The number of the streamers varied in number from one to four, and usually terminated near the zenith. Sometimes they would pop on or off suddenly. Other times they would change from one state to another very slowly. Sometimes they would be blinking like stationary waves. Many times they appeared as moving waves of light, going from north toward the zenith. At irregular intervals the apparent distance of the streamers varied. They always appeared near in comparison with the northern curtain. The maximum distance never seemed more than forty miles, and several times seemed closer than cumulus clouds. The one observation that has stood out was made a little after 10 P.M. The one mass streamer seemed to be only twenty or thirty feet above my head. It was moving as waves in the general direction of Massachusetts Avenue toward Boston. It reminded me of fine particles of snow moving in a severe wind, as in a blizzard, when the snow is illuminated by a beam of light. The waves seemed to have much depth, as do the waves of moving snow in a blizzard. Nothing was visible beyond.

C. J. Taylor, of the Radiation Laboratory, Massachusetts Institute of Technology, made substantially the same observations from the roof of the Massachusetts Institute of Technology. While he was some fifty feet higher, the moving streamers were about the same distance above his head as they were above mine.

S. F. West reports that he observed the moving streamers or moving flashes of light to be barely over his head at about 10 : 30 on that evening. His observations were made on the roof of the Massachusetts Institute of Technology. It should be added that throughout the evening and night a very destructive fire was burning at Charlestown about two miles away. It is barely possible that the wind may have carried ionized air over our observation posts for a short interval. In general, however, the direction of the wind was toward Boston.

F. C. BROWN

QUOTATIONS

CHEMISTS AND THE NATIONAL DEFENSE

IN recent months many members of the American Chemical Society have expressed a desire to take an active part in the program of national defense. The number of letters which have been received by various officials in Washington from chemists all over the country offering their services to the Government is a clear manifestation of the great desire of the members of our profession to do their part in the present gigantic task of rearmament. Unfortunately, in many cases it has not been possible to take advantage of the talent thus offered. This is a physicist's war rather than a chemist's. For the present, at least, there appear to be more investigations of a physical nature than there are chemical military problems. But the situation may at any moment change rapidly. It is well to have a reservoir of research capacity in our colleges, universities, consulting laboratories and research institutes. It may not be long before this reservoir will be heavily drawn upon for tasks directly concerned with defense problems. And in the meantime it is of vital importance to the nation that our educational institutions continue to train young chemists and chemical engineers. Chemists in industry are, of course, engaged in work which almost without exception is in one way or another an integral part of the total defense activities of the country. More young men will be required every month for these tasks. Every teacher of chemistry, whether or not he is carrying on research for the Government, is playing an important part in the rearmament program of the nation.

Although physicists and electrical engineers rather than chemists are concerned with the most pressing research and development problems of the Army and the Navy, this does not mean there is no chemical work in progress. Quite the contrary. Both the Army and the Navy for years have maintained chemical laboratories where investigations are conducted on explosives, chemical warfare and a multitude of miscellaneous problems. In this period of unlimited national emergency, the work of these governmental laboratories must needs be supplemented. And to this end a number of chemists in universities and industrial laboratories have been called upon to assist. To some extent this has been done directly by the services, but to a large measure the task of assisting the scientific personnel of the armed forces has been the responsibility of the National Defense Research Committee. The effort has been to distribute the work as far as possible to a good many different laboratories and to draw on all branches of our profession. More than half the starred chemists in "American Men of Science" are now involved in one way or another in work pertaining directly to the national defense program.

The NDRC was created by presidential order in June, 1940. It came into being at a time when the shock of the fall of France had galvanized this country into action. The need for haste in the rearmament program was apparent to all. Industry was being called upon to perform miracles of speedy readjustment and expansion. A mobilization of scientific talent was evidently also a first order of the day. What was clearly needed was not another advisory

body, for the National Research Council was already functioning admirably in this respect, but an executive agency to assist the Army and the Navy by organizing the scientific reserve power of the country and putting it to work on those problems deemed most vital by the members of the armed forces. To this end, the committee was supplied with funds and given authority to enter into contracts with research institutions, both academic and commercial, for the prosecution of research under suitable conditions of secrecy.

Vannevar Bush, president of the Carnegie Institution of Washington, was appointed chairman. The Secretary of War and the Secretary of the Navy were each represented on the committee by high-ranking officers. In addition, many other officers were designated for liaison purposes on special problems. Through these channels we soon discovered in broad outline the nature of the most urgent matters that required scientific investigation. The civilian members of the committee divided up the work. To my lot fell chemistry; to President Compton of M. I. T. was assigned one branch of physics; to Frank B. Jewett, another; to Richard C. Tolman, of California Institute of Technology, a third aspect of physical investigation. Each of these divisions soon organized sections or subcommittees, each dealing with special problems.

My first act as chairman of the Chemical Division was to have Roger Adams and W. K. Lewis appointed vice-chairmen to organize two separate phases of the work. Needless to say, elaborate precautions were necessary to ensure secrecy. We were asked to sit down as partners with the scientists and engineers of the Army and the Navy and to share their secrets. Therefore, we saw to it that in every way we were as careful with our confidential information as the armed services themselves.

Unfortunately, the very secrecy to which I have just referred prevents my making this brief article interesting. Instead of listing the extremely interesting and highly important problems we have been called upon to solve, a writer on this subject must have recourse to dull statistics. During the first year of its existence, the National Defense Research Committee spent approximately $10,000,000 through 270 contracts placed in 47 different universities, technical schools and research laboratories; and 153 contracts placed with 39 industrial firms. Nearly 2,000 scientists are at work under these contracts and approximately the same number of technicians and assistants.

Last June an Executive Order created the Office of Scientific Research and Development with Vannevar Bush as director. In his new capacity Dr. Bush was charged not only with many of his former responsibilities as chairman of NDRC but with the further task of coordinating research on medical problems affecting national defense. And most important of all, he has charge of coordinating and, where desirable, supplementing the scientific research activities for defense carried on by the Departments of War and Navy and other agencies of the Federal Government. The NDRC now becomes a part of the new Office of Scientific Research and Development and I, as the new chairman, am responsible to Dr. Bush. Roger Adams has become a member of the NDRC and is in charge of all the work of the chemists.

A new Medical Research Committee of which A. N. Richards is chairman has been formed. The other members of this committee are L. H. Weed, A. R. Dochez, A. B. Hastings and representatives of the Surgeon General of the Army, of the Navy and of Public Health. Irvin Stewart is Executive Secretary of this committee, as well as of the NDRC and of the OSRD. This committee, which parallels the NDRC, is concerned with problems of medical research. On a scientific advisory council to the Director of the Office of Scientific Research and Development sits the chairman of this committee, the chairman of the NDRC, the chairman of the National Advisory Committee on Aeronautics and the coordinators of research of the Army and Navy. The Office of Scientific Research and Development maintains close connections with the National Research Council and its many sections and committees.

Since the work of the NDRC is concerned solely with research and development on instrumentalities of war, there are many chemical problems of national importance which lie outside its province. Some of these are clearly within the field of operation of the new Medical Research Committee, while others are the concern of the National Research Council and its agencies.

Many chemists have been asked to cooperate in the national defense program through the Chemistry Section of the council, and especially in the field of biochemistry through the Medical Research Committee and the committees of the council with which its work is closely associated. Undoubtedly there will be an expansion in this direction as well as in the work of the Chemical Division of the NDRC and gradually a still greater number of research chemists will be asked to play a part in the ever-increasing national defense effort. To those who have given freely of their time and talents, the country owes a debt of gratitude.—*James B. Conant, president of Harvard University, chairman of the National Defense Research Committee, in the News Edition of the American Chemical Society.*