Scientists and Mobilization

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IN THE OFFICE of Science Service there is a photograph that sums up all the exasperations and gripes of scientists about the use made of them in World War II. It is a picture of one of the young Science Talent Search winners, in Army dungarees, cleaning out a garbage can.

Now that events in Korea have turned the cold war into a warm war, planning for a possible full mobilization becomes more urgent, even while we hope to keep the Korean war from developing into a general conflict. The roles of the scientist, the technician, and the engineer will be vital if full mobilization becomes necessary. Their skills must not again be misused. This time we cannot afford it.

In the days of the American Revolution, fighting was a matter of individual choice. A musket, some ammunition, and a little food—all of them stock items around the house—sufficed for a little fighting. In the Civil War, young men could be drafted, but deferment was possible for those who could pay for substitutes. By this time there were better rifles and more artillery. Technicians were needed to make the trains run and keep the telegraph going, but the role of the scientist was limited almost entirely to experiments with observation balloons and the development of ironclad ships. These, incidentally, were invented by a Korean admiral in the sixteenth century.

In World War I, the United States only partially mobilized. Four million men were in the service, two million went overseas. Fourteen million men served in uniform in World War II. Its climax was a scientific event. The knowledge of scientists, technicians, doctors, and engineers was put to use in such a manner that the entire scientific world nearly used up its stock of basic knowledge. For five years almost everyone who had spent his life in pure research was busy applying his results and the results of others to the problem of winning a war.

On September 18, 1940, President Roosevelt put his hand into a fishbowl and drew out a number. This started Selective Service—based on the principle that those men who were physically and mentally fit had the obligation to defend their country as members of the armed forces. The Army thought that, if enough men were drafted, it would have all the cooks and automobile mechanics and typists and medical orderlies it would need.

In 1940, there were up to ten million unemployed, but the draft, and defense contracts, began taking up the slack. Even so, it was not long before it became evident that, despite the surplus of manpower at the beginning of the war, the supply might have to be husbanded and allocated to keep the civilian economy and war production going while the largest armed force in American history was built up. It also became evident that, in some occupational categories, there was no surplus of manpower; there was a shortage.

It was found that some people with special skills would have to be deferred, and instead of depending on finding the skills they wanted in the general draft pool, the armed forces might have to go after specific people with special skills. This was particularly true of men in scientific, technical, and engineering fields. These problems came up one by one, and, in one way or another, they were met, one by one. In this manner, the nation muddled through. And despite the muddling, the A-bomb was produced.

President Roosevelt tried to solve the problem. In January, 1944, he asked Congress to pass a National Service Act, based on a joint recommendation of the War and Navy Departments and the Maritime Commission:

> When the very life of the Nation is in peril, the responsibility for service is common to all men and women. In such a time there can be no discrimination between the men and women who are assigned by the Government to its defense at the battlefront and the men and women assigned to producing the vital materials essential to successful military operations. A prompt enactment of a national service law would be merely an expression of the universality of this responsibility.

No such act was passed.

In the meantime, for the scientists, confusion reigned. Some were deferred, but had to report back to their draft boards every six months to defend their

deferments. Some were drafted for specific projects, and when the specific tasks were completed—or the military thought they were completed—the scientists found themselves toting guns. Some were just drafted.

On one occasion the Army rushed to the American Psychological Association in desperate need of a hundred competent psychologists. The APA went through its files and supplied the names of one hundred men already in uniform and doing such things as clerical and administrative work, and even KP. Three times the Army built up radar research staffs for specific projects; three times the job was thought to be finished and the staffs were dispersed through the Army. The third staff had neither the experience nor the knowledge to do a proper job.

The general theory was that a young and healthy man wasn't giving his all unless he was in uniform. A clerk typist in the Pentagon got free drinks in Washington bars—a civilian technician back from New Guinea or the Philippines was asked what he was doing out of uniform. But still the war was won and scientists, as scientists, played a crucial part in the victory.

As the cold war developed, many responsible persons in the Defense Department, in civilian branches of the government, and in the scientific societies vowed that, if full mobilization should come, the manpower mistakes of World War II would never be made again. Some of them started to make plans based on the assumption that the cold war might turn suddenly into a hot war, amid the dropping of A-bombs. Immediate full mobilization would be the result, and that was what they were planning for.

But Russian-backed North Koreans attacked, and the nation was faced with the necessity of accomplishing a partial mobilization. Today there are many half-made plans for a full mobilization, the necessity for partial mobilization, and no adequate realization, much less knowledge, of what the basic manpower problems are.

In the Defense Department, for instance, many offices are concerned with some phase of scientific and technical manpower. There is the Personnel Policy Board, the Research and Development Board, the Munitions Board. There are the Army, Navy, and Air Force personnel offices, the Army and Air Force research and development organizations, the Office of Naval Research, and the Bureau of Personnel. In addition, almost every technical service, corps, and bureau have the responsibility for formulating requirements for scientific and technical personnel. There are other offices besides—having to do with specific phases of the Defense Department's manpower needs. Outside this department there is Selective Service, the Department of Labor, and the National Security Resources Board. With semiofficial status is the Office of Scientific Personnel of the National Research Council.

All these agencies are working in the dark so far as two things about scientific, technical, and professional manpower are concerned: They do not know how many people make up the manpower pool, much less what skills they have; and they have made no real estimate of scientific manpower needed for the armed forces, war production, and the civilian economy in a full mobilization. They are further handicapped by the fact that they must make plans for a partial mobilization even as that partial mobilization is going on. And they must try to make sure that partial mobilization does not interfere with plans for full mobilization.

The National Security Resources Board is supposed to have the top authority for determining the uses to which manpower will be put. It advises the President in this and many other fields and, presumably, what it says will be done. It hasn't said very much, but there is evidence that it has done more planning than has been announced. The several versions of the Gurney Bill, recently enacted by Congress, reveal some of the thinking of the NSRB, the Defense Department, and members of Congress on the problem of scientific personnel. As the bill was passed, it gave Selective Service the power, within certain limitations, to draft doctors, dentists, and persons in "allied categories." During its trip through Congress, however, it picked up an amendment, later dropped, which would have permitted the registration and drafting of persons in "professional, technical, scientific, specialist and other occupational categories."

There was considerable argument over this new provision, specifically whether the power to draft should be in the hands of Selective Service or in the hands of President Truman. NSRB favored placing the power to draft persons in the President's hands, on the assumption that he would appoint civilian boards to handle the various occupational categories.

While these provisions were being considered, NSRB revealed to a Congressional subcommittee part of its thinking on how to direct the manpower situation in a full mobilization. This seems to entail a radical revision of our historic methods of drafting men in time of war. Instead of drafting men by order number and hoping, in the general pool, to get the skills needed, NSRB plans envisage drafting some men by occupation. Also, the Defense Department would not make its requests for men directly to Selective Service. Its requests would have to be screened by manpower boards set up by the President and either granted or scaled down, as the over-all man-

power situation would permit. These manpower boards would presumably be composed of outstanding civilians in the occupational categories encompassed in the plan. Selective Service would merely perform the mechanical job of getting men into uniform.

If such a system is to work, it must be based on information. The old roster of scientific personnel was dropped in 1946 because of lack of appropriations to keep it up. A new start has been made at the behest of the NSRB by the Office of Education. People who realized the vital necessity of this kind of personnel data saw in the proposed, and dropped, enforced registration of all scientists and technologists a quick and sure way of getting basic facts, and getting them completely. The roster was seen as one of the main jobs of the new National Science Foundation. As this is written, however, the House has refused to appropriate any money for the foundation. The money is back in the supplemental appropriations bill in the Senate, but the immediate fate of the foundation hangs in the balance.

Within the Defense Department today there is certainly more realization than there was during World War II of how important our scientific manpower resources are, but there is still a tendency to look upon scientists as just another group of skilled men. The Department is naturally eager to get its hands on as many of the best as possible, sometimes without fully understanding just what it is going to do with them.

Outside the government the National Research Council has been most concerned with the manpower problem. M. H. Trytten, director of the Office of Scientific Personnel, is on a committee of the Selective Service Board trying to advise General Hershey about draft policy in connection with scientific skills. This committee is handicapped by a basic provision of the Selective Service Law—that local boards have the say about who is to be drafted. National Selective Service can only advise local boards as to their deferment policies. Dr. Trytten is also participating in meetings with NSRB manpower planners. In both these duties, he is further handicapped by the fact that the NRC is a semiofficial agency of the government. If he or the members of the National Research Council should disagree with a manpower policy set forth by the government, this position makes it difficult for them to protest or to take any independent action.

Scientific societies are only beginning to be concerned with the over-all problem. Sporadically one of them produces some information about the manpower pool in its own particular field or warns that things are drifting and something should be done. But, just as no one in the government has completed a study of the problem, so, too, the scientific societies have taken few, if any, steps to discover the thinking of scientists and technologists about manpower, or to present that thinking with some kind of a concerted voice.

At the moment these specific problems demand serious attention on the part of scientists:

1. What to do about that "significant proportion" of our scientists and engineers who are reserve officers. There are the Research and Development reserve units of the Army, numbering about 3,500 officers. But, in some industrial laboratories, up to 35 percent of the younger men are in the reserves, many of them with armed forces classifications that are unrelated to their civilian skills. The calling up of one or two such men from a laboratory may break up a research team. World War II Naval officers remained in the reserves whether they liked it or not; Army and Air Force reserve officers are there because they wanted to be. But every reservist can see to it that his classification fits his present-day skills. Perhaps there should be a method of transferring some of these reserve officers out of the armed forces into some new unit, which would be empowered to assign scientists to any place where they would be most useful.

2. What position to take in regard to Universal Military Training. Britain, which seems to have handled the problem of skilled manpower more intelligently than has this country, insists that every young man take two years of military training. Sometimes this training is delayed so as not to interfere with a man's education, but whether he be a future Oppenheimer or a future chimney sweep, he must learn how to handle a gun and, more important, learn what the armed forces are all about.

3. What policies to follow in this partial mobilization. One point of view is that present plans for enlarging the armed forces should not affect research and development for defense. Greater numbers of scientists and technicians in uniform will not quicken the progress of weapons development very much, yet, in these days, almost every echelon of almost every arm and branch of the service needs some scientific or technical skill on the operational level.

4. What to do about full mobilization. It must be taken for granted that most scientists, technicians, and professional persons in this country believe: (*a*) That there is a threat to our country and to the kind of civilization that best nurtures scientific progress, and that the threat may require a total war; (*b*) that, if this total war should come, there will be a pressing need for all our present scientific brains and skills, a need to train many more people, and a need to see that these people are used to the nation's best advantage; (*c*) that scientists, men and women, young and

old, have a duty to serve. This duty is the same as that of any man or woman who might be drafted. Scientists expressly do not wish to be thought of as an elite corps above the "common herd," but they believe that, because of the complexity and multiplicity of their skills, they present a special problem.

With these beliefs in common, it is the duty of the scientists themselves to contribute answers to that special problem. Scientists probably would go anywhere, provided they had confidence in the ability of those who give the orders to assess their worth to the country and to use it to the fullest extent. If, however, scientists subscribe to what amounts to a national service act for themselves, there would have to be answers to such problems as wages, hours, and working conditions, reemployment rights, benefits, methods of enforcement, and discipline. It might be argued that an individual research chemist best knows what he can do best for a war effort, and therefore should be allowed to volunteer to do that. This might work, but the rest of the nation, seeing their sons and brothers and husbands without the opportunity to choose between carrying a gun and working in a factory, would not permit that.

It would seem, then, that scientists, technicians, and professional people can only volunteer themselves in a body, and, once they do that, they can lay down certain conditions for their service—conditions designed not for the welfare of the scientists but for the welfare of the nation and of world civilization.

Charles Taylor Vorhies: 1879–1949

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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE lost a Fellow and a past president (1933) of its Southwest Division, in the sudden death at Washington, D. C., March 10, 1949, of Charles T. Vorhies, head of the Department of Entomology and Economic Zoology of the University of Arizona for many years. Dr. Vorhies had gone to Washington to attend the annual meeting of the National Wildlife Federation, of which he was vice president and chairman of the Committee on Conservation Education.

Born in Henry County, Iowa, September 7, 1879, Dr. Vorhies attended public schools and received the B.S. from Iowa Wesleyan College in 1902. At the University of Wisconsin in 1908, he was the first to receive the Ph.D. in zoology. He was professor of zoology and botany at the University of Utah and served also as acting dean of the Medical School from 1911 to 1913. In 1915 he moved to Tucson and the University of Arizona.

Dr. Vorhies worked steadily for the conservation of natural resources. He was a leader in the founding of the Arizona Game Protective Association, the Tucson Natural History Society, and the Arizona Wildlife Federation, which he served for many years as secretary-treasurer. His approach to conservation was never that of a blind sentimentalist; he put much stress on the importance of continued and unhampered research.

Dr. Vorhies was a man of extraordinary versatility. Originally an entomologist (his graduate studies were on Trichoptera), he later contributed importantly to other fields, especially vertebrate zoology. His leadership in the science of bioecology was recognized in his election as president of the Ecological Society of America in 1939.

The southern Arizona desert was Dr. Vorhies' laboratory, and he made good use of it, both in his research and in his teaching. His first trip to the then remote Santa Rita Mountains was in the summer of 1918; for years thereafter he followed the changing conditions of grass, shrubs, rodents, and rabbits on the Santa Rita Experimental Range. Thus he gradually developed the concept of "animal weeds," the abundance of which was the effect of an overgrazed range rather than its cause. In the earlier years of this research, the automobile was still rather new and the roads were poor. Dr. Vorhies became a skilled mechanic, an ability added to his knowledge of other such unrelated arts as cooking, fishing and other sports, music, and literature, as well as the sciences. He lived an exceptionally full life.

Dr. Vorhies was especially interested in the methods utilized by different animals to control water loss, and in their ability to live under arid conditions with little or no moisture. His most important paper was probably his "Water Requirements of Desert Animals in the Southwest" (*Univ. Ariz. Agric. Exp. Sta. Tech. Bull. 107*, 1945). His work at the Santa Rita Experimental Range produced three other outstanding bulletins, written in collaboration with Walter P. Taylor, on the relation of mammalian numbers and food habits to range forage plants. Their bulletin on *Kangaroo Rats*, published by the U. S. Department of Agriculture in 1922, was a pioneer accomplishment; it combined close observation of the animals' habits and life history with the effect of varying animal populations upon range production. Later bulletins on *Jack Rabbits* (1933) and *Wood Rats* (1940) were published by the University of Arizona's Agricultural Experiment Station.

Ever since the 1870s, the lush grasslands and abundant