

SOME FEATURES OF  
THE OPTIMUM REGIME

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### *1. Aim of Lecture*

Before tackling the subject of my lecture as announced in its title I want to tell you in a few sentences what I am after. As social scientists I and my colleagues in this field observe, first of all, that every social system is in movement; it changes all the time. We also observe that some countries, the Soviet Union, China or Yugoslavia for example, have social systems different from that of the United States. Even several Western European countries have systems somewhat different from that of the United States. Social scientists are asking themselves continually, and are also asked by their fellow citizens, whether their own system is the best or not, and if not, what

changes do they propose. Opinions on this question diverge widely and a considerable number of politicians have rather doctrinaire views. Some schools of thought have expressed their opinion, or rather belief, in such a way that they contribute to an increasing polarization: the creation of two opposite camps, usually with a stamp on them, such as socialism or capitalism. Both as a citizen and as a social scientist I dislike this tendency, and I think it is an increasing danger. Every year we see how social conflicts can easily develop into international conflicts and we all know that with the present type of arms things may easily run out of hand. I am therefore in favor of depolarization, and science generally has the task to draw questions out of the sphere of emotions and shift part of our answer to the realm of objective observation and reasoning. Part only, since we know that not all questions are susceptible to objective treatment. Wherever we succeed in shifting the frontier between belief and science, we have made progress. It helps to solve part of the problem at stake and in doing so bring people closer together instead of making them worse enemies.

My arguments will direct themselves to various groups of our planet; those in Western countries who search for improvement of our societies; those in communist-ruled countries, even if such an attempt were judged futile; those in developing countries who want to let their societies

evolve. The problem of finding the best social order has already become more urgent than it was, now that Professors Forrester and Meadows of M.I.T. have faced us with some formidable challenges [2, 6]. If indeed the limits set to human welfare are so much closer than we thought five or ten years ago, the problem of social structure has got a gigantic new relevance.

## *2. An Interdisciplinary Approach Needed*

The task to describe or at least to give a rough sketch of the best social order clearly requires an interdisciplinary approach. This has been understood by such different students of the future as, on the one hand, Kahn and Wiener [3] and, on the other hand, the two MIT colleagues already mentioned; and both groups consist of more than two people. The work done by the scientists mentioned shows already a clear interdisciplinary nature; they contain, along with those of the other physical sciences, elements of a physical, a chemical, and a biological character, and, in addition, elements of many human sciences. Having worked mainly in the field of economics, and having only some very limited knowledge of a few other subjects, I want to defend the

thesis that the general framework in which the topic should be treated is the one of welfare economics, although in a way different from traditional welfare economics which has remained too abstract. Welfare economics is the chapter of economics dealing with the question concerning what conditions must be fulfilled in order that social welfare be a maximum, subject to the restrictions within which human society has to live. The definition of social welfare is correctly supposed to be given to the economist and to contain at least one basic ethical element. The restrictions are often specified as the resources available and the production technologies known; at present we would certainly add the technologies of education as an important further element. This brief indication of the welfare economic approach already shows how many other fields of thinking are involved. I am going to point out, later, that some questions involving methodology also pertain. Before elaborating on this I want to repeat what I said on many previous occasions [10, 11], namely, that, to my taste, several economists have formulated in too narrow a way what are the unknowns of the central problem of welfare economics. Often they leave the impression that all we want to learn from the solution is how much work we must do and how much consumption and investment, and at what prices all goods and services will be sold. In other words, the unknowns are a



number of economic variables or entities and that is all. In my opinion the problem is much deeper, and the real unknowns of it are the set of institutions (or the several alternative sets of institutions) which by their operation will bring us that optimal situation or, rather, optimal development over time. To put it in somewhat more learned terms: We have to search for a group of institutions the activities of which can be described by a number of equations. The total of these behavior equations of the group should be identical with the conditions for optimal welfare.

The main difference in the approach I take and that which my colleagues in economics take in elaborating the solution to the central problem consists in the time order in which, during our analysis, the contributions from the other disciplines should be taken. While it has been customary for welfare economists to ignore the ethical factors as long as possible and only to consider it after the economic analysis had been finished, I prefer to discuss the social welfare function in the beginning, implying that an ethical choice is made at the beginning. This enormously simplifies the ensuing economic analysis, which in traditional welfare economics has to carry with it the large number of ethical possibilities during the whole process. What I intend to say will become clearer, I hope, during the elaboration of my analysis.

### 3. *A Survey of Possible Approaches*

The elaboration of my analysis first requires, I am afraid, a survey of the possible approaches in the form of a systematic presentation and grouping. Since, as we saw, the problem of finding the characteristics of the social welfare optimum, starts with the definition of the social welfare function and the restrictions under which we live, it is only logical to subdivide our system first of all into two categories of approach: (I) the choice of the social welfare function and (II) the choice of the restrictions. Let me warn at once that part of our social aims may also be given the form of restrictions.

By the social welfare function we understand a description of the preference system of the community, consciously or unconsciously, adhered to by the policy makers. For short-term decisions the policy makers will be, as a rule, the *government* administration; for longer-term decisions the legislature, PARLIAMENT and for still longer-term decisions the *political parties*. The preference system tells us everything about the relative values attached to alternative aims, such as having more consumption rather than more spare

time, and against what trade-off; the values attached to more consumption rather than more investment, including education. A long list of other possible components of social welfare could be given, but I will add only one more, of paramount importance, and that is the distribution of consumption and quantity and type of work done among the citizens.

It seems natural that the social welfare function depends on the welfare functions of the various citizens, or at least groups of citizens. Category I of our alternative approaches can be subdivided into five groups of approaches. The more generally we formulate our assumptions, the less certain, of course, can we be about the concrete propositions we can make about the features of the optimum.

Group *A* assumes only that social welfare depends on the welfare functions (or values) of all the citizens, but it does not specify how. Groups *B* and *C* assume that the type of dependence is what the mathematicians call separable; this means that social welfare consists of separate portions each depending only on one individual's welfare. In order to keep our treatment simple, we will consider only two forms of separability; Group *B* assumes that social welfare is the weighted sum of the individual welfare values; the weights meaning that a unit of welfare of one person counts more to the policy makers than



a welfare unit of another person; or less. In Group *C* of our approaches we assume that social welfare is the unweighted sum of the individual welfare of each citizen. Obviously this implies that under approach *B* we discriminate between various persons or groups and under *C* we do not. The distinction between these two groups only makes sense, however, if we assume that we can measure welfare and that, if there were more than one way of measuring it, we make a choice among these ways. This choice implies ethical elements as well as elements of methodology or philosophy of science. Depending on how we measure individual welfare, the question may even be asked whether not elements of discrimination can also slip in here.

We will discuss two more groups, to be called *D* and *E*, based on further assumptions that are conceivable. In these groups we assume that, as an ethical element, some form of equality between human beings is introduced. Before defining equality, we must go into some technicalities of an individual welfare calculation. Such a calculation contains three groups of elements. The first, to be called variables, indicate the size of entities which contribute to the individual's feeling of satisfaction and which can be varied, either by himself or by outside forces. Examples are the quantity of consumption, the quantity of effort

made or the job chosen by or given to the individual.

The second group of elements, to be called parameters, are the scores describing the individual's capabilities and needs; capabilities can be described by an IQ, or a set of test results; needs can be described by the size of his family and the state of his health. In the short run these are given and they differ from person to person. In the longer run they can be changed, but behind these changes there will still be unchangeable characteristics.

The third category of elements appearing in a person's welfare function are called coefficients; they indicate how strongly each of the other categories are affecting the person's welfare. In other words, they reflect the individual's sensitivity to the values of or changes in variables and parameters.

In a brief, and therefore always less precise, way we can say that the variables depict the individual's situation, the parameters his quality, and the coefficients his human nature.

What interpretation can we give now to the alleged equality of human beings? Since their variables are (their situation is) subject to change all the time, they are irrelevant for any definition of equality. Since parameters (qualities) are different according to observation, the only possi-

bility of connecting them with the concept of equality is to believe that in the very long run parameters may become equal. A case in point is made by L. Soltow [7] who observed that in Norwegian schools, the scores of children or grandchildren of people with different achievement were, one or two generations later, on the average equal. The most realistic assumption is that the coefficients are the same for all human beings and distinct from those of other animals. Our groups of approaches  $D$  and  $E$  are therefore characterized by the assumptions that, respectively, the parameters and the coefficients are the same for each individual, or for each relevant group of individuals (Group  $D$ ) and the coefficients only (Group  $E$ ) are the same for individuals or groups. Relevant groups, in this context, are groups which are treated equally by the institutions characterizing the optimum order.

Category II deals with the various sets of restrictions we can introduce. This category too can be subdivided into various groups of approaches; we will indicate these with the aid of lowercase letters. Some of the restrictions are of a technical nature: They express either production techniques or other natural laws, such as the equality of the quantities available and the quantities given a destination (consumption, investment). An essential difference in approach is found here just by considering production tech-



niques without external effects (Group *a*) and in also considering techniques with these effects (Group *b*). A production technique or process will be said to show external effects if its level of activity influences not only the welfare of sellers and buyers of the product, but also the welfare of others ("outsiders"). If no outsiders' welfare is affected, the process does not show external effects.

Other restrictions may be introduced as part of the objectives of the social welfare function. If such objectives are absent, we will speak of Group *c*; if there are, we speak of Group *d*. An important example of the latter is the restriction that all individual welfare values are wanted to be equal, which will be our definition of justice, coinciding with the definition chosen by Kolm [4].

#### *4. Some Remarks on the Consequences of Various Approaches*

No reader will be astonished if we state, as we did, that the more general our assumptions are, the less we can conclude in the form of propositions about the optimum. We will indicate some of these various conclusions for a set of approaches where, for the time being, we disregard



the existence of different goods and consumptive services. In the models we now have in mind, the existence of only one consumer good is supposed, in which we express consumable income. Another simplification is that we are not dealing with the development over time of the various entities we are going to discuss. Although these simplifications look formidable, they are not. It is relatively easy to introduce more goods or more time units. Our focus will be on other aspects of the optimum order, namely, the organizational ones.

We will now discuss very briefly the kind of propositions which can be made under the groups of approaches defined before (IA to IE and IIa to II*d*). In Group IA, where nothing in particular was assumed about how social welfare depends on the various individual welfare values, and where no external effects are present, we can prove that in the optimum position the ratio of the marginal utility of income to the marginal utility of a given type of effort is equal for all individuals. The marginal utility of effort can be seen as a way to measure marginal costs of production. Therefore our proposition may be interpreted also by stating that competitive markets for commodities and factors are institutions which together can produce the optimum, provided that also the other characteristics of the optimum are fulfilled. The latter proviso refers especially to in-

come distribution which must also be optimal. In Group IA no more precise definition of the optimal income distribution can be given than equality among individuals of the marginal personal utility of income, multiplied by the marginal social utility of a unit increase in personal utility. If a larger number of products and of production factors is considered, Group IA can derive similar propositions for all of them, with the same proviso on income distribution; a proviso comparable with an "empty box," as long as we are not more specific.

For Group IB, where again no externalities are assumed to exist, but social welfare is defined as a weighted sum of individual welfare values, the weights being constant for each individual, the same type of propositions can be attained, but the income distribution needed can be defined slightly more explicitly; equality among individuals is now required of their marginal income utilities multiplied by a fixed weight characteristic for each person.

Again, a more concrete proposition is possible under the assumptions of Group IC; free markets will lead to the optimum, provided that the income distribution is such that all persons have equal marginal utilities of income.

Group IE, where persons are assumed equal in every respect, would require equal incomes for everybody; supposedly at most only a future pos-

sibility and not necessarily so; in the short run, Group *ID* makes the more realistic assumption of equality in coefficients, meaning that incomes should be equal after correction for differences in needs, both professional and purely human needs.

In all that precedes we assumed the absence of external effects, as formulated under Group *Ila*.

If we introduce the assumptions of Group *Ilb*, free markets will not guarantee the arrival at the optimum for those goods the production of which shows external effects. In some way producers must be induced to take into account these effects; this may be done by taxes or subsidies in some cases, but in other cases central planning and decisions will be needed. In the well-known example provided by Meade, concerning mutual external effects between honey production and apple production, integration of the two activities into one enterprise would solve the problem and leave free markets as a possibility.

The preceding solutions are those valid for Group *Ilc*, where no other restrictions were assumed to exist. In Group *Ild*, where we add to the maximization of social utility the requirement of justice, defined as equality between the personal welfare values, Waardenburg [16] has shown that the same requirements with regard to income distribution are needed as in Group *IB*, that is, the equality of individual marginal utilities multiplied by a personal weight. Presumably



in this case higher weights will be given to individuals whose personal parameters would mean a handicap in a free society.

*5. Illustration by a Critical Appraisal  
of Traditional Welfare Economics  
and its Practical Application*

I am aware of the rather abstract character of what I said so far. I am now going to use everyday language to illustrate my points. This I propose to do by first giving a critical appraisal of the contents of and the practical applications made with the aid of traditional welfare economics.

Among the positive results of traditional welfare economics as well as their use by politicians I want to mention the propositions that in a large number of situations price uniformity for a given product or a given production factor (capital or many types of labor) is a feature of the optimum. When seen as a plea against discrimination in pricing, and against import duties levied by rich countries, such propositions often have been very useful. If we add that these uniform prices must be equal to the marginal costs, another useful case is made against monopolies or oligopolies.



A negative aspect of the way in which these results have been presented and abused by politicians is, however, that the important corollary was overlooked with regard to income distribution. The nondiscrimination and antitrust interpretations often given are valid only if the income distribution also is optimal. This is what I meant when I stressed that the optimum social order is a complete set of institutions the behavior equations of which, taken together, cover all the optimum conditions of welfare economics.

It is worthwhile to repeat this in simpler language still, by saying that, in an overwhelming majority of situations, incomes that are obtained from free activities must be redistributed before being spent. There is no rule for the optimum which says that any rich man is permitted to spend his productive income all for himself or, the other way round, a poor individual only has the right to spend as little as his or her low productive income permits. A system of taxes and subsidies is part of the optimum. By subsidies we may also understand the supply of services at lower prices than their costs. This is true within each nation, among the richer and the poorer strata; it is equally true between nations—even more so, since primary (or productive) income inequality is much larger between than within nations. Here reality is terribly far from the optimum.

The supply of services at prices below costs as well as what has been called central planning and decision making, together with other activities may be subsumed under the heading "tasks of public authorities." Contrary to what ultra-liberalists and similar doctrinaire politicians have said, there has been an impressive shift of tasks from private to public decision makers. Some public tasks are taken for granted nowadays by everyone, although there have been times when even these were carried out by private bodies or persons, for instance the tasks of army and police. Education, once a private activity, is increasingly being financed by public authorities. Road maintenance, except for turnpikes, has become a public responsibility. Railways in most countries are now publicly owned. Agricultural and other unstable markets are regulated. The total level of demand is determined by anticyclical and development policies of public authorities. New tasks have been added in the field of health; quite recently antipollution measures have been taken, with, in some respects, the United States leading. In the field of information, such as broadcasting and television, statistical and other public authorities make important contributions.

I cannot resist the temptation here to insert a remark on what have been called public goods. Thinking of processes which satisfy needs by their production of goods, my preference is to hold that

not the character of the goods, but rather that of the process determines whether these needs are satisfied by private or by public activities. There is a tendency for public authorities, or at least publicly owned or controlled units to carry out processes with very high fixed costs, whereas processes with lower fixed costs can be left to the decisions of private people. Cars tend to be private, trains and planes public; theatres private, television public, and so on.

Once we agree that income redistribution is an element of the optimal social order and taxes play an important part in redistribution, we must face the fact that the overwhelming part of our taxes are of a nonoptimal type: they affect marginal gains to be obtained from additional production considered and imply a downward bias of production.

### *6. Outline of Interdisciplinary Approach*

Let me now try to elaborate on the positive aspects of an alternative method to arrive at some propositions concerning the optimal social order. Methodologically I prefer to approach the structure of the "best" order by a number of successive steps, from simpler to more complicated models



—a method not unknown to economic science and often applied by other sciences as well. I want to stress that such a successive approximation has not only a didactic value, but, in my opinion, should be part and parcel of a scientific approach with a view to make matters not more complicated than is needed to remain in touch with reality, that is, observation. If a simpler theory can explain, in sufficient detail, observed phenomena relevant to our problem, there is no need to use a more complicated theory. I know how popular the joke about some of my colleagues is who reported to think “Why make something simple if you can also make it complicated?” I am not only opposing them for didactic reasons, but in principle.

The first stage of our task consists, as already pointed out, of the choice of a social welfare function. My proposal is to take the sum of individual welfare values, without weights attached. To me this seems to reflect democracy without discrimination, without assuming that people are attaching a high value to sacrificing much to others, but assuming that our attitude toward others should be governed also slightly only by envy. In other words, feelings of solidarity just about cancel feelings of envy.

Methodologically my proposal presupposes, of course, a tremendous optimism with regard to the possibility of measuring various people's wel-



fare. Let me defend my position as follows. Of course, I know that we do not have a good thermometer for welfare today. We only have a very defective one in that we can agree only in extreme cases that one individual's welfare is lower than another's. Today we only have a restricted number of wise women or men who are able to pass more precise judgments (and this is what measuring means) on the relative welfare of different people. In order to reduce the errors in such judgments, we take the average of the judgments of a fairly large number of observers, hoping that the errors will be mutually independent and partly cancel each other. We decide in parliament or in other groups by majority vote; for very important decisions we require qualified majorities—up to 85 percent in IMF—when we vote on creating Special Drawing Rights. All this is not exactly what we understand by objective or scientific measurement. As already suggested, we then think of thermometers, for instance. We should be aware, however, of the fact that also the measurement of temperature in physics is not a unanimous decision. Between 4° centigrade and 0° most substances agree that there is a fall of 4° in temperature, but if we had taken a water column as a thermometer in that case, water would tell us the temperature had gone up. In other words, even in physics we have taken a majority vote without insisting on unanimity. My optimism

on the future measurement of welfare is based on a general belief in scientific progress and on the state of affairs with regard to some components of welfare, such as health, where medical experts feel already fairly confident in comparing different individuals.

When it comes to specifying in explicit mathematical shape my concept of welfare I am inclined to use Weber-Fechner's law and propose that the welfare feeling derived from income available per consumer rises with the logarithm of that income [12], that is, by equal steps for equal percentage increases of income. In addition, I tend to state that an individual's happiness (as far as relevant for socioeconomic policies) depends on the possible tension (difference) between his actual capability and the capability required by his job. Usually he will take a job not too far from what his capabilities correspond with, and the tensions will not be large. But his happiness will decline rapidly if the tension increases in absolute value. As in job evaluation, we may use, to characterize the job as well as the person, more than one, up to twenty different aspects. Recently, some have reduced the number because of fairly high intercorrelations between several of the aspects used. Brinkmann [1], for the description of more qualified jobs, still uses a large number of aspects, but my guess is that there also we can reduce the number. Since the

job aspects and the corresponding personal abilities are the parameters in the welfare function, we still do not have the coefficients. Here I see a program of measurements in order to test my assumption that the coefficients are roughly the same for everybody, which then would reflect the "fundamental equality of men." We have begun to make the measurements, but they are in a very preliminary stage only. They probably will inform us about changes we will have to make and new parameters we must add.

Be this as it is, the remainder of my discussion will be based on the assumption that welfare or utility values can be measured and hence added and that we can establish a social welfare function. We may want to add, at least as one alternative, the restriction of justice, as discussed before. We must add, anyway, a considerable number of technical, chemical, and other restrictions; today we can add many more even than we thought twenty years ago. The extension given by Leontief [5] to his earlier work on input-output analysis is illustrative of some of the additional restrictions we have to take into account.

For activities showing no external effects we will find that a free market can still be a useful institution to allocate production factors and consumption, provided that other institutions are created or operating simultaneously. Decisions on activities with important external effects cannot



be left to decisions of independent firms or consumers. They must be induced to take decisions in the general interest which in these cases does not coincide with the traditional private interest. We already saw that sometimes taxes or subsidies may be sufficient; but there are other cases where more centralized decisions are needed, from the simple integration of two activities (honey and apple production) to the full-fledged decisions at the national level and even the world level—the latter type being much more rare than our survival requires [8].

Moreover an important income redistribution is required. As I tried to show elsewhere [9] this redistribution can hardly be stopped at the point of taxation, where we are now. Taxes on capabilities or capacities, so-called lump-sum taxes, are the only ones in line with the optimum conditions. Income taxes are a second-best at most. In the real optimum order, persons should be taxed on the scores obtained in an ability test which may be used also for providing them with the jobs they are most appropriate for. Such tests are not yet available in a sufficiently accurate form. But we observe continual progress in testing persons and designing their career. In order to take account of an individual's performance as well of errors made in earlier tests, his testing may have to be repeated every five or ten years. The essence of the lump-sum tax based on a person's



capability test is that the full fruits of any additional effort he makes will be left to him. Under such a regime two incentives will work simultaneously to let a capable man work hard. If he does not work hard, the high tax he has to pay will leave him with a low income; if he works hard, the full fruits of that hard work will be his.

Most people, including myself, are sceptical about the benefits to be derived from introducing such a new tax in the near future. We do not have the reliable tests that would be required if we are to give them such a central place. For the time being, taxes on wealth and hence inheritance taxes are components of a lump-sum tax which can be used. But they hit the wealthy only and not the gifted. In future, if our tests can be improved, a modest experiment with them could be made, where simultaneously such a tax at a moderate scale could be started and the rates of income tax lowered so as to yield the same revenue to the treasury. With increasing experience we hopefully could continue that substitution.

The case made for a capability tax constitutes an example where, at present, the costs (in money and in trouble) are too high for the institution to be introduced. It is comparable with the position of most developing (and some developed) countries vis-à-vis income taxes. The people of these countries do not yet have the tax collectors and the tax morals needed for income

taxes to be levied reasonably well, and hence they must concentrate on indirect taxes, farther apart still from the optimum.

With the lump-sum tax just described, based on a capability test, we can equalize the level of living for the various groups of society to a greater extent than is the case now. Elsewhere I elaborated on the features of an optimal income redistribution [12], and I already have repeated here that income differences would mainly reflect differences in needs, professional and personal. Professional needs may involve financing a study or repaying a fellowship. Personal needs include the size of the family and the health of the individual considered.

### *7. Concluding Remarks*

I tried to unfold my views on how to shape an optimal social order. I emphasized the interdisciplinary approach needed to define and specify such an order. I did not consider social welfare functions imposed by a country's government; but I want to add that certain features may have to be imposed if the population is shortsighted. Myopia is common to all of us in some sense, and may cause an individual to make deci-

sions he might deplore later on. Forestalling such decisions is a legitimate area for government to impose some measures. The best-known examples are obligatory schooling up to a certain age or excises on consumer goods endangering health, such as tobacco, alcoholic drinks, and a number of drugs. Imposing the complete pattern of production, as was done in Eastern Europe until 1956, or during wartime everywhere, leaves such a gap between the preferences of the government and those of the population that I excluded it from my treatment of the optimum order. If the pessimists of the Club of Rome are right, we may, however, have to consider the kind of order such imposition implies. In a way, I have been slightly more optimistic, by introducing the concerns of the Club of Rome in a number of new restrictions we have to reckon with.

Even so I have come to conclusions about the best order which have several socialist features: increasing tasks for public authorities, a much less unequal distribution of disposable income by higher taxes on wealth and the recognition of needs as one base for income differences. Interestingly enough I have arrived at these conclusions even though the concept of the social welfare function used was not formulated beforehand with a preference for any particular type of income distribution. If justice, defined as equal welfare for all, is added, an income distribution



may well result which implies higher incomes for heavy physical or extremely dull work than for mental or interesting work; but this case has not been analyzed in my lecture.

If it can be assumed that the lump-sum tax based on capability will once become possible, our optimal order may become more egalitarian and at the same time more efficient than it is in presentday Eastern European societies. This illustrates that the stubborn adherence to socialization of all means of production is more a demonstration of faithfulness to a century-old doctrine than one of original thinking. Of course this can only be substantiated if we actually succeed in testing a person's capability more precisely. With all the work done and progress made in both job evaluation and career planning—interestingly enough first in business—I am not without hope that we will succeed in introducing capability as a tax base.

There are other ways open for us to equalize income distribution to a greater extent, however. As I tried to show in a few recent publications [13, 15], schooling and family planning can have an impact on income distribution, and it is conceivable that inequality of incomes can be further reduced.

I want to finish by returning to my introductory remarks on the aim of my research. As I see it, modernized research of an interdisciplinary

character, using the framework of welfare economics, can be used as a common scientific language for social scientists all over the globe. It is my contention that Eastern European and Chinese social scientists could clarify their own position if they take the pains of a scientific critique of the approach offered; so far only ideologists have done so. Elsewhere I have attempted to answer these critics [14]. If we really want to co-exist, a better mutual understanding is needed. It has to begin with scientists.

#### Notes

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5. W. Leontief and D. Ford, *Air Pollution and the Economic Structure: Empirical Results of Input-Output Computations*, Fifth Conference on Input-Output Techniques, Geneva, 1971 (mimeographed).

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13. ———, "Trends in Income Distribution in Some Western Countries," to be published in *Geneva International Essays*, Geneva, 1972.

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16. J. G. Waardenburg, diss. (to be published).