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IMPLICATIONS OF ENVIRONMENTAL MEASURES FOR INDUSTRIAL DEVELOPMENT AND THE SITING OF ENTERPRISES

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by

G. PETRILLI

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COMMUNITY ECOLOGICAL POLICY : RESULTS OF THE ACTION FOR IMPROVING ENVIRONMENT ON INDUSTRIAL DEVELOPMENT AND SITING ENTERPRISES.

Summary

1. Defining the problem

1.1 There are good reasons to suspect that the industrial development of our continent tends to exceed - in many cases - the point of total maximum efficiency of the system thereby giving rise to contradictory phenomena showing a real challenge to the organizing, controlling and forecasting capacity by those who carry at present political, economic or cultural responsibilities.

From one aspect, the large concentrations of production - generally linked within the framework of the main urban centres of each country - are self-feeding according to cumulative movements, laying stress on the development potential of the strong areas compared with agricultural ones.

On the other hand, in these same areas of major concentration of mankind and production one notices, on an increasingly acute scale, phenomena of congestion and pollution representing in fact the "other side of the medal" of the large processes of technical developments of our continent.

Such problems assume a particular importance in those industrialized countries where the relative scarcity of resources tied to the ultimate aim to be achieved, is coupled to a marked rigidity of the national commercial balance. These countries are not in a position to oppose damage due to congestion and pollution with the fullness of means and the necessary machinery,

and cannot look on in the face of continued destruction of national wealth due to the existence of such phenomena. It is, thus, necessary to review continuously the programmes of optimum distribution of their own resources in terms of increasing diseconomy even at the cost of postponing for an indefinite period the alternative interventions of re-equilibrium and of territorial or sectorial development.

1.2 The deterioration in environment consequent upon pollution acquires a particular and specific importance in this respect since the exploitation beyond measure of the resources defined by Murphy as "expendable" (i.e. coal, mineral oils and gas) (*), and the increasing contamination of reclaimable resources such as water, air and even living organisms, rapidly alter the biological outlook of life and compromises even their further economic development.

(*) E.F. Murphy : "Governing Nature", Quadrangle Books, Chicago 1967, p. 29

Against such a galloping ecological crisis, the physiological capacities of man's adaptability are much slower, therefore, should the present trends continue, the sharp mutations of environment will increasingly hinder the progress of strong areas because people will have to function under conditions of environment ever more difficult and liable, eventually, to compromise existence itself.

It may be expedient and reassuring to attribute this analysis, undoubtedly severe, to a certain current vogue of ecological pessimism. There exists, however, too much factual evidence on the current level of deterioration and gradual erosion of the ecologic system of earth and biosphere (especially in areas which are more advanced industrially) to doubt the probable future impossibility of the self regeneration of nature confronted by uncontrolled and increasing exploitation of resources and by pollution.

Besides, it is not without a reason that the topic of the risks and of the costs of this exploitation and progressive deterioration of wealth which, although "free" like water and air, should become today the dominant consideration in economic thought.

Till now, one has acted as if these resources were practically limitless, working on the basis of a behaviour clearly defined by Boulding as the "cowboy economy" (*) where the use of

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(*) K. Boulding, "The Economics of the Coming Spaceship Earth", J. Hopkins Press Baltimore 1966 (essays of a collection dealt with by H. Jarret "Environmental Quality")

resources is reckless and lacks foresight. Moreover, it had been assumed that everyone was - and is - entitled to inject into the environment any type of products, including those causing pollution and even toxic ones (**), as if individual responsability ceases once the products or discharge of raw materials used in the production processed have left one's industrial plant or home.

Today, one begins to realize that the industrial systems of the west are rapidly heading towards disaster if they do not ration resources within the sphere of the "economic philosophy of the spaceship" (*) that is, if they do not set themselves strict limits to the indiscriminate introduction of noxious products in the earth's environment and if the natural resources available are not strictly rationed.

From this point of view the general discussion taking place on a World scale since recent years about environment, its pollution and regarding the best ways of exploitation of its

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(*) K. Boulding, "The Economics of the Coming Spaceship Earth", J. Hopkins Press Baltimore 1966 (essays of a collection dealt with by H. Jarret "Environmental Quality")

(**) It should be mentioned that already Plato, in "De Republica" recommended a law concerning water according to which "...whoever corrupts water with poisonous substances shall be summoned for judgment and, if found guilty, he shall be condemned to purify the source or water deposits polluted".

resources is all the more appropriate, at least in so far as one is anxious over a future which may see maritime basins or lakes (such as the Mediterranean or like the North Sea) transformed into ponds robbed of oxygenation, like Lake Erie, or to watch impotently the conversion of certain hydrographic basins (as the Rhine) as real sources of collective poisening (*).

1.3 It is worthwhile stressing that, from a purely economic point of view, the thinning of certain assets considered up to now as non economic because of their practically limitless availability, such as air and water, generates additional and potentially increasing costs to industrial complexes and, more generally, to the urbanization in the more developped regions, above all in relation to plants which become necessary to insure, in this and in other respects, the regeneration of the natural environment. Such additional costs are comparable to non ecological ones inherent to the development of new physical and social infrastructures in the zones where large flows of

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(*) These and other examples can be derived from the interviews given by J.Y. Cousteau, director of the Oceanographic Institute in the Principality of Monaco, to the Corriere della Sera (17/9/1970 and 3/12/1970), also from hearings in the Italian Chamber of Deputies in 1971, and above all the declarations made by Prof. Marini Bettolo, p. 29 and following, Vol. 1.

immigration occur due to a cumulative process of concentration of industrial investments. In this connection it is worth noting that such investments cannot generally be considered as replacing those which public services are bound to promote in the suburban areas through legislative obligations and connected with a more general re-distribution of national income; the very development of infrastructure in the most developed regions becomes more costly due to general conditions of ecological deterioration. The example can be quoted, in this regard, of the particular technical devices necessary in the development of road network for crossing water courses having a high level of pollution characterized by the presence of corrosive agents. The fact that road infrastructures are subject to abnormally high costs, even in peripheric regions, because of degradation of soil due to general worsening of ecological environment confirms, even under this aspect, the complementary nature which exists between the extreme situations determined in consequence of an economic development territorially imbalanced.

In the present state of affairs one can see from these aspects a marked contrast between the influence of cumulative factors which continue to increase from a business point of view, the suitability of location of new investments in the mostly developed regions (which determine a new city-country relationship opposing the suburban regions by way of depopulation to

regions of immigration gradually transformed in immense conurbations) and the appearance at macro-economic level of additional and increasing costs which were dealt with previously. This fundamental contradiction shows itself through the social tensions arising in those immigration areas because of the gradual deterioration in the quality of life, expressed by a housing crisis and by the lack of social services and also by factors of disturbance of an ecological nature. The pressures sometimes exerted by local authorities on the enterprises concerned, invited to shoulder a part of the costs born by the community, in consequence of their decision to invest, could indicate in this connection the possible emergence of new factors which may influence the conditions of profitability of such investments causing a reversal of trend. Such a supposition appears all the more valid in that technological progress itself tends, no doubt, to increase the degrees of liberty granted to industries in

their choice of location, once strictly dependent upon the availability of particular natural resources. In this connection the present economic decline of some amongst the major European coal bearing regions is significant; this decline is balanced elsewhere by an expansion built on the development of processing industries or basic industries supplied entirely with imported raw materials.

1.4 As concerns the ecological imbalance in its strictest sense (certainly not a new problem since equilibrium between man and his environment is as old as humanity itself but which today assumes a dramatic outline in the absence of biochemical or biophysical reactions spontaneously re-balancing) European industry appears today, under many aspects, as the main culprit both as a direct pollution factor of water, air and soil, and as a producer of goods having difficult or even non existant prospects of biodegradation and disposal.

There is certainly some truth in such an opinion on condition of not forgetting that industrial effluents alone contribute only partially to pollution of environment (*) and that, indeed, frequently the insertion of foreign elements in the natural environment to an extent that nature itself cannot bear, is a phenomenon attributable to a sum of individual egoisms or to blameworthy neglect on the part of large urban communities of the continent.

(*) Hearings of the Italian Chamber quoted earlier, mention an incidence on a World basis of the order of about 30 % - See the report of Ing. Badile of Finsider "Le acque ..." p. 176, vol. 1.

In effect, the "consumer society" almost never succeeds in consuming its products "in toto", resulting in an accumulation of large quantities of refuse on the fringes of our large cities, real graveyards of machines, domestic electrical appliances, plastic, wooden or paper wrappings and of anything else which is only "half consumed", to be later abandoned to environment at little or no cost.

The same can be said for water pollutions for which, apart from industry, there are other large polluters and especially the concentrated urban communities, refuse of large zootechnical and agricultural enterprises or certain extracting processes. In all these cases industry has several specific responsabilities which it is now time for it to spot and to take bravely upon itself with the guidance and help of public authorities. It is in this sense that, on the question of environment, community thinking is clearly oriented towards the objective of "...limiting (and if possible eliminating) the noxious effects of technical progress and, more generally, of the economic and social activities on the conditions of life, avoiding that the fight against pollution should become a fight against economic expansion and progress in general ..." (*).

(*) see "First report of the Commission on the policy of the Community on environment" III/1050-3/71-I, chapter 1, para 1.

Within certain limits, already today, new trends appear possible in scientific and technological research, capable of stimulating the current production structures and methodologies towards the necessary change of quality, i.e. capable of reconciling the requirements of comfort to those of an ecological balance, and it is in this sense that the present report proposes to suggest a first basis for discussion.

It seems equally necessary to see more clearly - and to show by documentary evidence - what foreseeable repercussions could ensue to industry from measures which are being scheduled to protect environment, bearing in mind that many forms of pollution are related to activities which are useful or even indispensable, whilst there are few ecological problems capable of being resolved by simple prohibition, because noxious waste - liquid, solid or gaseous - are frequently the inevitable by-products of necessary industrial processes.

In this sense, with a view to specifying constructively and realistically that which can be done, and when, the present report is presented in two distinct parts; the first, to define and discuss certain trends and criteria of intervention by the European Community concerning ecological policy; the second, to analyse possible industrial strategies deriving directly from such trends.

2. Ecological policy of the Community - a few principles and criteria of intervention

2.1 In introducing the first topic one cannot hide the serious situation which arises in the World today due to persistent disagreements between different countries over ecological policy.

In the face of the indifference of certain countries on pollution problems which they give rise to and which they export and in the face of other countries refusing to admit the common responsibility of all to oppose these dangerous situations, one has noticed recently unilateral legislative interventions on the part of other countries more seriously harmed by such indifference or refusal; these have seriously opened the discussions on the possibility of resolving, according to the rules of international rights, such a general and urgent problem.

It is objectively true that the efforts towards realizing a general agreement in such matter have had little success up to now; they bear witness, if nothing else, to the small number of national decrees to enforce the few international conventions which - at least for some types of pollution - have been convened with difficulty. It is in the face of this situation of profound disagreement and indifference (due to conflicting interests) that the

moment has come for the European Community to react, if for no other reason than to present to the forthcoming World Conference in Stockholm on environment (*), balanced and realistic theses which can find a more general acceptance by the World community.

The contrast of ideas which will arise at this meeting is, indeed, of no little importance; on the one hand, the just demands of more restrictive and severe regulations on the part of countries which bear mainly the bad influences of pollutions, will have to take into account the equal but opposite aims of developing nations which tend towards a rapid industrial start without the burden of additional costs for purification plant; on the other hand, there is a group of nations for which the problem is "non existant", they qualify the problem of pollution as a necessary by-product of a capitalistic system to be eliminated and, therefore, declaring openly their indifference towards every international agreement on the matter.

This is why the convening of the present meeting and the search for conciliatory proposals on a wider World basis seems today justifiable and opportune, being a historical European Economic Community task which cannot be deferred, for the special type

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(*) The World Conference on human environment will be held in Stockholm in June 1972, under the auspices of the United Nations, with the participation of the European Community and many international governmental and non-governmental organizations. In the time between this present conference and the Stockholm one there will be a meeting of the competent Ministers of the Community on the subject of ecology, also with the aim of defining a common position of the member countries, in accordance with the request made by the Italian government.

of relations which it is establishing on the one hand with the economic industries mostly developed and, on the other hand, with the developing countries and those which reduce the problems involving the fight against pollution to a simple problem of rescuing a system which they condemn and want to eliminate.

2.2 It does not appear possible to deny the well founded of the request by developing nations not to bear heavier burdens than those of nations which were industrialized some time ago, i.e. when the economy of these latter were at the initial stage of their development process. In this connection it must be remembered that the basic inadequacies of a linear representation of such a process in which the quantitative expansion of production is matched to a qualitative transformation of the means of production, marked by real technological "leaps", so that the later ones find that they can never follow the path of those who have preceded them on the way to development. The essential indivisibility of the scientific-technical process prevents, therefore, a conception of geographical expansion of the industrial phenomenon as a simple transplant of the type of development already experienced elsewhere. In this sense, a strictly uniform ruling at international level would be doubly unjust because it would not take into account the different degrees of pollution, for an equality of plant and technology, of the investments made in countries recently industrialized and also because it would ignore beforehand the possibility that the geographical expansion of industrialization should occur in conditions such as not to recur at all, or to recur on a smaller scale within the process of territorial concentration of the industrial installations seen in the most developed countries.

As regards specifically countries with a state economy, amongst which are included also countries with an advanced industrial

economy it is worth noticing how the duality city-country has been far from unrelated to the historical experience of the latter countries, especially concerning the potential worsening of reasons of exchanges between industrial and agricultural products, which has sometimes taken the form of a regime of punitive agricultural prices virtually out of reach. Even recent examples of tension between regions with a prevailing industrial economy and regions with a mainly agricultural one within the sphere of a state controlled economy confirm our opinion that the geographical expansion of the industrial phenomenon, rightly considered as the main problem today, can be attained at all levels only through interventions capable of associating the primary activities to the benefits of increase of productivity obtained by the industrial sector, fostering simultaneously a real economic diversification of the less developed areas, a consequent different composition of the flow of exchanges and a new type of integration between sectors. To consider the ecological problem as a necessary by-product of market economy means ignoring the close link between the deterioration of natural conditions and a process of territorial concentration of industrial investments which only partly and, especially as regards the past, can be object of utilitarian considerations, as to the profit of the enterprise.

2.3 This being dutifully premised, and in accordance with the principles that our European Community must necessarily choose to develop its own function as mediator on World ecological policy, the first problem to be now resolved is the one that goes to the very core of the present controversies, i.e. the nature of the regulations to be adopted on a continental and World level for the years ahead regarding industrial pollutions.

It concerns a question which has become classical, i.e. having to decide if uniform standards of discharge on a supranational scale are preferable or, if less rigid solutions are to be preferred in which the standards of industrial discharges are set out in function of the degree of pollution already reached and of the need of recovery.

In spite of the objective preoccupation of those who fear that a lack of uniformity in determining the territorial standards may acutely sharpen disloyal competition, or, anyhow, cause distortions in competition, the reasoning is not lacking in favour of a choice of more flexible standards :

a) In the first place, on a general level, it is difficult to admit that the imposition of uniform standards on a continental or World level is, in itself, suitable for realizing a concrete equality of initial situations between the various competing industries. The internal production costs stem from a chain of situations varying from one enterprise to the other, firstly between raw materials used, their transport cost, the processes used, the age and relative obsolescence of the installations. Uniform business costs are, indeed, few and there is no reason to believe that the imposition of uniform standards for discharge of waste will count enough to balance initial competing situations so different from other items of costs.

b) In the second place, for economic and functional reasons. It is probable that the introduction of a uniform system of standards could yield an effective reduction in the levels of pollution

only in the measure where the chosen standard is situated at a level which is very close to the "best" between the different national standards already in existence. Should it be otherwise and if, therefore, the future average supranational standard be set at levels well below the best that exist, the final result would, paradoxically be opposite to the objective aimed at, i.e. in the sense that the environmental situation of those countries which - for their objective necessity - up to now, have used high standards, would be compelled for obvious reasons of competition, to depress the qualitative levels used hitherto. Should they then be forced to keep to their actual standards, higher that the uniform one, the result would be - in this case also paradoxically - to have caused, to their harm, objective situations of disparity in competition.

Even accepting the fact that the future uniform standard should be close to the "best" levels, this could not avoid not producing considerable difficulties for those countries where ecological situations are not yet radically compromised, compelling industries set up within their boundaries to spend much more than necessary in order to arrive at the uniform standard. In other words, the imposition of a uniform standard of high level could cause, in several cases, an excess of investments in the purification plant since the capacity of the water or air to be self-purified would remain partially unused at unnecessary cost to the enterprises of the country

involved. Also, this phenomenon would not reduce, but shift, the problem of the initial disparities in competition between one enterprise and the other above all, in the case where the uniform standard in excess should be imposed to countries outside the large supplying or consuming markets, or else, to countries in the process of development with a weak economic structure.

c) Thirdly, and under these considerations, there are practical reasons which prevent the adoption of uniform standards on liquid and gaseous waste dicharges, namely, the impossibility to reach agreement at international level on the minimum standard to be adopted. Countries of weaker economic structure could, in fact, see in the imposition of uniform supranational standards of a high level, almost an attempt at industrial neo-colonialism tending to push their industries on the marginal fringes of the market, above all, as has been seen, in the not infrequent cases where the respective capacity for dilution or dispersion of the polluting substances is far superior to those met in the more industrialized countries.

For all these reasons, may seem illusory the healing powers that one usually attributes to the imposition of a uniform standard on liquid or gaseous effluents of industrial origins in relation to ecological purification and even to the elimination of distortions to competition.

The most realistic and economic approach to the problem must, therefore be carried out in a more flexible way, i.e. with the knowledge that the community or supranational regulations to be set out must allow for the fact that each country has ecological situations, necessities of environmental recovery and abilities of self-purification varying from one area to the other. Thus, the eventual agreements on uniform standards must interest - as we shall see shortly - homogeneous environmental units, that is to say, the individual water basins or lakes or seas.

Only thus will the future supranational ecological policy proposed by the European Community grow in credibility and feasibility, minimizing pollution levels at the same time that it allows a rational and economic use of resources.

2.4 Intimately connected to this first problem is, however, a second one of no lesser difficulty, namely, how to determine, in a flexible way - the admissible level of pollution and, as a consequence, the level of investments in purification plant in order to re-enter within the determined standard.

In this connection, once more, the opportunity is underlined of involving in future regulations single basins or sea areas evaluated case by case by the country (or countries) interested, and establishing, in consequence, the principle that the standards of uniform basins must vary in time according to the evolution of ecological deterioration pre-existing; there are several general criteria to discuss in this matter :

a) for example, the opportunity to specify for each basin - sea, river or lake - average uniform standards, that is to say neither too high nor too low;

b) alternatively, the opportunity to grant precedence to only supranational actions which tend to resolve pollution problems of a common basin, or to those actions which will oppose the export of pollution from one country to others.

This basic set up raises obviously many problems but it is perhaps worth remembering that the aim of a uniform decision on standards at continental or World level represents a desirable target which will be reached (if ever ...) a long time hence, and that at present, between the setting of an enticing but impossible aim and the pursuit of aims which are less ambitious but, nevertheless, possible, the choice seems inevitably in favour of the latter. To this, at least, leads a realistic and pragmatic view of the problem.

This having been said, it is now necessary to see which are the technical criteria to use concretely in determining the allowable pollutions. In this connection the discussion is still open at World level and the present opinions are only meant as a simple start to common thought.

As is known, there are in this connection two positions somewhat opposed; on the one hand, there are those who consider preferable

the method of "classification" of waters with a view to their optimum use. With such a method, once classified, (for instance the different streams on the basis of their use as drinking water, for agro-industrial or resort purposes, or for the elimination of liquid waste matter) one should impose for each body of water, quality standards compatible with the alloted function, determining the maximum load of pollution that such body of water is in a position to absorb. The subsequent distribution of such "pollution load" taken in total between the different users on the coast or around the basin would allow the evaluation of costs to be born in order to eliminate the waste which exceeds the maximum alloted quota.

On the other hand, there are those who maintain the usefulness of fixing rigidly the quality criteria of waste waters before they are discharged in the main waterways, in the sense that such waste must never carry pollution levels higher than a certain figure; this is the method of "standards on effluents".

From a theoretical angle, the first of the two methods suggested represents perhaps the ideal condition for industry in the sense that, thanks to it, could be known beforehand the obligations and the costs consequent to the location of a new plant depending upon whether the one or other water mass with different classification, is used.

However, as has been amply shown, such an ideal situation carries the risk - at least in the case of countries already advanced industrially - of remaining at the potential stage of realization if only because human and productive conditions already existing and which discharge into water masses are already so dense and numerous as to render merely formal the subsequent division and consequent unitary and global control. In the contrary case, the situations would be such as to prevent the siting of new activities unless this be done at ruinous cost in comparison with competing enterprises already established.

A quality standard on effluents applied generally and rigidly represents, on the other hand, in its turn, an excessively restrictive criterion which may carry serious but not always necessary burdens for the industries which may be compelled to settle in the vicinity of water masses requiring high quality.

As is almost invariably the case, the best solution is probably to be found in an interim stage between the two extreme positions mentioned earlier in that standards can be fixed for quality of the effluents which are extremely rigid for certain pollution factors (the toxic ones in general, the radio-active ones in particular), and more flexible standards may, instead, be used for the other pollution factors (muds and organic matters). This, of course, should take into consideration the existing degree of dilution and, above all, the best use it is intended should be made of the water mass in question.

Obviously, these considerations also form one more element against the argument of a uniform level to be imposed supra-nationally.

In the light of these considerations, this may not be the way to develop analytically the definition of threshold values to be applied for the protection of waters within the limits of a pre-fixed standard; in any case this is an argument which is outside the scope of the present report (*).

What is probably more important at present is the choice between one method of control and the other. It is at this level that it is possible to develop correctly, on this occasion, a general discussion on the preliminary study for the forthcoming World Conference to be held in Stockholm.

2.5 The problem being set as regards method, it remains to be seen how it is possible to avoid the distortion to competition which necessarily follows the application of regulations not uniform in time nor in space.

There is no doubt that such distortion could arise because of a different sharing out of expenses for the fight against pollution or, also, because of the different levels of pollution allowable or, finally, of indiscriminate exploitation of more favourable geographical conditions.

At this moment the problem is the one already touched upon previously, i.e. whether it is on pollution itself that it is possible to oppose and demolish the serious distortions which,

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(*) In this connection precise courses of action have already been expressed in Italy, circular of 2nd October 1971, No. 166 of the Ministry of Health has been sent to all Provincial doctors, also to the Regions, and a prospectus indicating the threshold values to use in the measurement of pollution of effluents. This prospectus on which industry has shown some reserve also for the arbitrary applications which have occurred in certain cases, was inspired by the more analytical one of 1970 by the "Federazione (italiana) delle Associazioni Scientifico-Tecniche - FAST". Moreover, Parliament is discussing the project of law 695 setting out new "directions regarding protection of waters" which presumably should include the prospectus regarding the threshold levels in question.

in fact, favourable geographical positions or advanced productive structures permit certain industries to achieve as compared to others located further away from the large markets or using obsolete plant and equipment.

We do not believe that an action tending to render uniform the costs of industrial depuration in continental or intercontinental areas is in itself capable of restoring full competitiveness.

We are greatly concerned, on the other hand, to establish possible measures which prevent, in all cases, the continuous attacks on the health of man and nature that could derive from fragmentation of experiences hitherto carried out or from the lack of any intervention whatsoever in this sector.

On the other hand, the fact of having already suggested supra-national actions common in every case, in which - within the same basin - minimum standards can be set, or in those cases in which the pollution of one country is exported is already an important step in comparison with a complete lack of any coordination or of no action at all.

On a short and medium term, it is possible that the policies of intervention suggested above keep alive situations of competitive disparity which already exist due to heavy incidence like other meta-ecological factors. It is also true to say that our suggestions do not reach the conclusion that it is necessary to let every country do as it wishes, but to the need to compel each country to do something; if nothing else, this will tone down and not emphasize eventual disparities already in existence.

In this connection, it is possible that international cooperation could do far more than has been done hitherto in other sectors, bearing in mind that in each country the top priority objective is preservation of citizens' health and not only that of operating on an abstract economic level.

It is not excluded, in the days ahead, that on a supranational level some minimum standards could be adopted which eventually bring closer together the various functional costs of depollution peculiar to each country. This will be possible, however, only when all countries of the continent have reached a common minimum level of industrialization.

In substance, the danger still remains that the flexible measures we have suggested may cause relative distortions in competions and, that danger, we consider in all its importance. But, whilst it is arguable whether the danger deriving from so flexible a regulation is decisive as compared to many other more relevant factors of distortion, we would like to stress also that, not always, the aim of ecological purification coincides with the elimination of distortions in competition. In saying this, we notice that the most intensively possible pursuit of the first aim - under conditions of varying limited resources and ecological situations highly different from one country to another - does not allow to carry out to the best advantage the pursuit of the second and vice versa.

These are, perhaps, the elements to introduce at the imminent World debate in order to smooth national attitudes which are some distance apart and to settle States' interests so binding in one sense or the other, whilst being aware that the European integration can be the means of a "dialogue between continents" which is realistic and well balanced.

In other words, it is not intended that things should remain as they stand nor to expect that there be an unanimous agreement in the immediate future on a uniform set of regulations on a World basis. But one must start a closer link of the various situations by means of initial interventions that compel all countries situated around the same basin to do something in a uniform manner, taking into account the degree of pollution which already exists.

On the other hand, one has to deal with the quality standards of effluents, and apply very strict measures for the toxic ones and - at this specific level at least - it is difficult to believe that supranational solidarity cannot reach a fair and enforceable agreement.

2.6 As concerns the more limited sphere of the European Community, I personally believe that the common regulations to be defined in the ecological field must be inspired by the general philosophy of the Treaty of Rome in the context of which, the care to eliminate every possible distortion in conditions of competition, is always seen as an instrumental requirement to be reconciled through appropriate procedures with the pursuit of the general objectives of community integration. These lines are particularly evident in the provisions relating to aid from the states, aids which, although hit by a prohibition of principle, are in fact subjected in a large measure to a simple procedure of previous authorization on the part of the Commission. Above all, this is valid for that which concerns objectives of balanced expansion, also from a territorial point of view which the Treaty explicitely aims at, and which the mere automatism of market could not allow to achieve as the historical experience of industrialized nations clearly demonstrates. The policy of prior authorization of aids must be seen, in fact, as an instrument given to the community institutions in order to oppose efficiently the tendency to glorify territorial imbalances which market integration tends naturally to emphasize. An ecological set of regulations differentiated according to the pollution level reached by single geographical zones considered in their natural unity, independently from political or administrative borders could undoubtedly come, even if indirectly, within the scope of a community regional policy, as a reaction to incentivating or desincentivating effects which it could produce in the single zones considered. It is clear, however, that a perspective of this type seems acceptable only in the measure in which it allows for the community institutions the availability of instruments capable of excercising a real control on the general conditions of industrial and urban development in the areas of recent industrialization, even with

a view to avoid, at a later stage, situations of ecological crisis similar to those it is proposed to obviate elsewhere.

In other terms, the problem of a community ecological discipline must be seen, in my opinion, in the general perspective of the coordination between the development policies put into effect in various forms by Member countries and the general objectives defined at community level by the programme of economic policy on a medium term. The possibilities to compare conditions pertaining to competition in the Common Market cannot, in fact, be considered abstractly in this or in other regards as a result of a mere effort of legislative harmonization, but it must be reached through increased political coordination in the context of institutional evolution imposed as a result of a real economic and monetary union.

3. Political ecology and industrial strategy

3.1 The principle being accepted that future community and supranational policies must tend, in a first phase, to issue common and uniform regulations relating to single basins and that, in any case, a clearly formulated and detailed control of quality must operate on standards of industrial effluents (strict where toxic effluents are concerned, flexible for muds and organic substances), it now remains to be examined - in the second part of the present report - which are the foreseeable repercussions of these measures on the future industrial strategy of our countries.

Amongst the various possibilities there is the main one of increase in costs of investments and operations of each industrial activity consequent upon the necessity of installing purification plant which reduce effluents of every factory within limits established by the quality standards.

This increase in costs has been estimated to average 8 - 10% of the actual investment costs. Obviously, the amount of such additional costs may vary according to the process of manufacture, to the quantity of waste to be dealt with and to the suggested flexible regulations. It is, however, possible to state that such additional cost will remain, in general, within limits far inferior to those mentioned earlier (*)

(*) The Italian "Istituto per la Programmazione Economica (ISPE)" has recently estimated that interventions for depollution which can be scheduled in Italy for the second five-year period (1971-1975) could involve a total investment of the order of 1,200 milliard lire on top of about a further 620 milliard for amortization and the operation of plant already installed.
In estimating the probable effects of such additional costs on the whole industry, ISPE has concluded that by 1975 there would be heavier charges in the internal costs of production within the bracket of 1.5 and 3%: this would apply in sectors where the costs of depollution are the heaviest (chemical industry, oil and coal by-products and non-metallic manufactures). In the other industrial sectors the increase in costs should be even less. Even with the usual caution where such estimates are expressed, they are well below the figure of 10% mentioned earlier.

and that the increased cost can anyhow be reduced later on in function of foreseeable installations for purifying treatment processes in addition to various fiscal and incentive reliefs granted to industries concerned.

In the end, and still with reference to a concrete proposal of suggestions to be made at the imminent World Conference in Stockholm, a set of incentive or relief regulations could be provided for which come close to the various national situations; these would place the burden upon the more industrialized states to act where their industries are concerned, and set up simultaneously a world fund for similar application of incentives and reliefs for industries of developing nations also required to be equipped with depollution devices for their own effluents.

At this point we are obviously facing not a technical but a political proposition. Nevertheless, we are convinced that such proposition could find a less difficult acceptance than could be thought possible today, at least to the extent that pollution does not know, nor respect, the traditional political and administrative boundaries (*).

(*) There are numerous instances of this : the German Rhine pollutes Holland causing serious problems. The Dutch draw daily from the Rhine numerous samples of water which are given gaschromatographic tests and are analysed for trace elements after a concentration process. Recently, the Dutch have heard from the Germans that 10 kilogrammes of one of the most powerful pesticides were discharged in the Rhine daily; these reached Holland. As regards air, the Ruhr in Germany pollutes air with SO_2 which falls back on Sweden where it comes down as a solution containing one thousandth of sulphuric acid. There are practically no limits to atmospheric pollution. (From the report of Marini Bettolo presented at the hearings of the Italian Chamber of Deputies).

3.2 Another factor to be considered is the probable fall in some manufactures also the gradual disappearance of other products of substitution in order to prevent emission of toxic elements or of goods not wholly consumable and which are the source of soil and water pollution.

a) <u>This topic concerns mainly the packaging sector</u> (see table 1)

The major expansion in the use of containers, especially those made of plastic material (polyvinyl chloride) - practically indestructible by traditional methods of treating solid waste - has, up to now, meant that incineration was the only possible solution for their destruction. In the case quoted, even though the plant fulfills its task of disposal, new ecological problems arise through the release of smoke with a high percentage of hydrochloric acid; these problems cannot always be expediently resolved by more advanced plant treating smoke itself.

It is, thus, foreseeable that in future it will be necessary to use substitute products which can be decomposed through action of atmospheric elements or

by bacterial action or, at least, products with a limited polyvinyl chloride content; it is to be hoped, in this respect, that there will be scientific research on a World scale.

A return, otherwise, to traditional containers using cellulose as a base appears to be an inevitable choice, even though it may be difficult to impose regulations of this kind.

b) <u>There is, moreover, the problem of reduction of atmospheric pollution caused by emission of fumes by over 250 million motor vehicles circulating in the World today</u>. This is a problem for which the best solution is now being sought and is being discussed on the basis of the possibility and convenience of reducing the pollution factors produced by engines as designed today, or else, to replace traditional internal combustion engines by others of new conception : accumulators or heat exchange batteries.

In the face of this problem it is highly likely that - at least on a medium term basis - the choice will have to go to the first possibility, that is, either by a drastic reduction in the use of anti-pinking petrol containing lead, or with noticeable changes in the chemical composition of petrol. In any case, the technical

propositions put forward in this connection for some time past, lead one to foresee for the next few years a noticeable increase in the purchase price of vehicles equipped with anti-pollution devices (higher by at least one-third compared with current purchase prices)(*); likewise, it is possible to foresee increases in running costs as a result of the entry into the market of vehicles equipped with electric traction.

Even with these views, however, the motor industry - vehicles and the petroleum industry linked to it - face heavy problems of reconversion and adaptation; these problems should not be neglected when laying out enterprise strategic projection, despite the impossibility for these industries to count - at this stage - upon clear and responsible regulations for their future programmes of reconversion.

These considerations lead to the hypothesis, worth some thought, of a reconsideration of the relative level of prices of a means of transport such as the motor car, causing a high degree of pollution, with the consequence of reducing considerably, in future, the rate of increase in private motorization, in favour of a vigorous revival of public transport. A development in this sense could, in itself, contribute towards checking the deterioration

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(*) Recent press conference of Chairman Agnelli on the eve of the Turin Motor Show (November 1971) in this respect.

already existing in the ecological sphere, even if it is not possible to ignore the grave economic implications of a matter of such importance, in relation to the strategic function actually carried out by the production of this type of capital goods in the face of general economic expansion.

c) A third problem of replacement concerns synthetic detergent products : not so much for the aspects assumed through dispersion in water as for their toxicity also in regard to the current pressing request to substitute actual productions of the "ABS"type of branched structure by others of the "LAS"type.

There are strong possibilities, in fact, that intermediary biodeteriorating products can give rise to toxic effluents of a kind which is not yet well known nor specified; this is, therefore, a sector still open to investigation and experimentation even in the perspective of necessary substitutes.

d) A later problem concerns the substitution of substances used today in the agriculture sector, such as chemical manures (which, washed away by rains, are carried into water courses, reaching the stratum) and, even more, the so-called pesticides - weed killers, insecticides, anticryptogams - whose use becomes increasingly frequent and indiscriminate resulting in direct pollution of strata. These substances are toxic to men and animals, even in very small doses (so small as to escape every analytical control), thus, along with the search for substitute products, regulations and stricter controls to limit their use

are foreseen. The problem is all the more serious in that, as is well known, these toxic substances tend to concentrate increasingly in the successive phases of biological transformation. Relatively modest in the plants treated and mentioned earlier, these substances are to be found in larger quantities in animals which feed on the plants and reach a maximum in the carnivorous which, in their turn, feed on the latter, as for example the predatories, thus severely compromising fauna with the tendency of extinction of certain species, so compromising the delicate biological balance.

e) As regards surface pollution due to thermo-electric stations (they load heavily the total emission of sulphur oxide), the way ahead is certainly still a long one; it involves the study of use on a large scale of substitute "clean" energy (natural gas, nuclear or, even though some way ahead, solar energy or energy derived from tides).

Meanwhile, one must look towards the construction of thermo-electric stations equipped with plant for the destruction of ashes and the retention of sulphorous oxides, also for control in the build up of smoke clouds (the "Lidar") whilst realizing that there do not always exist processes sufficiently tried out and of acceptable cost to maintain the price of energy at current prevailing levels.

If nothing else, this implies a foreseeable ulterior factor of increase in internal costs of production for all installations using electric energy.

3.3 Along with the necessary processes of substitution, industry will remain interested in ecological policy involving modifications in production methods, at least those which cause pollution of soil, water or air prominently and consistently.

All industrial operations must be re-thought; metallurgical ones (to reduce sulphur oxides and other sulphurous compounds, metallic oxides and carbon oxide dusts); factories producing paper, cellulose and artificial textiles (to reduce sulphorous hydrogen, sulphur oxide, carbon sulphide and xanthogenates); the cement industry (to reduce dusts rich in silicates); factories producing sulphuric and nitric acids (to reduce sulphur oxide and nitrogen); plants producing superphosphates, fluoridric acid and electro-chemical aluminium (to reduce fluorine and fluorides); the less important producers who use phosphoric esters (pesticides) or emit organic residues (slaughter-houses and tanneries). Under each of these headings of possible intervention, research and experiments are in progress on a World scale. The end result could lead to considerable innovations in production processes used up to now with foreseeable increases in unit and total costs and, therefore, with the consequent transfer of such a major burden falling upon internal and external prices.

3.4 Finally, whilst it is obviously possible to foresee that the future ecological policy will show undeniable and concrete advantages to manufacturers of depuration plant or to those companies responsible for their planning (*), I would not disregard the present possibility of foreseeing in such a policy a pressing stimulus to different siting of existing installations.

(*) Consider the case of Italy where, of about 8,000 communes, only 120 are equipped with depuration plant for treating dirty waters; of these, only 32 have complete and efficient installations for the depuration of liquid waste ...

If we refer to an opinion expressed some time ago by Pelletier (**), we can, in turn, assert that an efficient help to dilution of industrial polluting waste follows the possibility of specializing industrial zones on a territorial basis, away from residential ones, taking into account a multiplicity of factors in the location of the former (predominant winds, existing water resources, possibility of carrying out common depuration ...). This seems now preferable rather than saving a few isolated green spots in the midst of large polluted zones (as is frequently the case); to scatter amidst large wooded regions residential groups and industrial zones, the ones connected to the others by fast lines of communication. But town-planning solutions of the macro-territorial types are still an element of integration and not unique in the sector concerning ecological recovery, not being always evident because of the missing "large wooded regions" mentioned earlier.

Yet, it is clear that these solutions can mean a precious support; it is therefore useful, if not indispensable, to prepare a regional community policy so as to safeguard and improve environment, to put in value its characteristic, to stress the trends of territorial specialization of the "habitat" and to dilute - in the largest possible measure - concentrations of activities and populations now located in restricted areas.

(**) Opinion expressed at the European Conference on air pollution - Strasbourg, July 1964.

In this connection, the latest aims of the European Commission (*) appear to be most interesting for their high grade of realism and concreteness; also, on this subject, it may perhaps be possible to express some information on syntheses useful for the forthcoming World debate of Stockholm.

Nevertheless, I would like to insist particularly on the result of our most recent national experience, that is to say on the importance that - with a view to obtaining a thinning of present industrial concentrations - the combined effect of large infrastructural works causes, and of the policies of particular incentive for industrial siting in the more depressed agricultural zones.

Indeed, in most cases, the stimulus to decentralization of industries from congested areas to outside ones brings inevitably with it the burden of additional costs to the firms wishing to transfer in that they are required to move away from the large supplying or consuming markets (sometimes several hundred kilometers as occurs in Italy for the move from the north towards the south); they are denied the choice of location between areas insufficiently equipped in primary and secondary urbanization, serious business problems arise in the search for professional ability and intermediate contractors, these being available only on a very reduced scale where agricultural countries are concerned.

(*) See the First Communication by the Commission on Community policy on environment III/1050-3/71 - p. 20 et seq.

And yet, in the face of this kind of difficulties (sufficient in theory to deter any voluntary decentralization), the Italian experience after a decade of observation shows now that the combined effect of transport infrastructures and territorial incentives has given rise to environmental situations sufficiently favourable for the decentralization of hundreds of medium, large or very large industrial activities to the south (mezzogiorno).

In this sense, it seems to us that - more than insisting on the problematic possibilities of pacific co-existance between residence and industry within urban limits - the future regional community and the national policies of territorial readjustment must learn from ecological problems, as far as is objectively possible, the big lesson of participating in the dilution, on large spaces, of productive activities paying, however, in this case the right price in terms of sets of infrastructures and territorialy selected incentives.

3.5 Set out in these terms, the ecological problem is mingled with the more general one of the layout of the territory - using this expression in the most comprehensive sense - more than the intense urban planning in the narrower sense, the structural changes to be carried out in the agricultural sphere, the sets of territorial programmes of industrial development and the coordination of development programmes relating to physical and social infrastructures. Like the regional policy, the ecological one must surpass in fact, in the shortest time, its limits of public assistance intervention directed to relieve certain uneasy situations, in order to become a "modus operandi" of the whole economic policy. In this order of ideas, the same perspectives of common agricultural policies which provide radical changes in agricultural structures with a radical reduction of those

employed in agriculture and of cultivated land, impose on the one hand, the reabsorption of surplus agricultural labour into non-agricultural activities which prevent the present rural flight to continue, with the consequent exasperating imbalance, even ecological, between city and country whilst, on the other hand, turning to account forests of large geographical areas. The latter measure is justified on grounds of ecological outline, of instrument to conserve a seriously threatened natural patrimony and of the social element to assure to the population a greater enjoyment of natural resources through the setting up of large areas to be used as open parks. From all these angles, the common agricultural policy could lead to a privileged opportunity for the foundation of a new relationship between city and country where the rigid contraposition between metropolis and countryside will be replaced by a functional intregration between the two terms of the binomial, to be recognized only through a different demographic density.

That which counts the most to our ends is that within the ambit of the arrangement of the territory in the sense we have outlined and the creation of new employment outside agriculture should disturb the least possible the settling down of existing population with the social and cultural implications involved. One of the fundamental justifications for modern territorial layout is that of making the choice of locations inherent with industrial development with such criteria as to not compromise agricultural or touristic vocations of specific territories, and of encouraging, as far as possible, the establishment of a close relationship between complementary activities. The necessity to promote the largest possible diffusion of industrial development requires particular attention to infrastructures which must anticipate the demands, thus ensuring efficient incentives for decision to invest by private operators.

4. Final considerations

At the end of this expose - necessarily synthetic - of the problems and perspectives, we would, in concluding, hint briefly at the financial implications of such a programme and the actions and collaborations which they seek - on a national, continental and World basis - in view of its gradual pursuit.

4.1 As concerns firstly the financial implications, we must recall that the total cost of the various ecological recoveries assumes now in each industrial country a very high financial burden which can be valued in thousands of million dollars (*).

It seems, nevertheless, undeniable that the cost of depollution should appear, in time, progressively inferior compared to the economic benefits deriving therefrom to national or supranational communities, apart from any other consideration of compulsiveness of such task.

(*) The latest ENI-INVEST enquiry, results of which were given by Ing. Girotti in Milan in November 1971, establishes for Italy a global depollution cost valued for the period 1970-1985 at between 7,850 and 9,000 milliard lire. Other recent estimates mention an expenditure requirement for depollution of the USA not inferior to 11 milliard dollars yearly, of 2.5 milliard dollars for that of Great Britain and 2 milliard for France.

In any case, bearing in mind the necessity of putting into practice national programmes of depollution on all the main atmospheric, water or soil effluents without causing serious repercussions to internal industrial costs (and therefore to the price system) and on public finances, it will be obviously necessary to establish a schedule of intervention policies based on the following criteria :

a) Privileged and guaranteed credits - on a medium and long term basis - to firms and local corporations which put into operation purification plants. These credits could be studied as an incentive to the speed with which the investments in question are used, therefore, related proportionately to a volume of investments gradually reduced with the years.

b) Contributions in capital funds (i.e. non-refundable subsidies) to municipalities and, if necessary, to certain enterprises selected on a territorial or sectorial basis (for instance small size ones intending to put up common installations).

c) Fiscal reliefs (intended as deductions of annual taxes on profits by a portion of the investment in such installations in addition to the normal depreciation allowance) for allowances, reduced gradually, on the additional investments involved in such plants.

d) Charges to all polluting plants of the respective running costs in exchange for fair and recent

contributions which would go instead to the municipality (sewer systems, incinerating plant and water purification of common interest etc.).

In the absence of an appropriate contractual rule between the sources of pollution and the polluted subjects, the financial system it is proposed to set up is that of making internal in the calculations of operators - aimed at the convenience of single operators - those costs which are rightly defined by Von Mises as "external" (*), whilst trying to level as far as possible the benefits and social costs connected with pollution phenomena and to the successive interventions of depuration. It will probably be necessary, in such a perspective, to link the proposed taxation on polluters with the introduction of not symbolical prices for the use of some resources, i.e. prices such as to reflect the scarcity of these resources. This

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(*) L. Von Mises "Human Action. A Treatise on Economics" London 1949. Outside cost is the utility loss born by an economic agent for physical reasons outside its control and not compensated by any commercial redress. Von Mises maintains that "...in many countries proprietors of industries or railways are not considered responsible towards adjoining occupiers for damage inflicted by smoke, soot, noise, air pollution..." excusing such a situation by the fact that, frequently, one does not wish to "disturb" the industrialization nor the development of means of transport (the latter opinion is taken up by I. Cheret in his book "L'EAU et du SEUIL", Paris 1968 p. 67.

is especially valid for water consumption charges and solid urban waste disposal.

In conclusion, we express the conviction that it is possible to finance interventions in the depollution sector, by making a joint appeal to public finance (for distribution of incentives based on the indivisibility of certain costs), and to direct taxation on polluters in the dual aspect of compulsory depuration plant (for industry) and remunerative rates on fixed costs of depuration (for city consumers).

4.2 Concerning the actions and the degrees of collaboration that will have to be sought for setting up new and more coherent supranational ecological policies, the analysis developed up to now can involve the specification of the following proposals :

a) <u>Integration and bringing closer together of national legislations within the orbit of a supranational and flexible set of regulations</u>.

It will be necessary to decide upon uniform regulations for all countries adjoining a same water mass (sea, river, lake or territory) in which rigid standards are determined on toxic effluents, and standards which are, on the other hand, included between minimum and maximum values for those which are not toxic. In determining such regulations for basins, account must be taken of

the pollution degree already reached and that which is foreseen. Also within the orbit of a supranational general regulation must be prescribed, in a uniform way, for the interior of such basins, the system of incentives in favour of the construction and operation of depuration plant for industries and local corporations.

b) Attribution of authority to the European Community institutions for the solution of controversies relating to the sector and for the gradual bringing together of the various regulations of water basins, also plans of minimum requirements for observing and controlling the fulfilment of the regulations.

c) Suggestions for establishing organisations in each country for the fight against pollution, also with a view to facilitate international discussions concerning projects for the basin or on a larger territorial scale.

d) Carrying out a coordinated research programme on a community basis and subsequently on a continental basis, to obtain a better knowledge of pollution phenomena, to improve methods and techniques of measurement, of interpretation and elimination; to study and suggest substitution of necessary products or reconversion of industrial polluting processes.

Such programme could start with the setting up (already proposed to the European Commission) of a European Institute for Ecology with, attached to it, a centre for uniform observations and controls.

e) Immediate adoption of technological measures for each basin on the basis of specific "projects" (as for instance the "Mediterranean", "North Sea" projects, the "Rhine basin" project, etc.) indicating toxic pollution factors to be reduced with the method on effluent standard, also suggesting integrated ecological solutions satisfying water requirements of industry, not by drawing it from water-bearing strata, but as sewer water to be depurated and recycled in the sewer circuit with reduced levels of pollution (*) and, in any case, always devoid of toxic pollution.

(*) This method has already been successfully experimented with by IRI in the steelworks of Bagnoli (Naples), to satisfy a need of about 1400 cubic metres of water per hour. Dirty liquids are removed from the sewer, depurated and admitted to the production processes; afterwards it is returned, more depurated than at first, to the neapolitan sewer.

4.3 In conclusion, we can assert that the need of a community ecological policy coincides with that of the best use of resources available and with the rationalization of sector and territory in the subsequent development of our economies. These objectives could not be reached only as a consequence of setting up a customs union pure and simple, not only as regards the spread of development, but as a result of the construction of an integrated productive structure with particular regard to vanguard sectors, given the importance of the financial means necessary, where otherwise would be lacking common instruments of orientation for technical-economical development and integration between public powers and private operators. In this perspective the ecological policy appears as a necessary link between industrial and regional policies and it must propose to contribute to the diversified expansion of productive activity so that it occurs within the community sphere in such conditions as to promote, not only the general improvement in living standard and harmonization in the progress of conditions of life and work of the populations of member countries, but also, to minimize additional costs inherent to territorial imbalance, whilst increasing the relative efficiency and, therefore, competitiveness in enterprises inside the economic structure.

Al of which involves the recognition that within the ambit of an economic and monetary union, the problems of equilibrium between the balance of payments of member states tend, necessarily, to be identified with those of territorial development, necessitating a comprehensive view of problems related to development and redistribution of profits which go with their solution. From this stems the requirement of a community institutional structure politically strengthened and provided with adequate instruments of intervention.

The ecological problem has, in a short period of time, become known to public opinion; it has the merit of making immediately understandable the interdependence between the different aspects of an imbalanced growth which the market integration has experienced hitherto in the community without adequate political counterbalance, and tends in itself to amplify. The increasing tensions experienced in this connection by countries of immigration are particularly significant in the presence of large concentrations of foreign labour, mainly employed in activities and duties which national labour refuse to fill and, therefore, excluded from the social life of the host country. These tensions, coming on top of the ever increasing ecological deterioration, spoil in a way which is more and more apparent the quality of life in the zones considered up to now as being privileged and which run the risk of losing, even more than others, their historical and natural identities. For their part, suburban regions feel increasingly a demographic drain which is not compensated by a current of tourists nor by replacements of emigrants, whilst the free circulation of workers loses its social significance, in the absence of an availability of jobs "in loco" that makes of it a free choice and, therefore, a socially promotional factor. Moreover, even industrialization occurs, sometimes, on the strength of a constraint in the choice of location imposed by circumstances outside a rational plan of development of the region interested and, in contrast with agricultural or touristic vocations of the districts, because of the frequent recourse to technologies which are outdated and ecologically polluting.

The knowledge of these contradictions will tend to make itself all the more sharp as contemporary Europeans acquire the conviction that deterioration in quality of life goes

hand in hand with an insufficient participation by the populations interested, in the decisions from which their future depends or with a determined understanding of the development which tends to project in the future the evolution of the past, without taking duly into account the new requirements. The protest against such aspects by the present labour organization, despite political speculations which are built around them, comes also, ultimately, in this type of claim and puts in cause the undoubted waste of human capacity inherent to the present system. All the problems relating to quality of life, in its ecological aspects as in others, tend to put in new terms the relationship between industry and society, underlining the priority to be given to a global growth of man, which is the supreme aim of the development process.

This necessity to participate and the ever increasingly wider knowledge of a substantial identity of motivations between opposite manifestations of imbalance which afflict at present industrial society, make all the more evident that the European character of the problem requires a reply which is really to the measure of the problems. From an ecological aspects, the recent adhesion to the European Community of the four candidate countries opens favourable prospects because of the presence in certain of these countries, such as Ireland and Norway, of ecological situations which are still privileged, and for the high degree of awareness and technological progress which characterizes Great Britain in this respect. A community ecological policy solicits, however, by its nature, a direct dialogue between the common institutions on the one hand and, on the other, the social partners and local authorities in the search for solutions which can never be definitive but must adjust continuously to the whole problem and to the extreme and varied aspects of the real situations.

TABLE 1

Consumption of plastic materials in the United Kingdom, Germany and the USA

Country	UK	Germany	USA
Population	55,300,000	60,700,000	201,000,000
Consumption of plastic materials (tons)	1,105,000	2,549,000	7,143,000
Used for packaging (tons)	250,000	503,500	1,450,000
Percentage of the total used in packaging	22	17	18
Waste (tons)	16,000,000	15,000,000	90,000,000
Presence of plastic materials in waste (%)	1.56	3.35	1.6

Source : D.M. Sharp : "Problems of earth pollution" London, 1971.

CONFERENCE

"INDUSTRY AND SOCIETY IN THE

EUROPEAN COMMUNITY"

REPORT N°.6

IMPLICATIONS OF ENVIRONMENTAL MEASURES FOR INDUSTRIAL DEVELOPMENT AND THE SITING OF ENTERPRISES

by

J. LAOT

COMMISSION OF THE EUROPEAN COMMUNITIES

VENICE - 1972

CONFERENCE "INDUSTRY AND SOCIETY"

CONSEQUENCES ON INDUSTRIAL DEVELOPMENT AND THE LOCALIZATION OF ENTERPRISES OF THE ACTION FOR BETTER ENVIRONMENT

Report n° 6 - J. LAOT

We have probably taken a risk by choosing to deal with the subject of this report in this particular way. We are nevertheless convinced of the necessity of such an approach and this for three reasons :

- First of all Trade-unionism : we know by experience how much the application of legislation is dependent on various forces. Accordingly an attempt has been made in this report at identifying the threshold of Tolerance, to recommend this or that formula and to define whether the State, the employers or the consumers should bear the cost of anti-pollution measures.
  In this report we shall explain as we go along, the reason for acting differently.

- Secondly in order to appreciate "the impact of the struggle for better environment on industrial development and the location of enterprises", it is essential, considering the indefinite meaning usually given to "environment", to define our own idea of the word. This brings us to consider more precisely the consequences for cities of an industrial development in which the motor car industry holds the lion's share.

- Thirdly we cannot ignore the origins of what is now the world's major concern : environment. Up to now, nature has been robbed and made to sweat like a human being, the workers or the populations of the colonies. People have died and are still dying because of certain nuisances, but this has not caused much concern to the conscience of ruling capitalists. Now suddenly environment control becomes necessary but is expensive. To make this new burden acceptable, public opinion is mobilised. Consequences on industrial development, yes, but motivated by what ?

For these reasons, before agreeing to assume responsibility for writing and introducing this report on behalf of the "C.M.T." (2), the "C.F.D.T." (1) requested to be allowed to tackle the more general aspects of the problem rather than the too technical and limited framework proposed. Nevertheless, the tackling of these general problems still keeps us within the limits of the report to which we agreed.

A last remark : this report is essentially "C.F.D.T.". It was not our deliberate choice. Owing to lack of time, and taken up by our routine trade-union activities, we were unable to contact other european trade-unions. Therefore this report deals with the behaviour of french capitalism in respect of environmental problems. It does this in a specific way, taking into consideration the balance of forces existing in France, whilst at the same time following the general trend of world capitalism. This debate will undoubtedly enable the gathering of essential information and make for this deficiency.

(1) - Confédération Française Démocratique du Travail

(2) - Confédération Mondiale du Travail

The first part of the report specifies what we mean by environment and its importance in the development of human individuals.

The second part concerns the origin of present conditions.

The third question relates to the extent to which there exists the will to really solve environmental problems.

The fourth will show, through our french experience, our skepticism about how efficient additional control measures would be, unless power for enforcement were to exist.

The fifth analyses the true motives of the current campaign.

Lastly, we will make somme suggestions bearing upon industrial development and the location of enterprises, for the purpose of improving the environment.

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PART ONE

DEFINITION OF ENVIRONMENT

Should this report define environment ? We do not pretend to do so for the whole seminar and have no intention of imposing our ideas to anyone. But our approach would be misunderstood if we were not to explain what we mean by "environment".

Usually, it means nothing else than conservancy of Nature (given a capital N for the occasion), pollution and nuisances fighting off. One usually doesn't go further. It is sometimes a matter of town-planning, but only in the shape of architectural qualities, volume balance, etc...

It is a clever way to describe environment!...Such restriction allows to by-pass essential fields of action which directly concern industrial development and the location of enterprises. We mean the quality of living in cities, in conobation. Yet their conception is conditional upon (at least in France) options regarding, among others, the expansion of automobile industry.

To avoid any erroneous judgement, one precision need be stressed, we are set on technical progress, for industrial development contrary to the case brought only too often against us. We are set on industrial development aiming at the quality of human beings life, at developing their personalities and for that reason concerned by the subject of this colloquy.

It has been known for a long time, but recent human science advancement demonstrate it even more so today, that building-up of human beings personalities, their cultural field, are conditional upon the importance and nature of individual or group relationship, with others, with solid and economical structures, with objects. Surroundings influence on one's personality is determining.

Human beings are always uncompleted cultural products, to be built in a lifelong question of dialectic relationship. Each one is a product of the city or the country, his land, his soil, his family, his social class, his human group. A child is not born thief, delinquent or honest, he becomes such. To what extent did many children become juvenile delinquents for lack of cities thought and built to fulfill their needs, to allow them to express their creativity and exercise responsibilities ?

We are aware of stating nothing new, but what is obvious must be constantly reminded, not to be forgotten and made allowance for in the solutions brought to new problems. This approach to environment broadens its importance far more than the actual boom on nuisances for their worth.

In this human environment, relationship with natural elements such as : air, light, vegetation, space, etc... is only one viewpoint among many. This viewpoint is important but must hold its place among others just as valuable. More and more development of conobation compels one to live in surroundings built by men. And we all know to what extent this built up area is dilapidated, fallen victim to choices guiding the use of resources towards the expansion priorities of industry.

A business group belonging to the french VIth Over-all Planning, responsible for a report on "educating towards tangible knowledge", was considering the possibility of such teaching when :

> "the major estrangement in developed countries at least, is from now on that of the surroundings of city life : exhausting transportation, to and from work or to obtain remote utilities, sundry and ceaseless noise, small non-evolutive living-space and rigidity of prefabricated city surroundings or dismalness of anarchic suburbs, inhuman contacts with "the others", no longer village or borough neighbours, but anonymous individuals behind the steering-wheel of an agressive car...".

The group pointed out the loneliness of people in cities (but is one still allowed to call them thus ?) built to accomodate manpower and it added :

> "Except in a few ancient boroughs and sometimes in new realizations urbanized man no longer has any territory, real roof, secret corner. Life goes by while expecting and pursuing something else ; television, crowds in transit on roads, searching for the freedom of nomads and redescovering their laws and gatherings, or on a quest for lost houses".

Because of this approaching of the problem, the trade-union colloquy C.E.S.L. OE.CMT on environment and life surroundings which met in Luxemburg the 1st, 2nd and 3rd july 1971, declared :

> "Prejudice becomes even more impressive, as soon as one meets the consequences of industrialized groups on the psychism of people who live there :
>
> - these groups favour first the development of a technical mentality which doesn't broaden, but rather restricts man's cultural horizon.

" - partial information and undue publicity which are boundless, will manage to overpass the critical possibilities of man's mind where they'll entail dangerous disorders ;

- Very often exaggerated proposals of so-called cultural accomplishments estrange man and divert him from the real problems,

- Finally, in our groups balance of men becomes precarious, one needs only bear in mind the massive exodus of city dwellers towards the country during the week-ends !".

Consequences for human beings are not only periodical catastrophes resulting in many deaths (Meuse valley in 1930, London 1952 (and) 1962, shipwreck of the Torrey Canyon in 1967). Neither is it apocalyptic situations for the forthcoming decades. It is this very day, notwithstanding progress realized in the field of health, insiduous attacks to the physical and mental health of millions of people. By adopting a narrow definition of environment and by hiding some of the results upon everyone's personality, upon society, upon civilization, one thus avoids connecting this situation to the very type of industrial growth. One comforts him by proposing as goal, going faster in the same direction, but polluting less. This trend must be refused and the causes tackled, and to do so, they need being made clear for one and all.

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PART TWO

WHAT BROUGHT THIS SITUATION INTO BEING

To act efficiently, it wants acting on the causes. An indication as to what brought on this situation is given by those in charge of the environment crusade.

The highest ranking french State authorities don't hesitate to say that there is some talk about "creating and spreading some sort of environment ethics imposing upon the State, the communities, the individuals the respect of some elementary rules, for lack of which the world would become irrespirable...".

At other levels a no lesser ambitious definition is given "That will make of Environment Policy (°) a universal humanism". If the breadth of the speech provokes a smile, it is nonetheless true that the problem is fundamental. Moreover it has been thus for a long time.

In his book "Technics and Civilization" (published in 1934) Lewis MUNFORD describes the falling out which occurred in european society with the birth of capitalism :

> "There was an abrupt shifting of interest, from life values, to money assets...It was no longer sufficient to live from industry, independant wealth was a must. Work was no longer a life requisite, it became an important purpose in itself...There, is a phenomenon almost unique in the history of civilization, not a downfall into barbarism by the sinking civilization, but a thrust of barbarism helped by those forces and interests which originally had been at the conquest of environment and perfecting of human culture".

(°) capital letters in the text

This turning point in civilization "The great demographic and industrial outburst which took place in the XVIIIth century is due to the introduction of coal as a source of mechanical energy, to the use of new means to render this energy effective - steam engine - and to the new methods of smelting and working iron. A new civilization is born of the iron-coal compound". This civilization, this "carboniferous capitalism" will spread its consequences on human environment and workmen.

> "The sudden accession to capital in guise of these huge collieries, immersed humanity in a fever of working. Coal and iron were the hub around which circled other society services. The XIVth c. activities were absorbed by a succession of rushes, gold-rush, iron-rush, copper-rush, oil-rush, diamond-rush. Mine spirit earmarked the whole economy and social structure. This predominant working became the type of subordinated industrial method. The ruthless attitude, "make money", "woe unto the last" (attitude of mine rushes) spread everywhere. In the USA, Middle-West farms were worked like coal mines, forests were drained and mined like the ore of their hills. Humanity behaved like a drunken heir. Damage to civilization engendered by the superiority of new destructive and reckless habits remained, whether the source of energy disappeared or not. The psychological results of "carboniferous" capitalism : weakened ethics,- wish to get something for nothing - contempt for balance between consuming and producing - practice of sacking, as if waste was part of normal human environment - these results are obviously fatal".

"In this paleotechnic world, realities were money, prices, capital, assets. Environment, as well as Human life was treated as an abstraction. Air and sun, because of their deplorable lack of exchange value, had no "reality". Whence, water and air pollution, urban concentration around factories entailing "a reduced social life, an impoverishment of intellectual resources".

Through this period of capitalism, "the workman is considered only as a cheaper mean of mechanical production. Human beings are treated as ruthlessly as the countryside. Manpower was a supply to sweat, to mine, to exhaust and finally cast aside. Responsibility towards the life and health of the workman ended with the payment of the workday's salary".

The reciprocal alienation of capitalists and workmen was clear : "In the pursuit of profit, the ironmaster or the owner of a spinning-mill was driving himself almost as hard as his workmen. He deprived himself, put himself on short allowance, cut down expenses, by stinginess, will of power, like the workmen had to do by sheer necessity. The quest for power made the Bounderby hold life in contempt almost as much for themselves as for their wage-earning slaves. If the workmen were hurt by the tenet, their masters were just as much".

This description by MUNFORD of a condition marked by the lure of profit and power, the contempt of human life and nature, is caracterized in his own way by MARX who shows how capitalism" fanatical agent of hoarding, pushes men without truce nor mercy, to produce for producing...".

These quotations describe a bygone period. But in spite of the progress accomplished in different fields, is that one in which we find ourselves now fundamentally different ?

The condition of workmen in the firms is only mentioned as a reminder, since another report deals with the subject. But to proceed to work, daily becomes a worse plight. At the present time, in the Paris area it takes usually 1 1/2 hour and often 2 hours to commute. On the average, each workman spends yearly 50 workdays in transports.

And what about the conditions in which this travelling is accomplished ? An inquiry undertaken in 1969 by the Public Authorities points out in figures what workmen knew since a long time :

- at peak hours, the underground is made use of at 100 % of its capacity, when, as it frequently occurs, it doesn't exceed 110 % (7 persons per square meter), if not 130 % on certain lines (8 persons per square meter) without reckoning the time spent waiting in corridors or on platforms ;
- the speed of the metro unterground hasn't changed for 50 years (22 kph) and 74 % of its rolling-stock more than 30 years of use ;
- buses are ensnared in private cars, their speed limit passed from 13 kph in 1953 to 9 kph in 1969. Since, it slowed down even more, in spite of different measures taken in the hope of coping with the situation.

This state of affairs is a burden, particularly to workmen, because real-estate speculation rages about all the operations of town renovation. By constantly raising the price of land and the cost of building dwellings, it **daily** drives out of Paris workmen and obliges them to live farther and farther from their working places.

Long lasting commuting increases. At the present time, there are 3 to 4 peak hours a day. From now till 1975, there will be 5 or 6 consider the sponsors of the inquiry. Outside the firms, in the transportation directly linked to the work and to the reciprocal localization of firms and homes, the workmen's weariness will do nothing but increase. To the cost of living, hardships, reducing of working time, is added transportation costs.

As one is inclined to believe, the actual condition arises from the logic of an economical system based on the frantic pursuit of profit, power, on the will of domination. This logic is accepted by the ruling classes regardless of the outcome on nature and human beings, as long as their own power is not imperilled.

Then a question arises : "may environment ethics", "the universal humanism" mentioned in speeches, be a result of the work of contractors similar to their description given by a booklet of the Ministry of Industrial and Scientific Development, dedicated to innovation (p. 166).

> "But these characteristics are not sufficient. To become Contractor (°) implies an unfaltering will to be one's own boss and to take the corresponding chances. This state of mind is born partly from the wish to make a fortune, to become powerful and influent, to show the signs of material success and to attract consideration".

If that is the needed state of mind to bring forth innovation, innovation introduced as an "industrial imperative", even if there is further indication that "one of the privileged goals of innovation may precisely be environment control, if the progress of the material surroundings of human beings may arise from a quest for success of some "Contractors", the problem remains whole at the level of social relationship, of human surroundings. The inefficiency at that level justifies the doubt cast on the built of a "universal humanism" based on the "Environment pdicy".

(°) capital letter in the text

PART THREE

IS THERE A TRUE DESIRE TO SOLVE THIS PROBLEM ?

This question must be asked as well, for everybody may notice how much the current campaign exploits skilfully and carefully certain sides of the problem, while forgetting others.

The problem we have to discuss comprises two aspects : on the one hand there is pollutions resulting from production (water and air-pollution by factories disturbing noise levels for those who live or travel nearby) on the other hand there is the pollution and the nuisance caused by the use of manufactured goods. At the present time, emphasis is not equally laid on those two aspects, particularly when a question arising on the use of a product touches an important sector of industrial activity.

Our thesis is based upon our observation as to how the pollution and disturbance caused by the increasing use of cars in towns is analysed. This example has been chosen because it typifies at best the limits imposed for all aspects of their control by the type of industrial development in which we are involved.

Air pollution and noise

In France a government business group was entrusted in february 1971 with the study of the damage attributable to motor vehicles, and to develop concrete and motivated proposals aimed at reducing it.

Within a few months it established standards to be progressively enforced on cars, in respect of air pollution and noise. It underlined the technical limits of the abatement and the time frame for their implementation. In actual fact, allowing for expansion in the use of motor-cars, the measures taken in 1972 will allow in the worst cases that the present level of air pollution will not be exceeded in 1985. As for noise, a car accelerated to 50 kph, and starting from a stalled engine, is still comparatively noisy.

But the group insisted a great deal on the cost of anti-pollution devices :

> "... The economic aspects must be carefully examined. Price increases due to anti-pollution measures could have tangible side-effects on the automobile market, particularly as regards the market for small vehicles.
>
> ... Priorities must be determined carefully. Improvements in motor vehicles may, in fact, concern performances, safety, comfort, noise, pollution ...
> Each time a decision will lead to an increase in the price of motor-cars, say by frs 100 (f.f.), a yearly output of 2.000.000 vehicles will be involved and it will thus cost the consumers an added frs 200.000.000 and the advantages accruing to the public will be difficult to calculate with certainty ; furthermore there will always remain the doubt whether another more rational solution could not have been made".

We may, incidentally, note the trouble taken by the group to make rational choices in respect of the effects which anti-nuisance devices may have. But will manufacturers (all represented in the group), have the same concern when they will be deciding alone the increase in their cars' performances, and in advertising these in order to sell them ? Have they any concern for the consequences on the public ? What about the 14.705 dead and the 318.582 injured of 1969 or the 67 billion frs., per year cost of accidents, as shown from Reports by the National Road Safety Organizations ?

Do they take into account the consequences which greater use of motor vehicles have for the deterioration of city centers, an important matter to which we shall revert later ?

It is true that the price increase of cars acts on the whole market. The group calculated that a yearly increase of 3 % up to 1980, would result in the number of buyers being reduced by 11 %. Does this mean that manufacturers will cease improving performance ?

And what about this quotation of the report :

> "To apply the proposed measures would mean on the whole, increasing the price of the small vehicles more than the price of the large ones, with a consequent narrowing of the range of cars available. The cost increases would have less impact if the legislation were to allow small vehicles to be exempted from expensive anti-pollution devices (°). It should not be forgotten that in 1970, 37 % of the vehicles manufactured in France had a cylinder capacity inferior to 1000 cm3 and that such a market must not be tampered with too drastically, if severe economical after-effects are to be avoided".

These views are stated frankly, but in another part of the same report this flexibility in the rules was justified because future motorists "obliged to forgo buying a car and thereby feeling frustrated (°)."

The group concluded by recommending that legislation be progressivly introduced, that research and its functing be expanded and the share of Government financing required by such projects. Mention is also made of a new, less noisy and non-polluant vehicle in the offing.

At this point, the group considered itself qualified to submit proposals on town-planning and its ideas on sound-proofed habitats. It is however significant that it did not question the use of cars in cities, nor the possibilities of expanding public transport. This however is the real problem.

(°) We underlined.

The quality of life in our cities

It seems that citizens and especially workmen are made to believe that humanity is at grips with mysterious entities ... Didn't The President of the French Republic mention this problem himself :

> "Are not cities, centres and symbols of all civilizations destroying themselves, and engendering a new barbarism ?".

Looking at the matter objectively, the destruction of the city is the work of the ruling groups which control the economy and politics, who shape it and alter it to their own best interests. Such groups take no heed when pressed by committees tasked with the impossible task of reconciling the mounting problems of urbanization with the quality of social life, the development of green belts and the immoderate use of motor-cars.

From this point of view the non-polluant vehicle will not solve the problem. Parking space will always be necessary as will thoroughfares, as bottle-necks and traffic-jams and stalled buses will only increase. Undoubtedly air-pollution and noise will decrease, but the "rest" wont change. And this is the most important, not to say the essential point because the building of social dwellings, the preservation of green areas will be impossible because of the investments will be needed for the laying out traffic lanes ; this in turn will orient not only the industrial development, but will affect the standards of life and even civilization itself.

To conclude this subject, I would quote M. EISENMANN head of the Road Safety Interministerial Office when he declared, in opening a round-table on "Cars and City traffic" :

> "The fundamental problem lies and I will ask town-planners to state their point of view in the opposition existing between the city, concerved for bringing people together, meet and know each other and motor-cars who prevent this happening, use all the available space, create broad and noisy streets, as well as the loneliness of men in their car".

An other quotation is from a report, presented by Inspector M. LE GOURIEREC, to a meeting of civil servants from local administrations on the subject of protecting populations from the aggressions of modern life held in november 1969 and dealing with modern town-planning :

> "There is too great a tendency to subordinate town's blue-print to traffic requirements even though the latter is a cause of so many hardships for the population. When city renovation was undertaken, it levelled old quarters without giving due regard to architectural treasures or to certain buildings being a heritage of the past. Financial interests and real-estate speculation being at stake, aesthetic considerations or old stones didn't weigh much".

This is quite clear, but far quite different from the previous quotation according to which "the city destroys itself".

Consequences on the attribution of resources

Another study by the Administration of the Paris area having mentioned the increasing remoteness of new dwellings underlines the impossibility of mastering the expansion of motor-car traffic. Looking into the future, it gives examples of alternatives for the allocation of resources : 1 km of roundabout boulevard equals one hospital of 550 beds, or a kindergarten for 30.000 children, or nearly 800 four roomed dwellings. During the 5 years of the Fifth Plan (1965/1970) the government used up 96 % of its public transportation budget for the Paris area whilst this same area's local administration allocated 76 % of its budget to transportation and the City of Paris itself invested 53 % of its equipment budget also for transport. In spite of this huge effort using up national income to the prejudice of procinvial cities, traffic in Paris and its suburbs becomes worse and worse. This is true for all large cities.

If one adds that land earmarked for sports grounds and schools had to be used to build the periferic boulevard which turns out to be inadequate even before its completion, one may fathom the social consequences of the inordinate use of cars in cities.

From now on, measures must be taken ...

These considerations on the consequences of the use of motor-cars in large cities, and this recounting of obvious facts, will be countered by : "You are against progress, one can't thwart people's wishes". Nevertheless, it is more and more a question of forbidding all traffic in the city centres.

The issue is raised in the outline of the Town plan of Lyons. At the present tempo, the city centre needs three times as many car-parking space than is actually available.

Was not the same issue at stake, when the Brussel's firemen couldn't reach a large department-store on fire ? More recently in Paris the same problem occurred with less dramatic outcome.
Which large city dweller, faced by the mass of vehicles stalled in the streets at peak-hours, hasn't wondered anxiously what would happen in the case of disaster breaking out there and then ? How many lives would be lost for lack of help which cannot arrive in time because of traffic-jams ?
If such an event were to occur we are sure that public opinion would demand strict regulations, unacceptable today, being applied to car traffic. Is it really impossible to change the present situation now ? Everyone is aware of the cure : a considerable development of public transportation. Experiments are now being tried out :

> "Marseille tried, between the 7th and 27th of october, to "bring car traffic to heel" by combining a partial "no parking", especially in the heart of the city, with priority being given to public transportation and with the additional opening of 9 kilometers of lanes reserved for buses and taxis. More than a 1000 cars were impounded by city services because of irregular parking.
> Marseille today has more than 300.000 registered cars and 6.000.000 square meters of paved roads equal to 20M2 per car. The number of cars is multiplied by two every ten years. By 1980, it will reach

600.000, or one car per two inhabitants, as in the USA. If care is not taken, the city will smother to death. Those, most satisfied by the experience, were local people using public transportation. Buses travelled faster and more regularly ; they were coming through every five minutes on the North-South axis. Journeys were faster and cheaper for taxi-cabs customers. As for pedestrians, they felt at ease in cleared up streets. On the other hand, the heart of town tradesmen complained about slackening business. The city authorities consider that time must be given for customers to get accustomed to the new means of transportation put at their disposal".
(Le Monde, feb. 11, 1971).

... but are slowed down by pressures from the motor-car industry

However, the motor-car industry is an efficient pressure group. It holds a determining place in industrial development. It must provide 90.000 out of the 250.000 jobs foreseen, and earn 1/3 of the foreign currency income during the VIth Plan (1971-1975).
This industry is sufficiently dynamic not to need any specific incentives, so the report about the VIth Plan adds :

> "Generally speaking, a slowing down of demand on certain markets, due to threefold reasons, should not be overlooked :
>
> - a research for costly solutions to the emphasized problems of safety and pollution will weigh down heavily on production costs and an expansion of the market ;
>
> - the problems of city congestion take on such proportions, and their solution implies such vast infrastructure costs that the possibilities for market expansion of the highly developed countries are limited ;

- competition on foreign markets necessitates a diversification of models, with consequent increased production costs and reduced earnings.

"Public authorities will have to be constantly on the alertif, the automobile industry is to solve its problems in the years to come, and is to maintain its place in economic development.

Deeper thinking about the future of this industry in its relationship with transportation and town-planning policies should be undertaken in order to determine precisely what will be in the long term its share in the development of the economy".

This is probably the reason why more public gardens will be destroyed to make room for car-parks, and more thoroughfares will be laid out, such as the one running along the right bank of the Seine. The subsequent protests reached such a level that they will be taken into consideration before the left bank thoroughfare is laid out. As a result costs will be higher but cars will continue to circulate ... until when ?

The motor-car industry is the best example for illustrating the limitations of pollution and nuisance control. Industrialists and government officials admit the need for rules and regulations, but, on the one hand they must be very progressive and on the other hand they mustn't imperil industrial development as it exists today, whatever the consequences on daily life.
And yet, as we'll see in the next pages of this report : present regulations are not being applied and the existing guidelines for the location of business firms and the control of town-planning are willingly overlooked.

PART FOUR

IS ADDITIONAL REGULATION NEEDED ?

The case made for cars in the preceding chapter may be extended to other polluting industries or those whose products cause pollution : airports, food supplies, plastics, steam generating and atomic stations, etc...
One thing is alike in each case : pollution and its causes are known : in many cases research has discovered the means for control, regulation exists, ... but is not applied.

The same is true for the location of factories, that is to say town and country planning. Relocating a pollution prone industry means relating it to residential areas. There again, in FRANCE, documents exist but are not used, at least until recently. The following quotations will illustrate the point :
In a report established at the request of the Senior Environment Committee, Monsieur ROUVIER stressed the need for a single authority to be responsible for applying legislative and administrative regulations :

> "On the one hand, irresponsibility, as defined by civil and penal law, is common fare ; discussion on text drafts seems to be preferred rather than ordering the application of existing rules aimed at stopping the poisoning of water, air, animals or inhabitants ; these rules would bring about an efficient, economic and immediate control of pollution".

Another quotation, this one from a report by Monsieur ARMAND : "For an Environment Policy".

> "In theory several texts for repressing the degradation of the environment, for controlling real-estate development do exist and would enable public authorities as well as collectivities to discipline urban growth. But they are only partially applied and used, either because fines and penalties are too slight, or because several escape clauses granted for different reasons reduce their efficiency".

The reasons for this state of affairs are well known.
On the one hand, the lack of control procedures. In 1969, the Chief of Police of the Seine department stated : "To supervise some 30.000 classified establishments under our jurisdiction, I believe we dispose of 2 Chief Inspectors and 26 inspectors assisted by 23 supervisors".

On the other hand, the way in which law enforcement is organized. Let me go back to Mr. ROUVIER's report :

> "Not only are organizations, devoted in name at least to water and air pollution control, obliged to spread out, divided horizontally and vertically, paralyzed by anarchy, but more often - and now running the risk of being always - they are in the hands of pollution's natural allies. For only a country as intelligent as ours may be so bold as to allow itself the paradox of entrusting, as far as pollution is concerned, protection to the producers and prevention to the promoters. Is it possible that ministeries engaged in production find themselves as it is the case, entrusted with fighting off their own pollution ?". The FOS case is a good example.

There are not only economic, but also political reasons (see the case of the automobile industry). On this subject we quote this excerpt of a Prefect's speech at the afore mentioned meeting :

> "Furthermore, Prefects who come up against a certain kind of opposition should be backed "a priori" by the Central Administration. Here is what I mean : in the matter of pollution we have two types of industrialists, those who make amends and deplore the predicament imposed upon populations, and those who, by all sorts of means, try to avoid their responsibilities ; some of these manufacturers are sometimes extremely powerful. If a Prefect wants to fight, what he fights for must be considered as worthy at very high levels. Otherwise he is bypassed in the best of ways and he is finally asked why he intervened, especially in cases which to Paris, seem to lack all interest.
>
> I know of a dramatic case of pollution happening in a department I won't mention, so as not to embarass anyone. The general manager of the factory concerned is at the same time the President of the Chamber of Commerce, the Mayor of the city where the factory is located, is a Senator, President of the County Council, and this factory has, for more than 15 years, generated an appalling atmosphere "smog" for a radius of 50 kms. It pollutes the nearby streams which are no more than rivulets, when a flow comparable to the Rhine's would be needed to dilute the residues.

Furthermore, this factory in contempt of regulations, secretly increases its output.

> "Public powers are fighting, what might be called a delayed-action leading to nowhere because they are faced by too powerful a party, and also, it must be added, a kind of employment blackmail constantly prevails."

Is the process of change under way ? It would be most desirable, but recent examples prompt discretion. In respect of pollution, let us choose the example of FOS, and as for respecting town-planning guide-lines, we'll find out what happened to the overall planning proposals adopted in 1964.

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F O S

> "I should like to talk to you about a leading problem : it concerns environment policy. I consider the FOS area in a broad sense, reaching from Marseille to the Camargue, as a test for the french environment policy".

These words were spoken by Mr. Jérôme MONOB, government delegate for country-planning and local action, at an information meeting on october 8th 1971. A similar statement was made on 28 january before a meeting of foreign journalists :

> "I am convinced that the FOS area's planning, as far as environment is concerned will be a success... The greatest care has been taken in every field. The steel industry, it will be the cleanest of Europe. Non polluting central heating systems will be binding for all inhabitants. And as far as the power plant is concerned, the aim is to use only non-sulphuric fuel."

This statement requires analysis. Non polluting central heating systems are binding, whereas for the power houses, the aim is : to use sulphurless fuel. As for the steel industry, it will be the cleanest in Europe. The gradation is significant in itself. Lets have a closer look.

What is meant by clean steel- industry ? If this means an industry which doesn't throw up too much toxic by-products steel industry is certainly clean. On the other hand, it throws up large quantities of non toxic dust. Filtering equipment exists, and on 25 november 1971 the restricted Council, at the request of Mr POUJADE, took measures concerning "specific conditions,

such as the activation of the most modern anti-pollution methods of control and the pledge to introduce the newest devices which technology has developed in this field". These decisions are to be compulsory from industrial firms.

The financing the steel works at FOS, has met with unexpected difficulties, however having been promoted, it must forge ahead. It appears that these financial difficulties, have led the board of directors of SOLMER to cut-down expenses by postponing the introduction of anti-pollution devices.

Steel making also results in the production of large quantities of slag and dross: where will these be dumped ? In the countryside ? It also insolves the use of huge quantities of water which is subsequently wasted, polluted and heated. According to biologists, if water reaches 33° cent. all life disappears. What ground-rules have FOS engineers to work on ? What limits were they given ?

The steel works will, by 1974, use daily close to 5.000 tons of limestone quarried nearby. Transportation by water would be possible, providing the existing canals are brought up to modern standards. However reluctance to finance these works, is being shown by the Government, and a decision (as yet theoretical, since there isn't working) of using the existing road has been made. This means 200 trucks of 25 tons each, passing daily through Martigues with the noise and the dust which this entails added to the fact, that in Martigues, is the greatest road bottle-neck in the whole Department.

Let us consider the power-plant, the main responsible for air pollution. The estimate of specialists is that by 1975, 800 to 900 tons of sulphur will be thrown up into the air by the steam generating stations and this

amount is to be compared with the 700 tons which are at present beeing blown-up daily in the Paris area. One part only of the power-houses will be set up in 1975. Later on, dust and smoke from both the steel works and the power plant will mix the hydrocarbons generated by the oil refineries and the result could well be a Los Angeles type of "smog".

When the first surveys were made, the issue at stake was : the prevailing north-south "mistral" wind, which it was expected would blow everything off towards the open sea. Since, recent meteorological observations have stressed the importance of sea breezes, carried by easterly or westerly winds the pollutions could reach inhabited areas or natural parks like "La Crau" or "La Camargue".

The concern of the population is therefore understandable. A possible solution would be to build very high smoke-stacks, but this is impossible, because they would stand in the immediate zone of approach of the future airport.

All this enables one to understand more easily the government's decision on 25 november 1971 :

> "To fight atmospheric pollution, the quality of the air will have to be continuously controlled by a network of automatic devices. This network will allow instant detection of pollution outbursts due to bad weather conditions. Drastic measures of control will then be applied."

If we cast an objective look upon this state of affairs, whilst recognising the government's action aimed at reducting all kinds of damage due to local industrialization, we must temper the optimism of governmental statements. The will to fight pollution to the end, to see the enforcement of the "very strict conditions" imposed, in theory, upon the firms could be proven in two ways :

- On the one hand by making public the SCHNEEL report mentioned by Mr LAPORTE, local civil governor, when he was interviewed by the magazine "L'Express" (local edition, february 1972). It is relevant to link this report being put in the hands of the government and the decision to set up a network of automatic devices to detect and warn of incoming pollution. This will "enable to apply drastic measures of control" on polluting factories and even, in some cases bring them to a temporary halt. Large bodies of people aware of the risks could control the setting in motion of the foreseen measures.

- On the other hand by changing completely the supervising system. This is where we stand presently at FOS :
  - It is the naval department of the Civil Department of Bridges and High-ways of the"Bouhhes-du-Rhône", which must approve the treating of liquid cast offs in sea water. The Head of the naval department, is at the same time Director of the Autonomous Harbour, and promoter of the industrial zone ; his position is rather ticklish.

  - The mining department assumes the same responsabilities for the other cast-offs. In this department are found men with the same social and school background, than the engineers and the leaders of the steel industry. These men are government officials form the Ministry of Industry, Ministry responsible for the nation's industrial promotion.

  - The balance of numbers is greatly in favour of industrialists (3 capable engineers at the disposal of the Mines service, for the whole department). Moreover, these officials are submitted to heavy pressure by the manufacturers of anti pollution devices. From the new measures they recommand, will depend the negotiations and eventually the important contracts all the more important, because this industry being new on the market, monopolies are numerous.

- Once enacted, the measures must be made official. They will become so by a decree of the prefect. Now, the prefect enforces a government policy which gives the priority of priorities to industrialization. Moreover, unlike what takes place for large town-planning deals, there is no previous public enquiry. Measures decreed belong to administration affairs and are not made public. Recently, a township requested information about the measures decreed. Manufacturers cried shame : "the matter becomes political".

- The decree made public (and not the specifications which go with it) its application must be supervized. The supervisors are the same people who enacted the measures. Their number hasn't been increased and their inspection tours, very few, always assorted of a long previous notice. Most of the time, they amount to a meeting with the board of directors. To behave otherwise, would be considered as out of place.

By going deeper in the case of FOS, one learns alot more (social segregation, delay in fitting out schools, etc...) Essentially, it stresses the government's major concern : successful industrial expansion, at all costs, including the known overlooking of environment. The process is clear :

- on the one hand, the government helps to the hilt private business to peg out a new factory ;
- on the other hand, belatedly and under the pressure of public opinion, it takes measures to limit the pollution generated by the new factory.

The hierarchy in government concerns is obvious : first of all produce, in other words encourage capitalists to do their job, then far behind, palliate the most ranking drawbacks of that kind or production.

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PLANNING OUT OF THE PARIS AREA

The problems of pollution made of FOS an interesting case but it doesn't allow adequate appreciation of the consequences of factory location namely employment and housing. The plan for the Paris area has been analysed to this end.

Whether Paris should be allowed to grow at the expense of the rest of the country has been under discussion for many years, since 1930. After the war of 1939/45, the debate was carried on. After much discussion overall guide lines to be used for the planning-out of the Paris area.

In essence it aimed at avoiding that the population of the Paris area (presently 9.6 million inhabitants) were produced in 1965, should increase to 16 or 17 million by the year 2.000. A nation-wide policy was to be developed including the creation of 5 new cities located between 30 and 40 kms from Paris. These towns were to be located along two east-/west built-up areas following the valleys of the Seine and the Marne. To avoid the daily commuting from home to work, factories were to be installed. At the same time, to offset the lack of balance between employment opportunities and housing east of Paris, new employments were to be created in that area. Where do we stand 6 years later ?

The east/west development axis seems to be in jeopardy. One of the constraints already existed. The new airport of north/Paris (located at Roissy en France) will provide between 80.000 and 100.000 new jobs. A new town (SURVILLERS) will be built from scratchby private promoters. Presently, 30 to 50.000 dwellings are foreseen. It is located in the airport disturbance area, the very one where the overall plan foresaw no building at all. Thus all the problems and disturbance caused by airport noise are deliberately overlooked.

The experience acquired by the residents neighbouring the other parisian airport ORLY, is being wasted. It is true that medical care will be paid for by the community rather than the promoters. But today, it is common knowledge that the building of this town not included in the overall plan will hinder the development of the two nearest new towns, namely MARNE la VALLEE.

Another development, government inspired will make the situation worse. A motorway (A 10) towards the south-west was to be laid out between 1975 and 1980, when the expansion of the new cities would have become sufficiently dynamic not to be affected by it. The government by turning to private contractors for the financing the project, will speed up its realization. Among these contractors are real estate promoters, owners of broad expanses of land originally intented to remain as a part of a green belt. It is now common knowledge that real estate development will place along that motorway, for no one doubts that the promoters will succeed notwithstanding the provisions of the various regulations. Precedents exist in past years promoters were successful in securing derogatory rules in order to build in areas labelled "protected" in the overall plan.

Hence, it is possible to foresee a north/south axis of development occurring which will affect the overall plan and return to a ring pattern of development for the area south of Paris what everybody wanted to avoid. The built up area near the motorway A 10 will spread like an oil stain and will tend to become a link between the new city of St Quentin en Yvelines and Evry. The whole strategy of master plan is at stake. Moreover, as early as 1969, an anti-master-plan was already being mentioned.

Another unresolved so far, or at least delayed problem consists in promoting new employments east of Paris. The original decision aimed at increasing the office space availability in the "Defense" area so as to affract the head offices of the important companies located west of Paris. This initially implied creating 100.000 new jobs. However the need to maximise profits out of the "Defense" deal has stalled, for a while, the creation of new job opportunities east of Paris. The daily commuting of the east suburb's inhabitants has increased by 40% as most are compelled to work on the west side of Paris at "la Défense".

The future of the new city of CERGY/PONTOISE, is also compromised. Presently it runs the risk of becoming a dormitory-town. The government's decision of laying out a line of "Aero-train" between CERGY and "la Défense" throws light upon this situation.
These examples and the many others available, cast serious doubts as far as the trade unions are concerned on the usefulness and efficiency of the rules and regulations applied to location of new factories. The french experiment gives clear indication of the prevailing interests of real estate promoters, and the strategy of large firms. The governmental powers held by groups politically linked to the same interests and having the same notions on industrial development, cannot and do not stand in the way.

But bowing to public opinion's judgement and under its pressure, it cannot afford to let things get completely out of hand. The vested interests of capital is to prevent the blowing up of the system. But captives of their private interests, they are in contradiction with their own class interest and therefore need government regulations to keep the system in balance. Thus from time to time the government tries to promote town planning, but if the pressure from interests that back it becomes too heavy it will yield. Unless workers rebel against their conditions of life and take action.

These examples stress the system's weak points : Practice does not squate with statements of intention, and the political power attempts to shirk its responsabilities. Here is a relevant text :
The Minister of Environment, on june 4th 1971, answering questions of members of Parliament, confirmed the existence of important regulations to control town-planning and the conservation of nature but had to admit :

> "It is nonetheless true that it didn't prevent excessive town-planning, often anarchic and aesthetically open to criticism... It is mainly the extensive disregard of legislation which seems to be at the basis of the most grievous damage done to the countryside. Even in the case of areas listed in the government inventory, the arguments of the officials in charge - I shall give you in a moment an indication of the means at their disposal - and the advice of local planning commissions usually carries little weight when faced with the pressure of "urbanisation".

The very Government responsible for the derogations seems to be powerless "faced by pressures of urbanisation."
As if these derogations to the rules were not the government's own decisions :

- The planning of the "Défense" district is led by a public concern in which the government has the lion's share : the important increase of office-space in infringement of the planning scheme is accordingly, a government decision ;
- the decision to lay out an aero-train between "la Défense" and CERGY, was taken at a cabinet meeting ;
- the laying out of the PARIS/POITIERS motorway depended on the government as well.

Examples could be multiplied, as several thousands derogations to the rules occurred. That's the truth that lies behind the speeches. Then what's the use of added regulation, if it is meant to remain unapplied, for want of political will backed by a forces balance favourable to carrying on these controls ?

Useful proposals towards impreving human environment, must therefore tend towards bringing about the conditions needed for this balance of forces. The forces and the interests of those who stimulated this world campaign for the preservation of nature, must be aknowledged.
This is the purpose of the following part.

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PART FIVE

WHY THIS CAMPAIGN ?

To analyse the problems industry faces with pollution control, logically brings this question to one's mind: why this campaign? It is unusual for governments to take the initiative of imposing new charges upon business concerns. The whole history of the labour movement proves that hard struggles are needed for workers to be considered as human beings to have social legislation voted and that its application needs more struggles. And suddenly governments launch themselves in a world campaign to control pollution and the quality of preserve life. Why then this unusual behaviour?

Concerning the USA, it is easy to understand, for they were the first to rouse world opinion. This enables the current European campaign to be partly a preventive action, but the process and the reasons are the same.

The problem of pollution and nuisances is an old one:

- MUNFORD'S book written in 1934, and mentioned earlier in this report, refers already to previous writings on the subject.
- In France, it was B. de JOUVENEL who in 1957, published articles on environment, and on the integration of the costs of nuisances in economic budgets. Many more examples could be given. If until then, no one took notice of those warnings, if the costs were been integrated, it is not for want of knowledge, but was imposed by the economic system itself. Industrial development had itself to be hindered, for a new behaviour to emerge.

Thus in PITTSBURGH, in the conflict which started in 1939, may well be seen as a struggle by the population against the companies, but it was especially in 1945, when 40 industrial concerns decided to leave the town on account of the smoke, the fog and continuous danger resulting from floods and contaminated waters, that the measures adopted were enforced.

In France, the risk of water shortage, about 1965/67, brought out the pollution problem. This risk compromised the possibilities of industrial development as industry use close to 80 % of total consumption. The Torrey Canyon disaster, the "black tide", focused attention on sea pollution, but also on tourism which could go into decline if beaches too were polluted. A survey made by a consumers organization (1) pointed out the large proportion of beaches were swimmers health was gravely endangered. Presently, the same is true for numerous rivers and streams. To a lesser degree, we were therefore faced by a process similar to that in the USA.

But this state of affairs is not enough to explain the present campaign. Despite their consequences for humans, pollution and the destruction of the natural environment were long neglected. For them to become a concern of government and provoke a change of attitude among some sections of the governing classes, the calling into question of the type of development by young people issued from these same circles by scientists and members of universities was necessary. This finding added to that of the workers modefied the balance of forces and made a change of attitude necessary.

This evolution is very well described in an article in the employers magazine "The new Factory (L'Usine Nouvelle)" (monthly of october 1970) entitled "Pollutions": the American business concern wishing to win its case before public opinion, explains how polluting companies have understood, that whatever the quality of their product, their "brand image", important part of the pay-off, will come out besmirched! One switches from anxiety to optimism: "The anti-pollution equipment market is huge, and so to speak, still virgin".

The operation therefore aims not only at profit-making; it is also a political bargain and the same article explains it unambiguously bt setting in the context, President's NIXON speech of July 1970. Another employer's magazine "Enterprise", writes in its issue of June 26 1971:

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(1) Federal Consumers union "Que choisir" n° 42, April 1970

"To combat nuisances, has become of late a government business. This awakening to the consciousness of the political dimension of the problem came fast in all western countries. It is moreover, remarkable in scale, spontaneous and inclusive. Coming from the USA, it spread to all European countries, thanks to a far-flung international information campaign, to which accidental, but spectacular disasters, or unpopular industrial decisions gave an unprecedented echo.
The Nature Protection Year, organized in 1970 under the aegis of the Council of Europe, was used as a background for various public demonstrations, to sensitize public opinion and for steps taken more or less in a rush by the States to give the impression that they were doing "something".

Total expenditure by industries to combat air and water pollution is estimated at 500 to 600 million francs yearly. The cost will bear down very heavily on certain polluting industrial sectors such as iron and steel, cement factories, refineries, paper pulp factories, etc....). It will mean for them an added investment cost of 10 % .

Someone must pay. And to make sure there is always a profit, industry cannot be the payer, the bill would run up to high. Therefore the public will foot the bill, either as consumers or as taxpayers, if the State subsidizes.

Environment is now subject to a dual utilization: econimic exploitation because it provides new markets; ideologic, because it is indispensable to disguise true responsabilities and attempt to turn a social problem into an individual one: by bringing out in everyone a guilty feeling, induce them to pay the high cost of purified air and water and of less noise.

One of the goals of the campaign on the topic "Producers or simply consumers we are all polluters", is to pave the way not only towards payement of the bill but furthermore to be backed by a mystified

public opinion to keep the present dynamics on the go. On introducing the budget estimates of his Ministry, the French Minister of Environment followed that line:

> "Everyone pollutes, it is an obvious and determining fact from which I will draw two inferences. First, that to combat pollution is expensive, everyone's share must match their pollution".

But industries did not seem to understand! .... The calls to "environmental ethics" being obviously insufficient for them to run the risk of increasing their cost prices, more concrete instructions were given. At the start of the French campaign, in June 1970, the newspaper "Le Monde" recalling a recent statement of the Minister of Agriculture, according to which "the protection of nature must be paying", hinted that in the USA this was already the case. The article stressed how consumers were finally convinced that eliminating various kinds of pollution was a necessary service.

A few weeks later, "L'Expansion" devoted a study called: "Gold in waste", to the problem. It is enough to quote the commentary introducing the article in the summary.

> "Americans have begun to roll up their sleeves to devote all their energies at a task that will largely overtake landing on the moon. The large companies are already aware of the cost, but they have grasped as well that here might also be the fabulous source of new profits".

And the introduction to the article:

> " The American economy is on the way towards a new joint endeavour. This time it is neither the matter of winning a war, nor landing on the moon, but of achieving human purposes. Who would not agree? Clean air, clean water, clean cities, is everyone's concern".
>
> " The French Government in turn has set about it: On June 10 it drew up a programme and established a "High Committee" an initiative as yet symbolic. Serious business will start when investment and new markets are at stake. In the USA this is already the case. "Media" have created the obsession and the obsession has created business".

It would be too long to mention all that has been published on this theme in the economic and financial press.

But precise details emerged as the days went by. If the daily and weekly press keep on talking about threatening dangers hanging over humanity's future, the other papers point to a different side of the question: Foreseeable profits, the necessity to produce results fast in order not do abandon this market to foreign competitors.

In June 1971, talking to industrialists, the Minister of Environment, very firm about the necessity of doing one's utmost to stop polluting, enhanced another side of the current campaign:

> " It is quite clear that every environment policy must take account of the balance of forces and the economical relationship existing between nations. To blind ourselves to the fact that the great battle undertaken to protect environment is not only a battle of ideas, but a great economical and commercial struggle, would be incredibly naive".

That is what casts light upon the obstacles to international agreement on fighting pollution: the essential is to avoid losing the markets.

Knowing exactly how things stand,it is now possible to deal with the introduction of the trade-unions into this action for a better human environment.

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PART SIX

TRADE UNION'S PROPOSITIONS

Having presented a trade-union approach to the interface between the preservation of environment, industrial expansion and the location of factories, here are a few suggestions put forward in the light of our permanent preoccupation namely to provide a positive answer to each problem ; while at the same time assuring that the workers remain masters of their lot.

In the first place I must stress the importance given by trade-unionists to the human environment in all its' aspects which means refusing to limit the problem to the protection of nature alone. Nor is this a problem for the individual to be solved by teaching children at an early age to respect nature. Nor would it be sufficient to be a bit more careful while pursuing the same kind of industrial expansion or by "being at peace with Nature". No! the environment problem is not an ethical problem, it is a social and a political problem. What is at stake, is industrial expansion itself. This is what is being recognized by more and more people.

It is in addition the conclusion of a report presented by Mr BARRY COMMONER, Director of the biology center at the University of St LOUIS (Missouri), to the Stockholm conference on the protection, and conservation of Nature (1/4 july 1971). He is of the opinion that solutions to the environmental crisis will require a radical reorientation of production techniques, and a massive rebuilding of production facilities.

It is also the conclusion of a Financial Times editorialist who wrote on 6th april 1971 :

"The only possible way, is to redefine anew what our society expects of life. It is the utter confusion about our goals, which is responsible for so many of our fellow-citizens being all at sea and virtually in the throes of anarchy".

"We need a new goal. The old one - more industrial growth of the type known up to now - is already rejected by too many people. But what instead? More free time, more help to the under-developed countries, a better standard of life for our own poor ; frontal attack on the wretchedness of our cities, on the motorcar which, on a large scale, will have to be banned ; make atonements for the ravages incurred by our landscapes, all that is wishful thinking... If an authentic revolution was offered to us - a revolution raising the quality of life rather than the gross national income - the building-up of the new society would probably be costly. Meanwhile, if the masses were conscious of their being in seach of goals which they themselves have set, they would show an eagerness for work that not one of the doubtful fiscal incentives will ever get out of them."

This proves, that the solution is not what is heard too often : moving faster in the same direction and using the surplus thus freed to combat pollution. This conclusion is also that one of the CESL/OE.CMT meeting held in july 1971 in Luxembourg : we quote :

"6) It is true that the goals of production and consumption have enabled industrial societies to relatively overcome, destitution and hunger and that consumer goods produced by man are essential, to a certain extent, in securing its welfare.

" But consumption also serves artificial needs magnified by publicity and jeopardizing man's true satisfactions.

8) It only results in a continious pressure for reserving resources for the most profitable sectors, whereas basic human needs are not met ; particularly because of the lack of appropriate collective infrastructure.

7) Therefore it is the very pattern of industrial development which is at stake ; its sequels are increased by capitalist and neo-capitalist systems for which only the maximum profit for buisness, derived from the exploitation of men and nature, is of importance."

But here and now, different measures could reduce the baneful results of capitalist patterns of industrial development.

a) Include environment education very early in teaching, by emphasizing the extent and the importance it has for the development of everybody's personality. To limit this teaching to nature's protection, is to pursue the conditionning of children and students, it is misleads all those who didn't have the opportunity to get to the heart of the matter.
It must be proved that economic alternatives are not neutral, but are determined in the light of an ideology and result from a balance of forces.
Technical professions, should be taught and obliged to including anti-nuisance devices in the erection of new factories.
Teaching in professions closely connected with town-planning must entail practical work, such as studying toghether with city dwellers the newly erected buildings and the consequences which the surroundings created for them entail for their lives. For the workers in those

professions, a critical knowledge is essential for helping them to adopt later on working methods enabling them to create surroundings compatible with collective life, for teaching them not to think and build on behalf of others, and to allow their theoratical knowledge to be challenged by those who will later on live in surroundings which they had no part in building.

b) As regards pollution by factories, it is not enough to establish limits of tolerance : very strict regulations are essential. Once, during a debate with the French Economic and Social Council, the C.F.D.T. had requested that "permits for the location of industries for manufacturing new products, and generally speaking for start up new entreprises be granted only, if they were not to become a source of pollution and disturbances." This condition was rejected.

The Conference could adopt as its own this resolution, because it would enable the public powers to act. It would oblige companies to include anti-nuisance devices at the planning stage. Moreover, this would be far less costly than introducing the required modifications or external devices, once the factory is in working condition.
The same applies if a new product generates in much waste, the disposal of which should be foreseen before production is started.
A considerable increase of controls, and the modification of survey methods is also essential. Sources of pollution must be surveyed by representatives of the Community at all times, without advance notice, and without previous permission by the polluters, even if such cases were to infringe the rights of private property.

To this end, the conference should request that the feasability studies be published before the site of possibly polluting factories is determined. Thus, the populations concerned would be acquainted with the measures taken to avoid pollution, and would give a positive support to their representatives.

c) As regards paying the cost of the anti-nuisance measures, the answer must be clear. From the very beginning, the whole costs must be included in the cost of production and later determine whether a part of the added expense could not be borne by the national economy. The decision must depend upon the social usefulness of the product. In fact, if the product is a gadget, the consumer must bear the whole anti-nuisance cost, for there is no reason why the community should bear a part of the cost of an object which is not of vital necessity. On the other hand if it is a product necessary to normal life - this notion being relevant to the company's development and the apportionment of its income - then the company must share, in a proportion fixed in each case the expenses of the anti-nuisance measure.

d) The location of plants is a part of town-planning and urbanisation. These plans must therefore :

- locate factories and living quarters so, as to reduce daily commuting ;

- bear in mind the necessity of maintaining particularly in the city centres, a framework favorable to human relation and contacts between people, and to this end foresee a well organized public transportation system in order to reduce the use of private motorcars.

In France presently, these urbanization plans exist, but are not established democratically, and furthermore, local communities are too small to command the respect of industrial and financial powers. Conversely, the communities themselves, are too often in the hands of persons of standing who share the same interests and the same ideas, as those in positions of authority who at present use of the powers of the State.

Public opinion alone, can command to one and all respect for the plans. Regularly and correctly kept informed citizens could before any final decision of the authorities is made express a valid opinion because it would arise from permanent information and not from circumstantial evidence made available in respect of one specific case.
In the case of new cities, a representative body could replace citizens to give such advice.
The power of local municipal and regional authorities would, be strengthned by such measures, and this is essential, for only a survey carried out at a decentralized level and by the very persons concerned, can bring the present methods to an end. The mastering of the land, essential to a rational planning of space would likewise become rapidly possible ; such measures are essential for our cities as air pollution, noise and traffic jams are rendering life more and more difficult.
Measures are being taken to stop the deterioration of public transportation and to restrict the use of motorcars in the centre of some towns. However these measures are inadequate, and often, especially those related to the use of cars, penalize the less wealthy owners and are in fact segregation measures. Action must primarily be applied for the expansion of public

transportation, and for the reduction of fares having as ultimate objective : free transportation.

e) Finally in order to truly solve the problems besetting our society, workers and the citizens concerned must become aware of now those who are in power are manipulating them whether consciously or unconsciously by discussing only partial data with rationales stemming from their scale of values.

The mass media pay an essential part in mobilizing of public opinion, but those who were initially interested in arousing it, may decide to stop their action if they find it to be counter productive to their interest. They have the means to do so, but we must not allow this to happen for vested interest reasons. To stir up the people concerned by this matter, is therefore fundamental, essential, because, otherwise others will keep on thinking for them, and thus continue to dominate them. Eager to maintain their rule, but failing to integrate all the aspects of the problem, they will cater to their power and serve their idea of society with dramatic consequences.

Active citizens, acting on situations in order to alter them in function of objective requirements and organizing themselves to achieve a balance of forces needed to reach such goals are a pre-requisite of democracy.

In order to achieve a better environment, actions must be developed, such as those carried out for example :

- in the LYON area, to secure the location of a rifenery, not at the most lucrative spot for the plant, but in terms of where it will be the less harmful for the quality of life in the area ;

- in the St ETIENNE area on the occasion of the installation of a thermal plant to secure the application of measures already approved whilst the board of directors were refusing to improve the filtering equipment which had become inadequate ;

- in the PARIS area, where, since two years, actions are carried on towards better transportation, obliging the government to speed up the planned reorganisation.

Many other examples could be quoted, they are increasing in number especially those aiming at preventing the establishment of atomic power stations, but they do not fit the purpose of this report. The present experience of the Trade Unions confirms their long standing views : these struggles are essential, for without the persevering action of public opinion and of the workers, without pressure and without challenging the decisions of higher authorities, the rules and regulations dealing with most important questions will be neither proposed or approved, or if they are approved they wont be implemented.

Recent statements of a study group animated by Mr RALPH NADER, point out that in spite of an important mobilization of public opinion, the same situation prevails in the USA. What happens in Russia is of course not to be mentioned.

C O N C L U S I O N

Circumstances have not allowed a European approach of the subject of this report nor an analysis of the forces acting at that level. But with the present autonomy of Europe's political powers this would not be possible. Under present circumstances we can only make an analysis country by country.

Nevertheless, by analysing the true practices of the social forces of France undertaken for creating a better environment, and starting from a situation which can be more easily described, comparison with the practices of other countries must be made. It will facilitate a fruitful debate, an exchange of information and it will offer the possibility of activating international action by all those willing to really tackle the causes of the present situation.

Based on conscious actions by the populations concerned, such action will not curtail freedom of trade. On the contrary, it will favour its development, because the fight will be conducted, everywhere, against pollution and nuisances, the dilapidation of cities in order to realise a human environment which will enhance the development of everybody's personality.

Some will probably wonder about the ability for a liberal, economic and government system to submit to the proposals made in this report. It is a good question. Workers will struggle to better their life, their working conditions and to better their environment. They will judge the results of the struggle.
As for the ability of capitalistic government systems to set as their main objective the development of a society made for human beings : the future will tell !

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CONFERENCE ON INDUSTRY AND SOCIETY IN THE COMMUNITY

II - Industrial development, collective requirements and living conditions

Report No. 6:

Effects of measures for protection of the environment on industrial development and the siting of undertakings.

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Contents

I. THE PROBLEM STATED

The controversy that has suddenly flared up concerning the protection and amelioration of the environment, and to a growing extent environmental planning, has triggered off an escalation of opinions. Whereas according to one view the problem of the environment is almost denied relevance, there are not lacking voices which take it as the text for gloomy prophecies and for whom the protection of the environment becomes a fight against self-destruction by man of the very basis of his existence. Yet it is unscientific to go to either extreme, of disculpation or Cassandra-like utterances of woe, as well as unhelpful for finding a political solution. A scientific approach to the problem demands the sober rigour of theoretical analysis, and may not lapse into unverified or naive speculation.

In the environmental debate it is frequently postulated that liability for pollution and damage should precisely by virtue of a principle of compensation be laid at the door of the entrepreneur, not seldom with the political intention of making the capitalistic structure of production incur the greatest possible expense. But the problems involved in calculating environmental stresses only contribute to clarification if it is acknowledged that in a developed economy environmental pollution through production or consumption is the rule and not an exception. Therefore it is not primarily a matter of charging, but one of methods and measures that will serve to contain the pollution and eliminate, or indemnify, the damage it causes.

Economically speaking the consequences of environmental pollution can be grasped by way of the external effects it causes and the ensuing social costs. Analysis of the problem of the environment can, then, be

related to the concept and implications of social costs.

The external effects and ensuing social costs have, to be sure, been recognized as facts from the earliest beginnings of social accounting, but changes have no doubt occurred in the form and dimension of the phenomenon, and therefore also its relevance to the economy.(1)

For practical considerations on the question of protection of the environment the social costs can be narrowed down to all those costs, injuries or damage arising from external effects during the use made of natural resources of supply or natural productive forces of the environment as a medium for clearing away environmental pollution to third parties, households, undertakings or society as a whole.(2) There are various reasons why these social costs should have assumed decisive significance in recent times:(3) per capita utilisation of raw materials and energy, and per capita consumption have steadily risen under the influence of economic growth. The geographical concentration of industry and population places increased regional strains on the environment. The threshold values for the natural capacity of the environment to absorb deleterious substances have in some cases been exceeded. And technical progress, especially in the chemical industry, has led to new technologies and products on which it is in some cases difficult to retrench.

Earlier treatments of the problem of social costs were focused on microeconomics. Not until the growing importance of the social burden of the side effects of production and consumption became apparent was there a shift in the handling of the problem towards macroeconomic relations, so that production and consumption were viewed more clearly

not only in their aspect in which they impinged on particular sectors of the economy but also in their overall effects.

With this shift towards macroeconomics the problems posed by social costs underwent a transformation; while from the microeconomic viewpoint it was a matter of taking measures to achieve a static optimum allocation of resources, new dynamic aspects assumed greater prominence, calling for evaluation from fresh standpoints of overall economic growth possibilities. Economic growth must be viewed in the demands it places on the environment, and protection of the environment ranked with the classical aims of economic policy.

The growth prospects of the West European industrial nations will in future, as in the past, have to rely on industry above all as their main engine of expansion. The picture presented, e.g. in the United States, by the individual sectors of the economy in their contribution to growth of GNP, with industry taking a considerably smaller share owing to the level of income achieved, than in the EEC countries and remaining stationary in recent years, is unlikely to be reproduced here at any rate for the 1970s, and even undesirable in relation to particular growth targets. On the other hand, however, industry has to be blamed for a more substantial proportion of the environmental pollution observed, and one that is growing greater especially in respect of the relations between industry and traffic. A large part of the environmental stresses caused by transport therefore also results from the increase in traffic movements by private households as incomes rise. But industrial growth and the greater incidence of industrial traffic will also aggravate environmental problems in the future.

In debates about the conflict of aims between growth and environmental betterment, opinions have been heard giving expression to the urgent need, if we are to avoid a collision course between growing demands placed on the environment and Nature's shrinking capacity to absorb them, for altering our ideas, our moral standards and statutory requirements in relation to growth. As such efforts to protect the environment run the risk of leading to a general contestation of economic growth, these conclusions are obviously based on a wrong estimation of the substitution mechanisms of a market economy. For it would be inadmissible to lay responsibility for the environmental problem at the door of the market economy so long as the latter has not been called upon to resolve it. Unsatisfactory results are not in fact due to a market failure, but must be ascribed to a misdirected economic policy. To this extent the situation of the social costs problem lies in the creation of new conditions of production and consumption taking account of the environment as a production factor, and therefore cost factor, in the process of optimization of the market economy.

II. EXISTING AND POTENTIAL MEASURES FOR THE PROTECTION OF THE ENVIRONMENT WITH SPECIAL EFFECT ON INDUSTRY

As environmental problems grow in acuity as time goes on, the social costs will steadily climb. In the course of bigger and bigger industrial growth the environment's capability of reducing and eliminating the waste products and effluents caused by production and consumption is to a large extent exhausted in areas of industrial concentration. Beside the problem of supplying society with the goods it needs, we now face that of depletion.

If waste be regarded as the necessary consequence of any process of supply, it becomes clear that using Nature as the means of removing environmental pollution is to be seen to be an economically uncompensated factor input. Air, water and so on are thus resources not only in that they are utilized as an input in production, but also in that they serve as a medium for extracting pollution from the environment. Since such a use of natural resources is not a component part of the market process of valorization, no price is assigned to it either. So long as the environment could be regarded as a free good because the power of self-cleansing and ability of regeneration were available in adequate measure, there was no need for this to cause any falsification of the computational context of a market economy. But if under the impulsion of industrial growth the quality of the environment has become a scarce good, and therefore an economic variable, the consequence is distortions of the price structure and misdirected resources, so long as its use is not remunerated. Uses of the environment in production and consumption whose economic reflex effect is represented by the social costs occasioned are therefore to be integrated in the cost calculation of the private economy in the form of price indicators.

1. Setting the aims of environmental policy

The Federal Government defines environmental policy as "the whole set of measures necessary to ensure for mankind an environment such as he needs for his health and a decent way of existence, to protect earth, air and water and the vegetable and animal kingdoms against deleterious influences and eliminate damage and disadvantages from human ventures."(4)

According to this, the yardstick for environmental policy is above all social basic values such as health and a decent existence for the citizen. Even if any translation into concrete terms of environmental policy aims must safeguard the relation to basic values of society, the economic effects of environmental pollution on the productive sector may certainly not be disregarded. Hence the definition is not, economically, adequate. Instead the connection has to be established with the economic problems themselves.

If environmental protection is placed inside the magic polygon of economic target-setting, the conflict between economic growth and ecological quality becomes an urgent problem. Conflicts of aim with other economic targets, e.g. price stability or distribution standards, first present themselves in the further aspect of a burden on the costs of ecological measures or an accounting for the damage caused by pollution. The economic aim takes the form of a demand for appropriate growth, with as a corollary adequate quality of the environment, or its improvement and safeguarding, with as a corollary a certain rate of growth. In this

connection distortions of competition due to the specific social costs to the environment have to be eradicated or inhibited in order to raise the efficiency of the economic process. Such a policy of competition assumes the character of an instrument towards achieving the growth target.

2. Principles and strategies of measures for protection of the environment

The determination of growth targets, in conjunction with the corollary of relief of the environment, lends fresh content to the concept of technical progress. In traditional growth theory technical progress has been dragged in as a rag-bag quantity for explaining away all kinds of increases in efficiency, so that its sole standard of reference is growth of GNP. In calculating GNP, however, no account is taken of the social costs. But these are in many cases, once more, the consequence of the new products and processes designated as technical progress under traditional theory. To this extent GNP is a falsifying standard of reference for the concept of progress. The furtherance of technical progress under a policy of growth accompanied by ecological aims must be established on a basis of a cost/earnings calculation for which GNP constitutes no standard of reference.

To satisfy the requirement of achieving a given growth of GNP target, subject to a reduction in environmental deterioration, there have to be explicitly formulated minimum standards or limits of tolerance separated according to the different causes of pollution. Such limits on the tolerability and admissibility of pollution on the basis of the existing

relationships and status of an objectively assured technical know-how determine the tangible shape assumed by the subordinate condition of the growth target. The ecological performance capability of an area is made up of a great many individual threshold values of pollution, actual or potential, and the sum of all these values represents the standard to be applied in the case of this area. If we draw up a schedule in this way, whose threshold values reflect the relevant ecological data for the area, we identify the points for applying economic decisions and associated actions. For the decision-makers will be enabled to recognize local differences and answer the question of which areas are capable of supporting heavier loads or are overloaded as the case may be, and in what manner and to what extent. The degree of pollution reached so far can be taken into account, as it is indeed expressed in the determination of threshold values. The latter actually is a matter of political decisions "that often have to be justified according to target priorities at the time."(5) Hence it cannot simply be undertaken by reference to standards of an economy and technique independent of the State and not bound to take account of social requirements.(6)

Since the specific admissible pollution of the areas is disregarded in decisions concerning the siting of enterprises, the existing geographical distribution only imperfectly represents an optimum. The environmental policy measures which serve to correct the distortion of such misorientations do increase economic efficiency but must by the same token serve the principle of equal competitiveness at national and

Community levels. Accordingly there must be a harmonization of measures. A regionally differential administrative practice would precisely provoke the very distortions of allocation which it set out to remove. The particular nature of the problems is revealed above all on the international plane. In order to make use of the specific allocation benefits of hitherto lightly industrialised, and therefore less adversely affected, districts inside the Community, uniform rules throughout the Community are indispensible. They concern, first, the principles of environmental policy decision-making, and second, the application of the measures taken under them, i.e. the common definition of clauses of derogation and the timely agreement of transition periods. Particular problems arise out of the possibility of exporting environmental pollution, should air currents carry gaseous effluents into other States' territories or polluted watercourses traverse several countries. What is needed here is agreement among the national authorities on the setting up of Community-wide organizations or supranational authorities.

The modes of application of all existing and potential measures can be classified according to strategies which also have temporal and spatial aspects. Strategies tailored time-wise are on the one hand directed towards such activities as come into play for the first time and so are brought to bear where new establishments, transfers and extensions of works, industrial conversions and changes, new production processes and new products occur. As the existing constellations of pollutant phenomena cannot be radically transformed from one day to the next for

the purpose of protecting the environment, it is on the other hand necessary to strive towards a progressive improvement of the status quo.

In addition, certain kinds of pollution attributable to the siting of works or certain social costs depend upon the degree of agglomeration, so that the advantages of concentration increase at the same time as the social costs rise, but beyond a given point the growth rate of the latter outweighs the advantages of size and proximity, which are reversed and become disadvantages of scale. The task of a spatially-dimensioned strategy in these cases lies in blocking trends towards concentration and improving the quality of siting factors in such districts as show themselves liable to produce pollution in relation to their ecological capability, in other words promoting de-concentration. Using temporally and spatially determined strategies, a sectoral influence is also exerted to the extent that they promote changes in the structure of production of the processing industries in order to bring about structural dislocations in respect of depletion of the environment.

For the charging of social costs the Federal Government has formulated the fundamental notion of the originator principle.(7) Besides the favourable effect this has on the allocation of resources, it affords the advantage of satisfying the criterion of equity. But if ecological protection measures are to be expected not only to remove pollution but also to have compensatory effects by way of neutralising negative aspects of growth, it becomes plain that the principle of the originator, while providing a legal basis, cannot be taken as a general guiding principle for the charging of costs or provision against environmental damage. Whether the preference should in a given environmental situation be given to economic levers or direct controls of conduct, is a matter to be decided after evaluation from such

standpoints as reasonable proportions, acceptability to the parties affected and the overall economy and efficiency in the sense of the aims of protection of the environment.(8) It cannot fundamentally be a matter of lowering the output of the originator of the social costs while using the same technology or objecting to his siting decisions on the ground of alternatives that are not forthcoming. To this extent the criteria for selecting measures strongly argue in favour of a mixed system of direct controls and economic levers.

3. Contributions to the discussion of existing and conceivable measures of environmental protection

The existing and potential measures for protection of the environment span a wide range from the establishment of legal and organisational standards for the formulation of long term framework conditions for the economy, to a system of inducements and benefits for industrial activities.

The possibilities of legislation for overcoming ecological problems cannot be separated from the political possibilities, "for environmental legislation is indeed not part of the classic corpus of law but political action in legislative form, i.e. an instrument of environmental policy."(9)

The existing legislation for protection of the environment in the Federal Republic of today is essentially contained in commercial legislation and bye-laws. It knows the nature of the party committing the nuisance and the injured party, and accordingly always postulates an incident causing damage or nuisance that has already occurred or the materially present danger of damage or injury.(10) But it will have to

be the purpose of any future legislation for protection of the environment to apply the statutory requirements in positive steps to alter the state of the environment and preventive control of damaging factors while political decisions of principle are being bindingly laid down, environmental stresses impartially distributed and rational decision-making ensured.

In doing this, environmental legislation cannot be wholly indicative in character, in the form of enabling acts with local control reservations and general guidelines, precisely insofar as it prescribes the attainment of a given standard by a stated deadline.(11) For the sake of efficiency, it must also be mandatory in character, because in the longer term the behaviour injurious to the environment cannot be answered by local action taken by the State only once given limits have been exceeded, but must be combatted from the outset.(12)

Further, it is conceivable that enabling acts for the whole geographical scope of environmental legislation will be passed and constitute an overall legal concept. In particular areas of application the acts will, however, have to be supplemented by statutory regulations referring to the geographical, geological, hydrological and economic particularities of the corresponding districts, i.e. their special schedule of threshold values.

An effective environmental policy cannot dispense with the aid of science and technology. The problems awaiting attention demand a thorough and progressive use of technological advances both as a growth factor and a means of achieving the aims of ecological policy. By promoting training

schemes, and especially R & D, it is possible to increase technical know-how but this can only provide the basis for technical progress. Only if new technical know-how can be embodied in new processes and products is it possible to talk about technological advance, so that State backing for R & D must be complemented by measures to promote innovation. If on the one hand technical progress occurs in the form of autonomous technical developments, and on the other is induced by the pull of demand exerted by Society in calling for quite specific solutions to problems within a given time, the primary need is to concentrate on the latter phenomenon.

Three groups of action can be distinguished which successfully promote technical progress beneficial to the environment: raising the innovation potential (inventions), increasing incentives to innovation and removing or diminishing impediments to innovation.(13)

Training and information science, and promoting R & D all help to raise the innovation potential, and therefore new inventions. The State is able to encourage R & D expenditure by special depreciation rates and investment grants. State action to create or improve incentives for innovations which relieve or benefit the environment is most effective where it affords a prospect of material success. It therefore includes guaranteeing property rights in the inventions concerned, tax reliefs for revenue arising from the inventions and tax deductions for

applications of them. In future initial aids will also be given for new establishments of enterprises that carry through innovations. The foundation of a special ad hoc enterprise is a prerequisite for economic success in cases where an innovation is not incorporated in the strategy of the enterprise which gave it birth. Moreover the possibilities for capital participation by small and medium sized firms can be more intensively exploited, smaller concerns can be given a greater share of research contracts awarded by the State and losses and development costs spread over several years for tax purposes. If statutory provision is made for certain innovative requirements, higher depreciation rates could be allowed for the corresponding activities. In addition the State as client for technical hardware is above all able to postulate innovative requirements and given incentives in the case of measuring instrumentation and processes for ascertaining environmental stresses.

Since no private demand assesses the results of innovation projects beneficial to the environment it is advisable that the State should participate in the manufacturer's development costs or offer financial inducements to the user, in order to remove obstacles to innovation. Likewise funds could be made available for promoting new inventions in the form of, say, conditionally repayable subsidies to firms willing to produce or apply for the first time a process or product deemed to be of importance to the national economy, but unable or very reluctant to do so owing to the high risk involved.(14)

Since processes and appliances are already available now capable of reducing or confining environmental damage, thought must be also given to encouraging their application. This can be done by the incentives, special depreciation allowances, valuation concessions and open subsidies for investments serving environmental protection, as well as by harmonizing, augmenting and extending existing tax incentives and discarding the system of government orders as prerequisite for guaranteeing tax benefits for particular industrial transfers or modifications.

In this connection it is reasonable to lay down beforehand the time limit up to which such aids will remain available. Otherwise, while they would of course contribute to relieve environmental stresses they would continue to exist in the form of extraordinary charges on the State budget.

The fact that there is a prospect of material results from the utilization of technological advances as effective incentives to innovation implies not only expectations of market success but also cost savings. The State can make use of this recognition by applying financial penalties to activities damaging to the environment and so ensuring that firms are in like manner persuaded to introduce innovations or changes which economise costs and are above all ecologically beneficient, as is already done for reducing labour or materials costs. The levies can be related to production, input, pollution or damage caused. Penalizing products whose production or use is damaging to the environment could have a disincentive effect on ecologically harmful innovation.

So long as it is cheaper to reduce environmental stresses by applying precautionary devices and limiting production, these levies would impede the installation of such equipment but in some circumstances curtail production.(15) Assuming that holding back production is in many cases undesirable, conflicts with the aims of distribution policy will arise if the parties affected are able to dodge the penalization by passing the costs on to the user. Similar problems arise from the levying of charges on production factors whose incidence, in the technical status of production reached, causes environmental stresses.

The imposition of penalties on pollution or damage caused by it stands in more direct relation to the causes of the financial penalization and therefore affords more tangible inducements to changes designed to relieve the stresses. It would be necessary to introduce a charge that would take account not only of the desired allocation effects but especially the principle of tax equality. As social costs of environmental stresses are as a rule the result of multiple economic causal relationships, the principle of equality involves among other things a uniform charging and distribution of the total additional cost to the individual originators at all phases of damage caused. Environmental damage is usually first detectable in the form of pollution effects on the ultimate originator, i.e. the last link in the economic chain of causation: thus for example pollution from car exhausts constitutes the direct result of use of a product at the consumer stage although the cause of the pollution can be traced right back to the production stage of the plant manufacture and fuel preparation. It must be the legislator's task in such cases to prevent a one-sided charge on the ultimate originator.

By analogy with the existing value added tax, application of the originator principle would at first suggest the concept of a multiple "damage added tax" directed towards a proportional imputation and charging of the identifiable costs of environmental stresses to the individual originator at all phases. But such a concept must be ruled out as unworkable owing to the insolubility of the imputation problem and in some cases lack of certainty of the fundamental relations of the damage. Instead we have as an alternative a general pollution levy enabling by a wider interpretation of the notion of pollution a multi-phased taxation of production of the pollutant. In this case the choice of phase for taxation could follow the principle of ensuring at minimum cost the internalisation of particular environmental stresses within a period of time. In such cases, e.g. where pollution can be identified by means of combustion products as fuel-specific, a fuel tax according to the proportion of the pollutant accounted for in this way seems possibly more appropriate than a direct tax on pollution emission in the ultimate user stage. This applies for example to sulphur dioxide emissions which exhibit an unambiguous causal relation to the sulphur content of the fuel. Insofar as the process of fuel desulphurization represents the cheapest alternative way of obviating the nuisance, as compared with desulphurization of car exhausts, taxation of unwanted fuel properties would produce positive allocation effects by offering greater inducements for desulphurizing the fuel. Analogously in connection with motor fuel emissions, instead of the administrative regulations of the so-called "Lead Act" in Federal Germany, a solution more consonant with market requirements would have been taxing the lead content of carburettor fuels.

However, in laying down principles of tax assessment, care should generally be taken to exclude so far as possible undesired substitution effects in the pollutant production; this danger of negative side-effects can be averted however by particular administrative and taxation policy measures. Significant interdependencies of emission can precisely be dealt with in the framework of the comprehensive application of general taxation of pollutants by means of systematic equal treatment of substitute individual components. In this context individual indicators could in some cases be lumped together in aggregate tax assessment quantities for simplicity of collection. Thus for example effluent discharge into waterways can largely be expressed in terms of generalised "inhabitant equivalent values"(16) as already done in the current Netherlands effluent fee regulations.(17)

Like the pollution of waterways, the advantages of successive net emission charges also become clear from the standpoint of spatial equivalence: a system of effluent levies oriented on supplementary drain outlets of local originators excludes both local distortions of competition and any further application of the "roulette system" followed hitherto among individual adjacent authorities.(18) Another advantage for tax collecting remains the prior charging of emissions by local authorities that would be regarded so to say as a local "preliminary tax deduction" within the framework of a gross tax solution and excluded in advance from the basic assessment.

Altogether this kind of emission charge seems, from the standpoint of offering incentives for cost economies through technical progress or industrial charge, most suited to the purpose.

Finally in cases where protection of the environment is an overriding consideration because of the danger of irreversible damage, prohibitions will also be necessary.

In addition, thought should be given to laying down pollution quotas in the form of statutory limits on emission by particular plants. True, these direct interventions ignore that it may be quite appropriate to admit differential rates of charge in different areas, and so run counter to the principles of formulating threshold values. On the other hand they do not take account of the fact that the pollution rises with further expansion of production and a growing number of new additional sources of pollution, even if the required regulationary quota is not exceeded by each.

Long term viable scope for relief and protection of the environment should be afforded by corresponding motivation of economic factors by means of appeals and collective strategies of persuasion for giving up consumption by individuals and creating socially responsible industries. The State will also aim at creating and deepening environment-consciousness, by informing public opinion in detail as to the dangers that exist and are to be expected, demonstrating the causes and consequences of the dangers as an interrelated whole and indicating possible counter-measures.(19) Similarly, however, it must be endeavoured to steer this environment-conscious opinion, once aroused, away from any largely emotive area.

The preceding catalogue of conceivable and existing measures for protection of the environment for achieving or maintaining certain

threshold values is essentially a component part of the timely strategy for influencing future developments and altering existing conditions. The expectation that industrial growth will not even in future rule out the formation of extreme types of spatial development in the form of centres of agglomeration and therefore pollution, or potential areas of pollution, renders it necessary to take action under the geographical strategy. In some cases the instruments available to the temporal strategy can be used if, by tax incentives, subsidies and concessions for moving plants and establishing new ones with a view to relieving environmental stresses, and favourable capital market conditions, guarantees, etc., they promote deconcentration under industrial location policy and sectoral structure policy. The measures of spatially-effective protection of the environment only however promise results (excluding of course bans and other dirigiste controls) if the factors relevant to the entrepreneur's choice of site are lastingly modified and the scope open to the enterprise looking for a site is extended. To this extent measures of infrastructure policy play an important role within the environment policy. Aside from the wide-ranging problems of infrastructure policy in general, which are also of relevance here but go beyond the limits of this argument, the location of environmentally damaging industries needs to stimulate a climate favourable to industry that ensures the mental readiness of population and local authorities of all kinds to accept industrial installations even in cases in which an existing environment-conscious opinion is against accepting ecologically-threatening industries and raises the risk of infrastructural capacity lying fallow. Private industrial enterprise can only then undertake priming in the form of infrastructure investment, and exploit the possibilities created by the corresponding capital outlay.

III. ENVIRONMENTAL STRESSES AS A CONSEQUENCE OF INDUSTRIAL DEVELOPMENT

1. Overall economic and industrial growth

Any attempt to evaluate the effects of environmental protection measures on industrial development demands first a knowledge of that development that would ensue regardless of environment policy; for the future environmental stresses depend upon overall economic growth and the structural changes it involves. These are the changes made necessary by the growth process in production processes and industrial production programmes which decisively determine future environmental stresses.

The OECD in its projections for the 1970s set as a growth target an annual average growth rate of GNP for the OECD as a whole of 5.3%, and for the EEC of 5.2%. This projection sets a GNP growth rate for the Federal Republic of 4.6%. If Germany is not to jeopardize the OECD target rate, it will have to set itself an annual average rate of 4.6%.

To achieve this target, the manufacturing industries have special importance. There are two reasons why: the universally high share of GNP these industries account for (1968: 41.2%), and the high share of gross capital investment (1968: 21.7%).

A global analysis is not enough for estimating future environmental stresses, but rather specific sectoral developments have to be related to it and briefly shown in sequence. The production possibilities of West Germany and European metal manufacturers in respect of the slowly increasing demand in the industrial countries depend mainly on their export potential. As more and more developing countries switch to building up their own heavy industry, it may be expected that in future, in the case of simple qualities, our share of world markets will decline and constant shares of the market only be attainable in special products.(21)

High growth rates in transport in goods and passengers allow at least stationary shares of world markets to be expected in the vehicle manufacturing sector.

The marked tendency towards product diversification for electrical appliances in private demand points, in conjunction with the high long term demand for electrical engineering capital goods, to an unaltered high growth rate in the electricity sector.

Development in the machinery sector will in future depend on three factors. First, some groups are encountering declining or stationary demand, e.g. mining and agricultural machinery. Second, plant efficiency is currently increasing faster than the value of production, so that demand per unit output is declining at the user end. Third, growth losses in competition with electrical engineering are to be expected owing to substitution of electronically controlled for mechanically controlled equipment.(22)

Growth in the food and feedstuffs sectors will in future tend to decline owing to the comparatively low income elasticity.(23)

If it is not possible in the relatively labour-intensive textiles, clothing and leather sector to achieve marked gains in productivity by higher capitalisation, the wage increases accompanying a growing per capita income will probably cause a marked deterioration in conditions for the siting of industry in the Federal German Republic.(24)

In the case of the chemical, mineral oil processing and high grade coal derivatives industry with its broad range of individual products, demand in the present phase of development of the industrial economy is higher than average. Correspondingly, investment and planned expansion of capacity in this sector are growing faster than in all other industrial groups on average.(25)

In the remaining manufacturing industries divergent tendencies in the past among individual groups have largely been cancelled out; it is therefore to be anticipated that in future too their development will keep step with that of the national product.

Besides structural changes due to growth, the effects of technical progress, i.e. new production processes and programmes, are important. In this case too past trends allow forecasts of changes in production capacity and products. In the sales leader sectors of the manufacturing industries the production programme alters particularly quickly due to

the introduction of new or modified products.[26] In contrast the sagging sectors of sales growth have hardly had a chance to market new products. It follows for future trends that above all new chemical and plastic products, electrical and electronic equipment, short and long distance means of transport and the corresponding production capacities, affect the production programme of the industrial sectors.

The trend in the manufacturing industry characterised by structural changes and process and product innovation will also in future be directed towards the use of natural sources of aid and probably lead to further endangering of, or adverse effect upon, health, menaces against water supplies, loss of amenity areas and wasting of economic and cultural assets.

2. Stresses due to expansion of production and structural changes

The starting point for prognostics is the expectation that expansion of the volume of production alone brings with it additional stresses and excessive demands upon the environment taking account of structural changes in industry.

Industrial capital expenditure whose real share in gross plant investment by the manufacturing industry is, to be sure, declining in many areas, but without which the rationalisation of production aimed at by equipment investment is often not possible, betrays its influence on the environment by ever growing demands on areas formerly devoted to agriculture or forestry. For the FRG territory only approximate

values can be given of land use up to 1980: reduction of arable land 650,000 to 700,000 hectares, increase in land needed for housing requirements 290,000 hectares, for highways 120,000 hectares, for freight airfields and landing grounds 11,000 hectares and increase in forested areas 120,000 hectares.(27)

Comparison of the shrinking area of farmland and the rising demands, does - it is true - disregard an area of 109,000 to 159,000 hectares that still remain available for future environmental purposes whereas for example forest land is increasing at more than the estimated rate and nature conservancy parkland and general recreation areas are being laid out. In addition there also remains possible for the 1970s the targeted conversion of uncultivated moorland, fallow land and sterile land for ecological compensation purposes.

Expansion of production by volume also means an increase in industrial fall-out. The most important substances involved are those incapable of treatment for further use or regeneration, and whose elimination may be problematic, e.g. rejected batches from the chemical industry, pasty waste from dyers and paint factories, sludge from neutralisation plants, radioactive waste, etc.

Most problems of waste disposal can, however, be reduced to the drastically worsening pollution of the environment by gas and water effluents if the atmosphere and waterways are used as transport media for removing pollutants, or the air and ground water are burdened with combustible products and the dumping of fall-out products. The greater proportion of air pollution is attributable to the increased conversion

of energy, as fossil fuels need oxygen to release the chemically-bonded energy they contain. Moreover, higher production of goods from the various raw materials and the necessary transport activity by carriers with combustion engines cause increasing emissions of air-polluting substances, primarily in particulate and gaseous form. Watercourses are chiefly affected by industrial effluents including coolant water chemicals and mineral oils. In 1969, 8.4 M. m^3 of household waste water and 35.6 M.m^3 of industrial effluent, including 18.6 M.m^3 of coolant water were produced daily in FRG.(28)

Greater production implies first of all an expansion of these burdens on the environment from the manufacturing industry, especially the growth sector of chemicals, mineral oil and plastics processing, in step with industrial output, i.e. with a proportional relation of production and pollution.

3. The role of technical progress

This disregards however the influence which the achievement of technological advances may have on the increase in volume and pattern of environmental stresses.

The past provides examples of technical progress, intentional or unintentional, bringing with it environmental bonuses. Thus the adoption of the oxygen process in the steel industry both for increasing production capacity and replacing conventional processes not only brought

economic advantages in the form of cost economies and shorter batch sequence times, but also substantially reduced ecological stresses because much less gas and dust are emitted in this process than with older methods. The LD converter for instance gives off only 200 g of dust per ton of steel whereas basic Bessemer converters produce 7 kg of fine dust per ton of steel.(29)

As a hypothesis, let us take the following: raw steel production in FRG rose from 18.6 M tons in 1952 to 45.3 M. tons in 1969.(30) If only Bessemer plants had been used this would have meant an increase in dust from 130,200 tons in 1952 to 317,100 tons in 1969. In contrast if in 1969 the whole output had been produced by the oxygen process dust emission would have been only 4,160 tons. Of course the actual dust emission is higher than this favourable figure. Nevertheless, the proportion of oxygen steel in total output from its introduction to 1969 rose to 46% against only 15% of Bessemer steel, 29.8% open hearth steel and 9.1% electric furnace steel.(31) From 1970 on Bessemer steel will no longer be made at all in the Ruhr and in the whole FRG there have been since 1970 only four Bessemer mills still in production, and the drastic withdrawal of Bessemer working in the Ruhr is probably attributable to the clean air act in force in Nord-Rhein-Westphalia, with its provision for dust-removal plant in Bessemer steelworks.(32) The achievement of technological advances also shows regional differences whose advantages in relation to the degree of pollution first become apparent where timely action has been taken to combat existing pollution.

In addition a whole series of processes have been perfected for relieving nuisance, with a slight lag behind the technical innovation that caused it, or in some way dependent upon it e.g. plants for decomposing toxic substances or precipitation processes for removing radionuclides from radio-chemical laboratory waste. Possibly, however, technical progress by way of improvements in the component elements of production processes hold out the expectation that in efforts to smooth out snags in the organisation of the process used, account will be taken of aspects of de-pollution of the environment. True, this expectation remains but a hope, that might be nullified by opposing tendencies especially if the technical innovations do avoid one kind of pollution but produce new or different kinds, and so only are able to effect regroupings.

These considerations should in the final analysis result in calling into question the ratio between expansion of production and environmental stresses.

4. The influence of agglomeration and deglomeration tendencies on environmental stresses

Besides growth-conditioned expansion of production, the siting decisions of industry show effects on the environment on the one hand, in the form of additional stresses due to agglomerations and on the other, reduced stresses due to deglomerations. The constellation of factors determining location of industries has in the past led to local

concentrations, with the result that industrial growth tended to build up in high density areas. The view that enlarging the market potential promotes cost lowering, and the available infrastructure creates economies for enterprises because of better use of space, has favoured such concentration tendencies by effects of concomitance and imitation. In the recent past the constellation of siting factors has in some cases evolved, so that formerly important factors have been emptied of their content or new ones have gained importance and reversed the trend towards concentration. The large demand for space in automated production creates shifts of location into country districts, and the dwindling importance of dependency on materials owing to specialised preparation processes and substitutes for conventional materials has removed the former need for materials stores in close proximity. The lowering of costs of carriers and improvement of transport arrangements bring about a lesser incidence of transport costs. In addition, many firms have reached orders of size which give them national and international scale in their areas of supply for both sales and procurement, so that the original reasons for determining their location have become unimportant insofar as they concerned the available sales and procurement potentials.

To what extent new establishments and shutdowns, expansion, contraction or stagnation of quantitative and qualitative procurement and sales relationships and the resort to new production processes as a result of technical progress hold out a prospect of greater or lesser environmental stresses created by agglomeration and deglomeration trends can be shown, albeit not entirely exhaustively, by the example of the iron and steel industry.(33) As coal is used in the form of coke for blast furnaces and is therefore a material that loses the whole of its weight, the rule is for ore to be brought to where the coke is. But nowadays the ore used in the furnace charge greatly exceeds the coke,

so that owing to the smaller transport costs the steelmills must precisely be sited near the ore stocks. True, the higher ore supply costs are now to a large extent offset by other cost-saving factors such as the energetic connexion between mines, coke works, blast furnace, steelworks and rolling mills and the improved transport means and routes. In practice a change of location is only possible by a new establishment, since shifting furnaces and steel mills is hardly on, owing to the high capital cost. The most important location of the iron and steel industry in FRG became the Ruhr with its extensive coalmining resources, good transport position on efficient waterways and highly developed processing industry within the same area. In recent years coastal locations have assumed importance by a better transport cost situation, since raw materials, especially ore, are imported in ever-growing quantities from overseas countries. The presence of raw materials resources on the spot is no longer the only consideration, so that it may be expected in future that new industries will be sited more and more frequently in coastal areas, and the increased environmental pollution no longer exclusively concentrated in traditional locations.

Another example is that of the chemical industry.(34) This too, especially in the case of firms producing chemical dyestuffs, tended in the past to gravitate towards the stocks of raw material. Coal is the basic material for calcium carbide, the initial substance for the manufacture of certain plastics and fertilizers. In addition, the tar produced during gasification of coal serves to manufacture dyes, pharmaceuticals and plastics. Rock salt is the basic material for making soda and preparing caustic soda, chlorine and sodium. The series of important raw materials also includes potash, pyrites and lime.

Where it was impossible to relate a site directly to the location of the raw materials, it was chosen to provide good transport facilities. In FRG this is mainly evidenced by the concentration of chemical manufactures on the biggest inland waterway routes, the Rhine and Rhine-Main region. In addition, the more-than-average high capitalization and the advantages of mass production promoted the creation of huge concerns at particular locations. Other specialised sectors of the chemical industry clearly tend towards user centres, e.g. cosmetics and pharmaceuticals. Against such agglomeration, there have in recent times been opposite trends in some chemical sectors, proceeding from a continuous process of substitution in the raw materials sector, especially by switching of the production of the main basic materials and intermediate products from coal to petroleum or natural gas. As the advance of mineral oil products will in future go hand in hand with constantly ramifying pipe-lines, firms which leave behind the traditional locations reap the advantage of favourable materials costs so long as they establish themselves near the pipelines. Hence no fundamental regional switching of the chemical industry is assuredly to be expected since the major part of the refinery capacity has already been built up in centres of agglomeration. Yet this does afford the possibility of selecting sites outside the high concentration areas for future new industrial establishments.

While economic history goes to show that industrial agglomeration is a necessary consequence of efficient economic growth, the present trend shows these factors to be losing in importance now. Promoting future deglomerations therefore in some cases affords a fulcrum for environmental policy without impairment of growth targets.

IV. BACKLASH OF EXISTING AND POTENTIAL MEASURES ON INDUSTRIAL DEVELOPMENT

The forecast of industrial development in Section II took account of the restrictions imposed by environmental policy. The estimates showed that the importance of individual areas of activity in the manufacturing industries will also vary in future. The forecasting of future products mainly relies on historically discernible changes in industrial production programmes, with the consequence that in future too growth sectors may be expected to diversify by extensive innovations.

Such a development indicates that environmental stresses are likely to become greater. The measures for protection of the environment mentioned previously would undoubtedly reduce such stresses. But it remains questionable whether the scope of ecological policy is sufficiently wide not to affect growth targets. Hence it becomes necessary to estimate the backlash effects of environmental policy decisions on the future of industry as a whole.

1. Allocative effect of environmental policy measures

Environmental measures differentiated according to locality will have a decisive influence on the entrepreneur's choice of site. The internalising of social costs in the foregoing sense by price fixing according to land use signifies that private industry will choose its sites under new conditions. The individual firm will weigh the advantages of agglomeration for lowering costs against the greater costs

for use of the environment that this involves. The order of magnitude of the costs to be borne for environmental stresses lead to the expectation that deglomeration tendencies will result. This effect has to be considered as not distorting competition and therefore extremely positive, for it brings about an optimum-cost local allocation of resources.

A regionally and internationally well-thought-out distribution of industrial production may not of course only be regarded from the positive aspect of correcting competition and facilitating relief of the environment in regions previously threatened. Deglomeration always signifies likewise a potential renewed adverse ecological effect from areas hitherto reserved for leisure and recreation. Hence it always necessitates an evaluation of the reliefs from environmental stresses that are attainable.

The question of the influence of sectoral changes otherwise expected within the manufacturing industry sector through locally operative strategies for protection of the environment has to be answered in such a way as rather to enable expanding sectors to maintain or reach required threshold values. For it is the sooner possible for them to bear expenses and financial charges and put in hand necessary conversions and changes of production process.

On the other hand, sectors of weakly or declining growth have to face much greater problems of adaptation and finance. It may be inferred that measures to moderate the expansion of growth industries will accelerate the shrinking process of the weaker ones. The interdependence of different branches of the manufacturing industries acts as a catalyst

on the multiple supply relations between individual areas of production so that the moderating effects of the measures are all the greater the tighter the gearing to other sectors. For example, the chemical industry in 1964 drew, in terms of value of gross production, 34% of its preliminary services from the chemical industry itself, 2.8% from mineral oil processing industries, 5.4% from non-ferrous metal processing industries and 2.6% from mechanical engineering,(35) so that substantial multiplier effects would be expected from any lowering of the level of production in the chemical industry.

In spite of the relative reduction of stresses from the sectoral and local allocative effects, a reinforced reuse of waste emissions will be inevitable. This means that expansion of the depletion sector, i.e. recycling will be of great importance. The growth potential of the depletion sector will be quite capable of offsetting any loss of growth in other sectors. However, this statement relates only to gross national product but not real consumption, which is to be regarded as the precise final aim of the economic process.

The foregoing individual allocative effects can be obtained more quickly if firms are enabled by timely announcement to anticipate State action and so considerably reduce the necessity for it.

2. Presentation of various backlash effects in production processes and programmes

Technical progress has in the past been mainly directed towards the development of physical strength, high velocity, high precision, tireless productivity and the possibility of cost economies for it has been particularly demanded of any body manifesting insufficient strength, speed, precision and staying power. Furthering technical progress towards a solution of environment problems has also endeavoured to extend this list of criteria to the concept of environmental beneficence. The interaction with the environment must be applied as a yardstick for evaluating progress achieved, i.e. technical innovation is to be accepted as progress when it helps to relieve environmental strains, for at least the same level of production and quality of product.

Hence, inasmuch as the furtherance of technological and technical progress directly tends to develop processes and products such as limit environmental stresses, it can be expected that the production processes will alter in the sense of changes in manufacturing techniques and production factors in the direction of the goal of ecological relief.

True, changes in production processes are also conceivable that do not take the form of technical innovations but are by reason of the pressure of measures for protection of the environment transformed in the absence of innovation possibilities or objects into a return to older though correspondingly ecologically beneficial practices.

If the protective measures succeed in enhancing the previous pace of development of technical progress and extend the list of factors influencing the decision to adopt new processes from the environmental standpoint, it will also be likely to speed up the application of more ecologically beneficial processes. But above all the progress of pollution depletion techniques, and recycling, will be of great importance.

The underlying idea of recycling is the recognition that a large proportion of the fall-out and pollutant emission constitutes a waste of material, so that for example the sulphur dioxide dispersed into the air above the roof is a waste of raw material, or water pumped into rivers at too high a temperature is a waste of calories. If the environmental protection measures are aimed among other things at letting ecological protection figure as a factor in cost calculations, the economically rational re-valorisation of waste and pollutants may favourably influence costs.

The examples for experiments hitherto into the recycling of reusable materials show what importance this should be given in future, both economically and in relation to environmental depletion. Thus for instance the furnace-losses occurring in the production of sulphuric acid can be estimated since iron, copper, zinc, lead, cobalt and silver are literally leached out from these substances. Even the hydrochloric acid fumes produced in the combustion of PVC in appropriate destruction plants can be recovered. There have also long been possibilities for making use of the slag, regarded as a waste product of blast furnaces, as a cement for use in the furnaces. In obtaining salt, it was formerly

necessary to hack through the unwanted potash overburden to arrive at the actual mineral salt. Storing lime in huge quantities eventually led to the production of fertilizers. Paper mills can convert their waste to filter-charcoal which is then used for purifying water, and slag and fly-ash can be used for preparing building blocks. In addition, the demand for cooling water can be reduced by recycling the water already used. Even the heat released in garbage incineration in boilers or flame chambers can be used for driving heating power stations to supply district heating, hot water and electricity. And shredded re-graded garbage can be rotted down in compost heaps, e.g. open clamp, silos or bioreactors after enrichment with putrified silt from sewage treatment plant to produce a sort of peat.

According to the kind of feedback effects of environmental protection measures on the production process, especially in relation to the growing importance of the predominantly integrating factor of recycling, changes in the structure and size of enterprises are to be expected.

On the one hand, expenditure on appropriate changes in production processes by recycling in many cases go beyond the funding capacity of individual firms, and on the other, the adoption of new recycling processes is only first economically profitable on a comparatively large scale, so that firms are induced to conclude cooperative agreements and renounce unrestricted use of their own freedom of economic action, submitting to a general advance in respect of the industrial duty of altering a process to relieve the environment. Such action may go

so far as environmental requirements for total renunciation of economic freedom of action and so bring about horizontal and vertical concentrations. In some circumstances such concentrations are able, by reason of the advantages afforded by a potentially possible approximation to optimum dimensioning of plant and enterprise in scale benefits or economies of size, to neutralize adverse effects of industrial development.

In addition, it seems not irrelevant that environment-relieving productions are distributed among agreed firms in such a way that less output is required of individual plants and so less environmental pollution if they can concentrate on specialised production in less extensive but more specialised depletion activities. Agreements are also of course conceivable for reasons connected with the common development of environment-relieving processes and products, and the conscious strengthening of firms whose competitiveness has been weakened by ecological conditions. Such developments would involve changes in the structure as well as the size of firms.

The aspect of change of location undergoes an enlargement in the possibilities of existing or planned depletion arrangements. In endeavours to curb or reduce inroads on the environment by the manufacturing industries, without jeopardizing any growth targets, a special role falls to expansion of the depletion sector and the mechanical engineering industry insofar as they produce for ecological protection purposes.

Both for production and depletion activities, production factors come into play. The greater involvement of production factors in depletion activities signifies a reduction of their availability in other branches of industry.(36)

In the event of failure to correspondingly push forward technical progress in general, the necessary increase of depletion activities will be accompanied by a relative worsening of the supply of goods. To this extent the growth effects from the demand for preliminary services for the depletion would have to overcompensate the relatively bad supply situation in the national economy. The depletion activities will therefore not only be obligated to do away with harmful pollution but also to prepare from it reusable materials.(37) In the last analysis the location and capacity of the depletion installations enlarge the alternatives for decision-making in respect of choice of industrial location.

Checking and supervising the sources and forms of environmental stresses as a prerequisite for depletion activities call for new equipment and instrumentation such as e.g. probes for monitoring the special composition of pollution, measuring and analytical equipment for checking fluorine compounds, heavy metal aerosols, hydrocarbons and odorous materials, ion-specific electrodes, apparatus for gravimetric determination and measurement of biological oxygen consumption in real time, and analytical equipment for detecting oil traces and other high-molecular organic compounds.(38) In addition, ecologically harmless products will occur which can be used as substitutes for existing products whose use or application is ecologically harmful, and cause the latter to decline, as e.g. lead-free motor fuels, artificial organic

fertilizers, putrescible plastics of short half-life and low toxicity to warm-blooded animals, exhaust- and noise-free means of transport with newfangled propulsion systems and phosphate- and nitrilotriacetate-free detergents.(39)

Substitution processes are indeed also resolved by other effects: similar products prepared by methods which differ in the stress they cause have a different pricing pattern with existing financial conditions of ecological policy, so that the product can be offered more cheaply from the ecologically beneficial production. Similar discriminatory effects will arise from successful appeals to the user to abandon the consumption of ecologically harmful products and the corresponding emphasis laid on the ecological harmlessness of one's own products and the nuisance-capacity of competitor products in publicity material.

Lastly, the exclusion of certain products from the market will be attributable to bans under the priority given to protection of the environment, if research results do not exclude threats to health. Thus in the very recent past a series of chemical works have declared their readiness, because of the prospect of a ban in the matter, to start production of highly chlorinated biphenyl (PCB), used as fire-resistant coolants, lubricants and insulating materials and softening additives in many plastics, colours, paints and adhesives. For PCB residues in foods, air and water have led to a severe skin irritation called chlorine acne.

V. PROSPECTS AND CONSEQUENCES

The foregoing considerations have been intended to discover the dominant economic implications of ecological protection. The measures discussed necessarily call for harmonisation and uniformisation within the Community, for only in this way will it be possible to make use of the Member States' comparative advantages in promoting welfare.

But the question remains to be cleared up of how the Community should cope with distortions of competition on a worldwide plane. It must be borne in mind here, first of all, that imported products are cheaper than EEC ones owing to little or no impact on them of environmental protection; no less important, however, is the case that the removal of waste arising in the end use of imported goods involves higher costs compared with the domestic produce. In the first case it should be discussed whether there ought to be an additional customs duty fundamentally directed towards environmental stress in the country of origin. Such a proceeding is impracticable, for it cannot be the Community's duty to function at the same time as world policeman for ecological protection. One way out would be to adduce compensation for similar damage to the environment in the EEC. This would also have the advantage that so far as customs charges in the Community are higher than the costs of the environmental stress in the producer country, the latter would have an incentive to take ecological protective measures. In the second case an import duty on such products is likewise recommendable. Its form should be based on the depletion costs of comparable domestic products. Here too, again in the aspect of a supranational protection of the environment, a stimulus would be given to introduce ecologically harmless production techniques.

Many of the measures advocated presuppose that our knowledge of the relations between ecological and economic systems, and the distribution and composition of the adverse effects of environmental stresses, will be considerably extended. It is a matter of intensifying activities in the research into diffusion relationships and the international exchanges of such knowledge. It is already significant, too, to what extent the overall damage caused by environmental stresses is additive under the effects of individual pollutants, or whether the damaging effect arises first from the encounter between emissions from various sources. For an application of the originator principle presupposes the unambiguous computability of damaging effects.

Particularly intense efforts should, however, be applied to the question of when public investment for improving the quality of the environment is preferable to private investment for avoiding pollution. On the one hand, State investments might be preferable because efficient techniques of depletion of environmental pollution call for a certain minimum size of investment, which cannot always be matched by private capital. In addition it would in such a case be possible to utilize relevant economies of scale. This question is therefore of interest also because environmental goods have the character of collective goods and thereby, just as a pollution of the environment leads to multiple negative external effects, qualitative environmental improvements have multiple positive external effects.(40) This, it must be stressed, does not signify any retreat from the principle of a market economy. Yet the market mechanism should only be called into play where it is able to yield the best results.

Bibliography

1) JÜRGENSEN, H. and JAESCHKE, K.-P. — Operational processes for the application of the social cost concept in environmental protection, report prepared for the Federal Ministry of the Interior, Hamburg, 1971. p. 3

2) JÜRGENSEN, H. and JAESCHKE, K.-P. — Operational processes for the application of the social cost concept in environmental protection, loc. cit. p. 15.

3) JÜRGENSEN, H. and JAESCHKE, K.-P. — Operational processes for the application of the social cost concept in environmental protection, loc. cit. p. 13.

4) — Environment programme of the Federal Government, leaflet VI/2710, Bonn 1971, p. 6.

5) REHBINDER, E. — Environmental protection in Environment 2/71, p. 26.

6) REHBINDER, E. — Environmental protection, loc. cit. pp.26.

7) — Environment programme of the Federal Government, loc. cit. pp. 10 ff.

8) REHBINDER, E. — Environmental protection, loc. cit. p. 25.

9) REHBINDER, E. — Environmental protection, loc. cit. p. 23.

10) BOISSEREE, K. — Legal policy aspects of protection of the environment in: Environment 1/71.

11) REHBINDER, E. — Environmental protection, loc. cit. p.25.

12) REHBINDER, E. — Environmental protection, loc. cit. p. 25.

13) HATZOLD, O. — Principles and tasks of promotion of innovation in: Ifo-express service 14 of 3.4.70, p. 15.

14) HATZOLD, O. — Principles and tasks of promotion of innovation, loc. cit. pp. 14 ff.

15) ZERBE, R. — Theoretical Efficiency in Pollution Control, in: Western Economic Journal 1970, p. 370.

16) BUCKSTEEG, W. Establishment of appropriate principles for equivalent valorization of organic and mineral fouled effluent, series published by German Labour Club Water Research, e.V, No. 9, Bielefeld 1965.

17) SALZWEDEL, J. in: German Federal Parliament, 6th Electoral Period, Minutes of 3rd public information session of Committee for Interior & Committee for Youth, Family & Health on questions of environment protection on 8th March 1971, Minutes No. 42 and 30, p. 28.

18) SALZWEDEL, J. loc. cit. p.8.

19) Environment programme of Federal Government, loc. cit. p. 2.

20) OECD The Outlook for Economic Growth, Paris 1970, p.16.

21) Prognosis Report III: W. Europe 1985, Bâle 1969, p. 49.

22) Prognosis Report III, loc. cit. p. 52.

23) FELS, G. SCHATZ, K.-W, and WOLTER, F. The connection between structure of production and level of development in: World Economic Archives, Vol. 106, No. 2, Kiel 1971, p. 267.

24) FELS, G. SCHATZ, K.-W. and WOLTER, F. The connection between structure of production and level of development, loc. cit. p. 267.

25) Prognosis Report III, loc. cit. p. 54.

26) UHLMANN, L. Technical progress in branches of industry, in: Ifo-Express Service 24 of 12.6.70, p. 18.

27) Geographical order report 1970 of Federal Government, Leaflet VI/1340, Bonn 1970, p. 17.

28) Environment programme of Federal Government, loc. cit. p. 36.

29) ACKERMANN, K., GESCHKA, H. and KARSTEN, D. — Report on overall stresses on the national economy due to Environment programme of Federal Government, MS. Frankfurt/M 1971, p.50.

30) — Iron and Steel production in: Economy and Statistics, 1970, p. 467.

31) — Iron and Steel production, loc. cit. p. 467.

32) — Iron and Steel production, loc. cit. p. 467.

33) GEBHARDT, A. BAUMANN, H. and SCHWORM, K. — Agglomeration and deglomeration tendencies in W. German Industry, Ifo, Munich 1967, pp. 7 ff.

34) GEBHARDT, A. BAUMANN, H. and SCHWORM, K. — Agglomeration and deglomeration tendencies in W. German Indsutry, loc. cit. pp. 59 ff.

35) BMWI — Technology and Economics, Bonn 1970, p. 22.

36) THOSS, R. — Environment, on utilisation of theory for policy in: Economic Week, No. 41, p. 77.

37) THOSS, R. — Environment, on utilisation of theory for policy, loc. cit. p. 77.

38) — Vol. 3 of publications in series "in rem" of Federal Ministry of Interior, Bonn 1970, p. 31.

39) — Vol. 3 of publications in series "in rem" of Federal Ministry of Interior, loc. cit. p.33.

40) JÜRGENSEN, H. and JAESCHKE, K.-P. — Operational processes for application of the social costs concept in protection of the Environment, loc. cit.