

GENERAL SCIENCE

# National Security Lessons From Human Physiology

**Dr. Walter B. Cannon, Retiring President of AAAS, Points to Readiness of All Body Parts To Act Together**

**L**ESSONS for the security and stability of the nation can be learned from a study of the workings of our own bodies, Dr. Walter B. Cannon, noted Harvard University physiologist, declared in his address as retiring president of the American Association for the Advancement of Science. Dr. Cannon titled his talk, "The Body Physiologic and the Body Politic."

Security and stability, ardently desired by all thoughtful citizens and striven for by statesmen, are indispensable for the individual body, Dr. Cannon emphasized at the outset of his address. Let the body temperature drop below a certain point for even a short time, let the blood content of oxygen or its alkalinity or its sugar concentration fluctuate too far outside certain narrow boundaries, and serious consequences, even death, follow promptly. Yet so great has the unconscious wisdom of the body become in the course of millions of years of evolution that all these vital balances are automatically maintained, with never a need for directing thought on the part of the brain.

Yet, said the speaker, in addition to the regulatory arrangements which work for stability, we should recognize the significant fact that "our bodily organization is set up, as a rule, with a large margin of safety. Except in parts of the brain we are not built on a scant and skimpy plan. For example, we have two kidneys, we need only one; we carry much longer intestines than are actually required; half of the lung area, half of the thyroid gland, more than half of the pancreas can be removed without markedly altering the uniform state of the fluid matrix. When we consider the possible damage to organs by accident or disease this liberal mode of construction is obviously important for the persistence of the organism."

Another highly important factor in maintaining bodily security in an unstable world is its ability to make emergency alterations in its own "internal environment." Realization of danger causes a rise in adrenalin secretion, and this in turn a quick rise in blood sugar concen-

tration, making increased energy available for fight or flight as the situation may dictate. Against smaller foes from the world of germs the body makes its own kind of chemical warfare, with anti-toxins, or the blood recruits increased numbers of its "soldier cells," the white corpuscles.

Key positions and vital labor supplies are recognized by the body, too. In accidents, or during starvation, the most protected organs, and the last to suffer, are the directing brain and the pumping heart.

All of these bodily functions, and others as well, can be studied profitably by the physicians of our body politic, Dr. Cannon suggested. Not, he added, that the analogy should be pushed too far, comparing muscle cells to laborers, bankers to fat cells, etc. More profitable, it would seem, is to think in terms of functional balance, in state affairs as well as in bodily physiology.

Obvious to everyone, Dr. Cannon indicated, is the fact that the body politic is nowhere nearly as well coordinated as the body physiologic. Especially distressing is the lack of internal regulators in the social body. Instead of correcting drifts away from optimum conditions, our tendency as a body politic seems to be to get caught in cumulative difficulties; a run on a single bank starts runs on others, until we are in a financial panic; a period of high production is followed by a time of slump and unemployment. The body politic seems to be chronically prone to chills and fever.

In the nutritional analogy, however, things are a little more satisfactory, Dr. Cannon admitted. We have learned to store surplus food by freezing or heat-sterilizing it, so that the spoilage and waste that used to contribute to later famines have been materially reduced. He also noted with approval the economic measures recently taken by the government which allow the withholding of surpluses in fat periods, for disposal when times become leaner.

"Instant readiness for defense against dangerous and destructive enemies is also suggested by the body," Dr. Cannon continued. "We have noted that, when faced with the necessity of physical combat, almost every part of the organism is almost at once intensely aroused to defensive action and that, for gaining victory, mobilization of the (Turn to Page 408)



## NEW SPEED IN PHOTOGRAPHY

Three pioneering photographers are happily trying an innovation of photography, a  $1/30,000$ th second flash outfit that can be carried around by the photographer. Prof. Harold Edgerton is using his new equipment powered by a battery in the case that is slung from his shoulder. It will be six months or a year before this apparatus that Prof. Edgerton is testing on Dr. C. E. K. Mees is put on the market. G. W. Wheelwright, of polaroid fame, is looking on. The photograph was taken at the conference on Photography held by the Carnegie Institution of Washington in connection with their annual exhibit. Dr. Mees, vice-president and director of research of Eastman Kodak Co., answered questions about the Eastman products and how they could be more effectively used by scientists. Prof. Edgerton talked about his high speed flash technique and Mr. Wheelwright showed many of his slides that gave the impression of depth.