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SOME CONDITIONS FOR THE SOCIAL PERCEPTION OF POLLUTION IN ENVIRONMENTAL DISASTERS

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INTRODUCTION

I would like to begin this article by proposing a distinction between socially visible and invisible pollution. This difference may be very important when dealing with the reactions of citizens to polluting agents. It is possible to speak of the social psychology of pollution whenever a case of environmental damage occurs which can be perceived by some members of a society and selectively ignored or underestimated by others. The pollution may be present, detected by scientists, but lay people in the polluted area may believe that it does not exist or that it is not important. Therefore, if "men define situations as real, they are real in their consequences" (Merton, 1957), then self-deception can lead to overexposure to polluting agents when people do not believe that the case affects their lives.

In order to support this point of view, two facts can be briefly noted. It is much easier for governments to prevent industries, by law, from producing goods damaging to health and the environment than it is to persuade citizens not to use the products, once they are distributed. The continued failure of smoking prevention campaigns shows how difficult it can be to deter people from taking health-damaging cigarettes, once the social habit is established. In autumn 1976 during demonstrations, the former inhabitants of the dioxine polluted area of Seveso, Italy, who were compelled to leave their homes contaminated by a poison which was invisible and could not be detected by human senses, were encouraged to cross the same area from which they were banned (Alberizzi, 1977). They were willing to do this because they refused to accept the gravity of the situation. The same people would have more likely avoided the unpleasant sensation of a swamp odor, which, on the contrary, is not dangerous to humans.

This article is aimed at demonstrating that there are cases of pollution which are characterized by a high sensitivity and evident social perception, and which cause a social reaction and political involvement; and that there are other instances where there is a low sensitivity, self-deception and apathy toward polluting agents. It also wants to identify the conditions which may determine and emphasize social perception, and other conditions which instead reduce it. It is hoped that this will be useful in formulating social policies which are enacted to avoid pollution. People will not support an environmental program unless they have a subjective perception of the dangers which threaten them.

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SOCIALLY VISIBLE POLLUTION

By socially visible pollution we mean every deterioration of the environment which can be detected by the human senses, vision, smell, taste and feeling. Socially visible pollution can be temporary or long-lasting. An example of temporary visible pollution is an oil spill in the sea, caused by damage to an oil well or by the shipwreck of a tanker. This pollution can extensively affect a large part of the coast by ruining life in the sea and on the beaches. It is also quite visible. Cases of this type of pollution have attracted the attention of newspapers and of public opinion (Molotch, 1975): it has been possible to organize and request ample volunteer work to remove oil traces from the beaches. Also, the visible pollution was temporary; in a matter of months, the effects of oil on the coast had disappeared, even though it had accumulated in the deep sea. In substance, this type of temporary visible pollution is able to create a crisis in some sectors of our society and leads to a reaction strong enough to initiate work on the rehabilitation of the environment.

Lake pollution is also socially visible. Wastes from urban and industrial activity are slowly poured into the lakes, causing increasing biological or chemical damage (Anderson, 1973). Citizens can see the visible phenomena of lake eutrophication such as the abnormal growth of algae, the death of large numbers of fish, waste and dirt in the water, but do not necessarily do anything to remedy them. First, they might consider the pollution of their lake a commonplace occurrence ("it is just the price we must pay for industrialization"); second, they might feel that it is not in their range of competence ("it is a matter for the local government"); third, they might not feel directly affected by the lake pollution. Being a chronic phenomenon, lake pollution is much more likely to be tolerated or ignored than oil spills in the sea. It is also more difficult to fight, since it requires the existence of groups of concerned citizens. Some social categories might be directly interested because they depend on the lake for their livelihood: e.g. the lake fishermen; business people may start worrying when they see that tourism is negatively affected -- (this usually occurs at a later stage of lake pollution). Other citizens may feel involved only when they are told that the water they are drinking may be contaminated.

In this case, we see how a long-lasting phenomenon may become more *insidious* than temporary pollution. Most of the best Italian lakes have become polluted without either the concern of the inhabitants or the action of local authorities. And when the issue was finally raised, the deterioration of the environment had acquired such extensive proportions as to make local government action economically unfeasible (Sebastiani, 1976).

There is a point at which pollution becomes *socially visible*, a threshold of indifference is overcome and people begin to perceive the danger. This *alarmed perception* causes the news to be spread throughout the community, beyond it, and even to a national level, until a point of saturation is reached which is followed by a decline in interest. This final stage can be defined as *chronic adaption.*

This social phenomenon can be described mathematically by a logistic model of social diffusion in its growing stage (Pitcher, 1978). The shape of the curve of diffusion can change according to the time taken by the community to perceive the pollution (which is not necessarily commensurate with the growth of pollution itself). If not contrasted in its natural tendency, the rate of chronic adaptation to pollution can be approximated by a negative log curve. If the phenomenon takes a short time to become noticeable, the stage of indifference will be shorter and people will become alarmed more quickly. It is likely that a social reaction will occur (1) because there is a definite perception of the damage, and (2) because the sudden and

rapidly growing danger makes people foresee that it could reach greater proportions unless some repair and prevention is undertaken. On the other hand, in the case of slow growing pollution, indifference will last longer, and chronic adaptation is more likely to come early on. Policy-makers and the mass media must take definite action to *lower* the indifference threshold by making the population sensitive to the hidden effects of pollution and giving everybody sufficient basic knowledge to enable them to perceive the early signs of pollution. By means of continuing coverage, the media can also slow down chronic adaptation to a deteriorated situation. When alarmed perception occurs, it is time for the government to act and to request help and funding from the community. Later on, when citizens have adapted to a certain level of environmental deterioration, it will be far more difficult to convince them to support rehabilitation programs.

SOCIALLY INVISIBLE POLLUTION

Some of the problems of visible short- and long-term pollution have now been exposed. Let us shift to the central topic of this article: the case of a *socially invisible pollution.* This is every kind of pollution which escapes direct sensorial perception, and that needs specialized personnel and equipment to be detected, analyzed and treated. This is often a product of new forms of industrialization, or of the growing power of humans to modify matter.

Invisible pollution is quite hard to monitor and to control. Agents of pollution can easily avoid their responsibility. Industries using chemical plants do not always advise the population and local authorities about the release of poisonous substances in the air and in the water; and if these losses are not great, they are unlikely to be detected. Many Italian industries using chemical processes have saved investment money by cutting expenses in monitoring and security devices. Thus, it has recently happened that dangerous elements, formed in uncontrolled processes, were released into the air, in an inhabited area. Often there are no institutionalized ways of disposing of such polluting agents. Laboratories and plants find no better solution than to discharge their wastes into the water. Precise and realistic laws must be made and equipment supplied in order to avoid the consequences of invisible pollution.

The case of Manfredonia

Two particular cases of socially invisible pollution will be examined in this context. In the month of September 1976, one chemical plant in the neighborhood of Manfredonia, Italy, accidentally released one cloud of an arsenic compound. This is a poison capable of killing both animals and human beings in fairly large quantities. The cloud, driven by the wind, crossed the town of Manfredonia and the countryside nearby to disappear in the sea. People working at the plant knew the poisonous effects of arsenic from experience. The news spread rapidly and the population was made aware of the danger. A tragedy was avoided, but still, for several weeks, the inhabitants had the discomfort of having to leave and decontaminate their homes, of not drinking water from local wells, and of not eating locally grown vegetables. Luckily, the local government was able to give the appropriate instructions.

The most difficult operation was to convince the Manfredonia farmers that their products were poisoned by arsenic and could not be sold to the public. Farmers refused to believe that their whole crop was poisoned and had to be destroyed. Many of them, in order to avoid crop destruction, mixed up the poisoned with the uncontaminated food. It is difficult to assess how much contaminated food reached outside markets. It is, however, well known that local authorities had to take a firm stand upon the necessity for crop de-

struction. That meant a loss of several million liras per farmer. The same thing happened to fishermen. They were prohibited from fishing in the Manfredonia Gulf, but they could use other fishing areas. In 1978, these same problems arose at Seveso where several farmers were prosecuted for illegal cultivation (Buzzati Traverso, 1978).

Lessons. Generally, chemical pollution involves some food poisoning either directly or because it affects the environment where crops are grown. Chemical controls of food products are not easy to accomplish (1) because it takes some time to examine samples of the suspect products which, however, must be introduced into the market within a relatively short time; and (2) because controversies about the degree of danger to consumers are not easy to avoid. Farmers and fishermen will claim that their goods are in excellent condition, whereas the health authorities must prove that this is not the case. Objective standards of pollution are needed in order to solve these controversies on the quality of the environment and its food products. The demand for "objective standards" may be so strong that "experts" above any suspicion are called from abroad in order to provide that impartial judgement which affected groups will accept (Conti, 1977; Jesurum, 1977b).

The case of Seveso

A second example of a socially stressful situation caused by invisible pollution was created by the dioxine at Seveso. The mechanisms of pollution were about the same: dioxine was emitted, as a cloud, from a malfunctioning ICMESA chemical plant near Seveso and spread in the heavily populated area north of Milan on 10 July, 1976 (Elena, 1977; Calvino, 1976; Cislaghi, 1976). People in the area adjacent to the plant were kept ignorant of the pollution for approximately one week, with the exception of some advice not to eat fruit and vegetables.

Neither the firm nor the local government authorities were willing to disclose that a case of dangerous pollution had really occurred. These organizations tried to avoid their responsibility and later to manage it to their own advantage. Interpreting the general feeling of social insecurity two weeks after the deadly event, a journalist, Marisa Fumagalli, wrote: "Everybody is in a state of alarm, but no one knows exactly why; no one is concerned to reveal the truth in explicit terms." Offical reports by the company and the governmental authorities spoke of "pollution" without specifying what kind and how dangerous it was (Conti, 1977).

In fact, it took two weeks before the bureaucracy could decide that dioxine pollution at Seveso was dangerous. From a theoretical point of view, this fact suggests that, in the case of socially invisible pollution, the identification of the danger usually occurs late, thus leaving more time for the exposure of the inhabitants. According to Laura Conti (1977) the most dangerous period was that immediately following the spread of the toxic cloud, when – in the absence of an offical warning – people continued to eat vegetables and fruit and to live normally in the heavily polluted environment.

The news was also published in the newspapers, but had little effect at first: the inhabitants were not convinced that there was anything wrong with the environment where they used to live. Besides, it later became known that other cases of mild dioxine pollution had occurred before, in 1972, without serious consequences. It was then difficult to discriminate between a mild case of pollution and a serious one, which it turned out to be in that Summer of 1976. The public declarations of scientists and experts were instrumental in alarming the population; however, only the death of animals and the illness of many children who were heavily exposed finally persuaded the Seveso families that they were in serious trouble. Yet, two weeks after

the event it took the army to force people to leave the A (most polluted) and the B (less polluted) zones, which were then fenced with barbed wire. The pollution though not visible was persistent and stable for more than two years. This situation can be reasonably compared to a zone contaminated by radioactive fallout.

The social impact of dioxine at Seveso was enormous and still remains to be studied scientifically in spite of the large amount of journalistic literature about the event. It can be summarized in four stages: (1) the occurrence of chemical pollution and the process of identification of the danger; (2) the resistance of the inhabitants to abandoning the zone and the difficulty in convincing them that some sort of invisible danger affected their lives; (2) the pain of migration and of being compelled to leave properties destined to be destroyed or abandoned for a long time; (4) uncertainty about the future, about personal health, self-deception about pollution, and the attempt to settle down again and to re-establish a normal life.

Much has already been said about the process of identification of the danger and the actual difficulties met by ordinary bureaucratic administration in dealing with such an exceptional case as Seveso. It should be added that the difficulties of identification of the pollution continued in the following years each time some kind of measurement and evaluation was made of the polluted area. The first of these was the identification of zone A (most polluted) and of zone B (less polluted) in order to determine the most affected area in which human habitation was to be forbidden. Two types of errors were possible: (a) either to judge as "not polluted" the land which in fact was; (b) or to judge as "polluted" areas which were not.

The danger of the first type of error (most likely to have occurred in the delimitation of zone A) was that of exposing the population to a danger of which it was unaware. The second type of error could only result in the economic waste of a fertile area.

Subsequent problems arose with the monitoring of the health of the exposed population. Although it was known from laboratory experiments that dioxine had powerful toxic and tetragenic effects, very little was done to verify this in human beings. According to official accounts (Bonanni, 1977), within one year from the July 1976 accident, of the 733 people who left the most polluted zone A, only 47% underwent a general medical examination, 42% completed a dermatological test, and only 19% completed the necessary blood tests. Health monitoring was also difficult with women, who were advised not to have children. It is not known how many of them followed this advice. Of the several women pregnant in July 1976, it is not known how many decided to have an abortion. According to the available literature on this topic (Ferrara, 1977; Tognoni, 1978; Todisco, 1977), there were no clearly established standards for making a decision which in most cases could only be subjective [1]. In the absence of a valid relationship between the people of Seveso and local health authorities, it will be even more difficult to ascertain the long term consequences of this chemical disaster upon the health of the inhabitants.

Further controversies could not be avoided in the measurement and evaluation of the economic damage and in ascertaining the technical means most suitable for reclaiming farmable land. In order to free this territory from chemically stable dioxine, it would have been necessary to remove and burn the surface layer of farmable land up to 20 inches of depth. The expense of eliminating dioxine from Seveso amounted to several billion liras, a budget that the Lombardy county government even with the help of ICMESA was not able to afford; and there was no guarantee that the method proposed by scientists to fight pollution would really work (Metrangolo, 1977; Jesurum, 1977a).

Today, dioxine is still present in Seveso and, from the latest analyses, it seems to have spread toward Milan, carried by rains and by wind (Calvino and Guazzoni, 1976). In the midst of uncertainty and the difficulties actually experienced, the local government was not able to monitor the situation in a satisfactory manner. No extensive anti-pollution measures have been taken twenty-four months after the disaster's occurrence in Seveso, except that of banning people from living in and using that area. From the administrative point of view, that is certainly the most economical solution – especially when the dioxine is expected to dissolve by itself – but from a technical and political point of view it marks a defeat in the face of the human and technological problems caused by a man-made disaster (Cerruti, 1977).

In this respect, community groups have been more active than the government. The population is expecting repair of the damage; citizen's committees are demonstrating against the local authorities who, since the beginning, were supposed to be legally responsible for pollution control. Groups of citizens have attempted to reclaim – at least symbolically – the lost land. This had led to several spontaneous attempts to break through the fences and settle in the polluted area. Since people were not able to estimate the danger, they rationalized the absence of it and acted as if it were not there. The lack of a realistic perception was later exploited by local political leaders who had a vested interested in underestimating the amount of danger.

In comparison to the immobility of the public administration, these represent rough and primitive attempts at self-management of the recovery program. There is no doubt that the government (local and regional) must re-establish a "dimension of reality" among citizens, by discouraging hazardous attempts. On the other hand, the rehabilitation program could greatly benefit from the cooperation of volunteers from the local population who look forward to returning to their homeland. It is up to the local government to give the best technical advice and the necessary financial means to the citizens who want to return to Seveso in the coming years.

Lessons. Disasters like Seveso are going to recur in the future. Not only chemical plants but also atomic reactors are sources of socially invisible pollution. At present there is a raging controversy over the safety of atomic power plants under construction.

Past cases of radioactive fallout have been tacitly ignored by authorities or covered by military secrety in order to solve the problem of informing the public. This, however, might not be a correct way for the companies using radioactivity to formulate social policy. If they are in any trouble, similar to that of Seveso, they will probably need a greater consensus and more political support than that which is required today to set up their enterprise [2].

(1) Abortion at Seveso became a political issue in Italy where, in 1976, abortion was still illegal. In order to allow the Seveso women to abort, special instructions were given to local hospitals. However, these administrative procedures came too late to meet the immediate need of women, many of whom chose to have abortions abroad or in private clinics. The writings of Ferrara (1977) fully document the state of anxiety and insecurity in which this decision was made by individual women, often in opposition to their husbands or to Catholic doctors. Tognoni (1978) instead reviews the ambiguous stand taken by the press and by politicians. In this social context, the few cases of malformation which actually occurred among the new-born babies in the local government area were most likely to be ascribed to chemical pollution.

(2) Many governments and private enterprises have recently tried to overcome

popular opposition to nuclear power and nuclear fuel processing plants by force, with the support of the police or the army. This, however, is not the best way to prepare for future accidents, when the collaborative support of the local population may be required. The gap between public opinion and governmental policies and business interests has been strongest in Germany (i.e. at Brokdorf in 1976 and at Grohnde in 1977) and in the United States and Sweden.

REFERENCES

Alberizzi, M., Metrangolo, F. and Kasam, V., (1977). "Seveso: dodici mesi nel dramma," *Corriere della Sera.*, 7–8–1977:17.

Anderson, J.M. (1973). "The Eutrophication of Lakes," in D.L. Meadows and D.H. Meadows (eds.), *Toward Global Equilibrium.* Cambridge, Mass.: Wright-Allen Press.

Bonanni, A. (1977). "Nell'album misterioso della zona inquinata manca la foto della situazione sanitaria," *Corriere della Sera,* 7–10–1977: 3.

Buzzati Traverso, A. (1978). "Nella zona di Seveso 134 denunciati. Coltivarono orti ed allevarono animali," *Corriere della Sera,* 9–3–1978: 15.

Calvino, F. and Guazzoni, E. (1976). "La Nube e il Terreno," *Sapere* 796: 91–96.

Cerruti, G. (1977). "Un'Inchiesta Fatta di Attesa," *Repubblica,* 7–9–1977: 5.

Cislaghi, C. and Rivolta, F. (1976). "Demografia di una Zona Inquinabile," *Sapere* 796: 37–49.

Conti, L. (1977). *Visto da Seveso, L'Evento Straordinario e l'Ordinaria Amministrazione.* Milano: Feltrinelli.

Elena, E. and Conti, L. (1977). "Il Flagello della Diossina," *L'Unità* 7–10–1977: 9.

Ferrara, M. (1977). *Le donne di Seveso.* Roma: Editori Riuniti.

Jesurum, S. (1977a). "Un Flagello Chiamato Diossina," *Repubblica* 2–15–1977: 2.

Jesurum, S. (1977b). "Scienziati e politici tentano di ridimensionare l'allarme," *Repubblica* 4–22–1977: 24.

Merton, R.K. (1957). "The Self-Fulfilling Prophecy," in R.K. Merton, *Social Theory and Social Structure,* rev. ed., New York: Free Press; 421–436.

Metrangolo, F. (1977). "Come dev'essere il forno antidiossina? Gli esperti in disaccordo," *Corriere della Sera* 2–15–1977: 6.

Molotch, H. and Lester, M. (1975). "Accidental News: The Great Oil Spill as Local Occurrence and National Event," *American Journal of Sociology* 81: 235–260.

Pitcher, B.L., Hamblin, R.L. and Miller, J.L.L. (1978). "The Diffusion of Collective Violence", *American Sociological Review* 43: 23–35.

Sebastiani, L. (1976). "I Laghi del Lazio: Metodi di Intervento per la Salvaguardia dei Laghi", *Notiziario dell' Ordine degli Ingegneri della Provincia di Roma,* pp. 189–190.

Todisco, A. (1977). "L'Insufficienza di prove non assolvo la diossina", *Corriere della Sera* 7–10–1977: 3.

Tognoni, G. and Torri, B. (1978). "L'Aborto a Seveso", *Inchiesta* 7 (31): 61–72.