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INDIAN EDUCATION IN 2001

Two lectures
by

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I

India's Future

The Future

Futurology is not for me a science of prediction ; it is a tool for current planning. Its test is not whether its projections come true twenty or thirty years later : it is whether it has made for more prudent current decisions. It is not a unilinear or one-dimensional forecasting exercise : it is a continuous process of alerting ourselves and sensitising all around us to the realities—good and bad—ahead. It is not an exponential paradigm : it is a delineating of alternative strategies based on different *scenarios* which need continuously to be corrected. In this sense, all educational planning, unlike agricultural or even industrial planning, is a futurological exercise. Except in the case of major irrigation projects, agricultural programmes can be planned and executed in one year. Except for the capital goods sector, the normal gestation period in the manufacturing industry is 2-3 years. I leave aside our unfortunate and inherent capacity to double our gestation periods in major important irrigation works, steel plants or fertiliser factories. A public education decision made today, however, normally has a 3-12 years gestation period. The 10+2+3 school structure was formally approved in 1966 and hopefully by 1978—12 years later—it will become the pattern in all our States. A decision as to a child's educational career will fructify in terms of use of that acquired knowledge 10, 12, 15 or 18 years later. The inputs in education, by public authority or private individuals,

produce outputs after a time-lag varying from a decade and a half to two decades. Hence, when talking of Indian education in 2001 AD, we are talking of educational decisions that have to be made today or tomorrow, with an eye on our society not as it exists today, but as it will exist at that time.

Change in the Future

The problem that we face in visualising the future is that the future is made up of and is the resultant of change. This recognition that the composant and determinant of society, present and future, is change is one major gain. When I graduated from high school, fifty years from today, I visualised my future and India's future in terms of what economists call the stationary state. All events present and future were seen in simple terms. Conceptually, this meant conceiving everything simply and clearly, as entity isolated from its surroundings. In terms of rationality, it meant isolating the cause-and-effect relationship in such a manner that causality could be established in a determinate frame. In such a world either there was nothing complicated, uncertain, ambiguous or contradictory, or if there was any element of obscurity, doubt, ambiguity or contradiction in a specific situation, it was assimilated in our thinking with the nature of knowledge, which is a system of abstraction, a technique of simplification, banishing to the periphery, and terming as epiphenomenal, what did not fit into the simple abstract model.

Those days of assumed simplicity and consequent oversimplification have gone. Let us take the first half of the seventies which witnessed a series of shocks, the Indo-Pakistan war, the two successive years of drought, a rate of hyperinflation unknown in the country's history ever, the fourfold increase in oil prices and the shooting up of the international prices of cereals, capital goods and non-ferrous metals, violence in educational institutions. On the international scene, these changes have been accompanied by the emergence of the super powers and the detente between them, the Arab-Israel war in which the Arabs for the first time started with a victory, the establishment of OPEC countries as a decisive force in international relations, the end of the war in Vietnam, Cambodia and Laos and their

developing as socialist countries, the breakdown of the Bretton Woods international monetary system and a state of international monetary chaos, the high inflation, unemployment and stagnation (in some cases leading to recession in the industrialised world) and the formulation of the United Nations programme of the New International Economic Order, the Charter of Economic and Social Rights and the Cocotayya Declaration.

It is not only the speed with which the events have imposed and superimposed themselves on us and on the country that is unique : it is not only their content—shortages, privations, new policies—that is arresting : it is the fact that change has become the daily diet of our time and society to the point that the only thing that we can be sure of is that tomorrow will not be like today. It is at this point that there is recognition of the need for some king theory of change.

Change is a human characteristic. Unlike the predictable solar system where time is reversible, and day always follows night or *vice versa*, in a biological system the dominant notes are genetic mutation and ecological selection. Again, unlike the relative predictability of the biological system, where growth is a function of the genetic blueprint of every being, in the social system, growth is a movement to or away from states of equilibrium which can in the short run be predicted and/or controlled. This is the familiar typology of the economist who can forecast states of boom or stagnation or recession and set up social thermostats to bring the system back to a new variation of an equilibrium. When we turn to the growth of knowledge and social organisation, however, time is never reversible and what is termed 'systems breaks' are the governing rule. What we call 'change', which is the substance of current and future history, is a series of systems breaks.

In this sense change is endogenous to man and society. Man is born, grows, dies and is born again, and this is part of a predictable biological change cycle. But his knowledge and system of organisation are subject to mutations and are the basis of present and future shocks, which is the concern of this lecture. This is not to deny the place of continuity in the life of the individual and society. To remain one's self, "to thine

ownself be true", is an inbuilt, individual element. So, too, is the element of continuity in society. The Bolshoi Ballet in the Soviet Union, the Peking Opera in the Peoples' Republic of China, Fidel Castro tracing his thought back to Josè Marti as Lenin traced his to Marx and Marx to Engels, the D.M.K. in Tamil Nadu tracing its prohibition policy, its Harijan development programme and urban slum clearance accomplishments to Mahatma Gandhi and appealing to the Congress Party to follow Gandhiji's teachings are part of this element of continuity. But there is need here for caution. The outward symbols may remain, like the *pottu* or *namam* on our forehead, the eagle, the hammer, the star and the sword in the flags of many countries, providing a facade of unbroken and unchanging tradition, hiding the fact that, in reality, their import, significance and even function has changed completely. Hence this continuity cannot be expressed for the future as exponential trends. I remain sceptical of such attempts, because they are merely assuming a non-existing continuity, an extension, an acceleration of past profiles.

There is another element of discontinuity in the change which makes up our present and future—the discontinuity in values as between people living in one country and another. Here I wish to take a very simple educational value and contrast its application in our country as opposed to an industrialised country. We regard it as the failure of our educational system and a blight on our social system that the two are littered with a very heavy percentage of dropouts and pushouts from the school systems, ranging from 60 per cent at Standard V to over 95 per cent at the university level. All our efforts are bent towards increasing the retention power of our school system, and this having failed to remedy the dropout and pushout *malaise*, we are now turning to various programmes of non-formal education to provide the dropouts both basic minimum learning skills and opportunities for further learning and continuing education. In the industrialised countries, however, the view is gaining ground that dropping out of school should be encouraged and become the rule for the older children. With the kind of rapidly changing societies they face, instead of the schools grooming the students

in the industrial culture at a time when the societies are moving out into the post-industrial phase on the one hand and into a materialistic value system as a simple and easy means of controlling students and everyone in society at a time when these values are breaking down and are being challenged on the other, students are being encouraged to step off the one-way track, the conveyor belt of the school system and return to it later when they know what they want to do with themselves in and for society. This is part of the larger debate going on in these countries on the ideal of a deschooling society, with its assumption that education can become an independent social variable, as against our values in India (and the Third World countries generally) for a learning system—school and out-of-school—which will be essentially a contributor and reflector of a growing and just society.

Profile of Future Indian Society

It is at this point that we need to trace the profile of Indian society as it is likely to emerge in 2001 AD, of which its education would be a contribuant and a reflection.

Population in 2001

The 1971 census established India's population at 548 millions. What will the census of 2001 establish as the country's population? Here various factors must be taken into account. The first is the rate of mortality. Between 1951 and 1971 mortality rates in the country declined from 25 to 15 per thousand of the population. During the 30-year period, 1971 to 2001, the mortality rate is likely to fall from 15 to 9·6 per thousand, according to the Registrar General. This means that during the 30 years, the famines and droughts which will continue to occur in different parts of the country can be more clearly foreseen and planned for, so that famine deaths will not occur. It also means that our preventive public health programmes, particularly against communicable diseases, will be as effective as they have been in the last 30 years. The second factor is the birth rate, and here we are on somewhat uncertain grounds because it is here that a mutation can occur as happened in Japan during the fifties and as is happening in China today.

The demographer's tool to deal with this uncertain element is the familiar one of plotting three alternative trends varying from a high birth rate of 30·4 per thousand to a medium one of 25 per thousand and a low one of 21·1 per thousand. I must confess that I am not convinced that these alternatives exhaust the possible decisions which individual families and society as a whole will make as to future family size and fertility rates. For want of expertise in this field, however, I adopt the medium birth rate hypothesis, as recommended by the Registrar General, with his sober and sobering rationale : "the high and low sets of projections broadly indicate the likely range of future population trends in India. The medium sets may be taken as representing the most plausible course of population growth". With these parameters, the 2001 census will establish a population of 945 millions. It will take another eight years (by 2009) for our 1971 population to have doubled itself.

Production Structure in 2001

The structure of our society at this point of time, 2001, should be outlined. In 1971, the primary sector, agriculture, contributed 42·5 per cent to our net domestic product, manufacturing industry 17·1 per cent, infrastructures 12·0 and services 28·4. Here it should be noted that while in the 10 years 1955-65 agriculture's contribution declined from 55·8 to 42·6 per cent, that of manufactures went up from 13·2 to 18·2 per cent. In the following quinquennium there has been not only structural stagnancy but some retrogression. And this will be the structural profile of the country in 2001, if the secular trend of 3 per cent annual economic growth of the past 25 years is to be the trend for the next 25 years. I am going to assume, however, that our growth rate until 1992 will be nearer the 5·5 per cent that we have targeted in our last two Plans, and thereafter will be 7 per cent in the last decade before 2001. On this basis, our agricultural industry will contribute 27·2 per cent to our national income, manufactures 24·8 per cent and infrastructures and services 48 per cent. In other words, we will still be an agricultural society, with manufactures becoming more of a key variable in people's life than it is today.

Poverty Profile in 2001

Under such a structure what will be the anatomy of poverty in the country ? Here we start with the 1971 anatomy. The bottom 40 per cent of our people spend less than Rs. 300 per annum per capita on their consumption, while the remaining 60 per cent spend Rs. 1,106. At 1972-73 prices, the minimum consumption level is Rs. 500 per person per annum in 2001. There are two ways in which this minimum can be assured to every person in the country. One is to combine the growth of the economy envisaged above with full-fledged redistributive measures involving public control and ownership of all production factors, agricultural land, industrial assets, urban property etc., development of new organisations in farm and factory, under which the presently unorganised mass of workers are both participants and decision-makers, and a distributive network which reaches out to all parts of the country and all pockets of poverty. This would be a sharing of the relative poverty of the country by all its people, and can be reached fairly quickly, within one Plan period. The other *scenario* is to continue with our present system, under which incomes are earned and spent without restraint by a small minority except for the transfer from the rich minority to the poor majority which takes place, through the income tax, wealth tax and corporation tax and the various programmes that are being developed for what are called the vulnerable sections of society such as the small-industry sector, the opening up of backward regions, the SFDA, MFAL and DPDAS. On the very optimistic assumption that this second alternative will result in an equal increase in the growth rate of the income of the bottom 40 per eent for every 1 per cent growth in the economy, by 2001 our poverty group will just be reaching the minimum consumption of Rs. 500 per person per annum. Here there is a choice for every one of us in regard to the two *scenarios* that I have outlined.

Employment in 2001

The employment profile in 2001 AD is closely related to the structure and the poverty status that have just been dis-

cussed. Without entering into the conceptual controversies involved in the terms 'employment' and 'unemployment', and noting that in our poor country everyone (except the few with rich relatives) is busy in some way in earning or scratching out a living as otherwise one faces starvation and death, the employment referred to here is work which enables a person to support himself and his family, what is called gainful employment, in forms which add to the productive assets of the community or of the individual, not just digging holes and filling them up, not building pyramids or even Taj Mahals, but what is called 'productive employment'. Limiting employment, however, to what our census calls the labour force, our labour force will increase from 170 millions in 1971 to 364 millions in 2001. This more than doubling (121 per cent) of the work force in 30 years means that gainful and productive employment will have to be found for some 200 million new labour force entrants, plus what is called the unemployed and severely underemployed backlog which the Bhagawati Committee estimated at a conservative 20 millions. In terms of sectoral employment, using the preferred economic growth *scenario* outlined earlier, agricultural employment will increase from 130 millions (72·2 per cent of the labour force) in 1971 to 214 millions (58·7 per cent) in 2001, manufacturing employment will increase from 17 millions in 1971 (9·4 per cent) to 60 millions (16·6 per cent) in 2001, and employment in the tertiary sector will increase from 33 millions (18·4 per cent) in 1971 to 90 millions in 2001. We shall at the turn of the century be a heavily agriculture-based rural economy in employment terms. It also means a little less than half the 1,20,000 new labour force entrants per week between now and 2001 will find their employment in agriculture. This need not daunt us. Contrary to popular belief that there is overemployment in our agricultural industry and that the marginal productivity of our agriculturalist is zero, the facts are that Indian agriculture is only half as labour intensive as Japanese or Taiwanese agriculture. There can be a large absorption of labour in agriculture, provided labour productivity is improved—which means labour is able to use the new seed-fertiliser technology and the mechanised power, energised pump sets or small tractors or both, that accompany such additional gainful labour inputs.

The Residue

There are other parts of the Indian profile in 2001 that I do not deal with in the interest of brevity, notably the rate of savings—household, corporate and public—the role and rate of capital formation, the impact of international relations and, above all, our capacity to work together, to cooperate one with another, to deploy our capacity for discipline, integrity and tolerance, not when we are faced with external aggression or an internal emergency, but when engaged in the far more serious and decisive battle against poverty, injustice and inequality within the country. These are part of the prolegomena to education in 2001 to which I turn in my next lecture.

II

Education in 2001

We may now turn to look at the educational profile in 2001.

Quantitative Aspects

The first perspective and easy to visualise perspective is quantitative. Against the 117 million children of the age 6-14 in 1971, there will be 200 million children in that age-group in 2001 AD. Against the 320 million illiterate adults in 1971 (as the Prime Minister has pointed the census computation of illiteracy includes the total life span of our people, from 0 to 59 plus, which must be corrected to arrive at the adults, 15 plus, without education), there will be 370 million adults needing education in 2001, if the 0·75 per cent average annual rate of adult literacy between 1951-71 remains unchanged over the next 30 years, 1971-2001. If the existing school model is maintained in 2001, involving the provision of full-time school education to all in the age-group 6-14, then not only will there be need for 45 lakh teachers instead of the current 25·3 lakhs (if the teacher-pupil ratio is increased from the current average of 1 : 36 to 1 : 40 in 2001), not only will the cost of such schooling be Rs. 3,500 crores (at 1971 prices and salaries) which will be 2 per cent of the National Income in that year, against the total educational expenditure of the country of Rs. 1,350 crores in 1971, the amount of land that will be required for our additional schools, colleges and universities will increase by 5 lakh hectares. But the country in

the various *seenarios* outlined in the first lecture would need to increase its hectarage by 30 per cent (40 million hectares) and its productivity by at least 50 per cent in order to augment its foodgrains production by 100 to 130 per cent to feed its 945 million people in 2001. If to this is added the additional 8 lakh hectares that will be used for urban and rural housing for the people plus posts, railways, roads, etc., in 2001, the 5 lakh hectares of land for the additional schools and universities take a low place in our order of priorities and will not be available. I regard this school sites constraint as the decisive factor, rather than the problem of the increased number of teachers, which we can and should have in any case to meet the demands for remedial and continuing education of adolescents and adults, or the increase in absolute amount of our educational expenditures which will be for all education within the acceptable 4 per cent GDP norm. The educational system that will be obtaining in 2001 will consist of a reformed formal education sub-system and a non-formal education subsystem. The number of formal schools and universities will remain more or less at current levels, but will be used 24 hours a day instead of the current 6 to 7 hours. We have so far grown with the tradition that there is something sacrosanct in working and studying in the day and resting and sleeping at night. Around this tradition have grown such myths as an hour's sleep before midnight is equal to three or four hours' sleep after midnight. As experience with night shifts in factories, hospitals, as also during war time, and in high-level research and development laboratories and educational institutions has shown, further corroborated by controlled experiments in Europe in precision-instrument factories and in farms, the human mind and body can work at any time of the day or night with equal effect, precision and efficiency, and can sleep and rest during any part of the day or night to gain the necessary recuperation. Hence the Indian world of work and study will extend in shifts and relays over all 24 hours of the day and night, so that the same educational institutions will serve formal and non-formal education. The formal and non-formal education system will share the characteristics of flexibility in the age-level at which learning starts

The pre-school stage of learning could be extended to 8+ or 9+, so that the elementary level of learning which now takes eight years can be completed in about half that time from 9+ to 14+, on a full-time, formal, or part-time, non-formal, basis. There will also be flexibility with the integration of the learning system with the world of work, allowing the learners to drop out of full-time learning for such work as they choose or are obliged to undertake, participating at the same time in non-formal education experiences that interest them and fit their needs, before returning to full-time schooling. Both forms of education will be functional to the living interests of the learners—only in the case of full-time school learners the functionality in terms of farming, dairying, fishing, manufacturing, mining and office interests will have to be created by locating the school in the farm, in a dairy, in a factory or in other normal work establishments. In the case of the non-formal education learners, the functionality will be in making their learning programmes centre round the world of work in which they are engaged.

Innovation

Such an educational system will admit of innovation. That is, as education is an important factor in the change process, the change process will be built into the system to help it meet the change challenge. Here we face the dialectic of the conserving function of education—the conserving of values and the store of wisdom and knowledge that has been handed down the ages, and built into it—which degenerates into the conservative character of all educational systems, as against the need for change, adjustment and renewal that is imposed on it. Already the scales are being weighted against the conserving part of the dialectic. Today's outpouring of 1000 trillion non-redundant bits of information, which will quadruple by 2001, makes obsolescence more dangerous to the individual and community than illiteracy. The worst that can happen in these circumstances is for one to open the door of a typical 2001 classroom and, walking into it, find the teacher standing up front and talking. Rather, the changing world outlined in my first lecture will require a new kind of teacher

and a new kind of education, moving away from the current art of imparting and acquiring bits and pieces of information and knowledge, which become outdated even as they are being taught and learnt. Instead, there will be learning of how to learn facts, where to get information from, how to construct theories and principles using current facts even as they became outdated, as examples and demonstrations, and, above all, how to be engaged constantly in assessing, criticising, developing new theories, new facts and new constructs. This autonomous attitude towards learning will, on the one hand, mean that the professional educator will, no longer be, or imagine himself to be, the sole purveyor of education and, on the other, the basic education formation situations, of which the restructured primary school will be one expression, will promote the development of cognitive, affective structures and its accompanying qualities of accuracy, curiosity, construction on to the more abstract theorising and understanding and mastery of procedures. Education will thus develop in its students the basic skill-forming dispositions of initiative, inventiveness, decision-making and human relations, leaving to the firm, factory and office the task of imparting technical information and know-how. Such education, orientated to innovation in the twenty-first century, will be a system of perpetual reform in response to the constant and continuous change in society. This will place a heavy responsibility on educational research bodies to propose and bring about the intervention of continuous change in the change system.

Science and Vocationalisation

Education in 2001 will be an expression of the exploding forces of science and technology which will be operating in our agriculture, animal husbandry, forestry, fishery, mining and manufacturing industries to ensure the growth rate of 5-7 per cent outlined earlier. (I am using science and technology comprehensively to include physical, natural, human and social sciences and their technologies.) The science and technology developed in schools and colleges will have two primary functions. First, they will be the bridge between the world of study and the world of work, between reflection and action, between

theory and practice. At every stage of learning in school and out of school, there will be a work-experience component alongside of a theoretical component ; both will be science-based learning experiences in themselves and for themselves—not simply for what they will lead to. This science-based learning, at the early stages, will centre around gardening, fertilisers mix, pesticide use, land and water management, biology of the birds, insects and animals, physics of heat and concrete, chemistry of the soil, electric circuits, weaving, cooking, etc., and at higher learning levels around agricultural, animal husbandry and fishery sciences, agro-based industrial sciences, and various other technologies. The second function will be for science and technology and its research findings in our learning institutions to be central to agricultural and industrial development, and not, as they are today, linked to the non-essential goods where they are marginalised to the science and research of the industrialised countries and are a pale and ineffective imitation of the research going on in these countries. Our science and technology systems function is to be the infrastructure for the full and improved production of goods and services needed by our poverty sector. Then our education system will not be the gateway to society : it will be the centre of society. It will not be shut off from the farm and market-place. It will, as noted earlier, include the farm and the market-place.

Permanence

Education will be lifelong. We should be entering the twenty-first century with the scandal of mass adult illiteracy wiped out, if the first *scenario* that I have traced in my first lecture becomes our operative programme. But from the massive effort made during the remaining 25 years to educate our illiterate fathers and mothers, or elder brothers and sisters, we would have glimpsed a great and revolutionary truth—that education is not the spatial monopoly of something called the school and college, that it is not a time-bound learning experience, that there is no such thing as childhood education, adolescent education, youth education, adult education, that pedagogy and androgogy are just misleading time-distorting

educational bureaucratese. There is just education which is a way of life, a lifelong way of life. Every year, every month, every day, from the cradle to the grave, a person will be learning, open to learning and given the opportunity to learn in the home, school, university, factory, farm, hospital, office, co-operative, temple, trade union, political party, cinema and club. Education will be open. Schools without walls, polyvalent classes, integrated schools, universities of the air, will be juxtaposed with firms, farms, factories and business houses as education extension agents with their survey, documentation and research facilities. The whole wide open area of self-instruction, similar to what is taking place in our rural areas, will be operative. Let us not forget that for the farmer and his wife the farm is the school, what they do in their daily life is their curriculum of learning. Their experience in dealing with their daily survival problem is the substance of their education. Lifelong education in 2001 will be a fact of life.

Democratisation

The education system will be a contribuant to the classless society in 2001 outlined in the first lecture, as it is a faithful reflection of the class-based society today. This will involve not only the democratisation of the system through making it accessible to all persons, particularly the poor peasants, the landless labourers, the small artisans and the factory hands, their wives and children, which the renovated formal education sub-system and the non-formal education and training sub-system will assure. It will also involve developing in both systems a learning programme which will ensure equality of educational attainments and achievements as between members of the traditional intelligentsia who have had a long-term monopoly of attending and sending their children to schools and universities and those belonging to the vast majority who are the poverty sector and who themselves together with their children are first generation learners. This would involve the system not only following the individual learning path of each adult and child learner, and the provision of compensatory learning facilities to compensate for the past exclusiveness, but engaging itself in a constant diagnosis of its programme, its

objectives, its teaching and learning methods and achievements, its contribution to productivity and social equity—which is another aspect of the continuous change, reform and renovation referred to earlier. That this is no easy task in view of the conservative and class character of the formal education subsystem which can even give work experience a class bias alongside of the imperative of society taking a hand in its restructuration needs constantly to be borne in mind. As recently as in May 1969, the *People's Daily* in China wrote : "the representatives of the poor peasants [who entered the schools] unconsciously became engrossed in service tasks. Whereas the teachers give their classes, the former, having nothing to do, busy themselves with heating the stove, sweeping, carrying water, ringing the bell, and repainting the tables and benches. [This sounds very much like our work experience formula.] Under such circumstances, the representatives of the poor peasants no longer direct the school's movement of struggle, criticism and reform, and only enter the institutions to perform menial tasks. This situation should put us on the alert. The poor peasant certainly did not enter the schools to lend a helping hand and even less to submit to the direction of the intellectuals." A Unesco review of the Chinese educational system refers to three of its features : first, though started in the schools, the educational reform was carried out and achieved not by the teachers and students but by the whole society which created for itself the new school ; secondly, the new school is adapted to its means and its contemporary conditions of human resources and social structures ; thirdly, underlying the reform is the strong political will which defines the objectives, acts as the driving force, and with a simplifying boldness more often defies rather than controls the laws of pedagogy.

Education Decisions

As I suggested at the start of the first lecture, this educational profile at the start of the twenty-first century imposes on us—the government of the Union and the States, the teachers and students and society—five educational decisions as a prog-

ramme of action to be undertaken now within the constraints of the existing framework.

Restructuration

The present model with its structured hierarchy of time-dependent learning levels, single-point entry, isolation from society and market-place, outdated learning content, irrelevant evaluation techniques and class-biassed survival must be replaced by the systems model that I have been referring to throughout this lecture. The action steps for this purpose would be : (*a*) launching the non-formal education sub-system for the two priority groups—school drop-outs in the age-group 6-14 and working adult illiterates in the age-group 15-59, involving devising functional curricula, producing learning materials, mobilising teaching resources from trained teachers as well as progressive farmers, engineers, musicians and dramatists and sportsmen, and using existing buildings, labs and workshops for running the concentrated courses ; this has become official policy and we have made a start on this in some States, it needs to be accelerated in all of them ; (*b*) reorganising the existing formal education sub-system into multiple entry and exit points at its different levels, so that students could enter, leave and re-enter the school and university system at any one of several points to answer the call of work in the home, farm, factory or office, continue their education through organised non-formal programmes and re-enter the school and university at the appropriate points when they so desire in order to acquire further learning skills ; the launching of the non-formal education system and this re-organisation of the formal system will help the system serve the majority now excluded ; this re-organisation of the formal system has now been talked about for a long time, going back to 1910 since the time of Gokhale. It is now for us educationists to translate this proposal into a practical and working plan in each State, identifying the exit points and the certification of exiting students, defining the readmission requirements and procedures, together with means of evaluating the student's non-formal education experience, etc., and put the system into operation ; (*c*) establishing the relationship between the two sub-systems, involving the cross-

over points and the feed-in and feed-out provisions referred to earlier, and the *nexus* between their educational content, methods and technologies of teaching and learning ; (*d*) organising a massive training and retraining of staff which should include not only the full-time teacher but all who are willing to teach and train in the formal and non-formal sub-systems ; (*e*) vocationalising the second level through a system of diversified learning experiences, comprehensive schools and technical schools, so that such work-based education is freely available to all up to the age of 15 or 16 in school and out of school and becomes the constructive skill-forming terminal point for 80 per cent of the full-time students entering the school stream ; and (*f*) developing undergraduate education, full time and part time, in each State under a State Academic Council, with full-time student selection being based on long-range manpower budgeting similar to the one what we do in a rather hazy manner for undergraduate professional education to avoid the employment imbalances that I called attention to in my first lecture. All full-time undergraduates should be required to serve for a year in the NSS or as part of their graduating requirement. Universities will then be advanced centres of excellence in post-graduate education and research and should be staffed so that each of their departments in the natural, medical, engineering, agricultural, social and human sciences can develop high levels of disciplinary and inter-disciplinary research, along with a trans-disciplinary infusion that our society demands daily.

Curriculum

A second major action called for is the development of a modernised functional curriculum in all branches for both sub-systems, in which leadership should be assumed by universities and post-graduate institutions, but in which provision must be made for the involvement of each learning unit. Among the problems that need attention are the harnessing and harmonising of theoretical learning and work experience, balancing, relating and integrating the general education in language, literature, social studies and the sciences with diversified courses in agriculture, trade, engineering, secretarial skills, etc.,

and the researching into the age structure appropriate to each locality for the development of cognitive, and affective qualities, of theorising, analytic, synthesising and normative thinking qualities, and for launching into operational thinking, inventory-making and innovating. Such process-oriented rather than content-based learning programmes will enable both continuous change, review and revision of the subject specialities and allow some decentralisation of programming as a first step to each educational district and later to each school.

Technologies

A third action that should be taken now is the reform of teaching technologies and learning methods. Here we must begin by recognising the absurdity of the inflexible time constraint under which teaching and learning currently take place. There is, on the one side, the class of students with varying aptitudes : first generation learners versus the traditional schoolgoers, the gifted and the normal, and the fact of each student choosing his own learning path. On the other side, there is the objective of learning how and what to learn, made up of varying learning programmes ending with the classified end-result. But linking these highly variable input and output quantities within a rigid time frame—one year for learning, three hours for expressing what has been learnt, etc.—this time constraint should be broken and the learning time and teaching methods be reorganised around self-instruction, the discovery methods, problem-solving, discussions, question and answer sessions, seminars, programmed texts, radio, TV, library, field work, student participation and activity over a flexible time period that is suited to each student's learning aptitude. I have been speaking of disaggregated individual learning experiences. In our large country with a large learning population, we can at least make a beginning in our formal education classes, as we do in the non-formal, by internal grouping of each class not according to the alphabetical order of their names or to the order of admissions but by their learning interests and aptitudes, and if the multiple-learning methods referred to earlier are used, there will be more individualisation of learning and teaching. And we must help the teacher not to be afraid of being wrong. The

image of total knowledge and know-all behaviour that he exudes is anti-education in these days of exploding knowledge. And if he is never wrong, it means he has not changed, he has not tried anything new in methods or content. "Covering the syllabus" should not be held up to him as the ideal, as compared to the capacity to deal with a changing future. Both teaching and learning should be turned round to deal with changing future, and not with the "golden past", which is now so much a part of our national, social and pedagogic tradition.

Evaluation

Fourthly, and most urgently, the present examination procedure is a farce : and a farce should be scrapped and we should stop fighting to save this ante-deluvian tool. The alternative to it is not what has come to be called "no examination, automatic promotion". Rather we should now devise an evaluation system for both the formal and non-formal sub-systems and for every level of learning ; and a detailed procedure which will ensure that (*a*) it facilitates self-evaluation ; (*b*) it promotes learning and self-learning, teaching and futurological teaching ; (*c*) it encompasses every value, integrity, innovativeness, inter-disciplinarity, judgement and reflection that all education stands for ; (*d*) it produces performance records that are appropriate to purposes specific to it, *viz.*, individual, professional, employment and self-employment, and further learning ; (the above list is finite and exhaustive) ; (*e*) it provides a constant feed-back for the larger issues of learning methodologies, teaching techniques, curricular planning, educational policies and the good life for all, which is the end of all education.

Planning

Finally, there should be integrated planning of the system and its two sub-systems at every level—national, State, district, block, down to the individual learning unit. Here I have a few broad hints. First, the basic planning tool, which is educational statistics, should not be the bogus (and dishonest) enrolment figures that we use, not the simple reading and writing literacy test that we employ in the census, but the average daily and monthly attendance and a functional educational test. In a

sample test that I conducted as Chairman of the Education Finance Committee in my State, I found that, in the educational ranges, the average monthly attendance in the schools sampled was 40-60 per cent of the reported enrolment, and the effective literacy about 60 per cent of the record. The school head reports the non-existent enrolment statistics and the literacy result to the district officer, who, in turn, reports it to the State Officer. All this is put together as the basic data for the State plan, and then forwarded to the Union Government, where it is further consolidated into an impressive but unreal basis for the All India Plan. If planning is broken down and disaggregated as I have just suggested to the individual unit level, there should be a more reliable basis for planning. Secondly, there should be a clear definition of the primary objectives of each system or unit and a delineation of the secondary objectives of each sub-system against which progress can be measured. Thirdly, quantitative priorities must be established and continuously reviewed with accuracy and honesty, covering demographic trends, manpower demands, the socio-cultural needs and the correction of the unjust system. Fourthly, qualitative priorities including modernised management, teacher education and retraining, disaggregated learning paths, functional curriculum development, evaluation procedure, and the inter-locking of the formal and non-formal systems must be woven alongside of quantitative priorities. Fifthly, every management technique from simple inspection and manual checking to sophisticated tools such as the systems approach, operations research, programme budgeting, PERT and cost effectiveness studies should be used to see how the system, sub-systems and/or the component units are doing what they are required to do, and why they are doing them. In this setting, the one constraint that education does not really face is the financial constraint. Not only is there an inexhaustible reservoir of human resources at its disposal, unavailable to the other sectors of the economy ; not only is there the possibility of identifying and redeploying anything up to 50 per cent of current expenditure now being wastefully used on unwanted teachers' salaries, non-existent schools, dysfunctional school and college cramming or useless literacy classes. I believe that

the allocation and deployment of the financial resources along lines that I have indicated will help us reach our quantitative imperatives through qualitative priorities. All our quantitative objectives can be attained by using the financially feasible qualitative priorities, awaiting action now for the attainment of the free, full, productive, self-fulfilling and socially equitable educational system of 2001.