of Technology, delivered a course of four lectures from September 22 to 26 on "The Logical Integration of Differential Equations, with Applications to the Equations of Geometry and of Mechanics," at the Rice Institute.

LECTURES will be given at the University of Buffalo under the Foster Fund by Professor E. M. K. Geiling, of the University of Chicago, at the end of October on "Recent Trends in Endocrinology" and on "Some Biological Adaptations of the Whale," and during the week of November 7 by Professor M. S. Kharasch, also of the University of Chicago, on the general subject, "Chain Reactions Involving Atoms and Free Radicals in Solution." The Foster Fund was given to the university by Mrs. Orin D. Foster, in memory of her husband, to endow a lectureship in chemistry and related fields. Mr. and Mrs. Foster also gave the university Foster Hall, which houses the department of chemistry and the School of Pharmacy.

SIR WILLIAM BRAGG, president of the Royal Society, opened the Sir Robert Hadfield Metallurgical Laboratories of the department of applied science of the University of Sheffield on September 14. The new extensions and improvements, which were built at a cost of £30,000, represent the first stage in a plan of development for which an appeal for £250,000 was made two years ago. Sir Robert Hadfield, chairman and managing director of Hadfield's, Limited, Sheffield, gave £10,000 of the £30,000 required and equipped one of the research laboratories at a cost of £2,000. He also gave £5,000 for the plans for the new foundation.

THE Academy of Medicine of Washington, D. C., held its first autumn meeting on September 28. Dr. Philip Manson-Bahr, clinical director of the London School of Tropical Medicine, gave an address on "The Life and Works of Patrick Manson, Father of Tropical Medicine." Dr. Manson-Bahr is the author of a life of Sir Patrick Manson. The academy met this fall without one of its members, lost in the Hawaiian Clipper tragedy of July the twenty-ninth. Dr. Earl Baldwin McKinley was the moving spirit in the founding of the academy. Dr. Harry H. Donnally addressed the academy in tribute to Dr. McKinley.

THE Cotton States Branch of the American Association of Economic Entomologists will hold its 1939 annual meeting on February 21, 22 and 23, 1939, at Tampa, Fla. The Hillsboro Hotel has been selected as headquarters, where special rates of from $2.50 up have been obtained for delegates. Due to the overcrowded condition of Florida cities during the tourist season, reservations should be placed early by those who expect to attend.

A MISSOURI Minerals Industry Conference, sponsored by the Missouri School of Mines and Metallurgy and the Missouri Geological Survey, will be held at the School of Mines on October 21 and 22. The object of the conference, according to Dr. William R. Chedsey, director of the School of Mines, is for the mutual benefit of the producers of mineral products and the service institutions that are supported by the states. It will take the form of the presentation of problems of the various mineral industries by mineral producers. Dr. H. A. Buehler, of the Missouri Geological Survey; S. M. Shelton, supervising engineer of the Mississippi Valley Experiment Station of the U. S. Bureau of Mines, and Dr. Chedsey will outline the services that are now available to the producers of minerals in Missouri.

THE Society for the Promotion of Engineering Education will hold its annual convention in 1940 at the University of California in Berkeley.

FELLOWSHIPS in the Medical Sciences, administered by the Medical Fellowship Board of the National Research Council, of which Dr. Francis G. Blake, of Yale University, is chairman, will be available for the year beginning July 1, 1939. These fellowships are open to citizens of the United States and Canada who possess an M.D. or a Ph.D. degree. They are intended for recent graduates and not for persons already professionally established. Fellows will be appointed at a meeting of the board about March 1. Applications to receive consideration at this meeting must be filed on or before January 1. Appointments may begin on any date determined by the board. For further particulars address the Secretary of the Medical Fellowship Board, National Research Council, 2101 Constitution Avenue, Washington, D. C.

DISCUSSION

WAR AND SCIENCE

FOR a number of months European civilization has been making history around sharp curves at high and rapidly increasing speed. With brakes ineffective and accelerators pushed down to the floor, on September 14 it appeared to be crashing through the guards and about to plunge into the abyss of another world war. Then something happened, something unparalleled in the history of the world. It began to respond to control and changed its course to a smoother and safer road.

There were undoubtedly many factors that restrained Herr Hitler from precipitating Europe into war. In spite of his 10,000 airplanes and Germany's capacity

for producing more, he may have feared the ultimate strangling effects of his opponents' control of the sea. Perhaps he remembered that Italy had an army in Ethiopia and another in Spain and a long coast that it could not easily defend. Perhaps the announced intention of France and Russia and Great Britain to defend Czechoslovakia against aggression sounded in his ears like the rumble of a distant storm. He may have had a normal human reaction from the frenzy of his radio address to Germany. In spite of his harsh and uncompromising words, he may have heard an inner voice that warned him against arbitrarily condemning millions of young men to death. The dramatic visits and appeals of Mr. Chamberlain may have pleased his vanity and softened his heart. The intercessions of the President of the United States may have inclined him to a magnanimous gesture appropriate to a conqueror. All these things and many more may have had their effects.

The supreme influence, however, was the radio address of an elderly gentleman to his countrymen and to the remainder of civilized mankind. In it there was no boasting of irresistible might and preparations for war; no attacks on enemies, real or manufactured for the occasion; no claims of great achievements or promises of them in the future. In simplicity and humility Mr. Chamberlain explained what had happened and the steps that he had taken in his attempts to avoid open conflicts. He described the sacrifices Czechoslovakia had agreed to suffer in the interests of peace. He frankly expressed his fears of the horrors of war. With infinite restraint and consideration for the opinions of others, he made his nearest approach to being critical in his simple statement that he thought a certain position of Herr Hitler was unreasonable. After the seven minutes of Mr. Chamberlain's address, ranting and screaming and defying their enemies will no longer seem appropriate for statesmen in Great Britain or in Europe or in America.

There have been many turning points in history, most of them marked by great battles. One was when the Greek phalanxes at Marathon pierced the ranks of the Persian hordes and threw them into confusion. One was when Charles Martel and his army turned back the Saracens at Tours. One was when the allied forces shattered the power of Napoleon at Waterloo. And probably a more important turning point in human history than any of these was the radio address of Mr. Chamberlain, which was, of course, only the climax of a series of dramatic events. Like a mysterious voice coming through the ether from another world, it plead for tolerance, cooperation and the rule of reason. It aroused the better nature of mankind. Mothers in England and France and Germany and Italy and Czechoslovakia were happier that night than they had been for months. A cloud was being raised, a new light was shining, and peace in Europe was in the making.

An essential difference between the recent dramatic events in Europe and previous turning points in history is that in this crisis the opinions of the masses were an important influence. This was certainly true in democratic England. It was true even in Germany. The cheers of the Germans for Mr. Chamberlain, a potential enemy but on a peace mission, can not have escaped Herr Hitler. The visits of Mr. Chamberlain and his broadcasts, which were carried throughout Germany, had more profound effects than the winning or the losing of a battle. For many years, during which international relations will probably be established on a new basis, the words of Mr. Chamberlain and his visits to Germany and the final compromise of the interested parties will be cherished memories.

These dramatic and gloriously hopeful pages of human history could not have been written without the miraculous means of transportation and communication provided by science. Too often science has been charged with being largely responsible for the evils of mankind and with adding greatly to the horrors of war. In his presidential address before the British Association for the Advancement of Science, Lord Rayleigh refuted those charges. Perhaps a better refutation would be a proof that wars have not become more terrible with the advance of science. No one who has read of the siege of Jerusalem or of the Crusades or of the Thirty Years War in Germany would maintain such a position. All wars have caused deaths and disease and unhealed wounds and starvation and endless suffering. Science has saved more human life in the past ten years than was destroyed during the world war. Science can easily establish the fact that the sum total of its effects has been to relieve suffering and save life. And just now its applications have been an essential factor in initiating a new period in human history.

It would be naïve to assume that the agreements reached at Munich were not based in part on national jockeying for position. It would be even more naïve to believe that human hearts have suddenly become generous and altruistic. No such miracle has happened or will happen for a geologic age. It is true that Czechoslovakia is being dismembered and Russia is ignored. Already dictators are strutting as the saviors of peace. But the masses feel that they have been consulted, that town meetings have been held on a national scale. For at least a generation it will not be easy for Europe to become involved in a general war without the approval of the humble citizens who would suffer because of it. The pattern of negotiation and compromise has been set, and the power of a moral principle is again stirring mankind.

What has all this to do with scientists? Only to re-

mind them that they face an opportunity. For years they have cultivated cordial international relationships among themselves. As I have already written elsewhere, science is wholly independent of national boundaries and races and creeds. This is no idle statement. It is a living reality, illustrated in the international congresses of scientists that are being held in large numbers. Last December the American Association for the Advancement of Science passed a resolution calling on the British Association for the Advancement of Science and "all other scientific organizations throughout the world to cooperate not only in advancing the interests of science but also in promoting peace among nations and intellectual freedom in order that science may continue to advance and to spread more abundantly its benefits to all mankind."

At its recent meeting the British Association passed resolutions for closer cooperation with the American Association and organized a division for exploring the interrelations of science and society. The American Association will not neglect its opportunities to make science and the generous ideals of science more important factors in the progress of society. Its age and honorable history, its broad interests, which include not only the natural sciences but the humanities, its large and rapidly increasing membership, its obligations to society and its unparalleled opportunity to be of service to mankind all inspire its membership.

F. R. MOULTON

OFFICE OF THE PERMANENT SECRETARY
OF THE AMERICAN ASSOCIATION FOR
THE ADVANCEMENT OF SCIENCE

THE WESTINGHOUSE TIME CAPSULE

So many readers of SCIENCE and others have shown interest in the questions propounded in my letter published August 19 that a brief explanation of how these problems were finally settled may be in order. I wrote that Westinghouse was desirous of depositing a "Time Capsule" on the site of the New York World's Fair, containing a "cross section of our time" for posterity 5,000 years from now.

The problem contains three major parts: (1) how to build a vessel capable of lasting 5,000 years, (2) how to leave word of its whereabouts for historians of the future and (3) the selection and preservation of the contents. There are many subsidiary problems, such as protection of the deposit against vandalism. Burial 50 feet deep in the swampy soil of the fair site is expected to take care of this latter problem quite effectively.

The construction of the vessel was undertaken by a committee headed by M. W. Smith, Westinghouse manager of engineering. It was decided that a hard alloy of copper would be most suitable. For reasons of strength and convenience, a torpedo shape was chosen. The Time Capsule, as finally constructed, is seven and a half feet long and eight and three eighths inches in diameter. The outer shell consists of seven cast segments of Cupaloy (copper 99.4 per cent., chromium .5 per cent., silver .1 per cent.) which is temperable to the hardness of mild steel, but has corrosion resistance and electrical characteristics similar to those of pure copper. The segments are screwed together hard and sealed with asphalt; the nearly invisible joints peened out and the outer surface burnished.

The inner crypt, six and a half inches in diameter and six feet nine inches long, is lined with an envelope of Pyrex glass, set in a water-repellent petroleum base wax. This crypt, evacuated, washed and filled with slightly humid nitrogen, contains the "cross-section of our time."

After consultation with librarians, museum authorities and the U. S. Bureau of Standards, it was decided to leave word for the future by means of a book, printed on permanent paper in special inks. In order that the appearance of this "Book of Record of the Time Capsule" might match its permanence, Frederic W. Goudy consented to design it and set a portion of the type. A special run of 100-pound book paper was made to Bureau of Standards specifications. Suggestions for binding and general treatment were obtained from the National Archives, the New York Public Library and other sources. The cover is royal blue buckram stamped in genuine gold. The signatures are sewed by hand with linen thread.

Copies of this book will be sent to selected libraries, museums and other repositories throughout the world, in the hope that a few will survive in some form for the required time. The book contains a message asking that it be preserved and translated into new languages as they appear; a description of the Capsule's contents, and the exact latitude and longitude of the deposit as determined by the U. S. Coast and Geodetic Survey to the third decimal point in seconds. The geodetic coordinates are tied into the survey's national network, on which astronomical as well as geodetic data are given. In addition, instructions are included for making and using instruments to locate the Time Capsule by the methods of electromagnetic prospecting.

That our tongue may be preserved, the book contains an ingenious "Key to the English Language," devised by Dr. John P. Harrington, of the Smithsonian Institution. By means of simple diagrams, the peculiarities of English grammar are explained; a mouth map shows how each of the 33 sounds of English are pronounced. A 1,000-word vocabulary of "High Frequency English," spelled in the ordinary way and neo-