is not historical coincidence, I think, that this growth in humanity has undergone a remarkable acceleration during the 300 years since the birth of modern science. It is not by chance that such a period in history as the Augustan age in English literature, which is romantically remembered for its extremes in sensibility and cultivated taste, was also marked by a degree of callousness and indifference to the poverty and misery of the London eighteenth century slums which the modern mind cannot even comprehend. Nor is it a coincidence that faith in the future, in the inevitability of progress and the perfectibility of man, became for the first time a prevailing social psychology during the nineteenth century, when science and technology were fast coming into their own.

Things and ideals, then, cannot be separated. Means do make ends. Enlarged and extended human values can arise out of changing human conditions. Science is adding a new dimension to man's humanity. It is permitting human concern for the social condition of man. Material abundance and the technology of health, which science is creating, is making possible a greater human sensibility, a greater sensitivity to human need, misery and disease. Science has made compassion possible. It has permitted man to enlarge his heart. The leisure which technology brings can liberate human capacity to pursue more aesthetic and humane values.

It is almost axiomatic, therefore, that science must indeed be "the passionate concern" of any humanistic philosophy of education. Nevertheless, that educational philosophy which has taken its greatest pride in its humanism, the liberal education, has watched, largely unconcerned, as science has developed its own educational world—set up its own educational apparatuses, established its own system of values, its own methodology, its own priorities.

There have always been those in the arts and the humanities who have recognized the role which science could play in enlarging and extending human ideals and goals. The poet Shelley, for example, even at the beginning of the nineteenth century, believed it was the artist's responsibility to "absorb the new knowledge of the sciences and assimilate it to human needs, color it with human passions, transform it into the blood and bone of human nature." But, historically, science—even as it accomplished its leviathan growth, threatening with its genius, its resources, its prestige, its power to dwarf and overshadow the liberal education—has been largely ignored by that education.

The third assumption of a "new humanism," then, must be that in the modern world, the liberal education—the humanistic education, if you

will—is one in which an understanding of the language and the meaning of science must be an integral part. Science, I believe, must be inseparably at the core of the modern liberal education. This conclusion can be derived from the liberal education's own view of itself, its self-established purposes and objectives, its own criteria for judging the liberally educated individual.

The goal of the liberal education, as I read it, is the broad-based, rounded development of the individual in all of his varied intellectual, aesthetic, and humane tastes and interests. Its purpose is two-fold: life enrichment and life adjustment. First, the liberal education seeks to enrich the quality of an individual's life by cultivating within him those varied tastes and interests which permit a fuller and keener enjoyment of life. Second, it seeks to create that knowledge and understanding, that coherent picture of the world, its culture, and its problems, which will increase the individual's capacity to make rational and humane choices and judgments upon the problems he will confront in his dynamic culture.

If this be the meaning of a liberal education, then surely a liberal educational philosophy cannot close itself off from the world of science. It cannot shut itself off from the picture of the world which science gives. Surely, today, the person who does not understand the language of science can only have an incomplete and partial picture of his world. He cannot have the keen intellectual pleasure of understanding the magnificent phenomena of the universe which science is now unfolding. For example, he cannot begin to comprehend such mysteries which science is now solving as the structure, behavior, and properties of the DNA molecule and the role it plays in heredity and in directing the development of living organisms. He cannot comprehend such exciting new speculations of science as the possibility that there are strange star-like objects in the sky which are releasing energy at a rate 100 billion times greater than any known star. He cannot understand the mathematical fictions which describe such phenomena as light, space, and time.

Nor, if the liberal education is to fulfill its purpose of life adjustment, can it afford to shut itself off from that understanding of science and its technology which is necessary in equipping the individual to make rational choices and decisions in his science-dominated world. The future is unclear to all of us. But one overriding fact is only too apparent. As science and its technology grow exponentially, intelligent decisions on the policy and administration of the scientific society of the future, decisions which affect the conditions of life and the terms of existence of all of us, can only be made by those who understand science and its technology. As John Dewey, in refuting Emerson's view that to perfect ourselves from within was enough, and that it was enough to be a "be-er" rather than a "do-er," once remarked: ". . . while saints are engaged in introspection, burly sinners run the world." This is not to suggest

that those who understand science are "burly sinners"; but it is to suggest that the liberal education does not wish to cut itself off from those who will be running the world of the future.

This third assumption of a "new humanism," that science should be integrated into a liberal education, has a reverse side, however. It is the co-equal assumption that the education of the scientist and technologist should be within the context of a liberal education.

Science is built upon truth, the freedom to pursue scientific truth whatever its findings may be. Without truth, the whole structure and process of science would collapse. The doctrine of the ethical neutrality of science is indeed a necessary protection for this essential freedom. Science, however, is a human enterprise, carried on by human beings. I believe, therefore, that the young man or woman being trained in science or in technology should also be trained in the knowledge and values of a liberal education. His education should give him a view of his specialized discipline within the culture of science and within the larger culture of human values and institutions. Particularly should it provide him with a broad social understanding of the impact which science's technological consequences will have on his economic, social and political institutions. For our technology must surely be man-centered, controlled and directed for the human and humane purposes of man.

This third assumption of a "new humanism," then, has been that the education which is broad enough to fit "the shifting interest of mankind" must be an integrated education, built upon the old humanistic concept of the individual as a complete entity, who in his life will be facing a total situation, who will be confronting not only his own swiftly changing professional world, but also a dynamic economic, social and political world, a world of the arts and of literature.

The problem of broadening out the narrow-based, the professionalized, education into a rounded education has generally been conceived of as the problem of the dualistic development of the sciences and the arts, arising out of a kind of natural antithesis between them. And, perhaps, there is a certain conceit of the arts which sees science and technology as unesthetic, insensitive, pedestrian. Perhaps, also, there is a certain disdain by science for the arts, a disdain which views the humanities as lacking in exact scholarship, order, clarity, precision.

Would, however, that the problem of achieving an integrated education did reduce itself to a problem so relatively easy of solution as the problem of dualism. For surely the dichotomy between the arts and the sciences has little reality in nature. Both science and the arts and humanities spring, I believe, from the same capacities and qualities of the human mind and spirit. High scholarship in each area holds to the same values: accuracy, truth, precision, discipline, tolerance, freedom,

creativity, imagination. It is significant, I think, that science had its origin in the Greek mind, the same free, curious, and critical Greek spirit which also produced the first history and first western philosophy. Thus, the world of the arts and the world of science have unfolded together. The golden ages of literature and the arts have also been golden ages for science. It was not mere historical accident that the first folio of Shakespeare's plays and the first table of logarithms were published within a few years of each other. Therefore, science and the humanities need not be dichotomized. They need not be rival attitudes toward life.

The problem, then, of achieving a total education is not the problem of dualism—although certainly a first step in achieving an integration in university education is to rid ourselves of the belief in the antithesis of science and the arts. Rather, the problem is a vastly more complicated and difficult one. It grows out of the fact that because the capacity of the human mind is limited and the growth of knowledge seemingly is infinite, modern knowledge has had to be particularized to be mastered. Thus, the problem of partial knowledge is not that of a single wall raised between a monolithic science and a monolithic humanities. It is the many walls of specialization which are going up around smaller and smaller bases of knowledge both within the sciences and within the humanities. For specialization has no particular affinity for the sciences. It is a growth which flourishes in every academic area. The study of Etruscan art, for example, can be more specialized than the detailed study of a molecular structure.

It is not, however, the specialization of knowledge, but its isolation within a specialty, which creates partial knowledge. It is this polarization of knowledge which permits each discipline to contract out from any intellectual obligation or moral responsibility for developing that total knowledge upon which our rational decision-making process, both as individuals and as a society, must depend. Specialization need not, I believe, be the antithesis of the total education. Nor are exact scholarship and the many-sided education necessarily inconsistent. Disciplined intelligence can be compatible with wide-ranging knowledge.

The problem, then, in developing a total education is not that of holding back the forces of specialization. And indeed, if the universities were to attempt to do so, they would be as powerless as was King Canute in his effort to hold back the tides. Nor, would a university want to stop the course of useful specialization. For to do so would be to turn back the clock of scientific progress, that progress which is offering men so very much.

Let us, therefore, concern ourselves with the task of finding the means for breaking down the isolation of the specialized disciplines, of bringing them together in meaningful dialogue, of giving them a common

concern for fitting their specialized information together into a broader knowledge. In discussing the problem of developing within the individual student who is majoring in a specialized discipline that broad knowledge and understanding which will prevent his becoming isolated within his specialty, I could speak of such devices as curriculum adjustment, curriculum balance, free electives, required courses, timetables, colloquia, symposia.

Perhaps, however, I myself am a little guilty of holding the belief for which John Dewey disparaged Emerson—the belief that perfection begins from within. For I do believe that the achievement of an integrated education for the student must come from within our spirit and thinking as the faculty of the Iowa State University. It must come out of our collegial feeling of belonging to a common intellectual community. It must come out of our faculty members' ability to comprehend the language, tools, and concepts of their colleagues in other disciplines. It must come out of our understanding as a faculty of the need for bringing our specialized competencies to bear cooperatively and productively on given problems. It must come out of a wide-ranging perception of how to bring our knowledge together. If we as a faculty can even begin to achieve this kind of mutuality of intellectual interest, our faculty will surely develop for our students a really meaningful integration of knowledge at many points, on several planes, in varying degrees, at differing levels.

To bring scholars from the special areas of knowledge together into some kind of a common intellectual community will, I believe, require a strong common core of mutual interest and concern. The fourth assumption of a "new humanism," then, is that this unity is to be achieved upon the basis of the first principle of humanism—that education should be man-centered, that it should be oriented around the human and the humane.

It is absurd, of course, to suggest that each individual piece of research, each particular course of instruction within a specialty can relate specifically to the human and the humane. Such a generalization, however, which can be disproved in its particularized application does contain the larger truth that somehow scholars within their specialties should relate their disciplines back into the common educational core of the human and the humane; and that it is only in the human and the humane that they can find the great common central plane where they can meet in meaningful dialogue, can develop a common language, can find a level on which they can exchange knowledge on their specialized competencies. Within our College of Agriculture, for example, during the years when the walls of specialization have been fast going up in every area of knowledge, I have noted that the various disciplines in the physical,

biological and social sciences in agriculture have increasingly found common ground for understanding each other's concepts, methods, language, as they have come together in a cooperative working relationship on common problems of human concern.

It is, I believe, the responsibility of a scientific and technological institution such as the Iowa State University to put this concern for the human and the humane at the core of its philosophy of education. It should be the concern which gives our institution its meaning and purpose, which permeates our spirit of learning.

This, then, is the philosophy of a "new humanism" to which, I believe, the Iowa State University should commit itself. For the development of this kind of humanism in our educational program is, I believe, our necessity and our responsibility. Unlike the British universities of the nineteenth century, the American universities of the late twentieth century cannot sleep through the challenge of their age. Iowa State, because of its character and experience as an institution, has, I believe, a high potential for taking leadership in developing that blend of science with humanism in education which can make the universities an effective force in bringing our science into our culture on terms which will best serve the human interest.

The modern university must, of course, play many and particularized roles. The specialized disciplines must continue to divide and multiply out into exciting new disciplines on the frontiers of knowledge. Particularization and diversification are an important road to strength and excellence as an institution. Iowa State must, indeed, be an effective producer of professional competence.

I am not concerned, however, that the setting of the goal of unity, oriented around the human and the humane, will deter this natural and useful expansion. For there is, I believe, within each discipline in every area of knowledge, a kind of built-in, self-evolving force which propels its discipline forward. Thus, the particularized roles of the university are almost automatically enlarged and strengthened. The push and pressure will always be on for increasing the university's competence as a producer of specialized knowledge. And this is as it should be. I welcome such vigor within our institution. However, as Iowa State widens and diversifies its activities as a university, its faculty must together, as a collective entity, assume that general responsibility, which belongs to no one discipline, of overlaying and permeating our varied educational programs with the unifying philosophy of a "new humanism."

The achievement of such a goal by Iowa State will be difficult and complicated. I realize that exhortations from the lecture platform will not bring its accomplishment. However, philosophy, it is said, builds

temples before a single stone is laid. Let us, therefore, begin with a philosophy. Let us begin by developing that climate of opinion among our faculty which will put this institution squarely in the search for educational unity.

Let us begin by rethinking our assumptions, our priorities, our levels of urgency. Let us seek a new understanding of the necessary and the possible. Let us not ask: "Can unity be achieved?" Rather, let us ask: "Can we afford not to achieve unity?" Must we not ask the question: "What will become of all of our professional, specialized competencies if that unity of knowledge, which can guide us in our living harmoniously and justly together, is not achieved?"

We need to remember that time has three dimensions. It has a future, as well as a present and a past. Therefore, because a human goal has not yet been accomplished does not necessarily mean that in the future we cannot find the means for achieving it. Moreover, goals are really ideals, set ahead of us, not immediately to be attained. Goals, however, become their own instrument for realization. In the process of striving for them, they are being partially achieved on a daily, continuing basis—which is perhaps the real attainment of any goal.

The universities are, I believe, on the threshold of a new creative period in their development, a period in which they will seek to relate more centrally to the life and problems of their times. I am confident that the faculty of the Iowa State University is a faculty which has the creativity and the imagination needed in developing an education to fit the scientific age. I believe that we, as a faculty, can develop a common intellectual consciousness. And, if we can even make this beginning, I know that we will be able to create together—to use the words of a famous scientist—"an immense, intricate network of intimacy, illumination, and understanding." We can have that creative experience of finding new answers, new solutions arising out of the very process of working together.

We, as the faculty of the Iowa State University, can have the imagination and the boldness to experiment pluralistically, pragmatically with new forms and devices for unity in many areas and on differing levels, trying out new assumptions, testing out new premises. The Iowa State University can be an institution filled with imagination and excitement, an institution of high excellence which finds its ethos in an educational philosophy which brings its disciplines in the sciences, in technology, and in the humanities together in a common concern for the human and the humane.