Charles F. Kettering, Prophet of Progress

"We are not at the end of our progress but at the beginning. We have but reached the shores of a great unexplored continent. We cannot turn back. . . . It is man's destiny to ponder on the riddle of existence and, as a by-product of his wonderment, to create a new life on this earth."

This is a characteristic saying of the late Charles F. Kettering, who always spoke with optimism about the future and who spent his life searching for new knowledge and developing new products. "We must use the past as a guidepost, not as a hitching post," he would say. "The only incurable diseases are those the doctor's don't know how to cure."

Charles Franklin Kettering was born on a farm near Loudonville, Ohio, 29 August 1876, the year of the Centennial Exhibition in Philadelphia. He went to the one-room country school and later, with an apple in his pocket, walked 3 miles back and forth each day to the high school in Loudonville. Then he became a country school teacher and Friday night debater. At age 22 he went to Ohio State University to study electrical engineering, but trouble with his eyes soon forced him out. In the two years following, he worked for the telephone company in the small city of Ashland, Ohio, during which time he not only learned to do everything in the operation of such a system but also made improvements in it.

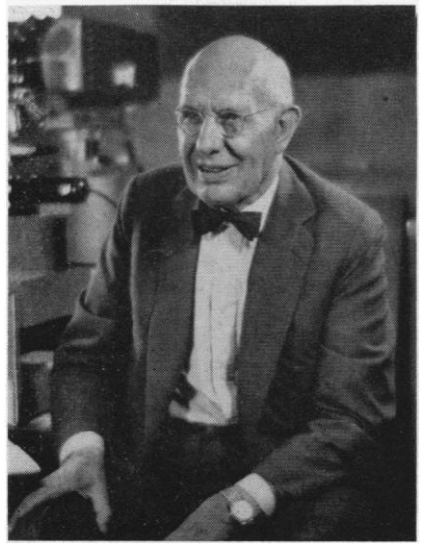
In the fall of 1901 he returned to the university. Still saving his eyes, he did not study books as much as most students. He often lay on his back on the bed and listened to his classmates read the assignments. Later he joked that he could always tell how much studying he had done at night by how hoarse his roommate was in the morning. But it was luck, he said, that thus forced him to work things out in his head. It sharpened his imagination.

In 1904 he graduated from Ohio State at age 28 and took a job as experimental engineer at the National Cash Register Company. There, among other things he utilized electricity to take the tiresome handcrank off the cash register and developed one of the first accounting machines for banks.

After having invented a better ignition system for automobiles, he left the National Cash Register Company in 1909 and became an independent inventor and development engineer. With Edward A. Deeds he organized for that purpose the Dayton Engineering Laboratories Company which began its modest operations in what had been the hayloft of the Deeds barn.

Soon Kettering made that historic development, the electric self-starter for automobiles, which appeared first on the 1912 model Cadillac. The application of this development forced the Dayton Engineering Laboratories Company to become a manufacturing concern, much against the wishes of its organizers. And before long they were operating a factory employing 1,200 persons.

Nevertheless, Kettering found time to continue his experimentation. Soon he developed an engine-driven unit to furnish electric light and power on farms. This development and his prior work on battery ignition led him into another field in which he became the principal pioneer. This was the field of hydrocarbon fuels in which he made a long and productive effort to overcome their principal defect—the distressing bugbear of knock which limits the compression and therefore the power and efficiency of engines.



Charles F. Kettering

To work on that problem and others he organized a new laboratory in a second attempt to free his research from the hindrances in a manufacturing concern. World War I came just at that time, and out of wartime activities in that new laboratory came the first synthetic high-octane aviation gasoline and a manless automatic bombing plane which was the predecessor of the guided missile.

Soon after World War I, Kettering accepted an insistent invitation to organize and direct a central research laboratory for General Motors Corporation. He organized that laboratory around the small one he had set up just a few years before, and for the 27 years following he served as vice president and head of research for General Motors.

The developments which came out of his activities in those years were far too many to be enumerated here. But among them were the discovery of tetraethyl lead as an antiknock agent and of basic knowledge about the relationship of hydrocarbon structure to behavior in combustion, which together pointed the way to high-octane gasolines and high compression in engines; the development of better and longer-lasting finishes for automobiles; the discovery of the nontoxic and noninflammable fluorocarbons as refrigerants; the finding of means to take out of engines the old-time shake and shiver which were so distressing to automobile drivers and which cut down utility and durability; and the development of an improved diesel engine which, in one of its several applications, revolutionized the powering of railroads by superseding the century-old steam locomotive.

On his own account, through the Charles F. Kettering Foundation, he instituted and pursued a fundamental search for better ways to utilize the energy of sunshine. As he expressed it, he was trying to find out why the grass is green. "If we starve to death or run out of fuel, it's our own fault," he said. He spent many years, too, in search of

an answer to the question: What is magnetism? He wanted to find out, he said, just what kind of fingers a magnet has that lets it reach out and pull a piece of metal to it. Also, through research at Washington University and later at the Sloan-Kettering Institute for Cancer Research, he did what he could to aid in the search for ways to prevent and cure cancer. After he retired in 1947, he devoted most of his time to these three endeavors, doing much laboratory experimentation of his own on the first two.

One of the biggest contributions Kettering made to progress was as a vocal advocate of revitalizing changes in industry, not only in his own company but in others as well. In the early years of his activity the need for technological progress was not nearly so well accepted as it is today. "I am not pleading with you to make changes," he kept saying in his many public speeches. "I am telling you you have got to make them—not because I say so, but because old Father Time will take care of you if you don't change. Consequently, you need a procurement department for new ideas."

With Kettering, as with others consecrated to it, the search for new knowledge was a religion. C. P. Rhoads, director of the Sloan-Kettering Institute for Cancer Research, said this about Kettering's views of research, "His principal point is that if one is to have a productive career in research, one must have some well-defined objective. . . . Without objectives, he feels, scientific life is unsatisfactory and scientific work in general unproductive. This point of view is, of course, in sharp contrast to that so frequently enunciated in recent years by those who believe sincerely that there should be no objective in research." But Kettering believed that research not aimed at contributing in some way to human needs, however indirectly, is not justified.

Popular as a public speaker, Kettering made hundreds of addresses and radio speeches. These were full of the wit and wisdom characteristic of him. He had a knack of putting things in direct and simple terms, of using imagery and apt analogy, and of injecting anecdotes and humor to give his talks vividness and vigor. Many of his sayings and epigrams have been widely quoted. "The price of progress is trouble," he would say, "and I don't think the price is too high."

On education Kettering's views were not in complete accord with accepted beliefs. "If we drove an automobile the way we try to run civilization," he said, "I think we would face backwards, looking through the back window, admiring where we came from, and not caring where we are going. If you want a good life you must look to the future. . . . I think it is all right to have courses in history. But history is the 'gonest' thing in the world. . . . Let's keep history, but let's take a small part of the time and study where we are going. . . . We can do something about the unmade history."

Robert A. Millikan said of Kettering, "He is unique in that he combines in one individual the interest in pure science with the practical ability to apply knowledge in useful devices." Willis R. Whitney, too, said of him, "We have never had another man like him in America. He is the most willing man to do things I have ever seen. Benjamin Franklin was a little like him. Both had horse sense and love of fun. If a fellow goes to school long enough he gets frozen in his thinking. He is not free any more. But Ket has always been free."

In 1905 Kettering married Olive Williams, of whom he said that she was a perfect supplement to an absent-minded inventor. They had one son, Eugene W. Mrs. Kettering died in 1946, and afterwards Kettering said of her that she was the only possession of his he had never tried to improve.

Kettering was generous with his time outside his principal field. Among a multitude of activities were his services as president of the American Association for the Advancement of Science in 1945 and of the Society of Automotive Engineers in 1918, as chairman of the National Inventors Council from the time of its formation in 1940, and as a long-time director of the National Geographic Society. From his contemporaries he received numerous distinctions, including more than 30 honorary degrees and many medals and awards.

At the funeral of Kettering's associate, Thomas Midgley, Jr., the minister read the familiar Bible verse, "We brought nothing into this world, and it is certain we can carry nothing out." Afterwards Kettering commented, "It struck me then that in Midgley's case it would have seemed so appropriate to have added, 'But we can leave a lot behind for the good of the world.' "

That comment of his could apply with even more fitness to himself. For what he left behind, when on 25 November 1958 he quit this world at the age of 82, is a vast heritage to the people of the nation from a dynamic, many-sided, and highly creative life.

T. A. Boyd

1016 Harvard Road,
Grosse Pointe, Michigan

News of Science

National Aeronautics and Space Administration Has Outline for Manned Satellite Program

The National Aeronautics and Space Administration, the agency responsible for the country's nonmilitary space activities, has released some of the details of Project Mercury, its manned satellite program. Preliminary information on the launching and recovery techniques, the man-carrying capsule, and other details were given with the announcement that McDonnell Aircraft Corporation of St. Louis had been selected as the source for the final design, development, and construction of the capsule. McDonnell, founded in 1939, is currently producing the Voodoo and Demon fighters and is a subcontractor for the Talos missile program. The company's experience in designing and constructing jet aircraft cockpits will have direct application to the capsule design problem that Project Mercury poses.

Space Capsule

The man-carrying capsule, as now conceived, will be in the shape of a truncated cone with a short cylinder attached at the point of truncation. Less pedantically, it could be said to resemble a cathode-ray tube. The base diameter of the cone will be approximately 7 feet, with the other dimensions scaled accord-