Art and Science

Victor F. Weisskopf

What could be more different than science and art? Science is considered a rational, objective, cool study of nature; art is often regarded as a subjective, irrational expression of feelings and emotions. But is that so? One can just as well consider scientific discoveries as the products of imagination, of sparks of sudden insight, whereas art could be viewed as the product of painstaking work, carefully adding one part to the other by rational thinking. Surely art and science have something in common: Both are ways to deal with experience and to lift our spirits from daily drudgery to universal values. But the roles of art and science in society certainly are very different. Science, unfortunately, is a closed book for most people outside the scientific community; its influence on society, however, is decisive in two ways. One is through science-based technologies that have fundamentally changed the social texture of society and our style of life. The other is by means of the philosophical implications of scientific insights, which, it is often asserted, support a materialistic, rationalistic view of the world around and within us. The role of art is not so easy to define, it does, or should, contribute to a deeper appreciation of our existence and should help us to endure and understand the human predicament. Unfortunately, much of contemporary art is also a closed book to many.

Let us start with the diversity of human experiences. There are outer and inner experiences, rational and irrational ones, social experiences
between two or many human beings, and experiences with the non-human part of nature. Our reactions to these experiences are manifold and varied. We think and ponder about them. We are oppressed or elated by them. We feel sadness and joy, love and hate. We are urged to act, to communicate them to others. We try to relate them to patterns of living. We make use of them to improve our lives and to avoid material and emotional hardships. We also use them to influence people by rational or emotional arguments and, unfortunately, also by the application of brutal force.

All these experiences and the way we deal with them are the raw material of human creativity. What are its manifestations? The creative spirit shapes it into various forms of most diverse character: myths, religions, philosophies, diverse arts and literatures, architecture, sciences, medicine and technology, and social structures. These manifestations are directed toward many aims, practical and spiritual. Their actual effects upon humankind are sometimes positive and constructive, sometimes negative and destructive, and often with little relation to what the creators intended.

**Space Is Blue**

Most forms of human creativity have one aspect in common: the attempt to give some sense to the various impressions, emotions, experiences, and actions that fill our lives, and thereby to give some meaning and value to our existence. Meaning and sense are words difficult to define but easy to grasp. We cannot live without meaning—oh, yes, we can, but a meaningless life would seem empty and cold. The crisis of our time in the Western world is that the search for meaning has become meaningless for many of us.

Different forms of human creativity often seem to be incommensurable, mutually exclusive, or even contradictory. I believe, however, that a better word is complementary, a term that has acquired a more focused
significance since its use by Niels Bohr. My main purpose here will be to point out the complementarity, in Bohr's sense, between the different avenues of human creativity—in particular between the arts and sciences. Even within physics itself, we deal with concepts and discourses that on the surface are contradictory and mutually exclusive but that on a deeper level are what Bohr aptly has called complementary. They represent different aspects of reality; one aspect excludes the other, yet each adds to our understanding of the phenomenon as a whole. The quantum state of an atom evanesces when it is observed by a sharp instrument designed to locate the electron. The state is restituted when the atom is left alone and given enough time to return to its original state. Both aspects—quantum state and location—are complementary to each other; they are necessary concepts to provide a full insight into atomic reality.

Similar complementarities appear in all fields of human cognition, as Bohr often pointed out. They have to do with the question of relevance. In the atom, the wave picture (quantum state) is relevant for certain aspects of its reality, the particle picture for others. There are different ways of perceiving a situation, ways that may seem unconnected or even contradictory but that are necessary for understanding the situation in its totality. A simple example may suffice for the moment. A waterfall may be an object of scientific study, in which case the velocity distribution and the size of the droplets and their electric charge are relevant; it may be something to be technologically exploited as a source of water power, in which case the quantity of water, its height and smoothness of flow are relevant; or it may be the object of a poem describing the beauty or the overwhelming force of the phenomenon; then very different properties become relevant. Consider that well-known conversation between Felix Bloch and Werner Heisenberg about the subject of space. Bloch was reporting to Heisenberg some new ideas about the relevance of certain mathematical structures in space when Heisenberg, his mind drifting into
other avenues of experience, exclaimed, "Space is blue and birds are flying in it!"

**The Holistic Approach**

We face a world of many dimensions and infinitudes, of which the world of the natural sciences is only a subdivision. The separation of the natural world outside ourselves from the internal world of the mind is an ever-recurring problem of philosophy and subject to questions and doubts.

Natural science, of course, is built upon some kind of separation of the external from the internal world; it regards the objects of its study as distinct and independent from the emotions and psychologic reactions that they may evoke in the observer. Emotions and the inner self are not excluded as objects of scientific investigation. But such studies are performed in a detached way, either by studying what is going on in the human brain by the methods of neurophysiology or by systematically analyzing human emotions and reactions with the methods of psychology.

Science is a relatively new creation of the human intellect. Before its appearance, the approach to human experience was essentially holistic. Myths, religions, and philosophies try to derive the totality of human experience, external and internal, from one leading principle and thus to provide it with a well-defined meaning. Everything is connected and represents the will of one or many gods; every event, every phenomenon is an expression of a deeper meaning strongly felt but only partially revealed when the course of events is interpreted. That deeper meaning need be neither logical nor unidirectional; it was often regarded as the result of warring forces, such as good and evil.

Art has always played an essential part in this holistic approach. It was, to a large extent, a servant of myth, religion, and philosophy and was a most suitable instrument to transmit holistic thoughts and emotions,
transforming them into concrete, visible, or audible entities. Think of Greek sculpture, Homer's poetry, the Gothic cathedrals, and Bach's Passions. There they stand, works of art, representing ideas and symbols immediately and directly, with all their spirit and power. They impose upon the beholder their meaning and their general validity, their grandeur, terror, or beauty—if the beholder is part of the human soil from which the myths or religions grew.

It is often said that another source of art exists: the immediate urge to embellish and decorate objects of special value and significance. There is not much difference between this and the intensification of symbols and ideas. The embellished objects are symbols that art renders significant; they acquire a meaning beyond their ordinary role through decoration and embellishment.

Whenever the mythologic and religious fervor begins to weaken, art tends to separate from these realms and acquire an independent role, replacing myth and religion to an increasing extent. It continues to create realizations of ideas and emotions that are important and significant in the culture of the time, although they may no longer be derived from a myth or a religion. Art serves as a powerful synthesizer of human experiences of the day, presenting to us messages of joy or sadness, greatness or meanness, beauty or terror, salvation or torture that cannot be transmitted in any other way. Two periods of separation between art and religion are well-known: one is that of Hellenistic-Roman art; the other is our own period, which started in the Renaissance and has resulted in an almost complete separation in modern times.

Art, just like myth and religion, is a holistic approach to human experience. Every true work of art transforms and molds a complex of many varied impressions, ideas, or emotions into a unique entity; it compresses a great variety of internal or external perceptions into a single creation. It expresses a whole truth—if this word may be applied here—and
not a partial one or an approximation of the truth. If it is a great work of art, it cannot be improved, changed, or redone in order to comply with new insights that were not taken into account in the first creation. It is an organic whole that says what it says in its own special way. At different epochs it may mean different things to the beholder or listener or reader; it will be interpreted in different ways: it may have more meaning at one period and less at another. It may mean different things to different groups of people, but it is valid and effective only in its original form. As R. M. Rilke said:

Der Dichter einzig hat die Welt geeinigt  
Die weit in jedem auseinander fällt.  
Das Schöne hat er unerhört bescheinigt  
Und da er selbst noch feiert was ihn peinigt  
Hat er unendlich den Ruin gereinigt  
Und auch noch das Vernichtende erweicht Welt.

Here is a translation by Douglas Worth:

Only the poet gathers what keeps falling  
Apart in each of us unformed and furled;  
In one hand beauty past belief enthralling  
The other full of darkness so appalling  
Yet sanctioned by his holy touch. Then balling  
The two together he remakes the world.

**The Scientific World View**

The holistic tradition, which stresses totality of human experience, suffered an important change with the birth of natural science. A new era began.
Instead of reaching for the whole truth, people began to ask limited questions in regard to the natural world. They did not ask questions such as "What is matter?" "What is life?" "What is the nature of the universe?" Instead, they asked, "How does the water flow in a tube?" "How does a stone fall to earth?" "What makes the blood flow through the veins?" General questions were shunned in favor of investigating separable phenomena, where it was easier to get direct and unambiguous results.

Then the great miracle happened: from the systematic study of many detailed phenomena, whose relevance was not obvious at all at the start, some fundamental insights into the basic structure of nature emerged. The renunciation of immediate contact with absolute truth, the detour through the diversity of experience, paid off. The restraint was rewarded as the answers to limited questions became more and more general. The study of moving bodies led to celestial mechanics and an understanding of the universality of the gravitational law. The study of friction and of gases led to the general laws of thermodynamics. The study of the twists of frog muscles and of voltaic cells led to the laws of electricity that were found to be the basis of the structure of matter. Some sensible answers emerged to those holistic questions that were shunned at the beginning. The nonholistic approach led to holistic results.

The holistic character of scientific insights differs greatly in character from that of myth, religion, and art. First, it does not directly include what we commonly refer to as the human soul, our feelings of awe or desolation, our ambitions, our convictions of right or wrong. It includes only the physiological and psychological phenomena accompanying these realities. The holistic character refers to the unity of natural phenomena outside our "souls." Second, and equally characteristic, scientific insights are always tentative, open to improvement and change; they have a restricted validity, appearing as incomplete perceptions of parts of a greater truth hidden in the plenitude of phenomena, a truth that is slowly but steadily revealed to us.
Every step toward more insight adds to the value of previous steps. Scientific creations do not stand, each by itself, as works of art; they cannot be regarded as separable entities. They are parts of a single edifice that is collectively assembled by scientists and whose significance and power are based upon the totality of contributions. In German this is referred to by the untranslatable term "Das 'Weltbild' der Natur-wissenschaften." Newton said, "I stand on the shoulders of giants." His work, like that of Einstein and other great scientists, comprises only a few stones of this edifice—albeit rather large ones at pivotal locations.

It must be said, however, that there is something like a collective edifice of achievement in the arts. There is tradition which develops from one period to the next; Mozart could not have written his music without Haydn and the development of baroque music since Bach and Handel; Schubert and Brahms would not have been without Beethoven. Michelangelo's art builds upon Greek art and that of the early Renaissance. We understand a work of art much better when it is considered with the cultural framework of its time. Art grows from a cultural soil fertilized by previous creations. in this sense the artist also "stands on the shoulders of giants."

**Art Versus Science**

The scientific culture differs from the artistic one in several respects. Here are a few important examples. There exists something that may be called scientific progress. We definitely know and understand more today than we did before. Einstein's theory of gravity is nearer to the "truth" than Newton's. If Newton were alive today he would freely, and probably enthusiastically, admit that Einstein's theory is an advance, compared with his own (a statement that is hard to prove; nevertheless it is convincing to every scientist). No such progress can be found in art. There is no reason why a Gothic sculpture should be considered better than a Romanesque
one, or why Raphael represents an advance compared to early medieval art, or Mahler compared to Mozart. True enough, there is a tendency to increased sophistication in art as time proceeds. The means of expression become more manifold, varied, and intricate. Of course, a similar tendency exists in the sciences. In the latter case, however, it is connected with a genuine increase of insight into, and understanding of, nature. The increased sophistication of art may have led to a wider scope of subject matter and a greater variety of creative forms but hardly to a more powerful force of artistic expression.

Another characteristic difference between art and science concerns the role and significance of the original creation: the distinction between content and the form in which it is expressed. It is much harder to separate these two elements in art than in science. The way the content is expressed plays an essential role in art; indeed, it is what makes the difference between art and mere description or photography. Any change in the way of expression would change and weaken the content of a work of art. You cannot paraphrase or explain it without greatly diminishing its impact. I remember my literature teacher in high school who asked us to repeat a poem by Goethe "in our own words." What a ridiculous request! The same is true about translations. Evidently they are necessary to provide access to literature that would otherwise remain inaccessible. But a translated poem or novel cannot exert the same impact as the original does on somebody who is well-versed in the language. Nevertheless, commentaries or analyses are useful to deepen the impact of the original work, but they cannot replace it. The weakness of describing the content of a work of art is especially obvious in music, which seems so inappropriate to talk about in words but, after all, the theologians also talk about God.

In science, the situation is very different. The original creation of the scientist, his first publications of the idea, are read and appreciated by the bulk of scientists only for a few years. Later, they are of interest only to
historians of science. The important part of the creation is its content, which in most cases is better brought to effect in later presentations, usually by other authors. In most instances, the original creator of a new insight was not fully aware of its significance and of its connection with other fields. It takes time to do so and it is done by scientists with different points of view. For example, any scientist who wants to become acquainted with and appreciate Einstein's work today would read books such as Steven Weinberg's *Gravitation and Cosmology*, instead of Einstein's original papers. Here, we face a major difference to the situation in the arts, where the original creation remains the most effective presentation of its content. It requires considerably higher standards from the artist. As Bertrand Russell said, "in art nothing worth doing can be done without a genius; in science even a moderate capacity can contribute to a supreme achievement." Perhaps we find a parallel with the situation in science when we consider dramatic arts and music, where the performance is an act of interpretation that may change the original significance of the work to the better or worse.

Another factor is the emotional impact of scientific and artistic creations. The work of art represents a personal entity which is transmitted to, and reexperienced by, other individuals as a personal experience. A scientific insight into the workings of nature is an impersonal entity, an abstraction from a multitude of specific direct or vicarious experiences and creative ideas of many individuals; it is understood by other individuals as an impersonal general intellectual entity. The work of art produces in the recipients very personal feelings of joy, sadness, spiritual elevation, or tragic dejection that are an essential part of the message. A scientific idea may also produce feelings and emotions, such as awe, joy of insight, satisfaction, and the like. But they are not an essential part of the message.

It is often said that the role of intuition is a common factor in art and science. Rarely is any advance made in science without an intuitive
perception of some idea or of some hidden relations. In art, of course, intuition is the essential driving force of creativity. However, scientific and artistic intuition are not always of the same character. True enough, the first spark of an idea or the first glimpse of some grand unification may come to the scientist in a similar unexplainable flash of insight as an artist's revelation. But, more often than not, scientific intuition comes from an unconscious or half-conscious awareness of existing knowledge or of connections between concepts that have not yet been consciously realized. But any intuitive scientific insight must be rationally validated afterward before it can be incorporated into the scientific edifice. In contrast, artistic intuition is the main instrument of creation and does not require any additional validation; it reigns superior and is the highest instance of judgment over and above the mold of style and fashion.

The Complementarity of Art and Science

Both art and science give us deeper insights into our environment. But this environment is not at all the same. For science (only natural sciences are considered here) it is the natural world in which we live, including our own body and brain. For art, it also contains the natural world, albeit in a different way (remember Heisenberg's space), but it mostly consists of the vast realm of personal ideas, feelings, emotions, reactions, moods, attitudes, and relations between human beings. One might object to this and assert that all these elements are also subject to a scientific approach as phenomena within our brain. This certainly is true, but just as science approaches external natural events in a thoroughly different way than art, so does it approach the internal landscape of what we may call our souls. This difference has very much in common with Niels Bohr's complementarity. There are several contradictory, mutually exclusive ap-
proaches to reality. The scientific approach to a phenomenon is complementary to the artistic approach. The artistic experience vanishes when the phenomena are scientifically explored, just as the quantum state is temporarily destroyed when the position of the particle is observed. We cannot at the same time experience the artistic content of a Beethoven sonata and also worry about the neurophysiological processes in our brains. But we can shift from one to the other.

Both aspects are necessary to get at the full reality of the phenomenon. We may admire the starry sky and the vastness of variety of star patterns, or we may contemplate the physical nature of the stars and star systems, their motions and their developments from the big bang to their present stage. We can be impressed by a clear sunset because of the beautiful blending of colors or because of some thoughts connected with this symbol of the end of a day in human life; however, we can also be impressed by the processes of refraction and scattering of light in the atmosphere by suspended particulate matter.

A similar complementarity characterizes science and religion or myth. Religious approaches to human experiences are contradictory to the scientific one only in a superficial way. The following anecdote may illustrate it. In a Jewish theological seminary, a discussion took place about the proofs of the existence of God. It lasted several hours. Finally, a rabbi got up and said: "God is so great, He doesn't even need to exist!" Existing is generally used as a scientific term; in this sense it obviously does not apply to religious concepts that have an "existence" in a complementary realm of human experience. Jean Hamburger expresses the complementary situation succinctly in his book, La Raison et la Passion. "We must accept the idea that man can acquire all kinds of truths. But let us not mix them up; we would risk that the mixture would dissolve them all."

The contrast between complementary approaches is not necessarily between rational thinking and emotional feeling; one can and does talk
rationally about emotional impressions and about art, myths, and religion. Yet it is a very different type of discourse—lucid and concise within its own intrinsic scale of values, but fragile and in-definite when judged by the peculiar requirements of scientific inter-course. One view complements the other, and we must use all of them in order to get a full experience of life. Scientists in particular may become aware of this need because their professional life is one-sided: "in the morning I go from mystery to reality; in the evening from reality to mystery." But mystery is another form of reality. No wonder so many scientists are actively or passively interested in music, the most irrational of the arts.

Here again one may look at the situation in complementary ways. True enough, music is "irrational" in the sense that there is no "ob-jective" way to prove what musical passage is right or wrong. But the structure of music is related to structure in science, especially in mathematics. I refer to symmetry, repetition of a passage in a different key, inversions of tunes, and many other topological features. No wonder scientists are attracted by the fugues of Bach.

The vast difference or complementarity of art and science ought to be so obvious that it should need no further comment. But there exists a subgroup of scientists who do not subscribe to this statement. Let us call them the "science chauvinists." They maintain that progress in neurophysiology and brain science will lead finally to an adequate scientific understanding of what is going on in our brain when we create or enjoy a work of art or when we are so spiritually elevated by art or religion that we sense a deeper meaning in it. Going one step further—now the subgroup becomes noticeably smaller—they maintain that we then may be able to create art or replace it scien-tifically by certain nerve stimulations, because we then would know its neurological function.

The notion of scientific insight into the essence of art is based on a number of fallacies. True, there is no imaginable limit to our un-
derstanding of brain action and of the identification of definite nerve processes with emotional, moral, or aesthetic thoughts or feelings. We may expect tremendous progress in this field of science within a few decades. But there are several reasons why there seems to be a definite limit to fundamental scientific understanding of such matters. One reason has to do with the fact that any scientific research is based upon reproducibility of results. Certain phenomena in our souls that are relevant to the arts are not reproducible. Every human being (except identical twins) not only has a different set of genes, but he or she has been subject to a different set of impressions. Some of these differences may be considered irrelevant in certain respects—for example, a medical doctor will treat a disease successfully by the same methods, whether the patient is an Einstein or a half-wit. But for the development of human cultures and traditions the differences become most relevant. Human culture is an amplifier for both the genetic differences and those acquired by experience. A nonrecurring unique combination of such differences makes the artist capable of creating a work of art. It also determines the unique way in which an individual experiences that work of art. How can such a process be scientifically analyzed when it occurs only once? Do we not face here a typical complementary situation between the structure of the nervous system on the one side and the creation and perception of art on the other? Indeed, does not the specific uniqueness of a work of art represent a fundamental obstacle to the application of scientific analysis to the creative and perceptive process?

The same problem also appears in the social sciences. Nonrecurring, unique events occur frequently in the minds of human beings; they have decisive influences on the social fabric of society because of the amplifier effect of human culture. This effect may turn out to be a serious impediment to reliable scientific predictions in the social sciences; it may also be a fundamental difficulty when animal socio-biology is applied to
human societies.

I must confess that I may run into the same error that Niels Bohr committed when, some time ago, he argued that the processes of life are complementary to physics and chemistry. He based his conclusion on the fact that a strict chemical analysis of life processes requires the death of the investigated creature. Therefore, he considered it possible that living matter may represent a different state of matter, complementary to the nonliving state, an analogy to the atomic quantum state that is destroyed by an attempt to look at its detailed structure. He was wrong—as the discovery of DNA and all that followed have clearly shown. I do not think that I commit a similar error, but if I do I am in good company. I believe there are fundamental obstacles to a full scientific understanding of the creative processes in art that cannot be bridged over, just as no new physical theory will ever get rid of wave-particle complementarity.

Sense, Meaning, and Hope

Art and science have this in common: they provide meaning and sense to human experience. But the sense of the meaning is thoroughly different. If has been observed that art transforms general experiences into a single and unique form, whereas science transforms detailed single experiences into a general form. Either of the two transformations results in a holistic product: the work of art and scientific insight. But there are vast differences between the two. We have already mentioned the tentative, unfinished character of our scientific perception of nature. It represents only part of a truth that is developed step by step, whereas a work of art is finished and transmits its full message at all times, although the message may not be always interpreted in the same way.

In what sense does the universe make sense? in the sense you sense a sense. Every true scientist feels a sense, consciously or unconsciously. If he
did not, he would not go ahead, with that fervor so common among scientists, in his search for something that he calls the truth. Surely a large dose of ambition is mixed into the fervor—acclaim, tenure, a Nobel Prize—but there is no denying that it exists. It is based upon a conviction that what the scientist does is worthwhile and will lead to an increase of insight, something that is great and valuable beyond any doubt, even if the fallibility of humankind makes the wrong use of it. Great insight leads to great power; great power always leads to great abuse.

The decay of a sense of meaning and the increase of cynicism in our culture have also contaminated natural scientists. These trends have shaken the conviction of some members of that community, but there is still a good deal of belief in the purpose and meaning of their collective work. I cannot help feeling that they represent a "happy breed of men" among so many others who grapple with the problems of meaning, sense, and purpose.

The emerging scientific Weltbild contains much to support the enthusiasm and fervor of its propagators. The great unifying principles that underlie the plentitude of events become clearer with every decade. An outline of a history of the universe from the big bang to the human brain is taking shape, and it becomes ever more convincing with the discoveries and insights that emerge from year to year. What is more startling and uncanny than the recent observation of the optical re-verberation of the origin of the universe in the form of a cold radiation that fills all space? What is more impressive than the steady growth of our insights into the structure of matter, from molecules and atoms to nuclei, electrons, nucleons, and quarks, and our growing understanding of nature's fundamental forces? What is more overwhelming than the recognition of the chemical basis of life, in which the stability of the molecular quantum state emerges as the true basis of the fact that the same flowers appear again every spring?

Do we find a similar fervor and sense of purpose among other groups?
Surely we do. We find it among those who are devoted to creative, artistic activities and among those who try to improve the social fabric of our times in many different ways. However, they face a much greater challenge. The problems of natural science are much less messy, much less interwoven with the complexity and fragility of the human mind. It is easier to perceive an underlying order in the flow of natural events if human behavior is excluded.

The decay of previously existing sources for meaning, sense, and purpose—such as myth and religion—has left a great void in our minds, a void that craves to be filled. Every human being craves meaning and sense to his existence. The answers to these cravings must, by necessity, be holistic. They must embrace the totality of human experience and endow it with luster and light. With the decay of myth and religion, all that was left was an autonomous art that has made itself independent of any prevalent religion, and a new, most vigorous intellectual development that is science. Can these two enterprises serve as providers of meaning and sense? Goethe said

He who has Art and Science also has religion
But those who do not have them better have religion.

Goethe's remark points out an important element common to both expressions of the human mind: their true significance is not easily accessible to a large part of humankind. Of course, there are many expressions of art, and some of science, that are indeed appreciated by large groups of people—such as folk art, popular science, and science fiction. Pop art, jazz, and rock music play an important role, arousing enthusiasm in large parts of the population. However, these manifestations are not the most effective providers of sense and meaning. The grandest creations and achievements of art and science serve as inspirational sources only to a small minority of humans; their values seem to be unsuitable for a
wider spread. The large majority cannot get meaning, sense, and purpose from these sources. They crave some sort of religion, as Goethe says. Perhaps the greatest problem of our day is that this craving is no longer fulfilled by the conventional religions and that there is nothing to replace them.

The kind of meaning that science provides to its perpetrators has not proved satisfactory for this craving, even though everybody is fully aware that we live in an age dominated by science and technology. On the contrary, to a large extent this awareness is tied to practical applications, among which the military ones and the destructive effects of technology on the environment play an important role. The scientific insights into the greatness and unity of the universe, in the large and in the small, have not penetrated much into the minds of the people. This is probably the fault of scientists who do not try hard enough to transmit the elation they feel at the peak moments of their work. They are too much immersed in their narrow specialties and do not seek to express sufficiently the deep connections their insights have provided. It also is partly the fault of the artists and writers of today who neglect this task. Is it not the duty of art to remold all that is great and awe-inspiring in our culture and to lend it a form that stirs the souls of people? Perhaps the great ideas of science are not suitable to inspire outsiders with any true elation.

What is it, then, that contemporary art expresses? It reflects a frantic search for some kind of meaning by trying to go in many hitherto untried directions. We observe an outburst of new ways and forms of expression. From time to time, indeed, something really great and beautiful is created but, more often than not, what we see are the results of wild experimentation for the sake of being different from what has been done before. Perhaps this frantic search is a symptom of a lack of sense and meaning. Perhaps it is a method to arrive at a meaning.

Many creations of contemporary art, especially literature, deal with the
tragedy and depth of our lack of purpose and meaning. In this effort our art is powerful, heart-rending, and deeply depressing. It acts as an amplifier of what is meant by the void in the mind; it follows the great tradition of art by elevating this to grand tragedy. Even cynicism has been ennobled by contemporary art. But in it we do not often enough find those ingredients that permeated art in past centuries—beauty and hope. This is perhaps the reason why the classical works of art have retained their power and significance. They seem today even more powerful and significant because they contain many of the ingredients missing in much of contemporary art.

Our material and spiritual world is in disorder and in danger of destruction. The great insights and elations of science, as well as of art, have not much impact on most of the people because these values cannot produce a ground swell of meaning capable of permeating the collective mind. Among the younger generation, however, there are many signs and portents of a craving for sense and purpose and for the dignity of the individual. This ground swell appears in various forms; some are constructive, some destructive. There are promising efforts to improve the social and spiritual climate; there are cults and semireligious sects. All too often some of these cults and sects have led to misconceived mysticism and to a concentration on the inner self, without the necessary relationship to society. There may come a day when scientific and artistic meaning will combine and help to bring forth that ground swell of meaning and value for which there is so great a need. The growing awareness of this need is in itself an important element that brings people together and creates common values and even elations. There is always hope—for hope.