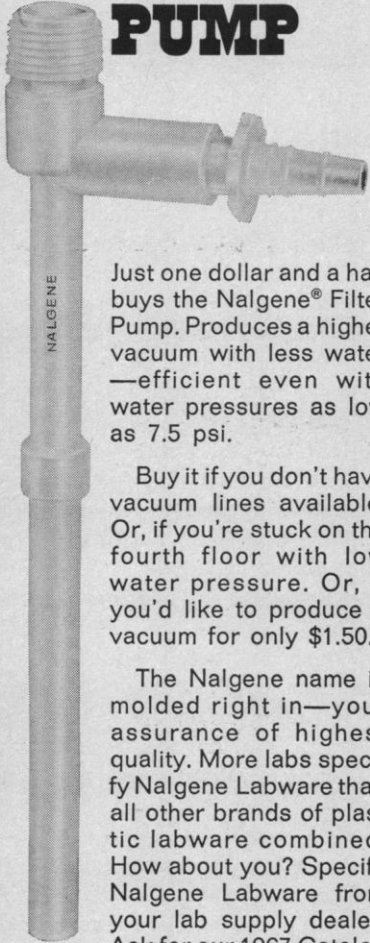


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Congressional Testimony

I, too, was much distressed by the partisan article, "The great research boondoggle," referred to in Abelson's editorial ("A partisan attack on research," 9 June, p. 1315). In his criticism of the magazine article, Abelson said, "The article is also very damaging when it quotes a professor of chemistry at a large university as saying that government support of research is 'potentially the most powerful destructive force the higher educational system has ever faced.'" That statement was made by me before a congressional subcommittee, but the following paragraph is the *complete* expression which I presented on my views of government support of university research and demonstrates clearly that the quotation as it appeared in the article was taken out of context (1).

The present program for Government support of university research including the methods and policies for granting and administering funds, is at the same time the greatest benefit and also potentially the most powerful destructive force the higher education system in America has ever faced. Federal support has created opportunities for the evolution and advancement of human knowledge and for the stimulation of creativity far beyond the most prodigious expectations of our current senior scholars. University scientists, particularly the young men, with and without tenure, are working unbelievably long hours and with a passion that suggests a compulsion to prove their worth to society. At the same time an imbalance between the effect at the graduate and undergraduate levels has arisen with the results that the talents of the undergraduate students are not being developed. Hence the supply of dedicated teachers, competent scientists, engineers, scholars, and well-informed citizens is being constrained dangerously due, in part, to a loss of the stimulation, guidance and experience-inspired knowledge which traditionally has been passed on to the students by the research scholars.

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Reference

1. Hearings before a Subcommittee of the Committee on Government Operations, H.R., 89th Congress, 1st session (Government Printing Office, Washington, D.C., 1965), p. 5.

Such attacks by quoting titles of valid research projects are unfair but not new.

In 1892, Congressman Hilary A. Herbert of Alabama nearly destroyed the U.S. Geological Survey by ridiculing the paleontological work of O. C. Marsh. He displayed a special author's

edition of Marsh's work on toothed birds, a sumptuous volume with morocco binding, gilt edges, wide margins, specially tinted paper, and a wealth of illustration, "... pointing to it as an excellent example of the way in which large amounts of Government money were being wasted" (1). The next day Herbert admitted that Marsh had written to him 6 years earlier, pointing out that the work in question was not published by the Geological Survey, that the cost of illustrations (and special printing) had been borne by the author, and that a supposed duplication of printing was only of a 40-page abstract.

In spite of this admission, "birds with teeth" continued to appear in speeches against the Survey as a symbol of government waste. The House voted to end all federal work in paleontology. Senator Wolcott of Colorado indicated that the birds themselves were not important, "... but here is a chance to cut Survey appropriations." The Geological Survey was eventually saved only by the resignation of Director John Wesley Powell in 1894.

Today it would be just as tempting for a congressman to launch such an attack on radiation studies as a way of cutting the AEC appropriation or an assault on biochemistry to "get" NIH. Scientists should do their best to inform the press that a book, or a research project, should not be judged by its title.

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Reference

1. C. Schuchert and C. M. LeVine, *O. C. Marsh, Pioneer in Paleontology* (Yale Univ. Press, New Haven, Conn., 1940), p. 317.

Why's of Weightlessness

Lilley's letter (9 June) on weightlessness in space corrected one popular misconception but propagated another with the statement, "The gravitational forces on an Apollo crewman will be very weak for much of his journey, and his weightless condition will indeed be due to his remoteness from the earth and moon."

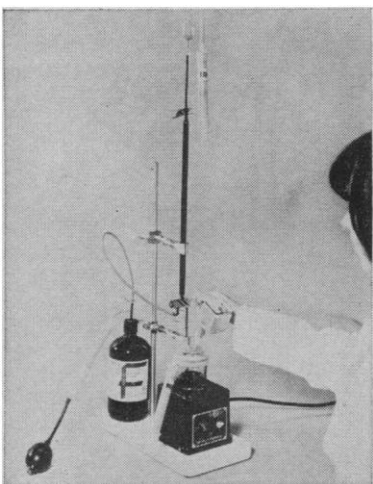
The reason for weightlessness during an earth-moon trajectory (which, even at the gravitational minimum point, is still subject to appreciable solar gravitation) has nothing to do with decreas-



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ing gravitation—weightlessness would obtain in a gravitational field of any strength whatsoever. The explanation is exactly the same as for weightlessness during a near-earth orbit: whenever the rocket motor is not firing, both the spaceship and the astronaut are in the free-fall condition, and thus both move on the same trajectory with the same acceleration and consequently with no relative motion between them.

Weight can only be caused by a gravitational field when, as on the surface of a planet, a body is restrained from accelerating. For example, a spring scale measures the force which the earth exerts to keep a body from accelerating downward; this is its weight.

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Measure of Education

In commenting on Carter's article on the National Assessment of Educational Progress ("Educational testing: national program enters critical phase," 5 May, p. 622), I should like to make two points: (i) the twin problems of measurement—criterion and sampling—do not appear to have been met by those responsible for NAEP; and (ii) since there is likely to be no way of maintaining the security of the tests and other instruments, it is inevitable that in a significant number of instances the tests will, as the American Association of School Administrators has predicted, dominate if not determine the curriculum.

What shall be the criteria by which citizenship shall be assessed? Are comparisons of educational progress in this domain to be made across social class lines or will the white, Anglo-Saxon, Protestant ethic be the standard? Will the same measures serve central city and suburb, North and South; and, if not, how will comparisons be made?

Two things might be said concerning the sampling problem. At the American Educational Research Association session on NAEP in Chicago in 1966 one of Tyler's assistants explained how random sampling would be achieved; then, presumably sensing some enthusiasm from his audience, invited any administrators present to volunteer their schools as subjects! A sample made up of volunteers first, and second, of subjects from schools whose administra-

tors are *not* among those who object to NAEP, may not be particularly representative.

The influence of NAEP instruments on the curriculum is more serious. Already examples of some test items are public knowledge. Can anyone suppose that when the program is completed the mass media and the popular press will not insist on using many more items as examples in reporting the level of educational progress discovered by the investigators? School boards and citizens groups all over will demand that the full battery be administered in their schools to determine whether the taxpayers are getting their money's worth. Under such circumstances it is hard to believe that most teachers and principals will not begin to slant the curriculum in the direction of the tests.

It is perhaps unfortunate that AASA took quite such a strong stand—unfortunate but understandable. After all, school people have been criticized for everything from Sputnik to their inability to solve the problems of delinquency, poverty, crime, and what-have-you. (It might be observed that the condemnation of the schools over Sputnik has not turned to equally loud applause now that we seem to have drawn even in the space race.) What is more disturbing is the emotional and uninformed reaction of so many people who attack the critics of NAEP. In "stating their oppositions to AASA's stand," for example, the dean of Harvard's Graduate School of Education and his associates say, "We believe that the risks of knowing nothing are greater than the risks of knowing something, and that the national assessment program should be allowed to go forward in a *modest* and *exploratory* way without *harassment*." (1) (Italics mine.)

It seems inappropriate to employ such emotion-laden words in deliberating the merits of what should be a scientific investigation. There is a third possibility that could be added to "knowing nothing" and "knowing something." The something "known" can be either true and useful or false and harmful. The odds that the unhappy third result may obtain are too great to ignore.

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1. *Harvard Grad. Sch. Educ. Alumni Bull.* 12, No. 1, 31 (1967).