the nuclear industry and among health physicists and others responsible for radiation protection. But it is to suggest that those looking for a balanced presentation of the benefits and risks of nuclear energy should look elsewhere than *The Careless Atom* and other more recent publications.

ANDREW P. HULL
Health Physics Division, Brookhaven National Laboratory, Upton, New York

. . . Novick's probing is trivial compared to the grilling the electric utility and nuclear manufacturers get from the AEC and the Advisory Committee on Reactor Safety. If Novick wants to be a Nader, he ought to take on some real opposition. The nuclear industry is having a rough time trying to displace the stacks of the coal-burners that spew smoke, sulfur dioxide, radon, and about one-fourth of a plant's waste heat into our air. Novick should try fighting the coal lobby or even the bureaucracy of the AEC itself, which is bending over backward to assure nuclear safety for the public, and has reduced the pace of long-term development of nuclear power to a crawl.

The needs of the world for energy are real. The finiteness of our fossil fuel reserve is real. The desire to harness the atom to provide safe, clean, and plentiful power is real, and so are the efforts of dedicated men to achieve these goals. The public good is not well served by scare journalism.

A. DAVID ROSSIN
Adlai Stevenson Institute of International Affairs, 5757 South Woodlawn Avenue, Chicago, Illinois

Moon, Mars, and Money

Carter's rundown on NASA plans (5 Sept., p. 987) prompts me to recall Geographer George Sauer's comment as chairman of the international symposium in the 1950's on Man's Role in Changing the Face of the Earth. "We are now come," he said, at the end of that week, "to a revised version of Aldous Huxley's 'brave new world' of the '20's—to a faceless, mindless, countless multitude managed from the cradle to the grave by a brilliant elite of madmen intent on technological progress."

Paine knows full well that there is a great deal more to be done, of vital urgency, than "to fill 200 million alimentary canals every day." For one thing, there is the problem of emptying those canals! What an assault could be made on our environmental problems —physical, cultural, and economic—if the same quantities of money and brainpower and industrial facilities that go into the space program were to be applied in those fields.

"By the end of the century," says Paine, "if you haven't been to the moon, you're not going to be with it." Give NASA until 1975 (?) to create a vehicle capable of hauling 100 persons and necessary equipment to the moon. Then, a trip a day until the turn of the century would carry only 900,000 of us to the moon—only .045 of 1 percent of our present 200 million could be "with it"—about as many, perhaps, as would make use of the controversial supersonic jets with their prodigious and intolerable sound problems.

RUSSELL G. LYNCH
8121 Stickney Avenue, Wauwatosa, Wisconsin 53213

Amchitka: Waves of Opinion

Carter's technique in his article on large-yield explosions on Amchitka (22 Aug., p. 773) is to quote the opinions of "authorities." Though factual in the sense of offering valid quotes, this approach does not truly provide the reader with a basis for drawing his own conclusions. Carter further fails the scientific community by (i) quoting only seismologists who feel some degree of alarm (he could have quoted others of equal scientific renown who would have said there was no danger from large tests on Amchitka), and (ii) quoting the opinions of other scientists who have no basis for forming definitive opinions on the subject, or who are allowing their scientific opinions to be dictated by their political beliefs.

Much scientific information is available on the matter and could have been presented by Carter if he had attended the meetings of the American Geophysical Union or if he had sought the data. The possibility of venting is to be argued only by inspection of the venting history at the Nevada Test Site and Amchitka, that history being available. The possibility that large shots on Amchitka would cause tsunamis should be evaluated in terms of the relation between large shots, observed patterns of seismic radiation from such explosions, observed aftershock activ-

ity, and the regional strain pattern in Nevada, and locations and modes of genesis of tsunamis, location of Amchitka relative to earthquake foci and observed seismic radiation patterns from Longshot. . . .

GENE DAVIDSON
17269 Tennyson Place,
Granada Hills, California 91344

Davidson misrepresents my article by seeming to suggest that I arbitrarily chose to quote only those scientists who feel some concern about the Amchitka test series. To the contrary, several of the scientists' whose views I mentioned were members of the President's Science Advisory Committee's ad hoc panel on the safety of underground testing. Two others whom I mentioned, and who also are concerned about the Amchitka tests, are members of the AEC's own ad hoc panel on seismology. If I have chosen my authorities from among scientists whose judgment is colored by political beliefs, it would seem that the PSAC and the AEC have committed a similar error.

LUTHER J. CARTER
Science

Dyons Versus Quarks

Two quite different references to particles of fractional electric charge have appeared recently in the pages of *Science*. The term "quark" was introduced in 1964 to designate hypothetical entities carrying electric charges of one-third or two-thirds the normal unit. In a "Research Topics" article (26 Sept., p. 1340), Robert W. Holcomb has reported on Australian cosmic ray observations of a few events with less than normal ionization, which were detected in very high energy showers. This has been advanced as evidence for the quark, although a more conventional explanation is also mentioned in this article.

The other reference occurs in my article "A magnetic model of matter" (22 Aug., p. 757). It is pointed out that the speculation of magnetic charge can account for the observed integral nature of electric charge in ordinary, magnetically neutral, matter, while also implying that particles carrying both electric and magnetic charges can exhibit fractional electric charges in just the way suggested by high energy particle empirics. To emphasize the fundamental dyad of