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ON THE RISE OF INTELLECTUALS AS A CLASS:

An Excursion Into Self-criticism *

by

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1. Introduction

Two different intellectual roles should be distinguished although they often go together: the intellectual in search of truth and the intellectual in search of power. The former is sociologically probably most similar to the artist; the latter is a quite different type and possibly the main constituent of the new class, in capitalist and socialist countries alike.

Historically the rise of the intellectual into positions of power beyond that of being occasional advisers, more similar to court jesters, can be seen as closely related to the emergence of nation-states and centralized capitalism, particularly industrial capitalism - but also mercantile capitalism. In other words, it is a recent phenomenon in Western history (not in Chinese history, because of the tradition of mandarin examinations). From an early start in France in the seventeenth and England in the eighteenth centuries the curve has picked up and is certainly still in its exponential phase, not yet levelling off. So, why this connection between business, whether bureaucratic or capitalistic (and as to the latter: private or state), and the rise into power of the intellectuals?

The answer is probably very simple: intellectuals had something to offer on which they had a de facto monopoly: the tools with which big systems could be made not only comprehensible, but also manipulable. The basic tool was and is abstraction, the reduction of natural, social, human reality to ideal types that can be characterized by means of a low number of variables - eg. the way I am doing right now in an effort to come to grips with the position of intellectuals. The variables are then combined into what is technically known as cartesian products, and general hypotheses/propositions/laws are formulated, including some of the combinations of the values of the variables, excluding others. (2)

Whether these hypotheses are developed deductively from higher level hypotheses (theorems, axioms) or inductively from observation-sentences need not concern us here - both methods would have abstractionism and some kind of attempt to build systems of sentences in common. And that is what the intellectual offers: words stringed together in ways that are supposed to make the opaque transparent, the ungovernable manipulable. The bigger the system and the more complex its structure, the more indispensable the intellectuals. This has one important consequence: there is a vested interest of the intellectuals in large scale systems such as big nation-states, empires, transnational corporations, big national planning agencies, intergovernmental organizations. Thus, there is an intimate relation between the expansion of political and economic units in size, and the quest for general hypotheses, invariant of space and time and personal idiosyncracies. The intellectual produces laws, both in the legal and in the scientific sense - and more general the bigger the system.

Imagine as a counterpoint to this a small self-reliant unit, say of the order of magnitude of 10^3 or 10^4 - eg., some kind of federation of villages. ⁽³⁾ The unit by and large produces what it consumes and consumes what it produces, and the workings of the unit are relatively transparent to everybody participating in it. While not denying the need for administration, administrative science is hardly necessary, and while not denying the need for numerical information, the members of that community can to a large extent be seen as such, as human beings; there is no necessity of coming to grips with them through statistical tables alone. Transaction systems in the field of production and consumption can still be elaborate and ornate, equipped with much social embroidery and ritual, not stripped to the bare skeletons of market prices. Nature can still have beauty and power, not being reduced to chemical formulae and physical properties - as comes natural when raw materials are fetched from far away places and the only question asked concerns the composition so as to know which lumps of raw material are identical or equivalent physically speaking.

Large, even world-encompassing economic cycles and complex, large societies can only be handled through abstraction and generalization - which is what science is about - not through the direct and highly subjective/particularistic perception of

every single element or unit - including of human beings. If human beings should mainly relate to each other in the complex ways known as love and friendship - and also as nepotism - there would be much lower limits to the size of the systems. Even today there are such limits: even any army of PhDs cannot handle a big nation state or corporation but need the assistance of "artificial intelligence" - so far mainly in the form of data-banks and computers, later probably in more dramatic forms: robots. Needless to say it will be in the interest of the intellectuals to maintain the monopoly over them, interspersing themselves as the indispensable go-betweens, translators, interpreters - between the masses, the ruling elites and the machines. It is this monopoly position that is at the roots of the rise of intellectuals as a class.

Crucial in this connection is the concept of an "expert", or rather the social role of an "expert", perhaps as seen by a sociologist. The expert is defined not so much by what he knows as by how he behaves. The expert out for power will know that there are two clear rules that should be respected. First, stick to your field of competence and let it be a narrow one - have at your finger tips detailed, seemingly inexhaustible, knowledge within a sector that fits relatively well into the way knowledge/expertise is divided among institutes/ministries/UN agencies. Second, come up with findings and ideas and advice that would fit into the general underlying paradigm within which the rulers operate. If you do not stick to these rules, you challenge the only intellectual command the by and large non-intellectual rulers have left: a common sense, generalist view, and conventional wisdom. The intellectual sticking to these two rules can get far into the corridors of power. But in a ministerial position his weakness will show up: he may believe in his own theories and not see them as insight-producing tools, and act accordingly ⁽⁴⁾ forgetting that they are abstractions from a much more complex reality. Also, in playing the game as described, producing what the rulers want to hear, he may become a tool rather than an equal, and the rulers may play the old divide et impera game among research disciplines and researchers within the same discipline. In short, this power game, like all power games, requires skill - and usually the intellectual is a power game amateur, easily paid off with a promise of undisturbed academic life and a consultancy or two.

2. The components of technocracy.

Three types of elites can now be seen relatively clearly: the bureaucrat (arising out of big scale territorialism), the capitalist (arising out of big scale economic cycles), and the intellectual properly speaking the researcher (arising out of big scale abstractionism and generalization, and indispensable for the other two). Time went on the latter category of the three invaded the other two, turning them into applied intellectuals, applying first legal systems, then natural and social sciences, including economics as a science; retaining for themselves access to the production of new intellectual tools and the highly important right to certify the first two categories. The data are not at hand, but it is fair to say that most of the people handling big scale decisions in general, and decisions about production factors in particular, under systems of centralized governance and private or state capitalism, have at some point or another been examined and certified by a more research oriented intellectual often called a "professor", whereas the opposite is generally not true. The other two categories may compensate for this by regulating the access to jobs as researchers through administrative or financial structures, but they do not certify.⁽⁵⁾ If they try to do so, a civil rights issue is created in most countries, the intellectuals, properly speaking, retreat into their ghettos and refuse to deliver the goods, eg., fresh ideas, and the system quickly goes stale. Of course, there are always intellectuals who will "cooperate", neither state nor business enterprise have hardly been known to die only for lack of intellectual services - but there is a limit to how much intellectuals can be controlled and steered without becoming grossly suboptimal. Even in the Soviet Union the Academy of Sciences has a certain autonomy.⁽⁶⁾

So much for the relations among the three components of today's technocratic trinity: the bureaucrat, the capitalist and the researcher - all of them with PhDs, all of them looking relatively similar,⁽⁷⁾ streamlined by the same schooling systems with its primary, secondary and tertiary components. Marxist analysis has focussed on the second of the three components to the analytical exclusion of the other two, leading to results that are relatively visible in countries using marxism as a guideline: elimination of the private capitalist, but certainly not of the bureaucrat and the researcher. To the contrary: both roles are flourishing; the thesis in the present paper of course

being that they are by and large substituting from both ends for the vanishing second component. To see this some kind of marxist analysis may be useful, using such categories as ownership of means of production and expropriation/appropriation.

For what happens when the capitalist is "eliminated as a class"? If the system remains basically the same the functions of the capitalist remain, or perhaps better vice versa: if these functions are taken over by others, the system will remain basically the same. If bureaucrats and researchers are on fixed salary they may nonetheless decide over the surplus that has been produced by the workers - the only decision they cannot make is that it should go into their own pockets in addition to a fixed salary (we disregard corruption and similar aberrances). They also decide what to produce, but they may be "softer" than capitalists as to how to produce it - the working conditions (experience does not seem to indicate that bureaucrats and researchers designing production processes are more prone to let workers decide than are capitalists, however). They may decide that a substantial portion of the surplus shall be used for basic need satisfaction of the masses of the population, but then they may also decide otherwise (eg. that it should be spent for military purposes). They are said not to be in a position to buy and sell means of production, but what is the difference between a capitalist selling one factory and buying another, and a state bureaucrat being transferred from one corporation to another? Would not the essential point be internal power relations inside the firm and the degree of autonomy of the firm from higher orders of decision-making?

We just mention this to point out that the intellectual/researcher will operate within a different type of ownership and would use other means of legitimation (expertise) to legitimize his sizeable portion of the total surplus produced. Indeed, the production of such rationales would be a part of the intellectual craft and as intellectuals are experts on this we would assume them to be, by and large, unbeatable in this field - which is one reason why intellectuals like capitalists and bureaucrats need traitors to their own class.

3. Intellectual work as a production process.

In principle the basic means of intellectual production is one: the brain of a person whose basic material needs are satisfied at least to the point that the brain can function and communication can take place. But add to this the material components of intellectual production as known today: buildings big enough to house teams, archives, libraries and laboratories; computers; participation in expensive international conferences to sound out colleagues before publication; the publication machinery itself; not to mention everything that goes into data-collections, and it becomes clear that the means of intellectual production defined this way are far outside the private reach of most individuals. Societies can produce them out of the surplus from the general production process, but that raises problems of ownership and access. As is well known, whether the ownership is private or public, the geographical location of these means of intellectual production is highly asymmetrical, concentrated in university towns that also tend to be the bigger cities, even the capitals (with some important exceptions) - with easy access to the other two groups. The access is restricted by criteria of purse, power, privilege, intellect and/or loyalty - in other words by the criteria that generally define access to the ruling class. These criteria apply a fortiori, one would surmise, the more sophisticated the means of production: to become an undergraduate student not so many filters have to be passed; to become a top research professor with total access very many criteria have to be satisfied. Thus, there is a de facto control of the access to the means of intellectual production.

Generally speaking what has happened during the last generation or so is what can be characterized as the transition from artisanal to industrial modes of intellectual production; from the master with a handful of disciples working mainly with his hand and his brain and some tools, to the web of interrelated laboratories/computers/data banks etc. characteristic of modern research. A similar development has taken place in the field of teaching: from such artisanal forms as the tutorial to the mass production in university factories with up to 100.000, even more, students. This has important methodological consequences, as it can probably be said, in general, that scientific products that have been produced this way will be seen as more valid because they are produced in this manner, not because they represent deeper insight

or better correspondence with facts.⁽⁸⁾ Those who control the means of industrialized intellectual production will thereby receive an extra source of legitimation: not only do they have power in advance, but they also have the privilege of producing valid science. The lonely scholar, located in a provincial town in a periphery country may have the most brilliant insights: he or she will never be able to present them in the legitimate fashion with adequate, up-to-date footnoting, the most recent terminology and laboratory/computer sources to lean on - and hence will never receive the stamp of approval. Knowing this he or she will do everything possible to move into the center where those means are easily accessible, or lose in the battle. The result is increasing centralization.

Most of the science produced until the last generation or so, or even until very recently, was produced by the artisan scholar, so this is tantamount to saying that what is produced today is so much more valid that it is warranted to change mode of intellectual production. The parallel to industrial material production is obvious: nobody will dispute that there is a gain in quantity, not that some products unheard of before are made available; the problem is to what extent the quality can be said to be higher. If previous modes of intellectual production were capital-saving, staff-saving and highly brain-intensive, the present mode is capital-intensive, staff-intensive and in so being may permit itself to be correspondingly economical on the brains. It is difficult to see, for instance, that the enormous quantity of PhD theses produced during the last ten or twenty years in the social sciences, coming out of foundation-supported projects, compare favorably with what was produced by a handful of scholars during the last century.

So much for the centralizing aspects of intellectual production and its increasing similarity with industrial as opposed to artisanal production. What about the relations between intellectuals and non-intellectuals? The thesis given here is that there is a clear and even accelerating change from a relatively horizontal relation to an increasingly vertical relationship. Thus, one can conceive of a situation where the intellectual related to the rest of society much as an artist would do today: he might be rich or poor, have a different, more interesting (and therefore more irritating) life style or not - but he could not be said to deprive others of important experience. Probably he could rather be said to enrich them to the extent that the products were made available

in a form suitable for general consumption and enhancement; sharing as it were with others his vision of truth.

With the intellectuals in pursuit of power it is different. What they do is essentially to engage in a division of labor whereby problems are lifted out of the everyday sphere of others and handed over to intellectuals. Thus, administrative problems of any complexity end up with the bureaucrats in the bodies for central decision-making; problems of economic cycles similarly, and cognitive problems are given to the researchers. For all of them the problems serve as the raw material out of which they produce their end product: a decision, an investment, a finding, a solution, -- handed back to where the problem came from. But the spin-offs from this division of labor remain with the intellectual center: the challenge, the testing and further development of creative power, the joy of being at the forefront of something, the power of shaping the existence not only of oneself, but of vast masses of people. Generally the material advantages are not inconsiderable either. These roles carry substantial salaries and added benefits in the form of consultancies, honoraria for lecturing and writing on what they have already been paid for lecturing and writing on anyhow, etc. But this is of less importance. Much more significant is the emergence of a society where conflicts, problems and challenges that should belong to others are expropriated, lifted out of their lives as it were, and appropriated by the intellectual center, for them to be stimulated by - often even over-stimulated. "You have an interesting problem there - I will solve it for you!"

And thus we are back to the old pattern: a small elite with monopoly on means of some kind of production, channeling something of the most precious human life has to offer upwards towards themselves. It is hard to estimate their numbers, and social statistics is not written in the units of "challenges and creativity lost and gained" - but in units reflecting the predominantly material concerns of our civilization. Nor is theory developed by intellectuals likely to be a theory casting the intellectuals themselves - us - in the role of the exploiter. Landowners, princes and prelates, capitalists, the rich and powerful, who have what intellectuals usually do not have, serve better as the points on which the theories may focus and around which indignation may crystallize. Ultimately one might even imagine a society where the means of intellectual production are

so monopolized by an intellectual elite, so solidary and loyal to itself, that no such thoughts would ever emerge; neither from the intellectuals, nor from masses left dull by insufficient exposure to problems beyond the most private sphere of consumption, and by over-exposure to solutions produced for them by others.

Let us now try to summarize the reasoning so far in slightly more technical terms. Thus, we have assumed a production function for intellectual production:

A production function for intellectual production

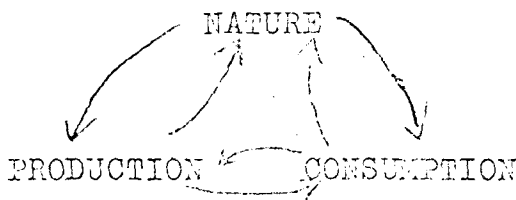
<u>Raw materials</u>	+	<u>Capital</u>	+	<u>Work</u>	+	<u>Research</u>	+	<u>Organization</u>	=	<u>Output</u>
PROBLEMS		+ CAPITAL		+ BRAIN		+ META-INTEL		+ INSTITUTES	=	BOOKS
		LIBRARIES		work		LECTUALS		THINK TANKS	=	ARTICLES
		COMPUTERS		STAFF				NETWORKS etc	=	LECTURES
		LABS etc.		work						

The important point here is the nature of the raw material: the problem. What researchers appropriate from others as part of a well paid class able to appropriate surplus is only the material part: the non-material appropriation, as argued above, is more important and is a part of the general cost of function of increasing size of social organization. Like land used by a land-owner or raw materials bought by an international corporation, problems are taken away from somebody who could have made use of them. Like for land or raw materials the argument would be that this "somebody" could not make so much out of them; they would have been incapable of making the desert bloom, of making automobiles out of lumps of iron ore, making social theory out of social problems. This may be true, but then who said that these forms of raw materials should be processed in those directions and not in others? The argument might also be in favor of a better distribution of the raw materials, some for processing this way, some for some other type of processing and some for no processing at all - leaving some land, nature and problems untouched. But the production process above knows no such limitation. On the other hand, there is a built-in contradiction that makes it less efficient than one might believe: brain-intensive work becomes almost impossible in settings so filled with capital equipment, non-innovative staff, meta-intellectuals defining for the others what are problems and what are not (putting the power of ministries, corporations and foundations behind their words) that the industrial mode is likely to give rise to new artisanal modes as a reaction-formation.

4. Intellectual production as an economic cycle

To gain a little more perspective on this, let us then apply the total imagery of an economic cycle to intellectual production, not only the production function:

The economic cycle.



In regular economic life raw materials come from Nature, are processed in Production, distributed to Consumption; and then there are waste products from Consumption to Nature. But there are also arrows the other way: some raw materials are taken straight from Nature to Consumption (in modern economies such as air, water, and blue-berries, but the latter are likely to pass some production function so that surplus can be extracted as profit to some and taxes to others); then Consumption has to pay Production in money, work or in other ways; and finally, there is also "waste" generated in the production process ("industrial waste" as opposed to the "household waste" mentioned above). How does this translate into intellectual production? Only too well.

The products are given to the consumers; other intellectuals and non-intellectuals, split into elites and non-elites. It is obviously in the interest of the intellectual that others are able to consume the products; which means that the intellectual will have to have a three-pronged marketing approach. First, there is the version for colleagues (and students) - it is in his interest that there are many of them. Second, there are the bureaucrats and capitalists: it is in his interest that they are intellectuals. Third, there are the non-elites for whom "popular" versions are needed: it is in his interest that they are at least literate; if possible even able to follow intellectual discourses. Schooling, thus, does more to form people as consumers of intellectual products than as customers for corporations and as clients for politicians. To make up for this, obviously, corporations (C) and bureaucracies (B) can try to make up for this by hiring intellectuals to do the marketing for them: the tradition has it that intellectuals to the "left" go to the state and those to the "right" to the corporations.

In return the intellectual gets salaries and honoraria, royalties etc., mainly from B and C; but in some cases also from other I - the universities and academies. There is a very important distinction here and again it has to do with expropriation+appropriation: like a worker under capitalism the intellectual surrenders his work-product to those who pay him in the B and C cases (pledges of silence, secrecy clauses; and patent rights belonging to the corporation). In the I case there is a long tradition that the work product belongs to the intellectual, in some cases collectively (the institute as a collectivity), usually to the individual intellectual him+herself. In other words, the university tradition has fostered an institution somewhat similar to what a cooperative/commune is for other types of production: the producers decide over the product. That this leads to B and C efforts to control universities and to I efforts to obtain the same rights for intellectuals within B and C is obvious. But the whole relation is much less dramatic than the relations bureaucrat/client, capitalist/customer and researcher/researched because the relationship is so much more horizontal: between and among elites, not elites vs. people.

Then there is the direct consumption of problems without having them processed by intellectuals: clearly intellectuals will tend to refer to that as "romantic", "amateurish", "dilettantism", "quack", etc. There will also be quick reactions against B and C who try their own interpretations: some of the repression of intellectuals in some countries should be seen with some measured sympathy as a last ditch effort by non-intellectuals to be permitted to solve problems, even to define what the problems are. But in general the monopolistic attitude of intellectuals is more than clear enough, watching jealously that there is no legitimate road to problem-definitions and problem-solving except via intellectuals. Although trade unionism among intellectuals is underdeveloped, a parallel to how electricians, carpenters and others watch their interests can be drawn; it is not too far-fetched. Will the day come when a PhD is required to have an article on any kind of social problem published - or is that day de facto if not de jure already here?

There are still two arrows missing: the waste products. What are they? Clearly, the production by intellectuals generate lots of waste, some of it even measurable in terms of the paper used for books and articles reporting the fallacious, irrelevant,

inadequate and misleading. If 90% of all scientists ever born are alive today, then 90% of all mistakes done in the name of science are probably also made today. We know something about the mistakes from yeateryear; ours are hardly less serious. Actually, as has been argued above, the percentage is probably higher because of the brain-saving nature of the industrial mode of intellectual production, and because of the homogenizing influence of world encompassing B, C and I structures (intergovernmental organizations, transnational corporations and all kinds of international intellectual cooperations).

But then there is the other type, on the consumer side: yesterday's answers that no longer fit, not because they cannot be used but because they are "outmoded". There is planned obsolescence in intellectual production as in other kinds: new books have to be launched even when the new ideas, if any at all, could easily have been expressed in a short article, and articles have to be published even when the new ideas, again if any at all, could be expressed in a sentence or two. Why, just as the capitalist promotes a product the intellectual product promotes the intellectual under the slogan "publish or perish". But this has a very concrete implication: to make room for his own product, debunking of others becomes perhaps even more fierce, even deadly if it had not been for the production of consumers of intellectual products.

All of what has been said so far takes on a more sinister aspect the moment the international dimension is introduced. With the "problems" seen as being located in the third world, intellectuals become like miners excavating these countries for rich problem ore; in their nature, their nutrition or health status, their attitudes, behavior and social formations. The raw material is then taken to the first world for processing into books, articles and lectures; some of this is retained by intergovernmental and first world national B, C and I, some of it trickles down to their third world counterparts and very, very little to the third world peoples. That the third world intellectuals for a long time have argued in favor of what amounts to a New International Intellectual Order is obvious; if their first world counterparts are to serve as models, there will not be much sharing with people in this, only sharing with other intellectuals which in itself is an absolutely just fight. And like for commercial products the third world will

get the intellectual products of yesteryear (when they are not used as testing ground by travelling intellectuals for ideas so outrageously unfounded that they would not have dared test them out at home) and right-out fallacious products (like so much of economic growth theory - in other words waste products from both the production and consumption ends of the economic cycle.)

5. Conclusion.

If one now accepts this type of analysis, just for the argument, the problem obviously arises: what to do about it. So far only one society, but admittedly a very large one, has formulated its social problematic in these terms: the Chinese during the cultural revolution 1966-69. A major point about that historically many-sided and complex phenomenon was the idea of guaranteeing to everybody some kind of access to problems, some kind of challenge, some stimulus to feed the need for creativity. Some of the solutions they came up with are well known: cut down on theoretical university education (in fact, down to eighteen months); combine theory and practice; have rotation among intellectuals and non-intellectuals in positions of decision-making; give workers some engineering tasks and have engineering work some time on the factory floor with a view to developing the worker-engineer; organize most of the economy (the communes) around non-industrial modes of production.⁽⁹⁾ Other methods could also be thought of. Thus, the academic reward system could favor brain-intensive, capital-saving rather than capital-intensive, brain-saving products - in general favor the type of product that can emerge outside today's self-styled "centers of excellence".⁽¹⁰⁾ Another approach would be to accept some measure of centralization, but "let one hundred flowers bloom"; in other words a pluralistic approach to intellectual production with schools competing with each other, liberating non-intellectuals from the pressure of a monolithic monopoly. Some of this is actually happening in the social sciences in liberal countries: there are competing schools, they do disagree, the layman is free to make up his mind and if he is wise he will understand that this contradictory totality is social science, is what it is about, and that what he should do is not to choose, but to contribute to enriching it further. It is dialogue, not consensus, that matters.⁽¹¹⁾

Still another approach would be to make everybody in society an intellectual engaged in the processing of abstractly formulated problems, leaving the routinized tedia of any society to the modern substitutes for slaves and women: automation. Leaving aside whether this is feasible or would be so taxing on non-renewable resources of raw materials in general, and energy in particular, that it would only aggravate our ecological imbalances even further, there is one particular source of error in this approach that should be pointed out. It is simply this, and we know it already: if the non-intellectuals of today become intellectuals, today's intellectuals will become super-intellectuals - for instance armed with the artificial intelligence mentioned above. After all, this is precisely what has happened during the last generation or so: ever higher percentages of the cohorts have gained access to higher, so-called tertiary, education, and at the same time ever higher forms of higher education (quaternary, quintenary - -) develop in the form of post-doctoral courses, ever more elusive think tanks tied to the "intelligence services" and the secret laboratories of the transnational corporations emerge as they should, according to this theory. In short, there is no evidence that the gap is decreasing, just to the contrary: it is widening.

Which leaves us, not necessarily with the first alternatives mentioned but with something more important: a problem, a challenge, and even a challenge which may demand all the creativity we can offer in order to be handled - before it handles us.

N O T E S

* Part of this paper was given as a lecture at the Universität Tübingen 500 years anniversary May 1977. The paper is also an input into the Expansion and Exploitation Processes subproject of the Goals, Processes and Indicators of Development project of the United Nations University.

1. For a discussion of changing roles of the artist, see Johan Galtung, "Social Structure and Science Structure" in Methodology and Ideology, Copenhagen, Ejlers, 1977, ch.1 - pp. 21-24.
2. For a discussion of scientific activity in such terms, see the book quoted in footnote 1 above, pp. 44 ff.
3. In other words, like a Chinese People's Commune used to be before the onset of the counter-revolution following the death of Mao Zedong.
4. See the chapter "Deductive Thinking and Political Practice: An Essay on Teutonic Intellectual Style", in Johan Galtung, Papers on Methodology, Copenhagen, Ejlers, 1979.
5. On the other hand, they can of course control those who certify.
6. This is the reason why a person like Sakharov is nonetheless still at large and in a position to exercise considerable critical activity.
7. If one really wants to see the B-C-I class all one has to do is to take an early morning flight from a major airport in a metropolitan country: they are all dressed in the same suits, have the same haircut, the same attaché suitcase and the same mannerisms. Whereas in earlier ages it must have been very easy to distinguish between nobility, clergy and merchants, their latter-day successors, bureaucrats, intellectuals and capitalists look very much the same.
8. This point was extremely cleverly made use of in the making of the reports "to" the Club of Rome.
9. For some details about this, see Johan Galtung and Fumiko Nishimura, Learning From the Chinese People (in various languages).
10. The Nobel prizes, however, are probably given to work that is both brain- and capital-intensive.
11. One reason for this is very simple: if nature and society are ever changing, so should science be - for "change" in the dialectic sense of that term does not only mean change according to known laws, but according to unknown and even unknowable laws.