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A Contribution to the Discussion on School Education

In recent years the general and specialized scientific press has carried an unending stream of articles, responses, résumés, and the like-all devoted to a single theme: what to do about our children, what and how to teach them, how to bring them up. The school, of course, is a vitally important social institution, but that is hardly the sole reason for spilling so much printer's ink, nor does it explain why so many scholars who have no direct link with the schools are giving them advice, recommendations, and instructions. An explosion of opinions, a flood of good intentions. I have looked over many of them. It is hard not to agree with many of them right off. Cramming is harmful? Of course it is harmful; of course we should push children more to think independently, to make use of their stocks of knowledge. But, another asks, surely we cannot forget the need for them to build up these stocks of knowledge in their heads? Of course we cannot, of course they have to store up knowledge for recall, even if that means cramming. And this too is absolutely true. We must do all we can to encourage the child's self-activity, his initiative, his interests. But-the opponent objects-at the same time we must not undercut the role of the teacher, his authority. The system of compulsory timetables is poorly adapted to the encouragement of intellectual self-activity. They have experimented and ruined the schools.

You cannot banish Pushkin from the schools. A textbook can hardly con-

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vey the beauty and meaning of his poetry. There is no need for textbooks. It is necessary to read Pushkin himself. However, Pushkin can be read at home—why spend lesson time on him? Better to use it for the study of serious sciences—mathematics, physics, chemistry!

"Allow me!" the honored academician replies. "Our ideal is not the *Realschüle** but the school that provides general education and produces well-rounded, fully developed people. It is very dangerous to yield to the pressure of the technological age! It will prove damaging to physics, mathematics, and chemistry themselves!" "No it will not," the mathematician retorts. "Mathematics itself incorporates moral and esthetic values."

I do not present a list indicating sources. I think that this is superfluous, and everyone will recognize in the above a more or less detailed recapitulation of the mass of opinions expressed in just the last few months.

So the wheel turns. I could give in to the desire to put another spoke in the wheel. But stop!

Is it not time to try to understand what brought about this eruption of thinking about the schools and how it can be that everyone is right? Does the rough and ready truth not lie in avoiding "extremes" and combining them in a sober, rational, and harmonious fashion?

This is what the "résumés" usually say. Recognizing the "relative truth" of each thesis and antithesis, the author of the résumé establishes a synthesis within which the "rational kernel" of every opinion is preserved and "exaggeration" beyond the limits of the reasonable and permissible is eliminated.

I do not want to compose a résumé, especially in accordance with this recipe. I think that only life itself will find a final synthesis. I shall merely make a few points concerning how real life problems compel dozens of people to express dozens of different opinions.

It is only by proceeding from these problems that we can determine who is right and who is wrong without laying claim to the wisdom of Solomon.

Let us start with what is "generally known." Fundamental shifts are occurring in the mode of people's life activity. Automation, computerization, and the mathematization of science and technology are taking place. The requirements on man as a component of production are changing. Some skills and abilities are being displaced by machines, which do the same thing better and faster than man. Others, conversely, are turning out to be insufficiently developed and demand special care—for instance, the ability to exercise rational control over a vastly expanded machine technology. This is already true today. Tomorrow all tendencies will impose the same requirements in even more acute form.

^{*}A type of science-oriented high school in German-speaking countries.—Trans.

And the schools shape the people who will live tomorrow. In the realm of theory the question of today's school can be solved correctly only from tomorrow's positions, not from today's. Such are the conditions of our task, of our problem.

We cannot try to imagine the "model" of this tomorrow in detail. We can envision only the general contours, which are visible even today in the form of basic tendencies. It is especially important to imagine as clearly as possible all the real tendencies of development today and tomorrow (all and not just some of them).

Is the role of mathematics growing? That is quite obvious. Must tomorrow's person know mathematics? He must, better than he knows it today. Is man's moral responsibility for the consequences of technological innovations that are equally capable of benefiting man and bringing him innumerable misfortunes growing? Yes. It suffices to recall the problems that have already arisen in connection with nuclear energy. Is the role of the social sciences growing in this connection? Immeasurably. Will tomorrow's person have to understand social problems better than he does today? Yes, he will. Otherwise things will be very bad indeed for him, so bad that no mathematics will save him.

Is the individual becoming more specialized? Yes, he is. Is there a growing need in this connection for a counterweight in the form of general culture? Yes, there is.

But here, it seems, I am again falling into the same antithetics over which I waxed ironic. He must this, he must that, he must the other. . . . This must surely scare a person, especially an eight-year-old. So what is the way out?

Do we imagine tomorrow's person as an encyclopedist, as a walking encyclopedia of any and all knowledge and skills?

Surely infeasible.

Do we proceed further along the path of specialization, turning each person into a narrow—and becoming narrower from day to day—specialist, comforting ourselves with the thought that it is only all people "together" who make up Man with a capital letter? That they will compensate for one another's defects?

That millions of specialized cretins [from the German *Fachidioten*—Trans.] will together constitute a person of brilliant all-round development?

And this is only a current problem projected into the future.

A fact is a fact: today's acute and direct requirements for the "insertion" of man into production of the material and spiritual life of society demand his "fragmentation"—the splitting of his abilities. This is a fact. A fact fully realized by those who want to subject schools to the same process, so that

one school should train mathematicians, another school machine operators, a third salespeople, and a fourth English-language interpreters.

But this too, alas, is infeasible. Why?

Because the same process is taking place within each of these occupations.

Because an education that you call "mathematical" today will seem so "general" tomorrow that its products will be regarded as old-fashioned eccentrics who seek to encompass what cannot be encompassed. Tomorrow, today's "mathematicians" will be denounced as "humanistic utopians"; it will be said that more specialized schools should have been built earlier—schools for the training of topologists, set theorists, mathematical logicians, and so on—and that in the 1960s "topologists" were taught a great deal of superfluous material, including for some reason "numbers" and "arithmetic."

And what if tomorrow that narrow subfield of mathematics for which a person has been trained disappears altogether? He will have to be retired on pension. Retrain him? At the age of forty, or even twenty, it is already too late to retrain a "narrow specialist." And if you do retrain him it will cost so much that with the same money you could have trained five new, even narrower specialists.

Can even the most farsighted mathematician say which parts of currently taught knowledge will still be needed by a person in the 1980s, which will retain the name of "science," and which will be relegated to the archive or museum?

The real contradiction that you are obliged to resolve not only within "mathematical" education but in its general form is that of the relationship between "general" and "special" knowledge and, in the final analysis, between the "general" and the "special" person, between the generalist and the specialist.

It is this contradiction between the general and the special or particular that underlies the problem of "general and special education." It is not a new problem. The novelty consists only in the fact that this problem is now being solved not just on paper, not by means of operations with terms, but on *living people*. On paper you can make a mistake. To make a mistake on living people is a tragedy.

That makes it all the more important that we foresee the possibility of mistakes first on paper and try to solve the problem correctly on paper before we start to experiment on the living soul.

And it is to this that we are now witnesses.

The discussion on school education, in the final analysis, boils down to this fateful point. Today the discussion is theoretical in character. Tomorrow it will be a question of life and death for the individual. For each and every individual. The general and the particular or specialized. How are we to understand this?

Here there is an immediate clash between two different and irreconcilable logics, between two philosophies.

Two understandings of the "general" and the "particular" that cannot be reconciled in an eclectically synthetic judgment—"both are important," both "general" and "specialized" education.

Having chosen one of these logics, we do not have the right to reason in this way and are obliged to state clearly which of the two we prefer.

Not prevaricating before science, logic, and my own conscience, I am obliged to say that if I am forced to choose between the "general" and the "special" I am categorically in favor of the *general*. I am in favor of the broad and comprehensive development of *general education*. And I am categorically against "specialized education" if it is turned into the antithesis of "general education."

What is the "general"—both in man himself and in each system of knowledge, skill, and ability?

It is not chatter about this, about that, and in general about nothing. It is not knowledge about many things. It is a special method of mastering the "special." It is the ability to see in the "special" itself the "embryo" of all other "special" features and characteristics within the framework of a solution to this general problem.

And a theoretical solution to the question of school education presupposes a clear solution to this central question of the day.

Either you consider the deepening of occupational specialization and "vocational education" a lasting and dominant tendency of world culture that is rooted in the requirements of "technology" *or* you consider it a tendency associated with the transient commodity-capitalist mode of the division of labor and abilities between individuals, classes, and categories of individuals.

In the first case, you will demand that the "specialization" of education be intensified. First you will plan special "mathematical" schools, later to be joined by special "political" schools, the mission of which will be to train a caste of "administrators."

In the second case, you will uphold the principle of the *general*—of the most genuine, broadest, and deepest *general* education for all. And on this basis you will plan some "special" schools not only for large and small categories of people but also for each *individual*.

Either "specialization" on the basis of the broadest general education—that is, first of all in the sciences devoted to *man*, to his mutual relations and his "nature" *or* you will regard "general" education as an appendage to "special" education.

In the second case, the most consistently devised and practically elaborated system of school education is the *English*, which even some moderate conservatives denounce as antidemocratic. It would be better if you do not pursue this principle.*

But if you want a really *general* education as the basis and condition for improvement in the field of "narrow" occupational specialization for the individual, then you must take care to create a new type of general education.

To date, no models of such an education exist either in Britain or the United States. Here we are compelled—like it or not—to be pioneers both in theory and in practice, creators and not imitators.

^{*}The original version of this article (published in 1964) was written before the reform of state secondary education in England and Wales. The old system was based on a tripartite division into grammar, secondary modern, and secondary technical schools. In the late 1960s and early 1970s most of these schools were replaced by comprehensive schools.—Trans.