

# editorial

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## Starting with the kids

**O**ur decision to devote this month's issue to "Physics for Children" reflects a growing realization that one of the most promising ways to encourage public literacy in science is to put more emphasis on science in elementary-school levels.

It happens that next month's issue will contain a summary of the report just being issued by the National Academy's Physics Survey Committee headed by D. Allan Bromley, who is also writing our summary. One of the conclusions contained in the report is that:

"The science education of the general public beginning in the earliest school years should be a matter of grave concern to the physics community."

In the summary, Bromley observes that although the precollege levels represent our best opportunity for introducing science to the lay public, science teaching at these levels (where it exists at all) is painfully inadequate, having received minimal attention from professional educators in physics and other sciences. The Survey Committee report further concludes: "The typical US teacher, at both elementary and secondary levels, is not well equipped to guide his pupils in learning that science is more than a collection of facts to be memorized or techniques to be mastered but is instead an inquiry carried on by people who raise questions for which answers are unknown and who have gained confidence in their ability to reach conclusions, albeit tentative ones, through experiment and careful thought sharpened by the open criticism of others."

This month's issue calls attention to two significant achievements aimed at making grade-school children familiar with the workings of the scientific method. The first is the Elementary Science Study reviewed by Philip Morrison and Joe Griffith (page 29) and the second is the Science Curriculum Improvement Study reviewed by Robert Karplus (page 36).

When we consider that in addition to these two programs there are at least four others equally worthy of note (COPE developed at New York University, "Minnemast" from the University of Minnesota, The Astronomy Program from the University of Illinois, and "Science—a process approach" developed by the

American Association for the Advancement of Science), it is clear that in terms of availability of good curricula the situation is well in hand. As with the high-school levels, where good curriculum materials have been available for some time, the larger part of the problem is the organization of programs to train precollege teachers to understand and be motivated to use the excellent materials that have been developed. In line with this goal the Survey Committee recommends: "All future teachers should receive increased exposure to science . . . Physics departments and faculties in universities and colleges cannot afford to ignore the opportunity . . . to initiate a long-term but sure approach to public understanding through education of the teachers who will provide the main point of contact between science and the average educated member of the public." The Committee further observes that with the slow turnover in jobs because of the oversupply of teachers, it will not suffice to train just new recruits but it will be essential to retrain, or continue the education of, present teachers.

Physicists will be able to contribute directly by instructing in teacher-training programs and by becoming involved with local school boards. Should a physicist (especially if he is out of work) consider teaching science in a grade school himself? Perhaps, although those experienced in this area indicate that only rarely does a physicist or other scientist happen to have the combination of talents needed to work with young children. The best results are typically achieved with teachers who are already expert in handling children and who have been motivated to teach science through special training.

A better role for the physicist who would like to work in this area is that of science advisor who works with a number of schools in a regional system, training and motivating teachers and developing programs and materials. John Dykla has been active in creating positions of this kind in Texas and, in a panel discussion at the January meeting of the American Physical Society in San Francisco, he described with enthusiasm the rewards that a physicist finds in such a role.

*Harold L. Davis*