an even greater scale. Even with the cessation of weapon testing, similar systems of monitoring will be necessary because of the increased use of nuclear power reactors, whose potential production of fission products far exceeds the amounts of activity produced by bombs.

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E. C. Anderson's comments regarding the feasibility of widespread monitoring of radioactivity in foodstuffs are encouraging evidence that it may now be possible to remedy "the lack of detailed, integrated, continuing data published in a form capable of enlisting the interest of the entire scientific community" that I pointed out in my article. Despite the very valuable contributions made by the Los Alamos group, the over-all situation on the radioactivity of food, especially with respect to strontium-90 in milk, remains rather confused. Anderson's laboratory has indeed produced extremely useful data which have been published in detail in *Science*. However because of the limitations of the bulk-counting technique, strontium-90 data are lacking. The Health and Safety Laboratory of the New York Operations Office of the AEC has studied at close intervals samples of milk from a half-dozen locations in the United States. The data are available in the form of a separate report, but most of the information does not appear in scientific journals. The results of the milk survey conducted by the U.S. Public Health Service were made public on 25 May 1958. In this case publication was in the form of a news release, and the data were restricted to an "average" for the 12 monthly analyses conducted at each of five locations. These variations in the form of publication and in the factual detail that is published illustrate the problem with which I am concerned. Surely the time has come when the agencies concerned with this problem should pool their data and publish them in detail in ordinary scientific journals.

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U.S. and Soviet Science

Many an article has been published recently on Russian science and Russian education. Undoubtedly the training given the pupils of Soviet schools is far more advanced, in the field of science, than that offered their American coun-

terparts; Russian students enter their universities considerably better prepared than our high-school graduates enter American colleges and universities. It took the sputnik to shake the American public from its apathy toward education —science education in particular—and bring it to the full realization that we are lagging dangerously behind. Yet, already in 1954, I had pointed out that our educational standards, especially at the secondary level and junior-college level, were not on a par with those of many European nations. It was during that year, too, that, tempted by far better remuneration in secondary education, I taught a semester in an American high school. From this experience I always remember the words of our superintendent: "In America, we aim at making citizens, not at scholastic achievement"; and of a mother: "I shall not tolerate that homework—which should be done by right in school—invades the privacy of my home and ruins my son's most precious possession, his eyesight."

The first disclosure of the Soviet advance upon us brought a clamor of dismay, then the search for an excuse: methods and programs in force in a dictatorship cannot successfully be applied in a democracy. Actually, is the Soviet pupil subjected to an intolerable educational and scholastic slavery? Nothing is further from the truth; strong secondary and higher education programs are in force in France, in Germany, and in Belgium, all very democratic countries. Throughout high school the Russian student spends 33 hours per week in school, of which 15 hours are devoted to science, and his Belgian counterpart spends, per week, 37 hours in school, of which at least 12 hours are spent on science and mathematics.

Science published recently [**126**, 1095 (1957)] an extremely interesting report on Soviet science. This article pointed out the unusual achievements and attainments of the various scientific disciplines, and I am deeply impressed by this information. The two fields which retained (quite naturally) my attention most specifically were oceanography and crystallography. The writers did some excellent reporting and clearly indicated that the Soviet Union is undeniably among the leaders. However, the emphasis put on the difference between what is done in the U.S.S.R. and in the United States perhaps creates an inaccurate impression: that we are trailing only the Russians. I wish here to underline that such is not the entire truth.

Facilities for oceanographic research in the United States—regardless of the excellent results attained by such men as Ewing, Heezen, Shephard, and many others—do not seem to weigh heavily by comparison with facilities and equipment in the U.S.S.R. But, shouldn't we point out that the French have made just as tremendous strides? Although student enrollment is minimal, the University of Paris has inaugurated a brand new oceanographic station near Nice, has its own small vessel (the *Francis-Boeuf*), and calls upon the *Calypso* to supplement it, while the University of Aix-Marseille is famed for its work with the bathyscaphe.

In the article cited above, J. D. H. Donnay mentioned the amazement of Western scientists at the advances made by the Russians in the domain of crystallography and pointed to the status of this science in the United States: no institute of crystallography, a singularly great paucity of courses, and not one single department of crystallography in existence. The importance accorded crystallography in the realm of the geological sciences is not limited to Russia, and we are not trailing only that country. Belgian universities all have separate chairs of crystallography (as do the Rusisan) and require from all students aspiring to a master's degree in geology at least one course in crystallography, and the University of Louvain even imposes a requirement of one such course for the bachelor's degree and a second one for the master's [see R. H. Charlier, "The training of geologists and mineralogists in Belgium," *J. Geol.* **5**, 2 (1957)]. Courses in crystallography are included in the curriculum of geological engineering; they are offered to students in physics and chemistry. This is also a required subject for would-be geologists in Switzerland. Every single Belgian university has a separate department of crystallography, and a student wishing to obtain his master's degree in geology may, if he so desires, specialize in crystallography and write his master's thesis in that field. In France, most of the universities have a separate department of crystallography, and in Paris alone, courses and departments exist at the Sorbonne, the Institut Catholique, and the Muséum d'Histoire Naturelle.

While perhaps Belgian specialists are not as advanced as their Russian counterparts (I am in no position to judge), I should mention that courses are offered and that people are trained in crystal chemistry and x-ray diffraction in Belgium.

It is thus apparent that we not only need to compare our achievements with those of the Soviets but should strive to emulate some other democracies as well.

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