Not less noteworthy than the responsible initiative shown by Vannevar Bush was, however, the selfless willingness of our other men in prominent scientific positions to accept his leadership. It was the wholehearted co-operation of such persons as Lyman Briggs, Karl Compton, James Conant, and Frank Jewett that made the work of the committee effective. Each of these men was himself head of a scientific enterprise that in its own field was leading the nation. All had won high distinction for their own scientific work and were Bush's seniors in the administration of research organizations. The personal rivalries that were slowing down Germany's war research underscore the importance to our nation of this co-operative attitude of our own scientific leaders. Following their example, the entire American scientific fraternity gave Bush and his committee its full support.

One of the first major acts of NDRC was to establish a section for the study of radar, i.e., of short radio waves as a means for detecting planes and ships at a distance. This section, under Alfred L. Loomis, was a part of the division of NDRC headed by Karl Compton.[10] The fact that Ernest Lawrence was a member of this radar section aided in maintaining a co-operation between the radar and the nuclear programs. Such co-operation became essential to the completion of the atomic weapons.

Those who are inclined to think of scientists as men apart from the world, closeted in an ivory tower and immersed in their special studies, should consider the debt the nation owes to men such as these. All the scientific members of the National Defense Research Committee had taken active part in the defense of the nation during World War I. They were alert, respon-

[10] For a more detailed description of the National Defense Research Committee and the subsequently organized Office of Scientific Research and Development of which Vannevar Bush was director, see Stewart, Irvin, *Organizing Scientific Research for War*, Little, Brown and Company, Boston, 1948; Baxter, James Phinney III, *Scientists Against Time*, Little, Brown and Company, Boston, 1946; Gray, George W., *Science at War*, Harper & Brothers, New York, 1943.

sible citizens, to whom their nation's welfare was far more vital than their own. Their vision was as broad as that of any, and farther-seeing than most. Especially noteworthy was that they were self-starting. New, vitally important possibilities of science they brought, one after another, to the attention of government and military groups that all too frequently felt no need for them. They worked in harmony with all the sorts of men who were needed for making the scientific developments effective. They stand out as exemplars of free men devoted to the service of their nation.

HURDLES TO SURMOUNT. Why was it necessary for civilians outside the government to prod it into action? Why were the funds for a program as vital as that of uranium research only available in such very limited amounts? The answer is twofold: first, the dominant pacifism of the nation, and, second, lack of awareness within the government that scientific knowledge is vital to the nation's strength. As of 1956 both these situations have changed to such an extent that it is not easy to recall our prewar attitudes.

By 1939 the armed services had been so long starved for public support that they were in no position to take the initiative. The public attitude and the official position of the government had been strongly pacifistic. Recall the sharply negative American reaction to President Roosevelt's 1937 'quarantine' speech in which he proposed that the fascist nations should be held by the rest of the world forcibly within their present boundaries. Remember the neutrality laws, designed to prevent any action that might draw us into armed conflict in case a foreign war should develop.

A conversation that illustrates the American temper of the times comes to mind. Professor Werner Heisenberg, one of Germany's leading scientists, had come to Chicago in the summer of 1939 to attend an international conference on cosmic rays. He believed that Germany was ready to go to war, with the

intention of gaining control over Europe. He asked me what the United States would do in such an event. My reply was that Britain would have no alternative but to go to the aid of France, and that eventually the United States would go in on the side of Britain.

'What makes you think so,' he asked, 'when your laws and your votes all seem to mean peace?'

'In part it is the change in attitude that I saw in our nation during the First World War,' I replied, 'but even more, it is a sensing of the feeling of our people. They don't want war, but they don't want to stand by either when they think injustice is being done. As you know, the whole background of our history shows that there is fighting blood in our veins.'

'Are you sure of this?' he asked.

'There is no doubt whatever,' I replied.

'Can't the President make some statement, so that the political leaders in Germany would know what to expect?' was Heisenberg's truly anxious question. 'There is still time for them to reconsider. In Germany the calculations are made on the assumption that your neutrality laws mean what they say, that the Americans will let the Europeans fight out the next war for themselves.'

'It's too bad,' I replied. 'Your German leaders made the same error in judging the American attitudes in 1914. But if Roosevelt were to state in public that we would go to war to save the other nations of Europe from being conquered by Germany, he wouldn't be President any more. The American people just are not ready to think of war.'

'Indeed it is too bad,' was Heisenberg's comment. 'As I understand it, the German military staff believes that they can overcome anything that Europe and Britain can bring against them. But if they thought America would come in against them they would fear eventual defeat.'

Another conversation also illuminates the American attitudes

of this period. A luncheon conference immediately after Britain's declaration of war against Germany in September 1939 was held in the top-floor private dining room of the Times Building on Times Square. The group was called together to consider the editorial policy that *The New York Times* should take in commenting on the war developments. The publisher, Mr. Arthur H. Sulzberger, presided. Present were a dozen men from the editorial staff and from the board of directors. I do not recall the precise words that any of them said, but even I was startled at the confidence of these experienced journalists that before too long the United States would be in the war as Britain's ally. Our nation was unprepared in its mind for the part it must eventually take. How could their newspaper do its part in preparing the country for what lay ahead?

What I remember most vividly of this meeting was its effect on my son Arthur then aged twenty-one, the only young man in the group, who by chance was with me. He was deeply shocked by the way these responsible 'old men' talked of a war that the young men would be called on to fight.

His reaction was that of the very large majority of Americans of his generation. Most of us, having been led to believe that our war 'to make the world safe for democracy' had been futile, were convinced that war was wrong. Hence our neutrality laws. We would have no part of war. This doctrine was preached from the pulpit, taught in the schools, and drummed upon by an influential segment of our press. To those who had been born during the First World War this was almost the only view that they had heard expressed. True, peace is not possible nor ethically permissible in a world where there are nations that will use force when necessary to gain their selfish ends. But this was too unpleasant to contemplate. We would avoid war simply by not fighting!

Not all the nations went through this experience of pacifism. The militarist spirit as developed in Italy, Germany, and Japan