

present marketed) will encourage the use of aluminium as a conductor of electricity? To be sure, as the developing countries gather economic momentum, they will begin to make larger demands on raw materials such as these, yet it does not follow that they will have to repeat in every detail the industrial history of the countries now industrialized, and it remains a comforting truth that the raw materials on which the products of modern industry are based loom less large in economic terms than the products of the Industrial Revolution. Computers, after all, need very little copper for their manufacture. In general, the problem of raw materials is not a problem of the exploitation of a finite resource, however much it might be made to seem as such, but is a problem in economics—how best to regulate the prices of raw materials so as to balance the present demand against the probable demand in the future, how best to encourage what kinds of substitutions, how best to bring into production new reserves (not the least of which are the oceans of the world). Nobody should think that there is nothing to worry about. Good planetary housekeeping, as *The Ecologist* would no doubt describe it, should be an important objective of public policy. But it is a public disservice to describe such intricate and interesting problems in such simple and scaring terms.

Similar fallacies attend *The Ecologist's* analysis of the supply of food. The document says that food production in the developing world has “barely kept abreast of population growth” and that such increases as there have been are a consequence of the “opening up of new land for cultivation”. It goes on to say that this will not be possible for much longer, for “all the good land in the world is now being farmed”. Factually, these statements are incorrect. In many parts of South-East Asia, the past few years have seen dramatic improvements in agricultural productivity, acre for acre. In any case, it remains a fact and even something about which agronomists should hang their heads that tropical regions are still comparatively unproductive of food. But the chief complaint of this declaration is that the “FAO programme to feed the world” depends on an intensification of agriculture and that the strains of wheat and rice likely to be the work horses of Asian agriculture are more vulnerable to disease and more demanding of fertilizer.

So what? must surely be the moderate reply. In North America and Western Europe, after all, agriculture is much more intensive than most agricultural practices likely to be common in Asia in the next few years. And the benefits of intensive agriculture are not merely that a given acre of land can produce more food each year but that it can be made to do so at a lower labour cost. Indeed, it might well be calculated that until the populations of the developing world are able to feed themselves without employing more than half of their labour force on the land, they will not be free to develop either along the lines of Western industrialization or along some other route that they might prefer. The fact that intensive agriculture entails crops which are highly specialized and therefore vulnerable to epidemic diseases of one kind or another is no more relevant in Asia than in, for example, North America.

The abiding fault in these discussions is their naivety, and nowhere is this more true than in speculations about the social consequences of the phenomena over which *The Ecologist* wrings its hands. Starting with the assertion

that the developed nations have already collared the raw materials with which developing nations might seek to improve their standards of living, the journal goes on to say that “we are altering people’s aspirations without providing the means for them to be satisfied. In the rush to industrialize, we break up communities, so that the controls which formerly regulated behaviour are destroyed. Urban drift is one result of this process, with a consequent rise in antisocial practices, crime, delinquency and so on. . . .” This is an echo of the distinguished doctors’ declaration about the consequences of crowding, but is it fair to describe this, as *The Ecologist* does, as a portent of the collapse of society? Is it reasonable to say that in such circumstances, “it is more than probable that governments will fall into the hands of reckless and unscrupulous elements, who will not hesitate to threaten neighbouring governments with attack if they feel they can wrest from them a larger share of the world’s vanishing resources”? The truth is, of course, that this is mere speculation. All the attempts which there have been in the past few years to discover correlations between such factors as population density and prosperity per head of population with the tendency to violence, either civil or international, have been fruitless. Who will say that the crowded Netherlands are more violent than the uncrowded United States? And who will say that the forces which have in the past 2000 years helped to make civilized communities more humane can now be dismissed from the calculation simply because a new generation of seers sees catastrophe in the tea leaves?

100 Years Ago



THE FOUNDATION OF A TECHNOLOGICAL EDUCATION*

TECHNOLOGICAL education is taken up by many writers on the subject at the time when a youth is supposed to enter the School of Technology; and scientific men, as a rule, do not seem to set sufficient stress upon the necessity of laying the foundation for it at a much earlier age. It is not indeed scientific men alone who are interested in this question, but they are the authorities who should speak out upon it, for they alone are competent to pronounce an opinion upon the value of scientific education. It cannot be expected that men who themselves know nothing of science, care nothing for its progress, and recognise none of the obligations under which they lie to it, should favour its introduction into our schools, and thus depart from the stereotyped and antiquated system of education, that brings up our youth but partially fitted or altogether unprepared for a majority of the occupations they are destined to pursue, and exposed at every point to suffer from their own ignorance and the impositions of others. Every one now-a-days should have such a knowledge of scientific principles and methods as will enable him to form a just idea of the value of science, and to distinguish between knowledge and pretence—between science and quackery.

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