

## OF THE WEEK

environment report	116
x-ray-laser advance	116
oldest vertebrate	117
genetic vulnerability of crops	117
flood-warning study	118
death with dignity	118
scholarly access	119
solar flares	119
cryosurgery on tumors	120

## NOTES

earth sciences	121
behavioral sciences	121
physical sciences	127
medical sciences	127

## ARTICLES

experimental prisons	122
organ freezing	125

## DEPARTMENTS

letters	114
films	114
books	128

Cover: The modern architecture at the Kennedy Youth Center in Morgantown, W. Va., is only one of the innovations made by the Federal Bureau of Prisons in an attempt to upgrade the criminal justice system. See p. 122. (Photo: Kennedy Youth Center)

<b>Publisher</b>	E. G. Sherburne Jr.
<b>Editor</b>	Kendrick Frazier
<b>Aerospace</b>	Everly Driscoll
<b>Behavioral Sciences</b>	Robert J. Trotter
<b>Earth Sciences</b>	Louise A. Purrett
<b>Environment</b>	Richard H. Gilluly
<b>Medical Sciences</b>	Joan Arehart-Treichel
<b>Physical Sciences</b>	Dietrick E. Thomsen
<b>Copy Editor</b>	Nadine Clement
<b>Production</b>	E. Cherry Doyle
<b>Assistant to the Editor</b>	Esther Gilgoff
<b>Books</b>	Margit Friedrich
<b>Circulation Manager</b>	Lawrence Cope
<b>Advertising</b>	Scherago Associates, Inc.
11 W. 42nd St., New York, N.Y. 10036	
Fred W. Dieffenbach Sales Director	

Copyright © 1972 by Science Service, Inc., 1719 N St., N.W., Washington, D.C. 20036. Republication of any portion of SCIENCE NEWS is strictly prohibited.

**Subscription Department**  
231 West Center Street  
Marion, Ohio 43302

Subscription rate: 1 yr., \$10; 2 yrs., \$18; 3 yrs., \$25. (Add \$2 a year for Canada and Mexico, \$3 for all other countries.) Change of address: Four to six weeks' notice is required. Please state exactly how magazine is to be addressed. Include zip code.

Printed in U.S.A. Second class postage paid at Washington, D.C. Established as Science News Letter ® in mimeograph form March 13, 1922. Title registered as trademark U.S. and Canadian Patent Offices.

Published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D.C. 20036. (202-785-2255). Cable: SCIENSERV.

august 19, 1972

## COMMENT

### Public understanding of physics

The report just released by the Physics Survey Committee of the National Academy of Sciences, entitled "*Physics in Perspective, Volume 1*," must be given very high marks generally, but in dealing with the physics part of what is called public understanding of science, it fails badly.

Such a failure is not surprising, for it simply is another example of the extreme difficulty which scientists encounter when they attempt to grapple with the issue. In my opinion, this is largely due to a lack of recognition of the extreme complexity of the problem, and a consequent reluctance to spend time thinking through the many complex, and often value-laden, questions which are involved.

The report discusses public understanding of physics in a number of its sections, but nowhere does it face up in any definitive manner to a number of key questions concerning the subject. An example is what is probably the most important question of all—why *should* the public understand more about physics?

It is first important to note that the question can be answered from two very different points of view, that of the physicist and that of the public.

The usual reasons given by physicists and other scientists to the question tend to fall into three major categories. The first involves the implied assumption that if the public knew enough about physics, there would be no problems in getting research support. It should be emphasized here that generally, this does not involve selfish reasons, but rather the belief that physics is so wonderful that people would want to support it if only they knew more about it. The second reason is that any educated person should know something about physics, just as he should be familiar with Shakespeare and Bach. The third reason is that in a democracy, the citizen must know enough about physics and other sciences to be able to participate fully in making decisions.

From the point of view of the public, the reasons are different. One reason for learning about physics is simple idle curiosity. At certain times, it is quite fun to learn about what makes the sun shine or what those high-energy accelerator people are up to. A second reason involves amateur science. The amateur astronomer or the hi-fi addict has many reasons for learning about fusion or spectroscopy or solid-state physics. The third, and most important to the public, is to learn about physics in order to solve problems, either personally or through the initiation or support of appropriate legislation. Here physics enters into such questions as fallout, seat belts in automobiles, or the causes and effects of sonic booms.

A consideration of the report shows that the reasons for understanding physics were not very clearly stated, but seemed to relate to the "educated man" reasoning. Surprisingly, no mention was made of the need for an understanding of science in a democracy.

If the report did not make recommendations for a massive program attacking public understanding of physics and of science, its failures would not be important. But it is suggesting a program of great scope which could cost millions of dollars a year without any clearly thought-out rationale to support and direct it. I frankly cannot see the members of the physics community paying \$10 per year (as recommended) for a program which includes explaining the significance of fermions and bosons to an audience equal in size to that which understands the difference between rational and irrational numbers. And yet this is one of the suggestions.

The American Institute of Physics—or the National Academy of Sciences—would do well to invest a considerable amount of time in trying to think through just exactly why it should support a public understanding of physics program. And after this, it should spend time in considering a number of other questions, including what it wants to communicate and why, what specific portions of the public it wishes to reach and why, what media would reach these subpublics most effectively, and so on. Both communications research and practical experience indicate that answering these questions is an essential prerequisite (but no guarantee) to a successful program.

Public understanding of physics—and of science—is too important to take any other approach.

E. G. Sherburne Jr.