

Education in East Germany

by
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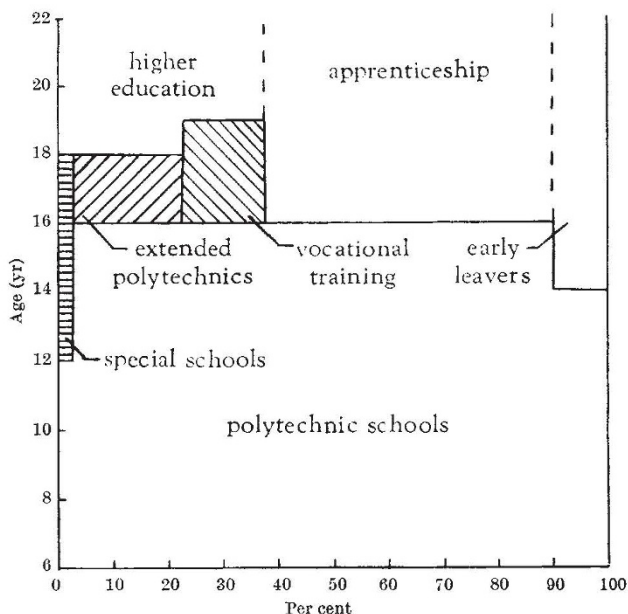
MR. McNAMARA thinks that Europe is educationally backward, and makes no bones about saying so (*Nature*, 213, 851 and 853; 1967). Certainly there are few European countries which can rival the United States in terms of the sheer quantity of education which it supports. There is, however, one country at least in Europe which claims to match America's commitment to education. Twenty per cent of its GNP is spent on education, and one-third of its students continue education beyond the age of 18. The education system has a distinctly technological bias—all of which would doubtless gladden Mr. McNamara's heart, if East Germany were not part of the communist bloc.

Since the war East Germans have shown a compulsive desire to eliminate all traces of the old Germany. West Berlin, like most cities, is a pleasing mixture of old and new, and has a traffic problem; East Berlin, on the other hand, is a city of sweeping boulevards flanked by ten-storey blocks of workers' flats built with wonderful thoroughness but a sorry sense of design. Education has also been completely reconstructed, in a way which illustrates that East Germans are pragmatists as well as socialists. What follows is based on a description of the East German system supplied by the director and assistant directors of the apprentice school at Jena, one of the largest in the country. While the figures are impossible to substantiate—if they are all true it is difficult to see where supplies of unskilled labour come from—there is no reason to doubt the general structure, although it may not be in general operation everywhere in the country.

The backbone of the structure is the system of "polytechnic" schools. Children enter them at the age of 6, and most stay until the age of 16. These schools give a general education, with a powerful push towards vocational training; in the last two or three years children spend one day in each week in practical training in factories, in a kind of inverted version of British "day release". The aim is for all children to stay at school until the age of 16, but it is admitted that at the moment about 10 per cent leave at the age of 14. Russian is taught from the age of 11, and English—as an option—from the age of 13.

At 16, the student has three choices. The commonest course is to enter an apprenticeship, which lasts two or three years, and leads to a nationally recognized certificate. Some 40 to 50 per cent of school leavers do this, East Germans claim. Training during apprenticeship is free, and a nominal allowance of 120 marks (about £10) a month is paid. When the apprenticeship is completed, an employment agreement is signed; most apprentices at the Jena apprentice school stay in Jena to work for Carl Zeiss "as a matter of course". The whole cost of the course, and the teachers, is paid by the state, and there are apparently more applicants than places.

Two other courses are open to the school leaver, both leading to higher education in universities and high schools. About 20 per cent of the 16 year olds go to extended polytechnics until the age of 18, when the



Apart from the special schools, the East German education structure shows no division until the age of 16, when transfer takes place. In Britain the Plowden report, devoting five pages to a discussion of the age of transfer, decided that 12 was the ideal age.

qualifying examination for university entrance—the "Abitur"—is taken. The other possibility is to take a combined "Abitur" and vocational training course, which takes three years to complete. At the end of the course the students are qualified either to enter university or high school, or to take up the vocation they have studied.

So far the system seems to conform with socialist principles. But there are other, newer schools which are by no means as egalitarian, and are clearly designed to cultivate an élite. These are the special schools, which only a tiny minority—about 2 per cent—of the population attend. The special schools cover subjects such as technology, sport, fine art, and music, and the children selected for them start at the age of 12 and continue until they are 18. The best pupils in the polytechnic schools are selected for special schools on the basis of reports from their teachers, and it is claimed that the method of selection is so good that only 2–3 per cent of those selected drop out before the age of 18. It is not possible for able pupils passed over at the age of 12 to enter the special schools at a later stage, so that the schools represent a complete separation of a small section of the population from the rest. The products of the special schools in technology are intended to be middle or top managers in industry, or to take up jobs as representatives overseas. In addition, although, of course, the East Germans are

not explicit about this, special schools offer very good opportunities of recruitment to the Communist Party, or at least of obtaining loyalty to the party line. This is particularly important for those who are allowed to travel overseas, either as sales or service engineers, or even as sportsmen.

Great stress is laid on group activities in all East German schools, and particularly in the special schools. The groups are organized by the teachers, assisted by youth groups such as the Youth Pioneers, and the aim is to promote "collective as well as individual achievement". To judge from the posters which are displayed by the youth groups in the apprentice school at Jena, political activities go at least as far as condemning American activity in Vietnam, and declaring support for the socialist state, if no further. The posters seem no more offensively propagandist than any that might be seen in Trafalgar Square, but their unanimity is depressing. The apprentices themselves—half are girls—seem very young by comparison with western 15 year olds, but a down to earth style of dress and absence of cosmetics have a lot to do with this.

Central control combined with a belief in education does provide one benefit which hard-pressed British teachers would welcome—East German teachers are paid more than their counterparts in industry. Their advantage is derived from an arrangement which provides for them to pay tax on only 70 per cent of their income. This fringe benefit, it is explained, is not a capitalist blunt instrument for persuading people to become teachers, but is intended to allow teachers to buy the books and literature they need. Whatever the reason, pupil-teacher ratios (not to be confused with the actual numbers in each class, which are slightly higher because not all teachers are working all the time) seem much the same as in Britain, 28 : 1 in the polytechnics, and 25 : 1 elsewhere. Teachers work a 45 hour week, and teach 24 lessons (each of 45 minutes) each week; the rest of the time is for preparation. This suggests that some of the

classes must be very large indeed, although the absence of separation into primary and secondary schools may allow the British primary school crush to be avoided.

To recruit people to important jobs in a country where salaries are rigidly controlled and do not respond to market forces obviously calls for efficient forward planning, and vocational guidance which falls just short of compulsion. Children decide on their professions at the age of 15, but vocational guidance begins with "toy construction sets" at the age of 11. Direct guidance begins at the age of 13, when "factory day release" begins. The East Germans admit that one advantage of the polytechnics is that "children become acquainted with production very early". They are taught to understand the country's needs, and apparently "conflict is rare". Changing from one form of training to another is also rare, and outright failure, the Germans believe, "belongs to the past". Whether this system works better than the unpredictable surges of the free economy is doubtful, but certainly it relies very heavily on accurate central planning, and risks being overtaken by events. There are, for instance, very few computers, and even fewer systems analysts, in East Germany.

East Germany suffers from a brain drain, though the flow has been staunched since the building of the Berlin Wall. It is a migration in two directions, as the very best students are often rewarded by being allowed to go to the Soviet Union to further their education. This the East Germans do not mind, for they regard it as a compliment to their educational system, in much the same way as Mr. Quintin Hogg applauds the migration of British scientists to the United States. There is, in addition, the drain to the West, from which, surprisingly, the East Germans wring some wry humour. Their favourite story, doubtless apocryphal, concerns Dr. Adenauer, the former West German Chancellor. Asked by a visitor where the West German universities were, he is alleged to have replied, "Our universities? Oh, they are all in the Eastern zone".

Restoring Atmospherically Degraded Images

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How is it possible to extract the most information from optical images degraded by the passage of light through the atmosphere? This was the subject of the Woods Hole Summer Study on the Restoration of Atmospherically Degraded Images held at the Summer Studies Centre of the National Academy of Sciences between June 27 and July 22, 1966. The director of the study has singled out some of the principal themes and conclusions.

It was pointed out in Newton's *Opticks* (Book I, Part I, Prop. VIII, Prob. II; 4th ed., 1730) that even if "the Theory of making Telescopes could at length be fully brought into Practice, yet there would be certain Bounds beyond which Telescopes could not perform. . . . Long Telescopes may cause Objects to appear brighter and larger than short ones can do, but they cannot be so formed as to take away that confusion of the Rays which arises from the Tremors of the Atmosphere." For example, the diffraction limit of a 48-in. telescope is 0.1 sec of arc, but "seeing" effects limit the actual resolution to several tenths of a second. A recent study sponsored by the United States National Academy of Sciences undertook to investigate how far such non-Newtonian devices as electronic computers and lasers may be able to circumvent

the effects of atmospheric turbulence on the formation of optical images.

The Summer Study did not consider techniques of image enhancement that depend only on some form of contrast amplification to make a photographic image more open to interpretation, for it was assumed from the start that one would be able to perform more sophisticated operations on a recorded pattern of light intensity with the object of undoing degradations and of restoring, as nearly as possible, the image that would have been recorded in the absence of degradations. Among the resources of modern technology which may contribute to this end are high speed digital computers with large memories, powerful laser sources of coherent radiation, and electro-optical image sensor techniques which are fast