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CHARACTERISTICS OF THE MATURE INDUSTRIAL SOCIETY

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As a professional economic and social historian, I am strongly inclined to regard problems from the long range point of view. From this vantage point, a talk on the nature and problems of advanced industrialized societies of the future smacks of a dangerous exercise in clairvoyance.

The Industrial Revolution is not over and many economists feel compelled to talk of a second Industrial Revolution in order to explain all of the astonishing changes that we have seen come to pass. For thousands of years, civilized societies were geared around agriculture. Civilization followed civilization, and each one had its own individual characteristics but they all had one common denominator: for millennia, animals and trees were the leitmotif of economic history. Then, with startling suddeness, the machine successfully took over. We live in an age of transition. We know what we have left behind but we do not know what lies ahead. The so-called "industrial societies" of today are rough and poor prototypes of "industrial societies" as they will be in a few decades hence. Our industrial societies are still conditioned by values, traditions, and institutions inherited from their millenary agricultural past. Their actual features and their problems give us an exasperatingly, vague indication of what an industrial society will be in the near future. We do not know what lies ahead. Our past does not offer us any guideline. This

is why we feel so over-anxious, so frightfully insecure, and so plagued by doubt.

Two dangerously threatening problems bother our minds and our souls: war and overpopulation. Both are not new phenomena. They have always existed and they seem to be an inextricable part of life. What is alarmingly new is the dimension that both phenomena attain with industrialization. While it took a hundred thousand years for the world's population to reach 2 1/2 billion, it will now take a mere thirty years to add another 2 billion. Our efficiency in proliferating is only paralleled by our potential efficiency in killing people. Million of people can now be instantly killed with our powerful gadgetry. Leonardo da Vinci once wrote: "Two weaknesses leaning against one another add up to one strength". This is true in architecture, but unfortunately enough, it does not hold for our contrasting "weaknesses" of war and overpopulation - or at least, it might hold only in an unbearably cynical sense.

The dangers of overpopulation and war remind us that we as "social animals" are not improving as rapidly as the techniques we develop. Technological progress is, by its very nature, a cumulative one. Ethical progress is not. As a matter of fact, technological progress is now so rapid that not only ethically - but mentally and physiologically as well - we seem incapable of coping with it. The rapidly mounting number of neurotics in our society is a clear indication of the difficulties faced by our intellects in adapting to the pace of change and of activity imposed on us by technological progress. The extraordinary diffusion of all kinds of phenomena such

allergy to drugs, synthetic foods, and the whole question of pollution is abundant evidence of the difficulty encountered by our bodies in adapting to the new synthetic products that our chemical technology is spewing out.

For many years to come, I believe, this will be the main problem that industrial societies will have to face: that is, to adapt people, economic organizations, and social and political institutions to an extraordinarily rapid rate of technological change. To treat such an imposing question in all of its fundamental aspects would require a team of researchers and years of work. Obviously, this is not possible here. Therefore, I simply propose to touch upon several points of the problem while omitting others - recognizing, of course, the limitations suggested by incompleteness.

The remarks that follow are based on three assumptions. The first assumption is that a successful industrial society of the foreseeable future will be characterized by a high rate of technological development.

The second assumption is that industrialized societies will be able to keep their population growth <u>under control</u>. This statement needs some qualification. We can safely assume that in any industrialized society the life-expectancy of people at birth will be above 70 and at sixty it will be above 15. Low mortality does not necessarily mean low morbidity. In fact, two contrasting influences will be at play: on the one hand, better food, better hygienic conditions, better medical care, better and more widespread

medical knowledge will tend to produce a healthier population; on the other hand, the survival of the weak and the sick will prevent the process of natural selection to operate successfully especially in the early stages of life. Which one of the two contrasting forces will eventually prevail, remains to be seen although I submit that the net result will be a positive one. Even if such a view should prove overly optimistic, the assumption of a low mortality can plausibly be retained. If the mortality is low, population growth is kept under control only on condition that reproduction rates are kept at correspondingly low levels. All available evidence indicates that industrial growth and urbanization have been accompanied by a fall in the birth rates. But it is not equally clear whether industrialized societies will always and automatically succeed in controlling the reproduction rate of their peoples. The weakening of family ties, the facility with which divorce is obtained, and the emergence of an affluent welfare state are factors that may dangerously weaken the sense of responsibility of potential parents towards potential children; we may witness in industrial societies a dangerous fall of the age of marriage coupled with a corresponding increase in the birth rate. Today, the differences among developed societies in regard to fertility are still, exceedingly high. There is no doubt that if dangerous pressures are to be avoided, industrial societies will have to move closer to the reproduction rates of Sweden rather than to those of the USA. It is not without risk that I assume that this will happen, but in doing so, I am probably still working within the realm of plausibility.

The third assumption is that there will be no major atomic war. This is by far the least plausible among my three assumptions, but I have to accept it because it is doubtful whether industrial societies would survive a major atomic conflict.

Under the condition of rapid technological change, the prerequisites of skill and intelligence demanded of individuals in order to be usefully employed grow rapidly higher. A progressively larger share of physical output will be related to progressively more elaborate machines, and on the other hand the machines will require the care and attendance of more knowledgeable and intelligent people. At the beginning of the 19th century, it was possible for England to industrialize with a labour force half of which was illiterate. It would be difficult to do the same to day. It will be impossible to the same tomorrow. An English physician has recently maintained that our machines are improving more rapidly than our average intelligence and that in a few decades people with an I.Q. < 110, while still the majority of the population, will have great difficulties in finding a job. Personally, I would not take these arithmetical exercises too literally, but I would not dismiss lighteartedly the underlying argument either. Questions of intelligence aside, there is no doubt, that as our fixed capital is becoming more elaborate and expensive, our human capiral has to improve correspondingly. As has been done with the concept of literacy in the analysis of a highly dynamic society we have to replace the static concept of education with the dynamic concept of <u>functional education.</u> The concept of <u>functional education</u> implies that 1) education is a process, i.e. it

should be regarded as a continuous variable; 2) functional education is different for different roles; 3) the requirements of functional education change as the society changes.

The education of the average individual has to keep up with technological change. Underdeveloped countries that are willing to industrialize, find themselves confronted with the problem of training their labour force on a scale that was unknown to the countries that underwent industrialization a century ago: a circumstance, this one, that instead of working in the direction of levelling off international disequilibria is working in the opposite direction. Once a country has taken off and has entered the rarified atmosphere of sustained growth, a number of circumstances and forces operating both on the side of demand and on the side of supply make it possible to produce an adequate labour force. We cannot, however, assume that this is an easy and spontaneous process. Recent studies have shown that in some advanced countries some sections of the population although improving their education in absolute terms, are falling behind the rapidly growing requirements of the society and consequently an increasingly larger number of their members will have difficulties in finding jobs in the decades to come. It takes a good deal of effort to supply an industrial society with all the technicians it needs; it takes a still greater effort to give to everybody the increasingly larger amount of education and training needed to be usefully and efficiently employed. In order to reach such a result, a society has to divert vast resources - both human and material - to an important area of the tertiary

sector, namely to education. Under the pressure of events, we are becoming increasingly aware of the role and importance of education in a developed society. But the amount of our resources that we devote to education is still too small - much closer to the standards of our not distant agricultural past than to the standards of our industrial future.

As I noted earlier, one can reasonably assume that in an industrial society there will be some control of fertility. If this is the case, the population pyramic will be narrow at the base. In an agricultural society the active population is burdened by a relatively large number of children; children are put to work at an early age because, in general, the burden of support is uncomfortably high. An industrial society has to face exactly the opposite problem: it has to take care of a relatively large proportion of aged people whom nobody knows how to put to work. The problem of aged people in an industrial society is not only of quantity but also of quality. In an agricultural society an old man, if in tolerably good health, is rightly considered a living repository of rare wisdom and of useful knowledge. In an industrial society characterized by a high rate of technological change, an old person, even if in perfectly good health, is regarded as an useless relic of the past. In an industrial society, old age is not only a case of decay but also of obsolescence.

Actually, the more rapid the rate of technological change, the lower will be the median age at which people become obsolete. We are reaching a situation in which we may find ourselves burdened

not only with a relatively large number of aged people, but also with an even greater number of trained and healthy people who have become obsolete at a relatively early age, in terms of the most recently developed technologies. Intensive programs of re-education for people already employed may offer a partial solution to the problem but they will not eliminate it.

In recent times much has been written and said about the problem of using profitably our leisure time, the assumption being that the machines increasingly substitute labour and leave us with increasing amount of spare time. I question this assumption very much. Those who say that we are left with much spare time remind me of those people who believe that they get large profits from their capital only because they underestimate amortization costs. If we were to devote ourself diligently to learn daily all that it is necessary in order to avoid personal obsolescence, we would easily realize that we do not have time to waste. In fact our daily routine work does not leave us enough "free-time" the necessary for reeducation and the consequences of this fact are aggravated by the fact that we largely use whatever "free-time" we are left with for other purposes than for reeducation. The rate of obsolescence of each one of us in the presence of a rapidly changing world is consequently uncomfortably high.

One may envisage a highly competitive society, in which people will drive themselves beyond endurance during the brief period during which they are <u>a la page</u>, and will grow accustomed to the idea of retiring at a relatively early age. This is not, however, the only possible solution. It cannot be excluded that organized labour will press for the extension of tenure up to the age of 65

from a few privileged areas (public administration, education, etc.) to larger sectors of occupation. A system of employment of this type would eliminate a good deal of efficiency and would automatically build within the socio-economic system a strong resistance to change.

Until now, I have spoken in very general terms, but I am the first to recognize that any useful discussion should be carried at the level of specific jobs and professions. I cannot indulge here in such a lenthy and detailed type of analysis, but I would like to make a few comments at least regarding the broad differences that may appear between the secondary and tertiary sectors, namely between the industrial sector proper and the sector of services. Being constructed on a residual concept, the tertiary sector is not an homogenous unit and all statements made in connection with it have to be carefully qualified. At any rate, for the very reason that the tertiary sector is a very heterogeneous basket, it is bound to contain a number of activities in which technological change is not as rapid, a number of activities for which automation is difficult or not entirely convenient, and a number of activities in which a system of employment based on tenure customarily prevails.

These circumstances will relieve the pressure for the substitution of people with machines and/or with more "up to date" and consequently the tertiary sector will be in all likelihood, noticeably less selective than the secondary. The ideology of the welfare state and parkinsonian laws are bound to aggravate this disequilibrium. In an agricultural society there is a great tendency for disguised unemployment to grow and proliferate in the agricultural sector. Industrial societies, I think, will have to

watch carefully the sector of services in which the growth of inefficiency and disguised unemployment is highly probable. This point should be emphasized especially in relation to the areas of education, research and public administration, which are bound to absorb an increasingly larger share of our resources, and on whose efficiency - as I indicate below - will eventually rest the possibility of further growth of the industrial economy.

Much of what I have previously said in regard to manpower is also valid for fixed capital. While in the past it has been possible to move toward industrialization or to sustain industrial growth with relatively small amounts of fixed capital, today, huge investments are necessary both for embarking on and for sustaining industrial growth. This is another fact that makes the move to industrialize by the late-comers more difficult and favours the growth of international disequilibria. While the amount of fixed capital per unit of labour is reaching increasingly high dimensions, the rapid rate of technological change determines a correspondingly rapid rate of obsolescence of plants and equipment. Entrepreneurs will have to face a situation in which fixed costs will represent a very high percentage of total costs and depreciations rates will be extremely high. This situation will frequently cause nightmares to many an entrepreneur, especially in the short run but I do not think that these difficulties should detain us here. Instead, I would like to turn to another point. When agriculture and husbandry were first developed, the new way of life introduced a completely new mental attitude toward time. It is not simply fortuitous that

the first agricultural societies built impressive structures such as the Babylonian temples or the pyramids of Egypt which were supposed to last for eternity. The life of the farmer, as opposed to the life of the hunter, is characteristically sedentary and is based on a strong concept of continuity. We are still attached - although more in Europe than in USA - to this traditional way of looking at things. Prisoners of our traditional outlooks, we still build airports, hospitals, hotels, government buildings and often private houses, as if they were to last for centuries, while we know that they will be outdated in a much shorter time. A few years ago, some experts of OECD indicated the losses that our outdated approach is causing to the economy and the hindrance to change that it represents. No matter how much we - and especially we Europeans - find this unpalatable, we have to admit that in a technologically highly dynamic society, everything around us will be terribly precarious. Our tastes also will have to change constantly in order to insure the absorption of the new products that a dynamic technology will incessantly offer to the market and a largely expanded advertisement industry will busily devote itself to keep our tastes from resting.

Until recently, in long range analyses, the emphasis of professional economists was all on investments and the formation of capital. Working on data of an historical nature, economists have now shifted the emphasis to technological progress, education, organization and related factors. As might be expected, there is the tendency to

substitute one exaggeration with another. It is difficult to overestimate the role and importance of capital formation in the growth process. In addition to many other considerations, one has to recall that the impact of education, research, and new types of organization can be felt in the economic system only through the formation of new capital. On the other hand, it has to be admitted that the attention given to education and research has been a major and salutary step in our knowledge of economic growth. There is no doubt that a good share of the economic development in the past decades and in the decades to come depended and will depend on technological advance and on the basic forces that are behind it, namely education and research. It is only logical that in a scientific age production should be a function of scientific research.

American industry is extremely dynamic and, in our time, one of the reasons for this fact is the amount of research which is generously subsidized by the U.S. government under the pressure of a tense international political situation. Europeans may be a bit too partial when they emphasize the benefits that the American economy derives from government contracts and government support. But it is a fact, that many effcient European firms cannot compete with their American counterparts unless they are allowed to share the new technologies resulting from the massive American research programs. A number of agreements, amalgamations, partial fusions are now under way to cope with this problem.

Once we have recognized the strategic role that is played by education and research in an highly industrialized economy we have

to face the problem of allocation of the necessary resources for these two activities. At present, the prime mover of our development is operating at full speed only because of the existing international political tension. Unfortunately enough throughout the last two hundred years, Western societies have devoted massive resources to research only in times of wars. Superficial observers have consequently reached the conclusion that war is a powerful instrument of progress. The fallacy of the argument should be obvious. War does not foster progress. What fosters progress is research. If in time of peace, we dovote to research the same amount of resources that we dovote to it in times of war, we will obtain the same results without atrocities and without miseries. An advanced industrial society has to find ways for supporting adequate amount of research under peaceful conditions. It has also to find ways for drastically improving upon the efficiency at which resources devoted to education and research are utilized.

The most recent bibliography on the cost of education, returns to education and returns to research, leaves me with the uncomfortable feeling that the prevailing methodology in this field is still in a discouragingly primitive state and suffers from an exasperating conceptual poverty and from a lack of basic philosophical thinking. I do not feel competent nor clever enough to offer some alternative suggestions in this regard, and I can only express the wish that some breakthrough will be accomplished in the not distant future. At any rate, I have to confess my instinctive pessimism about the possibility of research and education as institutionalized in the

universities to successfully meet the need of a dynamic industrial society. In the 17th and 18th centuries, when science took a dramatically new course, universities lagged behind the times, and new institutions developed to replace them, the Academies. The research centers that are now proliferating outside of the universities, are the industrial counterpart of the 17th and 18th century Academies. I am deeply convinced that their growth and proliferation should be greatly encouraged.

I want now to touch briefly upon one final point, namely the role of institutions.

It is my feeling that on the whole, institutions change more slowly than the surrounding historical reality and have a life expectancy much higher than they generally deserve. People with an inclination to resist change find in outdated institutitons powerful allies, and Revolutions are more often than not the unfortunate result of the historically unjustified survival of obsolete institutions. In a world of rapid technological change the problem of obsolescence of institutions is bound to present itself with unprecedented gravity.

There is a general feeling that financial institutions, joint-stock companies, anti-monopolistic legislation, universities and research-centers just to mention a few among our institutions, badly need to be revised and modified to keep up with the rapidly changing needs of an industrial society. Personally I feel that the State itself cannot escape undergoing a substantial change in its structure as well as in its nature. A few years ago, Professor

Boulding wrote that the market and democracy will dominate the scene of the industrial world. I am afraid that both the type of market and the democracy that will prevail in the future will have little to do with the type of market and democracy that we know and have in mind. The state and democracy that we know are those that emerged from the French Revolution. The state of the Founding Fathers, was based on the action of individuals who freely delegated to the State rights and powers. Nowadays, we are witnessing all over the world a clear cut trend: the individual is losing ground and individual action is progressively submerged and substituted by the more powerful action of scientifically organized pressure groups such as political parties, organized labour, industrial associations, etc. These groups, while crushing the individual, condition the state and progressively limit its power. The case of communist countries cannot be advanced as an argument against this view. Under its monolithic facade, the communist state also is more and more limited and conditioned by the growing strength of its internal groups. Our times remind me of the days of the late Roman Empire, when the seemingly all-powerful and centralized state was progressively undermined by organized local groups who paved the way for its final collapse add for the emergence of feudalism. Today, the forces at play are completely different, but the process is essentially the same.

Emphasizing the importance of technological change in an advanced industrial society, I have mentioned the parallel changes that have to take place in people, in reproducible capital, and in

institutional arrangement. It hardly needs mentioning that the relationships between technological change and the other changes cannot be unidirectional. Technological change will induce change in institutions devoted to education and research, but on the other hand, technological change will be, in turn, conditioned by the nature, quality and efficiency of these institutions. Similarly, technological change will force changes in the structure of our society, in the shape of capital formation as well as in our institutions. On the other hand, if bottlenecks should arise along anyone of these lines, technological change will be hampered and its positive effects on economic growth will be watered down. Thus there will also be in the industrial world, human societies that will develop and others that will decline.