

GENERAL SCIENCE

# Science for Defense

## It Is Comforting to Know in World's Emergency That Scientists Are Hard at Work on Essential Tasks

*Excerpts from a luncheon talk by Watson Davis, Director of Science Service, Washington, D. C. before the Department of Science Instruction, National Education Association, Hotel Somerset, Boston, Mass.*

**O**VERSHADOWING almost everything else these critical days is the application of almost all our energies and our science to rescuing the world from forces of darkness. Our science and our civilization are on the defensive. We must assume the offensive. There is greater need now for clarity in thought, teaching and doing than in more peaceful times.

Creative and aggressive application of science is called for to meet the present emergency. Research, experimentation and invention are as important to national defense as the airplanes, ships, tanks, and guns used by the military forces. In a large measure the weapons and the means of protection against weapons are created by science.

The scientist should not be blamed for the use to which the world puts his brain children, any more than a mother of a soldier should be taken to task. The airplane is first a means of peaceful transportation, and only incidentally used to carry death-dealing bombs. Our mechanized army is merely an adaptation of the millions of the useful automotive vehicles that fill our highways. The butcher knife is no less necessary and useful because a few misguided individuals use it to slit human throats.

### Scientists Hard at Work

It is comforting to know that in the present world situation scientists are hard at work on essential research tasks of vital importance to our defense effort. In almost every university and industrial laboratory there are teams of scientists hard at work on secret problems that will aid our defense efforts on all fronts.

Many of these problems are directly concerned with aerial, sea or land warfare, but many of them will bring important benefits to the population at large. Some of the social benefits of the defense effort, put into use by the neces-

sity of the emergency, should be long lasting.

Typical of these benefits to the whole population is the addition to flour and bread of vitamins and minerals which will heighten morale and benefit health. The most important of these additions is vitamin B<sub>1</sub> or thiamin which is generally lacking from our daily diet, and which is needed every day to keep us from becoming irritable, morose and uncooperative. This vitamin, riboflavin and iron are being added to "enriched" bread and flour, as the result of the cooperation of scientists and the milling and baking industry.

### Secret Weapon?

Dr. Russell M. Wilder, of the Mayo Clinic, Chairman of the National Research Council's nutrition committee, believes that Hitler's "secret weapon" may be the taking away of vitamin B<sub>1</sub> or thiamin from the diet of the conquered countries. A little thiamin deficiency is associated with irritability, but much or long-continued deficiency is more likely to result in depression, exhaustion and feelings of inferiority. The Germans are said to be making the fullest use of the newest knowledge of nutrition in the prosecution of this war, particularly, in reference to the excellence of the nutrition of their armed forces. Rumor has it, according to Dr. Wilder, that the Nazis are making deliberate use of thiamin starvation to reduce the populations of the occupied countries to a state of depression and mental weakness and despair which will make them easier to hold in subjugation.

Scientific research has been greatly accelerated in the government's many scientific and engineering laboratories, such as those of the National Advisory Committee for Aeronautics. In a very large measure the modern airplane is a creation of the engineers and scientists of the NACA, who added many miles per hour to the speed of war and peace planes without cost of extra fuel or power by making them aerodynamically smoother. Research is rushing in the many laboratories of the National Bureau of Standards, the U. S. Bureau of Mines and the

Geological Survey. The mining experts and geologists are searching intensively for new deposits that can supply much-needed strategic minerals, such as tungsten, manganese, mercury, tin, etc.

New organizations have been created to do research for the military forces. There is the Office of Scientific Research and Development that contacts and coordinates vital defense investigations. The National Defense Research Committee has over 200 secret projects under way. These involve the science facilities at 80 of our large universities and personnel at 30 large industrial laboratories. It is estimated that a fourth of the physicists of the nation are in defense research and many of them are working on NDRC projects. The Army and Navy undertake much research directly but in these urgent times the normal military research of the nation has been increased many fold by the extensive organization of projects under the NDRC.

The important function of receiving and evaluating the many suggestions offered by the public to help our defense effort has been undertaken by the National Inventors Council. This group of \$1-a-year engineers and experts, with the aid of a staff located in the Department of Commerce in Washington, has already received and reviewed over 25,000 suggestions, some of which are already being put to use by the Army and Navy.

Medical and psychological experts are being mobilized for defense research by the National Research Council, the operating agency of the National Academy of Sciences.

### New Ideas Wanted

One important fact may not be appreciated by the public. It is that the officers of the Army and Navy charged with making us strong in a military way are open-minded as to new ideas. As a matter of fact, they are eager for new ways to do things. If a new weapon is developed you may be sure that they will use it.

Psychological aspects of defense are more important in these times than ever before. Experts on human behavior, or misbehavior, perhaps it should be called, can help in our national protection against ideas and ideologies that do vio-

lence to our cherished ideals of democratic methods and procedures.

Unprincipled force wielded by the totalitarian dictators must be fought by all the weapons at our command. It may well be that we can develop and apply moral and psychological weapons that will prove to be as important as men, airplanes, ships and tanks.

More normal scientific developments of outstanding importance are continuing at an accelerating rate. Some of these fundamental and peaceful researches may be retarded by the concentration of personnel and laboratories upon military problems. But there is cross-fertilization between the emergency and the more normal activities. Some discovery for war purposes may be extremely useful when the world becomes peaceful.

### Important Developments

Picking a few of the most important of the newer developments in various science fields:

1. The chemical cures of diseases, through the sulfa drugs. The pneumonias and other various infections, dozens of them, have lost their deadliness, thanks to these chemical treatments.
2. Frequency modulation (FM) radio promises a revolution in broadcasting.
3. The newer knowledge of nutrition, the further exploration of the vitamins, carrying with it the possibility of banishing hidden hunger from the land.
4. Science's newer attacks upon mental disease, such as shock treatment for schizophrenia.
5. Continued development of aviation, making it the foremost method of speedy transportation, as constructive for peace as destructive for war.
6. The development of synthetic plastics—made from air, water, coal, oil, gas, salt, lime—to compete with metals, silk, glass, and perform many new tasks in our plastic world.
7. New understanding of the extent and composition of the universe and the nature of the atom.
8. The use of new methods in genetics to produce bigger and better kinds of animals and plants for our farms.

### Opportunity for Teachers

Science teachers have an immense responsibility in this troubled world. Human beings must know how to think straight and scientifically if the world is to be rescued from the plague of intolerance, emotional ignorance and aggression that afflicts it. Sane and effective persons have their abilities and person-

alities molded by home, community and school.

In the school, science must not be confined to the science courses. Science must take the offensive and penetrate its methods and its content into English, history, language, and even athletic curricula. The science courses must not be diluted and distorted by the old authoritarian cult of decreed knowledge, smacking of the false, outmoded, revealed wisdom of the ancients (and the Nazis) which has done so much to block human progress. The experimental attitude must prevail, the courses must be taught experimentally, the teachers must be experimentally minded in a perpetually unfinished experimental world. The science teachers must transmit to teachers in the other subjects the beneficent antibodies of straight thinking that do so much to create an effective civilization.

We should rejoice in the teaching tools that are available these days: Texts that spur the student onward in his exploration of the universe around him, exhibitions and museums of both historical and current content on a "do-it-yourself" basis, radio programs, phonograph records, motion pictures, that condense into minutes content that might take weeks to absorb by older methods.

Newspapers and magazines provide supplementary reading for science courses, new every day, that must not be overlooked. Science magazines, such as the weekly SCIENCE NEWS LETTER, have their important place for both teacher and student. Science Service has also made it possible for anyone to receive each month, and keep for his own, highly interesting and educational THINGS

of science, an educational service that has been received with much enthusiasm.

Paramount to all the helpful and almost necessary accessories to science teaching is the scientific attitude or method. Without the scientific way of thinking and doing all else is futile and misdirected.

The reason we teach science and take science to the people, as I see it, is because we are convinced that it is the successful method of doing and thinking. Much of our battle upward is a conflict between science and superstition. It is astronomy vs. astrology, fact vs. hearsay, experiment vs. dogma, planning vs. trusting to luck.

In these perilous times for so many areas of the world, we can not reaffirm too often that the scientific way is the democratic way. The methods of science will make democracy work if they find their way to the public. Tests of reason and experience can weed out the charlatan, the incompetent and the unworthy in high and low places in our people's business, if we see to it that democracy is free to operate. Freedom to practise the scientific method in the everyday world as well as in the laboratory is of importance equal to freedom of the press and assembly.

When we see the cramming of thoughts into dictator-wrought molds, the exiling of the brains and bodies of the human cream of great nations, the suppression of even the hollow shell of freedom over the great areas of this earth, we are thankful for the conditions under which we live and which we are resolved to maintain.

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