



Science As Aesthetic Experience

Polykarp Kusch

Dr. Kusch, distinguished physicist at Columbia, and Nobel Prize winner, delivered the Louise Draddy Memorial Lecture in the Bronx last spring. We publish excerpts below.

. . . To my mind the most important statement of science, the really fundamental statement, is that the world is ordered. It is certainly a basic part of the credo of the modern scientist that nature behaves in an orderly way and that it is possible to find the laws of order, that is, that it is possible to learn enough about the order to make the behaviour of the natural world predictable . . .

A knowledge of the order in the world has given a wholly new picture of man, of his world and of man's relationship to his world. . . .

I would like to make a point of my belief that the ability to establish new modes of thought and to produce new interpretations of human experience is a source of the power of science quite as clearly as the ability to modify the physical circumstances of the life of man . . .

For most scientists the things that compel to a continuing study of nature are the intensely personal satisfaction of the acquisition of knowledge, the delight of understanding and an unfolding perception of the beauty of nature. . . .

Kepler notes that the hidden storehouse of knowledge is so full that the human mind need never lack for nourishment. Of all the things that Kepler said, none is probably more true. Newton, born seventy years after Kepler, took the data and insights of those before him, especially those of Kepler, and brought them together into a single conceptual structure which, for incisiveness and inclusiveness is matched hardly anywhere in the formulations of science. Newton too recognized the limitless unexplored domain of science

and said, shortly before his death: "I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me." The Newtonian system of mechanics remained essentially unchallenged until the rise of the relativistic view of the universe at the beginning of this century. The remarkable thing about that view is that it did no violence to the Newtonian system . . .

The history of civilized man contains an impressive record of the life of the intellect, of the imagination, of human insight and perception. The quality in other ages that now strikes the most responsive note in us is that which gives evidence of the soaring of the human spirit to great heights. I personally look upon my membership in the human race with the greatest delight when I consider the monuments to imagination and intelligence built by my ancestors, the things of beauty that have been created . . .

There is also a tremendous pleasure and satisfaction in achieving or even of understanding a synthesis of apparently unrelated scientific knowledge. The inclusion of a large body of data or fact within a single statement or set of statements is an enormous triumph. If the statement has conciseness, symmetry, inclusiveness and simplicity, the formulation of the statement is an aesthetic triumph. The theory of universal gravitation formulated by Newton is an example of a synthesis of knowledge, whose extraordinary power is one of the great monuments to the human mind. Suddenly the motions of the heavenly bodies became simple and easy to comprehend . . .

The mechanism of synthesis is a mystery. It demands insight and imagination. It demands a sense of order and of beauty and symmetry. While the validity and scope of a synthesis is determined wholly by objective and rational appraisal and criteria, the origin of a synthesis need not be an exclusively rational process. It may occur through intuition, instinct, aesthetic judgment or any number of other extra-logical mechanisms. In this sense, the creativeness of science has its roots in the same part of the human mind as does any other creative effort; and it is as rewarding as creation in any other field of human activity . . .

Any observation made by man must be made through the mechanism of his senses which respond only to large-scale, macroscopic impulses or signals.

Man is totally unable to perceive or to have immediate experience of any aspect of the microscopic world, the world of molecules, atoms, electrons and nuclei, by the direct use of his senses. The problem of the scientist is to devise experimental procedures that will help in illuminating the nature of structures and processes not within the range of direct observation . . .

The act of creating an elegant experiment is an important part of the artistic quality of science. An experiment that is simple, achieves a result in a direct way, has subtlety of approach instead of a more massive frontal approach, describes imagination, has a range of usefulness in acquiring new knowledge, such an experiment is the envy of all scientists. It is the

envy precisely because it is a thing of beauty . . .

I would like to leave with you some ideas about the nature of science. It is indeed a source of power in the modern world, power over nature, power over man, power over the society of men, power, very importantly, over the minds of men. In the sense, however, in which science is an expression of the search for beauty, in the sense in which it is an aesthetic experience, it has served to give the lives of men a new dimension, a new perception of the world in which he lives. Science has thus immeasurably contributed to the growth and nurturing of the human spirit which is the most precious and perhaps the most durable of all the things that man has cultivated during his tenure on earth.



Louise Draddy '07

President of the Alumni Association, 1946-52

Whenever a Louise Draddy Memorial Lecture* is given at the College, those of us in the audience who knew her find ourselves hoping that she will not become in time merely a name to the students, staff, and guests who benefit from this tribute to her memory.

Hers was a life spent intelligently in the service of others. To the College she gave of her seemingly inexhaustible energies as President of the Alumni Association, as President of Neighbors and Friends of Roosevelt House, and as a member of the Student Scholarship Committee.

Her work in Civil Defense, her service on the New York County Grand Jury Panel and on the Boards of Directors of the National Council of Social Planning and of the State Federation of Women's Clubs established her reputation as an outstanding citizen. She was a vice-president of Girls' Town, Archdiocesan Chairman of Catholic Girl Scouts, and President for fifteen years of the Frances Schervier Home. For over

twenty years she headed the Ladies' Auxiliary of St. Elizabeth's and of Seton Hospital.

If this record—which won her many honors, including the *Pro Ecclesia et Pontifice* Medal from His Holiness, Pius XII, and an honorary degree of Doctor of Humane Letters from Fordham University—were presented in all its fulness to those who never knew her in person, those of us who remember her vividly (seven years, now, after her death) would hasten to add that it is only the factual side of the picture. Her work was the outward sign of the inner grace that was Louise Draddy. Handsome, witty, generous, astute—it was not only what she did but the manner in which she did it that made her memorable. Duty for her was never the Stern Daughter of the Voice of God; it always had something of laughter in it. Sentimentality could never survive the barbs of her wit, and pretensions vanished in the presence of her cool, intelligent appraisal. She had a fine mind and a compassionate heart, and the physical energy to do the job she found at hand. The wellspring of Louise Draddy's life was her commitment to her own faith. But that commitment was always accompanied by a profound respect for other ways.

Louise was born in Liberty, New York, came to the City, and graduated from Old Normal. She taught briefly in the elementary schools and then married Robert Draddy, a fellow-teacher. In her children and in her work for the College and her public services and many charities she found the expression of her many-faceted nature.

“With the fruit of her hand, she planted a vineyard.”

Margaret Grennan Lehmann '34, Chairman
Louise Draddy Memorial Lectures

* *The Louise Draddy Memorial Lectures in the College were established by a number of her friends after her death.*