The life and work of Dr. Robert J. Moon (1911-1989)

by Charles B. Stevens

This memorial to scientist Robert J. Moon was presented at the 15th anniversary celebration of the Fusion Energy Foundation. Dr. Moon was a founding member of the FEF and the editor of its technical publication, the International Journal of Fusion Energy. *Charles B. Stevens, a founding member of the Fusion Energy Foundation and* Fusion *magazine's fusion technology editor, is now collecting Dr. Moon's work and reminiscences about Dr. Moon.*

Today we are in the midst of the history's greatest scientific-technological revolution, which is epitomized by the process currently identified as "cold fusion." And as we will hopefully be able to organize the political and social circumstances to reap the benefits for all of humanity of this boundless treasure-trove of energy and resources, the question will be asked: "How did this process come to be realized?" And while I would not in any way detract from the essential ongoing work of Martin Fleischmann and Stanley Pons, whose excellent and longstanding research brought cold fusion to the attention of the world on March 23, 1989—exactly six years from the date that President Ronald Reagan announced the Strategic Defense Initiative (SDI)—I think we can safely predict that the answer will only truly be found through examining the work and intense collaboration of Lyndon H. LaRouche—who, currently, unjustly, languishes in prison, partly as a result of a fraudulent bankruptcy prosecution whose overturning we celebrate today—and Dr. Robert J. Moon, whose untimely death we are here to mark today.

It could certainly be argued that Dr. Moon had proven by his works that he was one of the leading physical scientists of this century long before he came to know Lyndon H. LaRouche. But I think that posterity will find that the joint collaboration of Bob Moon with Lyndon LaRouche, dating from 1974, has generated the context for the most profound scientific advances in human history. And while each individually and jointly have made the most startling series of personal discoveries—I need only mention Dr. Moon's Keplerian Platonic solid model for the nucleus, the developing notion of quantized absolute space-time, and the revival of Beltrami's concept of the negative curvature of space-time—their greatest effect will, I think, be found in terms of the impact on the minds and hearts of others. For I believe the heart of their collaboration was located not in simple personal discovery and achievement—either individually or jointly—but solidly centered on the great work of lifting up the minds and souls of their fellow beings.

Dr. Moon's family history can readily be traced back to the first English Civil War, Oliver Cromwell and so on, and the founding of the American colonies. As H. Graham Lowry has so aptly documented in his historical work *How the Nation Was Won,* this great republic of the United States was founded and brought to maturity through the leadership of devoted Christian scientist-politicians such as John Winthrop and Benjamin Franklin. Bob Moon was consciously raised in this great tradition and, in fact, devoted a large portion of his last years to detailed research into the history of the connection between science and morality leading into the foundation of the American republic.

Dr. Moon demonstrated his great scientific and technical aptitudes at a most early age. At five years old, he discovered, while fixing the battery of his father's new car, that he had an aptitude for car repair, and by the age of eight, he had established a fairly busy car repair shop in the family garage in Springfield, Missouri. (His father and brothers were not so technically inclined, as they were all lawyers.) And one day, about this time, while attempting to fix a relative's direct-current doorbell, he inadvertently rediscovered electromagnetic induction. This quickly led him to researches into electrodynamics, which he continued throughout his life.

By the age of 19 he had completed his undergraduate studies in Springfield, Missouri. Bob had basically totally consumed the local library and had been permitted to carry out independent experimental studies in physical science. Through his personal readings he discovered the historic work of Karl F. Gauss and the ongoing research of Prof. William Draper Harkins of the University of Chicago's Physical Chemistry Department.

In 1930, Bob traveled to Chicago and presented himself to the university. He first went to the Physics Department, but he was informed there that the field that he had planned to specialize in, nuclear physics, was no longer of interest and it was considered a "closed book." Proceeding to the Physical Chemistry Department, Bob found that Professor Harkins held a slightly different view of the prospective field.

In fact, Harkins directed Bob to look into serious problems that Harkins, himself, had detected with respect to the notion of the Coulomb barrier as first developed by Rutherford in his famous alpha-scattering experiments. And it is work along these lines which even today offers great prospects with respect to cold nuclear fusion.

Initially Bob was going to build a series of experiments which would have possibly provided the key to harnessing cold fusion at this early date. In particular Bob was going to build a combination of particle accelerators and Kapitsa-type machines for the generation of intense magnetic fields. In this way he hoped to have the means for exploring the electrodynamics for condensing electrons onto protons to form neutrons. (We now know that such kinds of processes are most likely involved in cold fusion.)

At the same time, theoretical researches led Bob to question both the Newtonian and Einsteinian approaches to physical science, as I will develop in more detail. Instead, Bob returned to the work of Ampère, Gauss, and Riemann to find a viable alternative. The problem being that if local forces could not explain the stability and dynamics of the electron and proton, then one would be forced to find a universal alternative, like that being explored by de Broglie of France. In carrying out his researches into these questions, Bob discovered the work of Henri Bergson and first began to explore the deeper questions of absolute space-time. He wrote an informal paper on this at this time. But due to the exigencies of the historical period, Bob's work was diverted at this early stage into what became known as the Manhattan Project of World War II.

Work on the Manhattan Project

Bob completed his Ph.D. on the subsidiary field of electron diffraction and proceeded at once to design and build the Chicago cyclotron. This machine became the workhorse of the early stages of the Manhattan District Project. The Manhattan Project actually began with the discovery of the isotope uranium-235. Bob helped to design and build the device which was first to detect uranium-235. He had the first experimental detection plate in his basement.

In 1985, during the visit of Professor Erich Bagge of Germany, I first learned that Bob had played a crucial role in realizing the first nuclear pile at Chicago. The essential point of failure of the German Manhattan Project of World War II, in which Professor Bagge played a leading role, was the failure to realize a working nuclear pile. This followed from the failure to realize how solid carbon bricks—graphite—could be utilized as they were in the Chicago pile. Bob utilized his cyclotron to activate the impurities in various graphite bricks taken from various locations in the oven used to generate graphite. He found that bricks taken from the center of the oven had fewer impurities than those from the outer region. This provided the essential means for seeing how to generate sufficiently pure graphite for constructing a nuclear pile.

Bob also helped design and build the Hanford plutonium production reactors.

It should be noted that Bob's possibly greatest accomplishment was that of succeeding in avoiding almost any recognition for his work on the Manhattan Project. If you peruse the histories of the project you will not find even a single mention of his name. Yet, his role is very simple to demonstrate: His name is all over the essential patents. Bob was generally opposed to being awarded patents on the basis of principle. But in the Manhattan Project he had no choice. Because the work was secret, it was decided as a matter of policy that scientific precedence would be maintained by involuntarily awarding scientists secret patents. Because of this, it is quite easy to document Bob's role.

Despite the importance of Bob's work in the Manhattan Project, he was recruited midway into the war by the radar

The International Journal of Fusion Energy

Editor's note

In 1984, the tenth anniversary of FEF, the editors of the International Journal of Fusion Energy *decided to expand the functioning of their technical journal, as they stated in their editorial, choosing the 19th-century* Crelle's Journal *as their "historial model of reference. . . . That journal contributed a noble and leading part in the fostering of the advancement of science in 19th-century Germany, and, consequently, in the world at large. With a clear general objective in view, but providing a free-wheeling forum for papers and correspondence focused upon the issues, we hope to contribute to acceleration of progress . . . as* Crelle's *contributed centrally to the accomplishments envisioned and steered by Alexander von Humboldt and his collaborators."*

We excerpt Dr. Moon's "Editor's Note" from IJFE, *Vol. 3, No. 1, January 1985, marking the foundation's second decade.*

program. That is how it came about that Bob Moon developed the curriculum for the famous MIT Radiation Lab's course on electromagnets and radar.

But Bob's role was not merely limited to technical questions. During the war, he organized with Dr. Franck the Concerned Scientists. This group opposed the unnecessary dropping of the atomic bombs on Hiroshima and Nagasaki. Later this group became the Federation of Atomic Scientists, and Bob and his wife Christine were the first editors of its newsletter, *The Bulletin of the Atomic Scientists*.

Following the war, Bob helped found the field of radiation biology and traveled to Canada where he helped initiate the Canadian nuclear program. He interrupted President Truman, while Truman was in Missouri accompanying Winston Churchill during his famous "Iron Curtain" speech, and succeeded in getting the President to return to Washington in time to get the civilian Atomic Energy Act of 1947 through Congress.

Bob later worked with Howard Hughes on the supersecret project to develop the Spruce Goose as the first nuclear-powered aircraft. During the 1950s, he perfected his work on electron diffraction to the point of seeing the first development of the computer-assisted tomography, or CAT scan.

In the late 1950s, Christine Moon came down with Parkinson's disease. At once Bob retired from the university and proceeded to personally take care of his loving wife. He also began researches into both the fundamental questions of neurology and into possible treatments for Parkinson's. Actually, as my sister Sally can tell you, Dr. Moon had long had an active interest in neurology. He apparently helped in the developing knowledge about neural transmitters and he had long been interested in nerve action potential experiments.

In any case, because of these personal developments, Dr. Moon had to drop plans to proceed with an experimental program which he developed in outline in the early 1950s for realizing cold fusion. It was this proposed project about which we first talked when I first met him in 1974. It was my meeting Dr. Moon in June 1974 that convinced me that it would be possible to build such an organization as the Fusion Energy Foundation, which we did begin the following fall.

Although Dr. Moon interacted from time to time with Lyndon LaRouche over the next 10 years, it was from 1984 on that they began a most intensive collaboration centered around the FEF seminar series and the publication of the *International Journal of Fusion Energy*. This collaboration, under the auspices of the FEF, was forcefully ended in April 1987 when the U.S. government illegally shut down the FEF and the *International Journal of Fusion Energy*.

The worldwide scientific community advances as its members share ideas with one another and new ideas are born that dictate new theoretical and experimental work to be done. It is well to listen to all ideas, for the seed of a most fruitful concept may arise from a seemingly insignificant member of the scientific community. The value of a scientist as he or she strives toward a better understanding of the physical and biological universe as created is determined solely through his or her ability to think, observe, interpret, and integrate concepts and ideas and formulate new theories and perform new experiments. Value is not determined by rank, salary, possessions, sex, race, religion, or place or birth, or pride. A good scientist wishes to serve mankind, stimulate creativity, help make life more abundant and full of joy, lift the physical burden and aid in the creation of a better understanding of the physical and biological worlds.

As new discoveries are made that create profound changes and outlook among the peoples of the world, it becomes all too clear that the scientists must engage in an intellectual, spiritual, and moral revolution. In order to accomplish this, scientists may work in their own nation-state or in other nation-states and the fruits of their investigations may be communicated by means of scientific publications or personally in order to share ideas and work together on theory and experiment for the purpose of achieving a greater and more accurate scientific knowledge of the biological and physical worlds.

On the biological side, science has brought about such things as the proper control of many diseases, increased longevity, the correction of some physiological malfunctions, improved nutrition, more accurate and rapid diagnosis and treatment of many diseases, the eradication of nearly all incipient epidemics, and many life-sustaining methods and devices, to name a few. On the physical side, science has led to the development of the new, abundant nuclear energy sources such as fission and fusion; of rapid transporation, communications, and computations; and of the transmission to the Earth of radio signals from a 6-watt nuclear-powered transmitter on a satellite 7 billion miles from the Earth (approximately 75 times the distance of the Earth from the Sun), just to name a few examples.

Such applications of science give man unprecedented power over nature and space. This gift will be a great joy to mankind if society is intellectually, spiritually, and morally deserving of it—otherwise, mankind will have set the stage for the creation of a hell here on Earth and in space. So how much of a hell will come to be before man changes—each and everyone—and makes such plans as are acceptable to God? . . .