GENERAL SCIENCE

Science Is Decisive

Present War Is a Battle of Scientific Wits in Which Outcome Depends On Who Can Get There First With Best

By WATSON DAVIS

THIS is a war of science, research, invention, engineering and technology. In all history the military forces have never been so dependent upon the new devices and methods that ingenious men not in uniform have thought up and created.

Science and technology are not only prime factors in fighting the most ruthless and mobile of all wars. They are decisive in the survival of the civilization in which we live.

The fortunes of war today are being determined by brilliant aeronautical advances diverted into planes of war—longer range pursuit planes, speedier dive bombers, heavier bombers—by bountiful technological production for a brave new world betrayed to purposes of destruction; by keen understanding of human motives betrayed into pernicious psychological warfare; our enemies, plotting for a decade or two to take the offensive (which those of goodwill could not bring themselves to believe), stole the tools of technology and converted them into weapons of plunder.

Eventual victory over the Nazis and the Japs is being built in the scientific laboratories and the technical plants of America. The speed of Victory will be determined by the speed and completeness with which those in military and economic authority heed the advice of the technically competent experts.

If technology is not given a commanding voice, disasters will continue and the plague of war may get out of hand.

If keen insight into the pattern of the future and good scientific counsel hold sway, the war will be shortened, long and hard though it may be.

Already in Front-Line Use

Important U. S. A. achievements in science and technology are in front-line use by our war forces.

Airplanes are detected many miles out at sea by new and revolutionary radio devices. These are secret devices of great practical usefulness in obviating surprise attacks by raiding planes.

New explosives of importance have been devised and put into production for this war.

Vaccines for yellow fever, typhus, and other diseases are in practical or experimental use to protect troops from the disease dangers of war.

Sulfa drugs and other chemicals, perfected and made in American laboratories, are reducing the losses of life and limb due to battle wounds.

There are many other new science developments serving in the war. Secrecy demands that many of them shall not even be mentioned.

Fighting for Two Years

For two years science and technology have been fighting this war actively. As vigorous as any branch of our defense was the plunge into war preparation of the scientists when France fell in May, 1940.

There was an acceleration of the tempo at existing government laboratories, such as the Naval Research Laboratory and other Navy research stations, Wright Field and other Army experimental stations, the laboratories of the National Advisory Committee for Aeronautics, the National Bureau of Standards, etc. As in every war since its creation by Abraham Lincoln, the National Academy of Sciences, and its National Research Council, took on renewed activity.

New organizations within the government were created to enlarge and accelerate the application of science to war. One of these was the National Defense Research Committee which last fall blossomed into the Office of Scientific Research and Development. Another was the National Inventors Council, which was given the job of receiving and evaluating the thousands of ideas and suggestions on winning the war that the public wishes to offer the government. The search for strategic minerals within the United States through the U. S. Bureau of Mines and the U. S. Geological Survey received renewed impetus. Many regular agencies enlisted in the war for the duration.

To advise is about as far as scientists and engineers can go in actually fighting the war with their new weapons. The military must use tools furnished them. The scientists can advise with some vigor and emphasis. But secrecy is necessary to keep the enemy from knowing what is being cooked up in the laboratories and readied on the invasion barges and in the bellies of the bombers. And secrecy can hide inaction as well as surprising, aggressive preparation. As with production and military action, the great problem is getting there first with the most and newest. If the enemy pulls a new one out of the laboratory, we must counter promptly and if possible raise him one. Or raise him before he has a chance to deal it out.

Classic example of applying the antidote in this war was the neutralizing of the magnetic mines of the Germans by the degaussing belts for ships developed by the British.

"The U. S. is now paying a crushing price for the belated technical education of its bankers and public servants."

This is the judgment of an article in *Fortune,* which says that the ultimate decision for action or nonaction upon essentially technological matters has rested in the hands of men "who were without the capacity or the spirit to make the correct technical decisions."

These are some of the technological blunders cited: A belated heavy, long-range bomber program, exasperatingly sluggish progress in getting adequate fire power and high-altitude performance into fighter planes, continuing failure to provide any emergency types of long-range fighter planes, failure to create sufficient stockpiles of strategic raw materials, except manganese, failure to convert industries to war production, failure to expand adequately aluminum and magnesium production, failure to produce enough strategic metals from low-grade domestic ores. And not least, the synthetic rubber plants that were not begun early enough.

Industry Expanding Vastly

Industry is expanding vastly under the war impetus. Science and engineering must direct most of this vast increase. For instance, the manufacturing chemical industry will practically double in structure and value during the present year, Dr. Walter S. Landis of the American Cyanamid Company estimates. Industry's expansion concerns basic stuffs, steel, explosives, synthetic plastics, and

thousands of other things. Science and research provide substitutes, and when substitutes become scarce, substitutes for substitutes. Silver goes to work for a change. Other things do the work of shellac, tung oil and other products of Asia and the East. And there are many useful and necessary gadgets: Air sirens, blackout lamps, fences that hear and electronic robots that replace watchmen.

Manpower Critical Problem

Manpower for the scientific war is one of the critical problems. Already most of the physicists and radio engineers are in the service of research, more than 3,500 for NDRC alone. For the Navy 25,000 women with radio experience are being sought. Radio amateurs to the total of 15,000 are in the armed services. Physicians are being assigned to posts in the uniform and to serve industry and civilians. Industry is searching for technically trained men. Every college graduate in science and engineering has several jobs waiting for him. Because this is to be a long war there is a growing realization that the boys and girls now in high school, particularly those with scientific promise, must be sought out and given opportunity to do the job they are best fitted for. Intensive short courses in engineering are training thousands of them for immediate jobs in industry, while others will find opportunity in accelerated courses in technical schools.

Science Talent Search

Thousands of high school boys and girls of potential scientific ability will be brought to attention by a science talent search being conducted by Science Service as one of the activities of Science Clubs of America. Twenty Westinghouse science scholarships will be awarded.

Under present conditions youth must come into active service earlier than has been customary in the past. If the war lasts five years longer, the boys and girls now 13 will be needed for fighting or production. In scientific research youth is no handicap, it may even be an advantage, once the basic foundations of past progress are known. Remember that Perkin was in school and 18 when he discovered mauve, that Hall was 26 when he produced aluminum, that Newton was 19 when he worked out the principles of gravitation.

We must begin an intensive search for genius, or at least talent in science. Those who have been endowed by nature and their ancestors and by their training and environment with a flair for science and research must be allowed to use that ability to the best interests of our war effort and our civilization. We must see to it that the unusual boy or girl gets an opportunity to go to college or technical school and is channeled into a definite specialized responsibility in our growing national machine for fighting and producing. We must see to it that the exceptional boy or girl is given the basic education that will allow him to become a leader in the important reconstruction after the war.

More than 50,000 inventive suggestions have been offered by the American public as an aid to winning the war. Some of these ideas are in actual use by the armed forces. There is still opportunity to help in this way. Suggestions should be addressed to the National Inventors Council, Department of Commerce, Washington, D. C. Lawrence Langner, secretary of the NIC, has suggested that anyone intending to invent should ask himself this question: "What would I do if I were the Commander in Chief of the Army and Navy and could use any invention which I could devise?"

Science News Letter, May 2, 1942

FITTING MEN TO WORK

For such "tight spot" jobs as this one of bucking up the rivets inside a wing, several aircraft manufacturers are using midgets. This man is only four feet tall and weighs 88 pounds.

PHYSIOLOGY

Unknown Mechanism That Starts Blood Flow Found

FOR the first time, the mechanism that starts the blood circulating through the lungs at birth has been discovered. The finding, by Dr. J. Allen Kennedy and Dr. Sam L. Clark, of Vanderbilt University School of Medicine, was announced at the meeting in St. Paul, Minn., of the newly organized American Federation for Clinical Research.

Prevention of the incurable form of congenital heart disease whose victims are known as "blue babies" may follow.

The newly-discovered mechanism is a muscular contraction which closes the ductus arteriosus. This is a channel between the pulmonary artery and the aorta which before birth shunts the blood so that it bypasses the lungs. Normally it closes at birth. If it did not we should all have congenital heart disease, with blue skins because our blood did not get enough oxygen.

There have been many theories of how the ductus closed, Dr. Kennedy pointed out, but none were founded on scientific fact. He and Dr. Clark found that the ductus is different in structure and reactions from other large arteries.

"We have observed that it closes by a muscular contraction and that in response to certain definite stimuli it will close," he reported. "At birth it normally closes within a few minutes and remains closed.

"The best method of causing closure of the ductus is inflation of the lungs with air or oxygen, either by normal breathing or by an artificial inflation method. Both are effective. Oxygen is apparently a necessary component of the gas mixture. Certain other stimuli will also cause prompt closure of the ductus.

"As an outgrowth of this work we have developed a new conception of the cause of patency (failure to close) of the ductus arteriosus. Instead of being caused by a developmental anomaly or true malformation, which has always been the accepted cause, we believe it is due to the failure of a normal physiological mechanism which should occur at birth, probably closely related to normal breathing and normal oxygenation of the blood after breathing has begun."

Science News Letter, May 2, 1942