News of Science

Sleep and Cerebral Oxygen Consumption

Numerous hypotheses have been elaborated in attempts to explain the puzzling phenomenon of sleep. At one time or another sleep has been attributed to arterial anoxemia, cerebral ischemia or anoxia, or to a generalized narcosis based on an unidentified humoral agent. New light has been shed on this old problem in a report by Mangold, Sokoloff, Conner, Kleinerman, Therman, and Kety in the July issue of the *Journal of Clinical Investigation.*

In a group of normal volunteers, measurements were made of cerebral blood flow and oxygen consumption, along with electroencephalographic and other physiological observations, during sleep and while the subjects were awake. During sleep there was a small but significant increase in cerebral blood flow, but there was no significant change in cerebral oxygen consumption or in arterial oxygen, carbon dioxide, or hemoglobin concentration. In coma or anesthesia, however, a significant reduction in cerebral oxygen consumption, sometimes to as low a value as 50 percent of normal, was demonstrated. The authors conclude that

"The state of sleep should be added to a growing list of conditions, like schizophrenia and performance of mental arithmetic, in which a good correlation between energy conversion and functional activity commonly found in other organ systems appears to be absent. This result is compatible with the current vogue of viewing the brain as a calculating or communicating mechanism which, in contradistinction to machines which do mechanical work, utilizes by far the greater part of its energy requirements merely in keeping its circuits alive and sensitive; the presence of a message, its functional usefulness or rationality adds only infinitesimally to the total load. Equally adequate, however, are hypotheses founded more on traditional biological concepts than on electronic analogues.

"Thus, when the brain is considered as a great number of functional units, many of which may be reciprocally related with regard to activity, then increased activity in one group of units may result in decreased activity in others. Under such conditions, different functions could result in an altered pattern of distribution of the activity without measurable changes in the net over-all oxygen consumption of the brain. Or, even more simply, is it not conceivable that the primitive functions of the brain, namely, the regulation of unconscious vegetative functions in the body, consume so much of the total cerebral oxygen requirements that they obscure the metabolic effects of the later phylogenetic functions found in conscious waking behavior, such as thought and reason?

"These studies have not elicited, nor were they designed to elicit, information bearing on the more subtle functional, biochemical, or electrical alterations in sleep. They do, however, render untenable those hypotheses which attribute this important phenomenon to an anoxemia, to cerebral ischemia, to narcosis, or to a generalized depression in cerebral metabolism."

Rubber Commission

The National Science Foundation has announced the appointment of a Special Commission on Rubber Research that will propose recommendations concerning the role of the Federal Government in basic research on synthetic rubber. The members of the commission are Arthur C. Cope, head, department of chemistry, Massachusetts Institute of Technology; Joseph C. Elgin, dean, school of engineering, Princeton University; Paul D. Foote, Gulf Research and Development Co., Pittsburgh, Pa.; Edwin R. Gilliland, professor of chemical engineering, Massachusetts Institute of Technology; Warren C. Johnson, associate dean, division of physical sciences, University of Chicago; William H. Davis, Davis, Hoxie and Faithfull, New York; Frank A. Howard, retired president, Standard Oil Development Co. of New Jersey; Farrington Daniels, chairman, department of chemistry, University of Wisconsin; David D. Henry, executive vice chancellor, New York University; Lawrence A. Kimpton, chancellor, University of Chicago; and William A. W. Krebs, Jr., associate professor of law, School of Industrial Management, Massachusetts Institute of Technology. Six members of the commission are scientists and five are nonscientists, in accordance with the provisions of the National Science Foundation Act, which also specifies that the commission shall elect its own chairman and vice chairman.

The synthetic-rubber research program, including the operation of a pilot plant and testing laboratory at Akron, was developed as an integral part of the synthetic rubber industry, which was administered by the Reconstruction Finance Corp. and by the Federal Facilities Corp. for the Government from the early days of World War II until recently.

On 1 July official responsibility for Federal support of synthetic rubber research passed to the National Science Foundation as a result of recommendations of the Rubber Producing Facilities Disposal Commission that was established by the 83rd Congress. The disposal commission also recommended that the Government's synthetic rubber plants be sold to private companies, and all but two of these were sold by 2 May.

The disposal commission recommended continuance, for at least a trial period running through June 1956, of the Government's synthetic-rubber research program conducted through universities and other institutions and the Government laboratories operated under contract by the University of Akron. The National Science Foundation is charged with the supervision and control of the research program and has been asked to evaluate the long-range role and responsibility of the Federal Government in this field.

The new special commission will also consider various alternatives regarding the Government laboratories at Akron, including the possible sale or lease to private industry, or to a university or other nonprofit institution, or retention by some agency of the Federal Government. The laboratories represent an original Federal investment of $2.2 million.

It is hoped that the special commission will complete its study of the entire problem and present its recommendations on or before 31 Dec., in order that its findings can be reflected in proposed legislation submitted to the second session of the 84th Congress.

Science and Politics

Scientists have an obligation to supply politicians with facts, thus reducing "the area of uncertainty and dispute to a minimum," according to Paul B. Sears, professor of conservation at Yale University. In a speech delivered on 18 Aug. at the first New England Watershed Conference, Sears, who is president-elect of the AAAS, said that this fact-gathering function gives science "a very definite relation to politics in the world today." He stated:

"I happen to have a high regard for