Letters

Removal of Oil Slicks on Oceans

The wrecking of the *Torrey Canyon* off Land's End, England, points urgently to the growing problem of oil slicks on the oceans. Attempts to set fire to the slick failed—I think through failure to understand the mechanism of burning of a heavy oil, especially when the underside is cooled by water. Incendiaries, tracers, and napalm were each ineffective. The agents that are needed are wicks, not incendiaries. The old trick of lighting a lump of sugar by applying cigarette ash is an example. The safety of heavy oil used in lamps is due to the fact that a wick is needed to maintain the flame.

I suggest that experiments be tried dropping cotton wads or asbestos rope bundles pre-dampened (not soaked) with kerosene. Repeated tries will be needed to determine the optimum size, weight, and specific gravity but I have little doubt the outcome will be sustained combustion over large areas. The wick-bundles would, of course, be scattered unignited, and the necessary matches applied afterwards.

Another remedy would be the use of empty tankers equipped with suction devices to "vacuum clean" the sea surface, funneling the oil into tanks and jettisoning the water. Not only would this perform a much-needed service but it could bring rich rewards in salvage to the servicing vessel.

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Are Better Schools Better?

Many readers of the U.S. Office of Education report *Equality of Educational Opportunity* [by J. S. Coleman, E. Q. Campbell, A. M. Mood, *et al.*] have erroneously inferred from it that school quality has very little effect upon the educational achievements of the pupils. Even some reviewers of the study, among them Robert C. Nichols in *Science* (Book Reviews, 9 Dec.), have come to this erroneous conclusion.

What the text does say, and what the data reveal, is that the within-school variance of pupil test scores is much larger, by a factor of about 4, than the between-school variance of pupil test scores. This finding about variations says nothing about the amount of material learned or the rate at which material is learned. The ratio of variances could lie exactly the same whether the schools were worthless or were tremendously effective in educating our children. The finding simply says that the schools of the nation seem to be rather uniform and says nothing about whether they are uniformly bad or uniformly good. The finding comes as no surprise at all to educators. Our schools are uniform; teacher training and teaching methods are much the same everywhere in the nation; curricula are very widely standardized, as must be the case in view of the mobility of our population; school equipment and school management are much the same throughout the nation.

It should be further pointed out that the comparison of the relative sizes of the two types of variance is not equivalent to a comparison of the importance of the school factors to that of nonschool factors.

What are the causes of the variations between schools of the school average scores? They arise from: characteristics of the schools themselves—their facilities, staff, instructional programs, activities; various social, economic, ethnic, intellectual, and religious backgrounds of the families; differences between communities in geographic location, values, activities, attitudes toward education, tax support of education, and so on.

There are sometimes political or other influences that determine the assignment of students to schools, and these also comprise part of the between-school variance. In order to determine the effect of the schools themselves, it is therefore necessary in any analysis to control for family background and community influences.

What are the causes of the within-school variation of student scores? Here we find a host of possible contributors: differences in individual student abilities; differences in the family socioeconomic background of students in the same school (including parental education and interest in education); differences in school experiences of students in the same school (different teachers, texts, tracks, curriculum); differences in outside experiences of students; and error of measurement in the tests and unaccounted-for variation (this includes interaction effects).

We observe, therefore, that we cannot consider the between-school variance to be the "school effect" and the within-school variance to be the "nonschool effect." Some of the within-school variance is composed of factors which may also be classified as school effects, so the effect of the school is found in both components of the entire variance.

The relatively large size of the within-school variance is itself the function of the range of scatter of individual student abilities within schools (this is often quite large because of the normal distribution of ability). It is expected, therefore, that the within-school variance will be much larger than the between-school variance. The importance, however, of the effect of the school, inherent in both variances, is not lessened.

It is important that the between-school variance increases substantially for the lower-achieving and minority-group students. Whereas the between-school variance is about 10 percent for white-majority students in the North, it increases to about 30 percent for some of the minority-group children. The report has also demonstrated that the teacher has a greater effect on these lower-achieving students. It follows that school quality is indeed of great import, and expenditures to improve it are educationally effective.

Student attitudes toward life and schooling can probably be much more rapidly modified by alterations in the school situation than by modifications of the home environment and of society, which may well take generations. From a cost-effectiveness point of view we would expect to receive much better returns on additional investment in education if we concentrate it in the well-defined area of the instructional