LOUIS NICOT RIDENOUR, JR.

1911 – 1959

By F. W. Loomis

ON the morning of May 21, 1959, Louis Ridenour was found dead of a cerebral hemorrhage in his hotel room in Washington, D. C. As so often in the past, he had come to Washington as a Scientific Adviser for the Air Force. He had made notes for a talk he was to give that day at a conference in the Pentagon.

Louis Ridenour was an extraordinarily brilliant and unusual man and the abrupt termination of his career at the age of 47 was a great shock to his friends. Many have written in to describe this or that part of his work or some facet of his character, but it almost seems that his career was so varied and his character so complex that no one has been quite able to see him whole.

Perhaps what most distinguished him was the breadth of his interests and the variety of his abilities. He was a nuclear physicist, a teacher, a radar engineer, a military expert, a dean, an author, an editor, and an industrial engineer and administrator. And in most of these occupations he did one or more outstanding jobs and left lasting accomplishments behind him. The total, as one pauses now to cast it up, is more impressive than probably any one person had realized.

He was a big handsome man with a great deal of personal charm, which in combination with high intelligence, imagination, and optimism made him a natural leader of men. He was the best of company, never dull, with a ready wit which was often caustic, a sensual appreciation of good food and drink and good company, a rather worldly (for a physicist) set of values with a perhaps excessive interest in rank and wealth and the symbols thereof.

Many have said of him that he had a low tolerance for fools; and indeed this tolerance was unrealistically low for a world constituted as it is, and as he made little effort to conceal it he undoubtedly acquired a collection of enemies that anyone could be proud of. But he also had a devoted group of friends and disciples.

He was born on November 1, 1911, in Montclair, New Jersey. He took his BS in physics at the University of Chicago in 1932 and his PhD under C. C. Lauritsen at the California Institute of Technology in 1936. In his senior year at Chicago he was editor of the student newspaper, an experience which undoubtedly contributed to his facility as a writer.

He was appointed to the Institute for Advanced Study at Princeton in 1935 to serve as an assistant to Fermi in an experimental project to be carried out at the University. But Fermi never came and Ridenour remained until 1938 as an instructor in the Department of Physics at the University.

In the fall of 1938 he joined the Department of Physics at the University of Pennsylvania which Harnwell had just taken over. He felt that nuclear physics at that time was badly in need of precise measurements and undertook the construction of an electrostatic accelerator with close high-voltage control. He soon had a good young group working on it with him, but he left for the Radiation Laboratory in January 1941, a few months before it was completed. At first he returned about once a month but soon became too deeply involved in radar for that. Finally the electrostatic generator was destroyed by a fire.

HE joined the Radiation Laboratory at the Massachusetts Institute of Technology in January 1941, two months after its inception, at a time when it consisted of about 50 physicists on leave from their universities for a few months to see whether microwave radar could really be made to work. This transition turned out to be the turning point in his scientific career. Though he made several efforts after the war, at Princeton, Pennsylvania, and Illinois, to reconvert to the academic life, he was never able to withhold himself for long from the urgency and excitement of military research and development.

He soon found himself in charge of an enthusiastic team of young men (they called themselves Ridenour's Rangers) who were developing the gun-laying radar that later became the SCR 584.

At that time there were at least five separate programs underway, in the United Kingdom, in Canada, and in the United States, all with the same objective—to devise a radar which would continuously determine the azimuth, elevation, and range of an aircraft, so that searchlights and antiaircraft guns could be brought to bear.

This was the period just after the British demonstration of the high-power microwave magnetron, and all parties were in agreement about the desirability of its use. Everyone, except the group which Ridenour led, was also in agreement that the radar should illuminate the target by broadcasting its energy from one parabolic antenna, and that the waves reflected from the

During World War II, while on leave from his post as chairman of the Illinois Physics Department, Wheeler Loomis served as associate director of the MIT Radiation Laboratory.

target should be received by a second antenna, so that the radar's own powerful transmitter might not damage its delicate receiver. It was also generally agreed that the error signals, which told which way to move the antenna assemblage that it might continue to point at the target, should be presented to men, who would then move the antenna with handwheels.

Ridenour's intellectual courage combined with his natural optimism led him to set the Radiation Laboratory group firmly on an opposite course. He had faith that the Laboratory would develop a good "T-R box" so that but one antenna could be used for both functions; and he saw that, if the radar would work at all, the error signals could be made to control servomotors directly, with advantages of precision and, as he put it, "freedom from hangover".

THE detailed development of this device was the work of a large group under the able leadership of I. A. Getting; for by that time Ridenour was serving as expert consultant to the Secretary of War, and he was touring the North African Theater in a jeep—ultimately to be arrested on the front lines as a suspicious character, for he was dressed in a slouch hat, a tweed jacket, G.I. pants and shirt, and a pair of tennis shoes. Hailed before the provost marshal, he was ordered to salute if he was in uniform, or else to take off his hat! He saluted, then explained that, as the first Expert Consultant to visit a theater of war, he carried the assimilated rank of a general officer; and that furthermore, there being no designated battle dress for expert consultants, he had exercised his authority to design one, and this was it. He then asked to be directed to headquarters.

So attired, he visited the Commanding General, and explained why the SCR 584 was just what the General needed in his business. The resultant request to Washington was the last action needed to put the 584 into production. Dr. Getting meanwhile, having shown that the 584 consistently outperformed its competitors, was still engaged in trying to keep the handwheels from being reinstated.

The 584, together with Bell Lab's M-7 computer, servocontrolled guns, and proximity fuses, was the first truly effective antiaircraft system the world had ever seen. Today, not only are many hundreds of the original SCR 584's still in use, but practically all of our air defense missiles (Terrier, Talos, both NIKE and its newspaper antagonist Bomarc, and all of our interceptor aircraft) depend in one way or another upon the principles of design which Ridenour first enunciated. Of the thousands of engineers who design these devices today, one wonders which, if any, has ever thought that there could have been even an argument about the basic principles, much less the bitter and expensive controversy which actually took place.

Soon after his return from North Africa he was made Leader of the Airborne Radar Division and Assistant Director of the Radiation Laboratory. Under his guidance the Airborne Division developed a bewildering array of radar sets for a wide variety of uses. The one which really became the mainstay of the US Air Force was the radar bomb sight developed by G. E. Valley under Ridenour's insistence that it must be simple, rugged, and quickly produceable if the tiny B-17's and B-24's of that day were to be usefully equipped in time. The US Air Force owed much of its success to its adoption of Ridenour's bomb sight.

IN 1944, he was appointed as chief of the newly formed Advisory Specialist Group, USSTAF (Strategic Air Forces in Europe, Gen. Carl Spaatz, Commander). This was the first time that a group of civilian scientists was established within the military for the purpose of getting newly invented devices into combat, in contradistinction to Operational Analysis which tried to get the best out of equipment on hand. Laboratory-made versions of mircowave radar equipment played a very important role in the later phases of the war in Europe. As an example of Ridenour's contribution, he invented the use of his antiaircraft radar—the SCR 584—for close control of fighter bombers in bad weather. He stimulated the British Branch of the Radiation Laboratory to make laboratory versions of a plotting table to enable controllers to vector the fighter bombers with precision; he persuaded the generals of the tactical Air Forces to deploy these units near the front lines; and he followed through to see that they were effective in combat. This invention was very important during the winter of 1944–45, when bad weather would otherwise have rendered the tactical fighter bombers useless. It was the prototype of similar devices which became the standard method of control of tactical aircraft in the latter phases of World War II and in the Korean War.

During this period, while billeted in the Soames House, in the direct path of the buzz bombs on their way to London, Ridenour immediately saw the fallacy of the British deployment of their defenses—with fighters ineffectually attacking over the Channel and antiaircraft defenses ringing London, where the best that they could do was to shoot down the buzz bombs so that they would go off in a different part of London. His personal campaign with the British commanders and intercession with Churchill forced the rapid redeployment of the radar-controlled antiaircraft to the south coast of England, leaving the last-ditch fight over England to the fighter interceptors. Ridenour's judgment was vindicated as the successful interceptions of the buzz bombs rose from a few percent to over 90 percent.

His influence was felt in all phases of the war because of his ability to analyze complex tactical situations, see which possible devices might help, persuade the powers that be by the logic of his presentations, and follow through in the laboratory and in the field to see that the necessary steps were accomplished. This ability, in a variety of endeavors, characterized his life.

Early in 1945 Ridenour was appointed editor of what became the Radiation Laboratory Technical Series, a set of 28 volumes which rather completely covered the subject of radar as of the end of the war. Rarely has a man so perfectly fitted a job. It called out all his qualities—his facility in writing, his talent for assembling and leading a group, his own encyclopedic knowledge of radar and electronics, plus his quick ability to learn and understand what he didn't already know, and especially his persuasiveness and influence in high military quarters, needed to overcome the timidity of the security-conscious bureaucrats.

The whole tremendous job was completed essentially on time, and it has been invaluable ever since. It is used by all the engineers in the now huge radar industry and serves to educate the new generations as they come along. Undoubtedly, it helped slow down the degenerative process which set in so strongly after the war.

While doing this Herculean job, Louis used some of his excess energy to encourage the American Institute of Physics to establish a "house organ . . . a unifying publication for physics, to serve all Member Societies of the Institute". Characteristically, he did this by producing an exquisite mock-up issue with a portrait of Niels Bohr on the cover, and fascinating articles by Sam Goudsmit, Lee DuBridge, Karl Compton, and others. The lead editorial set forth the need for such a journal and the requirements for its successful operation. This sample helped to convince the AIP, and within three years *Physics Today* was born.

AFTER returning to the University of Pennsylvania for a year he came to the University of Illinois in 1947 as Dean of the Graduate College and Professor of Physics. During his three-year tenure there (1947–1950) he played a major role in the initiation of a number of important new enterprises, such as the solid-state group under Seitz, the microbiology group under Luria and Spiegelman, the Control Systems Laboratory, the Illinois Digital Computer (Illiac), and the Radio Carbon Laboratory.

In 1949–50 he served as chairman of an ad hoc committee to survey research and development in the Air Force. The most distinguished member of that committee was General Doolittle who was naturally singled out for top attention wherever they went. Louis soon fell into the habit of introducing himself as "Ridenour, chairman of the Doolittle committee". Nevertheless the committee's report became known as the Ridenour Report. It recommended the formation of the Air Research and Development Command and the establishment of the Deputy Chief of Staff for Development and was thus a turning point in the Air Force management of research and development.

To enable himself to help implement the recommendations of the Ridenour Report he took leave for a year from Illinois in the summer of 1950 (the time of the Korean War) to become Chief Scientist of the

Dean Ridenour of Illinois—a 1948 photograph

Air Force. During his tenure in that position he sponsored the establishment of the MIT Lincoln Laboratory. This large organization, modeled somewhat on the MIT Radiation Laboratory, and jointly supported by the Army, the Navy, and the Air Force, was given the principal responsibility for development of the means of coordinating the defense of the United States against air attack. The SAGE Air Defense System and the DEW Line are developments of the Lincoln Laboratory that are well known today.

He never returned to the University of Illinois but took a position as Vice President of the International Telemeter Corporation in Los Angeles. In 1955 he joined the Lockheed Aircraft Company and rose through a series of positions and responsibilities until just two months before his death he was named Vice President of the Company and General Manager of the new Electronics and Avionics Division.

For his services during the war, Ridenour was awarded the President's Medal of Merit and also the Bronze Star. For his many services since then, the US Air Force has awarded him, posthumously, its highest peacetime decoration, the Exceptional Civilian Service Medal, with perhaps the longest and most highly classified document of justification ever written.

He is survived by his widow, the former Gretchen Hinckley Kraemer, and two daughters, Eleanor and Nancy, who live in Palo Alto, California, and his parents, Louis N. and Clare Ridenour of Pacific Palisades, California.

The writer gratefully acknowledges the help of L. A. DuBridge, I. A. Getting, W. C. Griffith, D. T. Griggs, C. F. J. Overhage, F. Seitz, A. H. Taub, and G. E. Valley, who have kindly sent him a great deal of information about Ridenour. However, the writer alone is responsible for all statements as they appear in this article.