

International Conference on Modern

Science and Moral Values

Yoshishige Sawada

Executive Chairman

Ladies and gentlemen, my dear colleagues from abroad:

I would like to say a few words of greeting on this occasion of the opening of the international conference on Modern Science and Moral Values. This conference represents the second meeting of a conference first opened in New York during November 1972, with the title, The Unity of Sciences. As a common theme for the present conference, the subject of modern science and moral values has been selected, and I would like to suggest to you why such a theme was selected and why I feel it is an appropriate one.

Modern civilization in the western world has been distinctively shaped by various machines created through scientific theory and technological development, and also by the extension through society of various social systems well-suited to the application of these machines to economic growth. Japan too, aided by the introduction of culture and technology from the west since 1868, has undergone similar development. Those who live in such a civilization have inevitably come to believe that their existence, and

even their very happiness, are guaranteed by the development of science and technology, and by the development of such social systems as effectively channel applications of science and technology so that the space and content of human life become more expansive. Such a creed I call the "idea of human history as progress which is based on the development of science and technology."

Modern ideologies and morals have come to be molded to conform with this view of history, and two theoretical attitudes, I believe, can be mentioned as providing the foundation for it. One is a popular and not necessarily scientific understanding of Darwin's theory of evolution, and the other, likewise non-scientific in character, is an understanding of scientific and technological development. Darwinism represents a rejection of the theological explanation for man offered by Christians, which claims that man was created in God's image, or in Latin, imago dei. Darwin instead offered the idea of evolution, and I might note that the term evolution was not used to denote "progress" but rather "survival through metamorphosis." The theory brings forward two concepts, the mechanisms of mutation and natural selection, and it employs them to explain evolution in a manner strictly complying with the scientific method.

It would be incorrect, however, to reason that this scientific theory leads automatically to the notion that

there is progress in human history, or in other words, that through natural selection Homo sapiens is continually being made better or more perfect. Before one can support such a view of history, one must supplement the scientific theory with some purely inductive premises brought in from the outside: that the evolutionary species of Homo sapiens is in some sense superior to all other species of life, that is, that it has some special, intrinsic merit, and also that the evolutionary change which has progressively perfected Homo sapiens up to now will continue right on into the future making it an even more perfect creature.

Darwin himself, in The Descent of Man which he completed in 1871 in his later years, argued in favor of considering human history as a history of progress. One thus might be inclined to think that his theory of evolution does provide scientific justification for the creed that human history and progress are synonymous, but as long as we are considering only the purely scientific aspects of his theory, we should rather conclude that it does not have the qualifications to make such a link. More appropriate is to say that Darwin provided a scientific theory quite palatable to the view of history as progress, but that Darwin and the other scholars of evolution who followed him did not formulate out of their own studies the twin value judgments concerning history that are necessary to reach this view, i.e., that the human

has some special, intrinsic merit, and that over the course of time the life of humans becomes better and more perfect.

No doubt many factors of modern society have worked to solidify and disseminate this structure of values, but what I would like to emphasize here as the most general and fundamental factor is our consciousness of the progress in man's knowledge itself, which has improved and become more comprehensive as the years pass by. I am reminded of a very thought-provoking suggestion made in 1961 by Sir Karl Popper in his Herbert Spencer Lecture entitled "Evolution and the Tree of Knowledge." While noting that the evolutionary tree of Darwin, developed in the famous work On the Origin of Species, shows a tendency toward greater differentiation and specialization of form and function as life evolves, the "growing tree of knowledge," Popper emphasized, evolves in the opposite direction of greater integration and unification. I would like to return to these concepts of integration and unification later on to air some of my own thoughts, but for the moment let me only point out that our scientific knowledge if properly developed, will undoubtedly continue to become an even more integrated body of thought, and while granting that during transitional phases a tendency toward differentiation and specialization may be present, in the end it will progress beyond this to acquire a character of universality which is expressed in the form of unified theories.

History in the west moved from the Middle Ages, where theological thinking held sway, to the modern, where scientific reason has become the dominant thinking process. Through technology, then, machines were invented, and these machines have been put to use in society's economic growth and to expand the scope of human life. Looking back on this process where scientific theory and technological know-how have increasingly progressed toward greater competence, and where their influence has been determinant in the formation of social systems, it becomes quite understandable why one might come to believe that human history too must be progressing in parallel with this scientific progress, or, in short, that mankind's history is one of progress.

In all of the so-called advanced nations such a view of history and such a structure of values have been accepted unchallenged since the advent of the modern age, and in the name of this creed new scientific theories and technological innovations have been born one after another, more effective social formations have been evolved and extended to put the science to work, and, as the end product, economic growth has continued while the living environment has been enriched. After the Second World War the pace of development of television, computers, and other machines for communication and information processing became particularly rapid, accelerating the overall trend of development. Viewing the overall

development from the Industrial Revolution up until recentl we might characterize it by saying that power machinery was produced to supplement hands, feet, and other "power organs possessed by natural man, and that chemical processing mach and apparatus were produced to strengthen the "chemical processing organs" inherent to the human body. Today, however, the new machines which are appearing dramatically reinforce the organs which man uses for communication and digesting information, and with this, man can now make the most effective use of his machinery to perpetuate growth an expand the living environment.

The relentless drive toward development and expansion has also, however, extracted a heavy toll from among that which is dear to us. Very recently man seems to have awakened to the fact that the greater the sacrifices that have to be made, the more the development and expansion is effectively negated, and that these sacrifices could even augment to the point where the very survival of the human race is called into question. It is not hard to understand that too rapid an expansion of the natural social system must lead in some sectors to the emergence of strains and distortions which, in the extreme, can upset the system's overall balance. Nor is it difficult to perceive that if, in the process of development, education is not available on the knowledge and techniques which can sustain the balan

of a system under expansion, that is, if the expansion is left unrestrained and unregulated, the tendency of the system's balance to move toward collapse will only be that much more augmented. I submit that the issue of the knowledge necessary to sustain a proper balance is one closely related to the theme behind this conference, the unity of sciences, and later on I would like to return to this issue and explain just why.

The strains that develop in man's social life emerge first in the form of inequalities in the distribution of wealth and lead to a class struggle between labor and capital; those that are emerging today, however, threaten the very existence of our natural environment, and for this reason are all the more critical. There is much work presently being done on these new strains on human life. This is clear, if from nothing else, from the many international conferences focused on this subject which have been held recently, not least of which was the conference in Tokyo that opened only about one month ago among the members of the Club of Rome. For this reason I will avoid the subject here, but first let me make one additional comment.

The expansion of economy and living environment which is the hallmark of modern civilization has not, unfortunately, had only the one side effect of ravaging the external environment which surrounds us; it has also reached into the internal structure of our lives to threaten our own self-identity.

In this respect, we should note that the present structure of our knowledge and the present systems of education are, here too, deeply involved in these internal types of crises

To achieve economic growth and to richen the living environment it has been necessary for the intricacy of our social system to become ramified, and this ramification of social structure has led us along the road to differentiation and specialization. The result is a situation where individuals have become atomized and been shut up within the confines of a life dictated by the requirements of their particular specialty, where many of the needs and functions of the organically structured living systems they once possessed in a more primitive, natural day have become numbed and paralyzed, and where unless they consent to continue living under these deformed conditions they themselves have created, their very survival is in doubt.

Even the university, formerly the staunchest bastion for the synthesis of knowledge, now moves in a direction where the fields of study have become so differentiated and specialized that it is considered enough only to acquire the specific skills of one's field, and this autonomous world of variegated and specialized knowledge has severed itself from the world of everyday sense where the great need is to know how knowledge gained can be put to practical use. The resulting nihilistic feeling toward existing science



and theory has now virtually deprived the university of its content. Since many young students cannot find subjects to study which whet their enthusiasm, one tendency is for them to fall back, under the protection of academic freedom, on an appetite-dulling routine of commercial courses which satisfy but the lowest of tastes.

Through radio, through television, through all sorts of publications we are flooded with the results of new and old discoveries in knowledge. Granting this ready access to knowledge, however, the truth is that we only know about things--we "know that" such and such is true. We have not yet attained the level where we can incorporate this knowledge into programs designed to resolve the many problems facing us--where we "know how" to put the knowledge to work. In brief, the knowledge we have progressively acquired to resolve our dilemmas cannot accomplish this role for which we originally began acquiring it. The reason, I believe, why knowledge has gotten out of control is due to the rapid tempo of its development and expansion, and for the same reason it is losing the capacity to help man control his life.

Whether or not we should assign the responsibility for the present inadequacies of our knowledge to the scientific method or to the scientific thinking we have been accustomed to using is an open question. But one thing at least can be stated plainly. That is, though admittedly the past development of scientific knowledge helped man retain control over

his life and his body, which, as a biological entity, had long ago lost its adaptability to the natural environment, if this same science is today functioning in such a way as to aggravate the crises now endangering man's life, then clearly there are some basic flaws in the configuration of modern science, whether within our scientific way of thinking or within our scientific theories, and it behooves us to confirm their presence and clarify their nature immediately.

The destruction now rampant in our external and internal natural worlds can hardly be but a partial or momentary inequilibrium resulting from ineptitude in handling just one political policy. There are a number of people, and that number is growing, who are by stages coming to the uneasy conclusion that what we have before us is a series of eschatological phenomena which western civilization must sooner or later encounter as long as the direction of development continues unchanged. While saying this, however, we should recognize that some other people have been able to respond in little more than an emotional outburst of reactionism which is reflected in the empty slogans they coin. Yet others, moreover, view the critical phenomena in existence today as but the evil offspring of capitalistic economy, and merely by dismantling the system of capitalism, they suggest the crises will pass away.

We cannot deny that western civilization has developed

as a socioeconomic system of capitalistic nature, and it is equally unchallenged that the present critical phenomena are nowhere more evident than around the large cities of advanced capitalistic nations. Still, the fact that similar phenomena have also made their appearance in many nations structured along other than capitalistic lines is a matter of common knowledge, and one may accordingly understand that the causes lie not so much with the system of capitalism as with the typically western structure of values it conceals, and with the uses that have been made of science on the basis of this value structure. What seems clear is that regardless of whether the socioeconomic system is capitalistic or communistic, as long as the values pursued are those of "material affluence" and "convenient and easy living," success in this pursuit must ultimately lead to the sort of phenomena present today. Whatever the national polity, then, the end result of using science and technology solely for the purpose of expanding production and building an affluent society must substantially be the same.

The core of the problem we face thus shifts to the system of values serving as a premise to modern western civilization; likewise, the solution to this problem will be found by asking what kind of new value system will make continued evolution of the human race possible, and note that I use the term "evolution" here and not "progress."

This new value system I refer to is not such as could be drawn up from a list of values that have been current at some time in the past. We must rather search for values which are not in conflict with the scientific means we use to eradicate the many impediments now endangering our civilization, and they should preferably be values which positively support our behavior in putting this corrective machinery into practice.

At this point, another type of person will be likely to ask, since we are obviously relying on science and technology to come up with such concrete corrective methods as will rescue the human race, why do we turn right around and also criticize science and technology, thus trying to lay all the blame for our problems at their door? Rather, they would continue, most vigorous promotion of further scientific and technological progress is what is currently needed. It appears to me, however, that such an assertion betrays some confusion of logic. That is, the present need is not specifically for the development of new scientific theories or technological know-how; what we need is the ability to effectively use what we know. Moreover, until such time as a scientific theory is effectively used in an application, no matter how excellent or superior that theory may be, it will have no practical impact on problem-solving.

The crux of the problem is hence putting theory into

practice, but if we consider a set of scientific theories which is applicable to some objective field, we can see that logically it is unlikely we shall be able to draw out, from among these theories, a theory which can comprehensively tell us how effective one or several of the other theories will be at resolving one, several, or a whole set of problems. A theory which is formulated as a means for applying and evaluating other theories is called a meta-theory, and the requirement for a meta-theory, in contrast to a theory, is that it be richer in respect to fundamental concepts and rules. The role played by the meta-theory for the theories it incorporates is, when making an application of human knowledge, that of a control, and for it to be successful as a control, in addition to the requirement that it be richer in respect to fundamental concepts and rules, it must, together with the theories, comprise one unified system. Thus, all parts of the system must obey certain rules in common.

The conventional theories of science and technology are lacking in respect to adequate meta-theories. In the past, the self-appointed leader in meta-theory development was the branch of philosophy which calls itself metaphysics and which, in name, transcends the physical and empirical sciences, meta being a Greek prefix with one meaning of "to transcend," "to go beyond." Yet metaphysica, in its development and in its functioning, is completely alien to the

scientific method, and for this reason philosophy, at least since the advent of the modern age with its modern science, has not been able to function effectively in providing the meta-theories for science's theories. Moreover, lacking adequate meta-theories, no amount of purely theoretical scientific and technological development can supply the answer to how theories should be applied, and consequently no solution can be found to the many grave problems besetting man's world.

One frequently hears the assertion that with respect to values, the position of science is neutral. Freedom in scientific inquiry, it is then stated, follows from the premise of freedom in respect to values, which in German is expressed as Wertfreiheit. But if such an evasion of the question of value is the fundamental posture of modern scientists, then we can only assume that these scientists deny to themselves the very apparent necessity for scientific meta-theories of science. Going beyond this, if we consider the true meaning of the phrase "unity of sciences" and recall the comment of Sir Karl Popper mentioned earlier, then we must conclude that these scientists are further denying the direction of evolution of the "growing tree of knowledge." Assuming instead that the direction of the unification of knowledge is recognized, then patently scientists cannot be permitted to be disinterested in questions of how scientific

theory is applied or in the questions of value which lie behind.

As you know, the theme of our first conference was the unity of sciences. Back in the 1920's, the logical positivists, in considering ideal science, had previously tackled the same theme, but what they attempted was a sort of absolutist approach treating unification as reduction to the methodology of the physical sciences. As a result, all things which resisted reduction to the level of the physical sciences, including those embodying values, were relegated to the sphere of phenomena with no intelligible meaning and discarded.

We today have no such need to approach unification by means of such autocratic reductionism. Our task is instead to give equal place to knowledge of actuality and knowledge of the pertinent value systems, and to clarify the interrelations where they are of natural consequence. As such, our work will follow more democratic lines. The question of just what configuration more fully unified scientific theories will take is one, I am sure, which we shall be able to answer more clearly and fully as our work moves forward, and in this respect, I think it is self-evident that the theme of the present conference was picked because it represents an intermediate step in this endeavor.

My thinking, as I am sure you will understand from what

I have said so far, is that we should pursue our studies into the unity of sciences in the form of an investigation into the unity of human knowledge, and that the unity of human knowledge must incorporate within it the unity of value consciousness and value systems. It goes without saying that this unity I am speaking of is one which must be attained henceforth, and which constitutes a necessary and important task for scientists and philosophers if we are to resolve the problems of our modern age. To accomplish this task, we must once and for all rid ourselves of antagonistic relations which derive from conflicting cultural traditions and ideologies, and pursue cooperative working relations from every possible angle. But I might add one qualification. In this conference our primary concern should not be how policies which are drafted to overcome the crises of our age can in practice, be made to operate effectively; rather, ours is the more fundamental task of seeking for new values.

I hasten to add that our objective should not be to arrive at a slapdash decision on a new value system, for such a decision could be no more than a temporary one, and inevitably some aspects of it would begin needing revision almost immediately. Instead, the kind of conclusion we need must be one which gradually takes shape after mature consideration of the many scientific theories that scientists and philosophers unavoidably encounter in various quarters



of their respective fields of research, and it also must be one which is tempered by the new outlook on values that is bound to come about as these scholars engage in self-criticism and begin to reach a better understanding of the harsh realities of today. There are innumerable questions that must be answered as well as problems that cannot be set aside, and it would not do to pass them by for the sake of an immediate conclusion. At the same time, I think we must also be cognizant of the limited time leeway that is left to us before the logical postulates for our task must be consolidated. For this reason, my own feelings as I greet the opening of this conference are simultaneously those of expectation and of unease.

In closing, let me repeat my belief that we have not assembled here to pursue exclusionary or separationist thoughts or to engage in self-assertion. Instead, I expect self-reflection to be the tenor of the interexchange, for we are here to undertake cooperative work in the name of understanding and unification. To all of you, then, who have come from every corner of the world to participate in the conference in this spirit, I would like to pay my warmest respects.