The Creative Act

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"...Let's keep starring man
In the royal role,
It will not be his
Ever to create
One least germ or coal.
Those two things we can't.
But the comfort is
In the covenant
We may get control
If not of the whole
Of at least some part
Where not too immense,
So by craft or art
We can give the part
Wholeness in a sense."
(Robert Frost: "The Holiness of Wholeness," Kitty Hawk)

The Essence of Science

Science is very often looked upon by the layman as that branch of human behavior which encompasses all things theoretical, mathematical, and difficult. It includes all the subjects never understood during childhood and never examined since. Even those who elected to study "science" further, perhaps sufficiently to make it their hobby or career, frequently fail to see its essence. When any interest lacks a vital principle, its pursuit becomes meaningless, or at best random and mechanical. Indeed, this is doubtless the reason why curiosity about many of those "sciences" dies so quickly.

Webster defines science as "possession of knowledge as distinguished from ignorance or misunderstanding," and knowledge attained through study or practice." Not until midway
through his third definition is any mention made of the study of the physical world, more properly termed "natural science." This should give us some indication of the direction in which we ought to go to find "science."

Knowledge is defined as "the fact or condition of knowing something with familiarity gained through experience or association." We thus have defined science and knowledge in terms of each other. Is it possible that the possession of knowledge so described is more than assimilation, that it is a reenactment? There are two types of knowledge which can be attained: new knowledge, or discovery, and old (previously known to someone) knowledge, or rediscovery. Of course, the latter is indeed a discovery, though not the original, to anyone but the first discoverer.

Let us pause to consider the last statement, for it is a cornerstone in the coming thought. That condition of knowing something with familiarity is completely novel to each individual to which it happens. It is even more than mere discovery. The rendition of fact and observation into knowledge, however simple or complex an attainment, is a miniature reproduction of the creation of the first rendition and all since. All who ever grasped the thought before are resurrected briefly in that twinkling. No less than a miracle occurs within the capacity of the human mind as it creates for itself time and time again new perspectives in the form of new knowledge.
Science is the creation of concepts and reexamination of the world in their light. Granting the establishment now that science is knowledge—as described above—the idea is not startling, but profound. Science is creation, only the first act of which is original. Beyond that, science creates universally and perpetually, as each rediscovery is a recreation identical to the first. More wondrous, and certainly essential to the immortality of knowledge, is the reinterpretation supplied by each of us who reenacts. This provides foothold for further creation and argument for the past.

The creation referred to is that act which lies in the detection of the hidden likeness, a term which Bronowski made popular. A scientist takes unassociated facts or observations and creates in them a likeness, a unity. Although the relationship later may be proven erroneous, its creation still exists. The importance of the thought process cannot be overestimated. Its method is used over and over to establish an impression, or to extract sense from nonsense, order from disorder.

Creativity is the earmark of every branch of science. Without it, there is no scientific thought. With is, there is law and theory and application. There is answer: answer to the questions What is light? How big is the universe? Where did I come from?
How can man look around him, observe intricate beauty and detail juxtaposed against the terrifying and awesome, and fail to ask from whence it came? As man formed and fashioned his reply, he created the life and physical sciences. Mathematics serves to allow him to conceive, estimate, and predict. Physics examines the gears and cogs of the physical world, biology those of the living world, and chemistry those which hold these two together. Then, as numerous as the major lines of thought in these areas, there are subcategories of astrology, Euclidean geometry, quantum mechanics, limnology, histology, spectral analysis, and a raft of others. Far reaches of investigation and speculation have become interwoven with the sciences to form developments such as statistical psychology, genetics in anthropology, and art media chemistry. Indeed, "each particular field of science has its inner logic of growth" (Dubos).

If science had no more to offer than an enumeration of laws, surely few would find it so gratifying as to incorporate it into so many other areas. Even the most rigid, abstract science is founded upon some single act of creativity where an association was made. It is the personal discovery of this act, the reenactment for the first time within the self, that makes science so beautiful and so comprehensible. When the essence of a thing is known, its worth is known, and that
surrounding it is easily apportioned into that which enhances it or destroys it.

Superficially, it appears that logic alone underlies the explanatory principles of science. Perhaps this is reason enough for some of the skepticism and criticism given it: strangely, people seem to despise logic. The source, however, and prerequisite, is the imagination responsible for the discovery. Not only is this imagination the very heart of science, but it provides the master-key to the lock of why science has remained so successful and interesting since its beginning.

Creativity is the product of all the cultural, philosophical, and historical beliefs of a society. Its direction and scope are governed by the attitudes of all, since science is not a singular outgrowth of an isolated person or persons.

And of the Humanities

Emphasis has been placed on the creative activity as displayed by science, but creativity is a quality characteristic of the humanities as well. In fact, one of its branches with which it is most closely identified, i.e. the arts or art, is defined as "human creativity." The humanities encompass a broad area of more culturally-derived forms of human learning and expression. Each form is accepted, generally speaking, as being a direct manifestation of creativity. This is astounding to believably few: the arts and humanities are thought to be
the very embodiment of human creativity. They are not, as is too frequently portrayed, man's colorful release of inner desires and remote fantasies. They are a statement of creativity identical to that of science. They concern an identification of a likeness between two entities, represented in one of countless many art forms. The scientist chooses to present his discovery under the guise of a branch of science, so likewise does the artist present his with the aid of a certain medium. Each selects according to his previous knowledge of and talent in the area. More often than we wish to realize, however, the statement offered is a universal one. It may be applicable to a horizon beyond its frontal appearance. Its thought process may be priceless. And just as we rediscover in science, so do we in the humanities. Who has not experienced anguish or joy while attending some favorite concert or reading some novel? This is the first creation relived, as powerful as the artist felt and intended it.

Other similarities may be found between science and humanities. Many are obvious and have been extrapolated on before. On the other hand, the perhaps most fundamental are more subtle. One is the use of symbolic concepts. Thought, not to mention interpretation and communication, is dependent on the effective use of symbolism. Both art and science capitalize on this; it is necessary to express as much as possible while conserving
time and materials. Truth is also no different in the sciences than in the arts. Truth provides the basis for the facts upon which science is built. Truth is the root of the human heart and emotion: it fixes the limits of the emotional facts which can be imparted through the humanities. The only difference here is that emotional facts are more difficult to convey accurately. The list of parallelisms continues.

A point being made in these observations, among others, is that science and humanities are very much one and the same. They are divisible only by the same criteria that justify the subdivisions in each of them, whatever those criteria may be. We have seen that the essence of both is in their being creative acts whereby knowledge is assimilated and dispersed. Why, then, is there such a trend to isolate the two? Is it a congenital trait of some sort, or a result of social influence?

The Imposed Dichotomy

First let it be said that "things were not always the way they are today." At one time, scholars and scientists met frequently to mutually communicate their ideas on various subjects. Children were schooled that the subjects were compatible and, verily, interrelated. The concepts and attitudes of science at the time were also part of general public awareness. Despite the several valuable functions of science in civilization and
and the benefits reaped from interaction with the humanities, the cleft is present and seems to widen. The romance, power, and continuity of the universe as viewed by the old masters and "literary" greats was not a product of any particularly rare genius. It was the inevitable outcome of a nearly complete mesh of contemporary scientific idea with humanitarian aesthetic perspective.

The object here is not to delineate the process by which these two expressions of mankind have been divorced, nor to divulge the party responsible, providing one is. Some say the estrangement is a result of rampant specialization on both "sides." Some say it is mismanagement on the part of educators, or parents, or the media. Most do not perceive the problem, or care.

Andre' Malraux said, "No man can build on the void..." The great majority of peoples have chosen to educate themselves precisely on that premise. But where we have in so many cases realized the importance and advantage of studying the humanities, we have failed to acknowledge the same in science. Conversely, some of us who do pursue science refuse to even consider the worth of the arts. In view of our proof now that their essence is coincident, it is foolish to allow the two to be separate and ridiculous to deny either attention. This is not to say that man should not devote most of his time and effort toward
betterment in his own area; but that, in addition, he should acknowledge and be open to all modes of creation available.

Control of the Part

Emphasis has been given not to the divisibility of science and the humanities, a topic in which C. P. Snow delights, but on their similarity by virtue of their essential nature. It has been stressed that science, or more concisely, certain fields of science, have been glossed over as being incomprehensible, technical, boring, or pointless. The humanities, for the most part, have not shared as merciless a fate.

To repair so grievous an omission as negligence of either or both the above should be the duty of all those guilty. It has been shown most difficult to experience all the creativity that has taken place since the beginning of man first-hand. Therefore, the most practical approach is that of the vicarious experience obtained through a sensible education. The manner in which this should be secured is at the discretion of the learner, whether by formal means or personal investigation. Each is education, the acquisition of knowledge. As Robert Welch summarizes, in education we seek "not facts, but the ability to find facts when wanted; not the accumulation of particulars, but an awareness of the general to which these particulars belong; not the little knowledge we may have acquired, but the extent of our recognition of the expanses we have only glimpsed."
While the importance of education is not to be slighted, it is noteworthy that the scientific sense is one that is innate. Man seems inherently curious about himself and his environment. He is more than willing to postulate and to express his opinion. The science (and the humanities) he creates is not a dry and bitter fruit, but a succulent one, providing the ground from which it grew was a fertile, procreative one. It is imperative that the learning process be provisional of intellectual insights as well as facts and theories.

Only by means of the knowledge which we accumulate can we experience the sensation of original discovery and fathom the creation which has thrilled man since time incipient. Science is surely the most direct grasp we have on an otherwise foreboding universe. It is by man's individual capacity for association, and consequent communication through his science and humanities, that he gains some control of that which he sees about him. Man will never create from nonexistence, but he will always have some share in an omnipresent creativity by his efforts to "give...wholeness in a sense" to his perceptions.
References


