

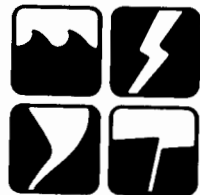
Natural Hazard Research

PERCEPTION AND AWARENESS OF AIR POLLUTION
IN TORONTO

by

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University of Toronto

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PREFACE

This paper is one in a series on research in progress in the field of human adjustments to natural hazards. It is intended that these papers will be used as working documents by the group of scholars directly involved in hazard research as well as inform a larger circle of interested persons. The series is now being supported from funds granted by the U.S. National Science Foundation to the University of Colorado, Clark University and the University of Toronto. Authorship of papers is not necessarily confined to those working at these institutions.

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PERCEPTION AND AWARENESS OF AIR POLLUTION IN TORONTO

Andris Auliciems and Ian Burton

A review of available studies on air pollution in Toronto shows that awareness of the problem is at least as high as in other North American cities. In this paper some of the reasons that might explain the high degree of awareness are explored and some implications drawn for public policy.

Public Awareness

Evidence for public awareness of air pollution in Toronto is taken largely from two recent surveys. A study made in 1967 by Peter A. Barnes,¹ then a student in the Department of Geography at the University of Toronto, involved the interviewing of 200 households randomly selected from areas immediately adjacent to pollution recording and monitoring stations. These respondents were interviewed by Barnes and others in person. The second study, in 1969, was conducted by Brian Shepherd² for Pollution Probe, an action-oriented citizens' group based at the University of Toronto. The Shepherd study involved interviewing 214 respondents by telephone.

Barnes' respondents were presented with a list of ten local

¹Peter A. Barnes, "Community Awareness and Concern with Air Quality in Toronto: A Pilot Study" (unpublished B.A. thesis, University of Toronto, 1968).

²Written and oral communication by Brian Shepherd, February, 1970.

problems and asked to rate each according to their degree of "satisfaction" on a five-point scale. The question was asked both with reference to the respondent's own neighbourhood and the city in general, and the results are listed in Table 1. Air pollution ranks clearly as the number one

TABLE 1
AWARENESS OF PROBLEMS RELATING TO TORONTO*

Order of Presentation	Area of Concern	Percentage of Respondents Regarding Area of Concern		
		Toronto		Neighbourhood
		Very Unsatisfactory	Very and Moderately Unsatisfactory	Very and Moderately Unsatisfactory
5	Air pollution	46	88.5 (1)**	60 (1)
7	Traffic congestion	38.5	73 (2)	39.5 (2)
4	Juvenile delinquency	29.5	72 (3)	38.5 (3)
6	Noise levels	20.5	56 (4)	37 (4)
10	Water pollution	27	39.5 (5)	26.5 (6)
9	General congestion of population	12.5	27.5 (6)	18.5 (7)
1	Availability of recreational areas and programmes	6.5	22 (7)	35 (5)
2	Employment levels	6	14.5 (8)	13.5 (8)
3	Garbage collection and disposal	3.5	12.5 (9)	9.5 (9)
8	Racial problems	1	11.5 (10)	4.5 (10)

* Q: How would you rate each of these for Toronto? How would you rate your own neighbourhood in terms of these problems?

** Indicates rank.

problem both for neighbourhoods and the city. 46% of the respondents described the air pollution problem as very unsatisfactory in Toronto and a further 42.5% said it was moderately unsatisfactory, while the percentages were not quite so high for neighbourhoods. Water pollution was ranked fifth for the city behind air pollution, traffic congestion, juvenile delinquency, and noise. For neighbourhoods, water pollution was sixth after the same four problems plus availability of recreational areas.

Shepherd's respondents were read a list of "areas of political importance" and asked how the Government should rate each item. In one case air and water pollution were not listed separately, but "pollution control" headed the list with 82.3% of the respondents classifying it as extremely important. Detailed figures are listed in Table 2. When respondents were asked to indicate which type of pollution they were most concerned about the largest group, 37.4%, chose an answer stating that all types of pollution are equally important. Among three individual types of pollution however, air, water and soil, air pollution was ranked highest with 27.6% compared with a close 24.3% for water pollution (see Table 3).

The considerable difference of opinion on the relative importance of water and air pollution between the Barnes survey in 1967 and the Shepherd survey in 1969 could be the result of the two-year time lapse between the studies,³ but is more probably related to the broader

³Although details are not available for public release, surveys were

TABLE 2

AWARENESS OF PROBLEMS CONCERNING THE GOVERNMENT*

Order of Presentation	Problem	Percentage of Respondents Regarding Problem as . . .			
		"extremely important"		"extremely important" plus "important"	
3	Pollution control	82.3	(1)**	100	(1)
8	Inflation	58.6	(2)	90.4	(4)
4	Housing	55.6	(3)	92.1	(2)
9	Health and welfare	45.4	(4)	91.3	(3)
5	Unemployment	43.0	(5)	89.8	(5)
2	Indian affairs	43.0	(5)	87.9	(7)
6	National unity	42.5	(7)	84.5	(8)
1	Northern Ontario development	29.4	(8)	89.3	(6)
7	Tourist development	13.2	(9)	67.4	(9)

* Q: I am going to read you a list of areas of political importance and would like you to tell me how "important" you feel the Government should rate each item.

** Indicates rank.

reference area that the Shepherd survey covered or reflects differently selected sample populations and differently structured questionnaires.

The two surveys also addressed the question of particular sources

conducted in 1968 and 1969 by the Ontario Water Resources Commission. In the latter year, "extreme concern" for water pollution had increased by some 4% to 92% of the sample (oral communication by M. Cheetham, Public Relations, O.W.R.C.).

TABLE 3
 CONCERN FOR TYPES OF POLLUTION*

Order of Presentation	Problem	Percentage of respondents . . .	
		"most concerned"	"least concerned"
1	Air pollution	27.6	10.3
2	Water pollution	24.3	4.2
3	Soil pollution	0.9	36.5
	Air and water pollution equally important		8.0%
	All pollution is equally important		37.4%
	Other combinations		1.8%

* Q: Of the three following types of pollution, which are you most concerned about? Least concerned about?

of pollution. Nearly half of Shepherd's respondents (45%) could not name a specific source of pollution. About one in four respondents (27%) could name a source for air pollution and these included vehicle exhausts 13% and smoke from factories and apartments 5%. About the same proportion, 28%, could identify sources of water pollution. In the Barnes survey sources of pollution were suggested. Of the eight possible sources listed (see Table 4), automobiles again head the list.

What accounts for this demonstrably high degree of public awareness about the air pollution problem in Toronto? How does it compare with awareness in other North American cities? To what extent is it due to the severity of the problem itself as indicated in instrumental measurements of pollutants or direct sensory experience, and to what

TABLE 4
 SUBJECTIVE IDENTIFICATION OF MAJOR AIR POLLUTING SOURCES
 IN TORONTO*

Order of Presentation	Source	Percentage of Respondents Identifying Source	
		In Toronto	In Neighbourhood
1	Automobile	89.5 (1)**	80.0 (1)
3	Industry	88.0 (2)	44.5 (2)
2	Oil burners	49.0 (3)	34.5 (3)
5	Municipal incinerators	36.0 (4)	29.5 (4)
4	Locomotives	32.7 (5)	22.0 (6)
6	Apartment incinerators	29.0 (6)	24.1 (5)
8	Natural pollution	26.0 (7)	17.1 (7)
7	Open burning of leaves	18.1 (8)	12.1 (8)

* Q: Which of the following do you feel play a major role in contributing to the general level of air pollution in Toronto/ neighbourhood?

** Indicates rank.

extent do the mass media play a role?

Toronto and Other Cities

A comparison of the results of the two Toronto surveys with similar data from Buffalo,⁴ Los Angeles⁵ and St. Louis⁶ reveals that

⁴Ido deGroot and Sheldon W. Samuels, People and Air Pollution: A Study of Attitudes in Buffalo, N.Y. (An Intradepartmental Report, 1962).

⁵Lester Breslow, Air Pollution: Effects Reported by California

public awareness in Toronto is certainly no less than in these other places and is probably higher.

A 1959 Buffalo study ranked unemployment, juvenile delinquency, car accidents and alcoholism ahead of air pollution as a civic problem, and in 1962, air pollution lagged behind unemployment, juvenile delinquency and communicable diseases. In a 1963 study, air pollution was ranked fourth in St. Louis after juvenile delinquency, unemployment and lack of recreational areas.

In 1959, 44% of the respondents in a Buffalo survey described air pollution as serious or very serious. In 1961, 75% of the respondents in Los Angeles said they were "bothered by" air pollution. In 1963 in St. Louis, 38% of the respondents described the air pollution as somewhat serious or very serious. These percentages are considerably lower in comparison to 88% who told Peter Barnes in Toronto in 1967 that air pollution was moderately unsatisfactory or very unsatisfactory, and 100% who responded to Brian Shepherd that air and water pollution are important or extremely important. Some of the difference is undoubtedly explained by questionnaire variability and the different circumstances in each place. Most probably, however, the time lag is a significant factor. In a national survey⁷ conducted in the United States in 1969,

Residents, from the California Health Survey (Berkeley: Department of Public Health, State of California, 1962).

⁶Southern Illinois University, Public Administration and Metropolitan Affairs Program, Public Awareness and Concern with Air Pollution in the St. Louis Metropolitan Area (Washington: Department of Health, Education and Welfare, 1965).

⁷Robert Cahn, "Poll Finds Alarm over Pollution," Christian Science Monitor (March 11, 1969), p. 95.

86% of a nationally representative sample said they were somewhat concerned or deeply concerned about air and water pollution, soil erosion and similar environmental problems. These and similar data are listed in Table 5.

While these data are by no means rigorous enough to be conclusive, they do suggest that awareness of air pollution in Toronto is certainly no less than in some other North American cities. The apparently greater awareness in Toronto is most likely due to the fact that the surveys were conducted more recently, as is discussed below. Certainly there is no evidence that air pollution is significantly worse in Toronto than in Buffalo, St. Louis or Los Angeles.⁸ The evidence begins to point to the conclusion that awareness of air pollution has grown in response to other factors. To what extent do people experience air pollution and become affected by it, or to what extent are they influenced by the media?

Air Pollution Effects

Although the presence of air pollution has been recognized as serious in some localities at least since the discovery of the energy

⁸ Precise quantitative comparison of pollution levels is impossible due to a) different types of pollutants, e.g. smog occurs in Los Angeles, but rarely in Toronto, b) different methods of pollution monitoring and presentation of data, e.g. sulphation in the Buffalo report is given in mg SO₄ cm⁻², but by SO₂ p.p.m. in Toronto, c) different averaging times of pollution counts. Some parallels can be drawn between St. Louis and Toronto, the former averaging for 1964 (p.p.m.) NO₂=0.033, SO₂=0.059, CO=6.3, hydrocarbons 3.1, oxidants 0.031 [Air Quality Data, from the National Air Surveillance Networks and Contributing State and Local Networks, 1966 Edition (Durham: U.S. Department of Health, Education and Welfare, 1968) p. 6]. Comparative Toronto data are shown in Table 6.

TABLE 5

ESTIMATES OF AWARENESS OF POLLUTION

Year	Place	Problem	Description of Pollution Problem	Percentage of Respondents	Problems Ranked Before Pollution
1959	Buffalo	Air pollution	"very serious and serious"	44	1) Unemployment 2) Juvenile Delinquency 3) Car Accidents 4) Alcoholism
1962	Buffalo	Air pollution	"very serious and serious"	46	1) Unemployment 2) Juvenile Delinquency 3) Communicable Diseases
1961	Los Angeles	Air pollution	"bothered by"	75	n. d.
1963	St. Louis	Air pollution	"very and somewhat serious"	38	1) Juvenile Delinquency 2) Unemployment 3) Lack of Recreational Areas and Programmes
1969	U.S.A. (national survey)	Air pollution Water pollution Soil erosion, etc.	"deeply and somewhat concerned"	86	n. d.
1967	Toronto	Air pollution	"very or moderately unsatisfactory"	88	none
1969	Toronto	Air and water pollution	"extremely important and important"	100	none

n. d.--no data

potential of coal in the 14th century, preventive and control measures still have not been widely adopted or strongly enforced. Variations in the quality of the air are not easily noticed by the human senses and, even when they are, the process of adjustment and acceptance has been rapid. Accordingly little gets done until the effects of air pollution become manifest. "Positive action has seldom been anticipatory, instead it has occurred only after dramatic disasters, or large-scale sensory insults have caused public clamor based on fear."⁹ The present day concern for atmospheric quality initially appears to have been triggered by such disastrous winter inversion smog episodes as those in London (1952) causing more than 4,000 deaths, New York (1963) with 800 excess deaths, the Meuse Valley (1930) and Donora, Pennsylvania (1948).¹⁰ At the time of occurrence, acute pollution episodes are not only evident by their visual and olfactory impact, but also by widespread chemical irritation of eyes, nose, throat and respiratory tract. The more serious results of these episodes are associated with subsequent health impairment and spectacular contemporary excess mortality rates, particularly in the case of chronic respiratory disease sufferers and certain age groups.

While acute pollution disasters are relatively rare phenomena, the atmospheres of all modern cities are pervaded by the continuous presence

⁹Leslie A. Chambers, "Classification and Extent of Air Pollution Problems," in Air Pollution, Vol. I, edited by Arthur C. Stern, 2nd ed. (New York: Academic Press, 1968), p. 4.

¹⁰U.S. Congress, Senate, Subcommittee on Air and Water Pollution, Committee on Public Works, Air Quality Criteria (Washington: U. S. Government Printing Office, 1968), pp. 37-40.

of various contaminants. These may be either gaseous or particulate, and, depending upon their nature and concentration, some biological and material damage may be incurred. For many large urban centres, the broad cause and effect relationships may be represented by schematic diagrams such as Figure 1 in which, for example, sulphur dioxide may directly cause health effects, or may also reach sufficient concentrations to become an odour nuisance, or may through oxidation and combination with suspended water droplets form sulphuric acid which in turn may produce material, vegetation or physiological damage.

Physiological Perception of Pollutants

While pollutants may be variously perceived at any stage following emission, it is probable that the strongest stimuli in Toronto are provided by the visible particulates such as smoke, vehicle exhaust gases, reduced visibility by haze, and the soiling of buildings, cars and clothing by deposited matter. It is pertinent to note however that, in general, the visually most readily perceived particles are least likely to constitute health hazards due to their relatively easy elimination from the human system,¹¹ but rather a soiling nuisance. As in most North American cities, the unburnt gaseous exhaust emissions of motor vehicles may be considered a major source of pollution. However, due to the absence of conditions, in Toronto, which lead to the formation

¹¹J. R. Goldsmith, "Effects of Air Pollution on Human Health," in Air Pollution, Vol. I, edited by Arthur C. Stern, 2nd ed. (New York: Academic Press, 1968), pp. 588-589.

of smog, the hydrocarbons are not regarded as a health danger,¹² but in view of their aromatic properties, they may be classed instead as odour nuisances. The accompanying discharge of the highly poisonous carbon monoxide is of course imperceptible, since the gas is both colourless and odourless, and since physiological impairment may not be recognized until the onset of such acute symptoms as headache, dizziness, nausea, fainting, etc.¹³

Apart from hydrocarbons and carbon monoxide, the most serious toxic and corrosive gaseous pollutants monitored in Toronto are oxides of sulphur (SO₂) and nitrogen (NO₂), and oxidants. The perception of gaseous matter depends mainly upon the sense of smell, which may, or may not, precede physiological damage. As illustrated by Figures 2 and 3, biological impairment (and material deterioration) is related to the duration of exposure to a pollutant, and it is possible that serious damage may eventuate from very low and imperceptible concentrations.

The determination of olfactory threshold levels of the atmospheric pollutants presents difficulties, not only due to possible additive, antagonistic, potentiation and synergetic combinations of the substances, but also the individual variability and state of health of the perceiver. However, an inspection of Table 6 which shows the existing concentrations

¹²Department of Energy and Resources Management, Air Management Branch, Report on Continuous Air Quality Monitoring Stations in Metropolitan Toronto during 1968, Report of November 4, 1969, p. 2.

¹³U.S. Congress, Report of the Surgeon General, Motor Vehicles, Air Pollution, and Health (Washington: U.S. Government Printing Office, 1962), p. 116.

Figure I. POLLUTION EFFECTS.

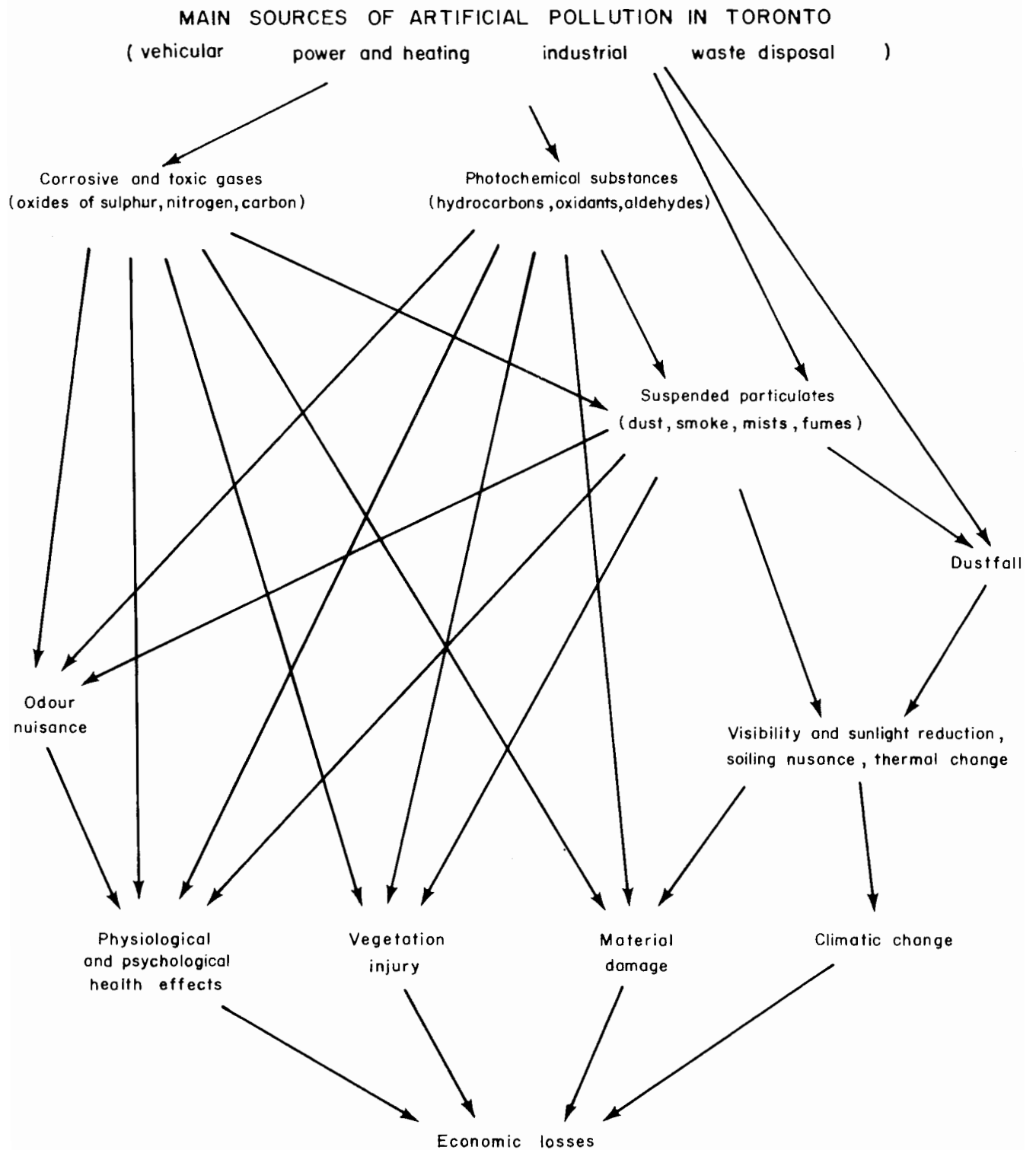
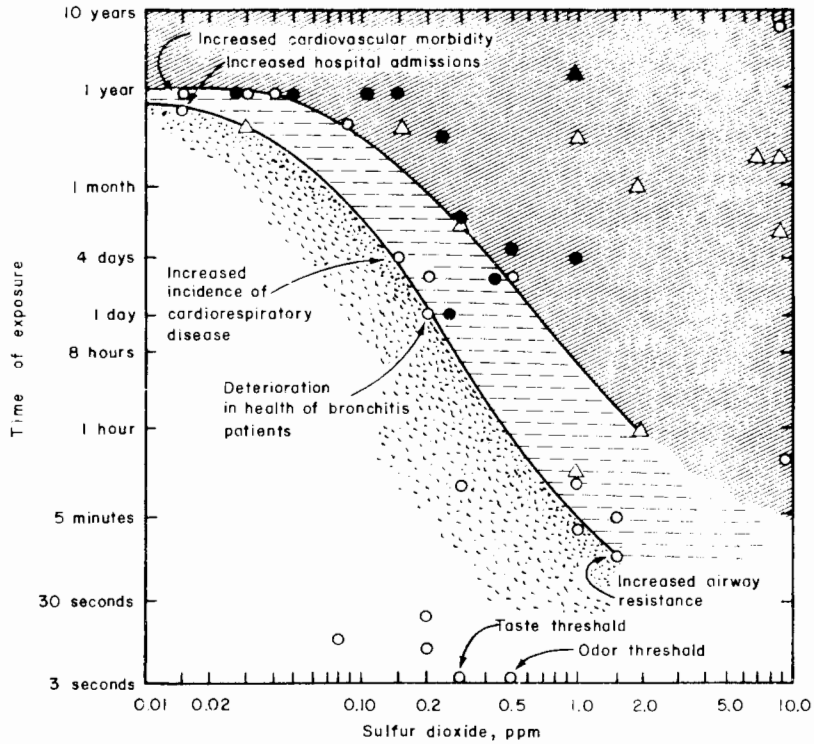
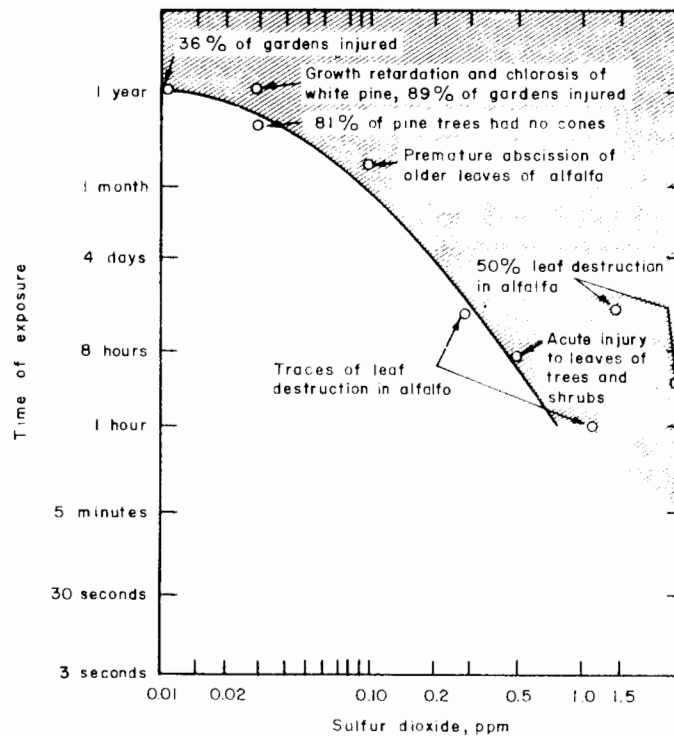


FIGURE 2. Effects of SO₂ on Health.



KEY: ○, morbidity in man; ●, mortality in man; △, morbidity in animals; ▲, mortality in animals; shaded area, range of concentrations and exposure times in which deaths have been reported in excess of normal expectation; dashed area, range of concentrations and exposure times in which significant health effects have been reported; speckled area, ranges of concentrations and exposure times in which health effects are suspected.

FIGURE 3. Effects of SO₂ on Vegetation.



KEY: Shaded area, range of concentrations and exposure times in which injury to vegetation has been reported; white area, range of concentrations and exposure times of undetermined significance to vegetation.

(after: Stern.)

shows the increase in number of newspaper items on an annual basis from 1958 to 1969 for air and water pollution in the Toronto Globe and Mail. A similar curve for the New York Times is shown for comparative purposes. The curves must now surely be approaching their ceiling. Referring to the nature of pollution coverage by the press, Ken Lefolii has recently stated: "In the media, pollution has the top of the charts all to itself, number one in the magazines, number one on television, number one in the papers."¹⁷ Much higher than that it is not possible to go.

The Consequences of Awareness

As a result of the high degree of public awareness of air pollution in Toronto the general public has begun to take action. A citizens' organization has been formed called GASP (Group Action to Stop Pollution). This organization is being given vigorous leadership by a Toronto alderman, Tony O'Donahue, and it has focussed most of its attention on air pollution. So far however, it has been inclined to take a rather legalistic and quiet diplomacy approach to the problem and has become neither a mass movement nor notably activist. Quiet diplomacy does not characterize the activity of another Toronto group, however, called Pollution Probe. Established in early 1969 and based at the University of Toronto, this group has attacked a number of pollution problems. A minor storm was created about the use of diazinon by the

¹⁷Ken Lefolii, "Will Pollution War Die?" Toronto Daily Star, February 21, 1970.

These results were probably obtained by the procedures that Barnes used. If, instead of naming six effects, the interviewer had simply asked "In what ways are you personally affected by air pollution?" the responses probably would have been significantly lower. Nevertheless, the fact that respondents are willing to say that they suffer irritation of the eyes or respiratory tract, and to attribute this to air pollution, indicates again the high degree of public awareness and points again to the conclusion that the awareness is the result of factors other than or in addition to direct sensory experience.

The Communications Media

It seems clear that the statements of experts as reported in the media and the rising level of journalistic accounts have been major forces contributing to the growth of public awareness and concern. In some cases the media have been accused of irresponsible reporting likely to cause undue public alarm. A well-known case in point is the CBC television program Air of Death which led to the establishment of a special independent enquiry by the Ontario Government into the fluorosis poisoning in the vicinity of the Erco plant near Dunnville, Ontario. The programme itself was subsequently the subject of an enquiry by the Canadian Radio and Television Commission.

Since there appear to be no attitude or perception studies of air pollution in Toronto prior to 1967, it is not possible to chart with any accuracy the growth of public concern. It seems safe to assume however that it has followed closely the growth in newspaper coverage. Figure 4

TABLE 8

REPORTED EFFECTS OF AIR POLLUTION IN TORONTO*

Order of Presentation	Effect	Percentage of Respondents Identifying Ill Effects	
1	Particulate matter/dust	56.5	(1)**
6	Odour	54.5	(2)
3	Discolouring of buildings, laundry, etc.	33.2	(3)
5	Respiratory irritation	30.0	(4)
4	Irritation of eyes	29.5	(5)
2	Poor visibility or haze	21.5	(6)

* Q: Are there any ill effects of air pollution that affect you personally?

** Indicates rank.

affected by particulate matter is credible. So is the report that 21.5% can identify poor visibility or haze. But in a city that is not subject to photochemical smog and where it is highly unlikely that the toxic gases have even rarely achieved sufficient concentrations (Table 6) to induce irritation of the mucous membranes,¹⁶ it is surprising to note that 30% of the respondents reported experience of respiratory irritation and 29.5% irritation of the eyes which they attributed to air pollution.

¹⁶It appears that none of the gasses present in the atmosphere have been shown to produce irritation below concentrations of 1 p.p.m. Air Pollution, edited by Stern, op. cit.

TABLE 7

SEASONAL AWARENESS OF POLLUTION AND CONCENTRATIONS

		Spring	Summer	Fall	Winter
SO ₂ deposition mean p.p.m./month (20 stations)		18.8	7.9	15.7	24.7
Hydrocarbons mean p.p.m./month		3.3	1.0	0.7	1.7
Dustfall mean tons/sq. mile/month		31.4	24.2	22.8	23.8
	Percentage of Respondents who Observed no Seasonality	Percentage of Respondents who Judged Pollution Worst According to Season			
Toronto	24.5	16.5	31.0	17.0	11.0
Neighbourhood	40.5	11.0	25.0	14.0	9.5

Similar results were also recorded in the St. Louis study,¹⁵ which pointed out that awareness of pollution may be more related to seasonal behaviour of people than to actual pollution concentrations.

There is additional evidence of incongruity between physiological perception of air pollution and what people report. The Barnes survey respondents were asked to indicate which of six specific effects of air pollution affected them personally. The responses, shown in Table 8, are surprisingly strong. That 56.5% of the respondents are personally

¹⁵Southern Illinois University, Public Administration and Metropolitan Affairs Program, op. cit., p. 23.

of the major pollutants in Toronto, together with determined olfactory threshold levels and lowest observed values of physiological effect, suggests that the gases can only very rarely be perceived by the primary sensory mechanisms. Thus given the nature and concentrations of the pollutants in Toronto, it is paradoxical that direct sensory perception of the contaminants is related more to the visual and olfactory stimuli of the less hazardous pollutants.

The above argument implies that, in the absence of very unusual atmospheric conditions, the citizens of Toronto are actually unable to perceive differences between the degrees of pollution by the continuously monitored gases. This supposition is supported by the previous study in Buffalo¹⁴ in which correlation between the degree of sulphation (apparently not much different to that found in Toronto), and subjective perception, showed important inconsistencies. There are also indications of people's inability to perceive the toxic gases, in the present concentrations, in the recent survey by Barnes. In this, responses to the question "In your opinion, is air pollution worse in any particular season?" indicated summer as the most polluted season, although maximum concentrations of sulphur dioxide occur in the winter months with a pronounced minimum in summer (Table 7). The concentrations of nitrogen dioxide and the oxidants do not appear to be seasonal, but the aromatic hydrocarbons and the deposition of particulate matter peak in spring.

¹⁴deGroot and Samuels, op. cit., p. 6.

TABLE 6

GASEOUS CONCENTRATIONS IN CENTRAL TORONTO,^a
 THRESHOLD AND PHYSIOLOGICAL EFFECT LEVELS^b (p.p.m.)

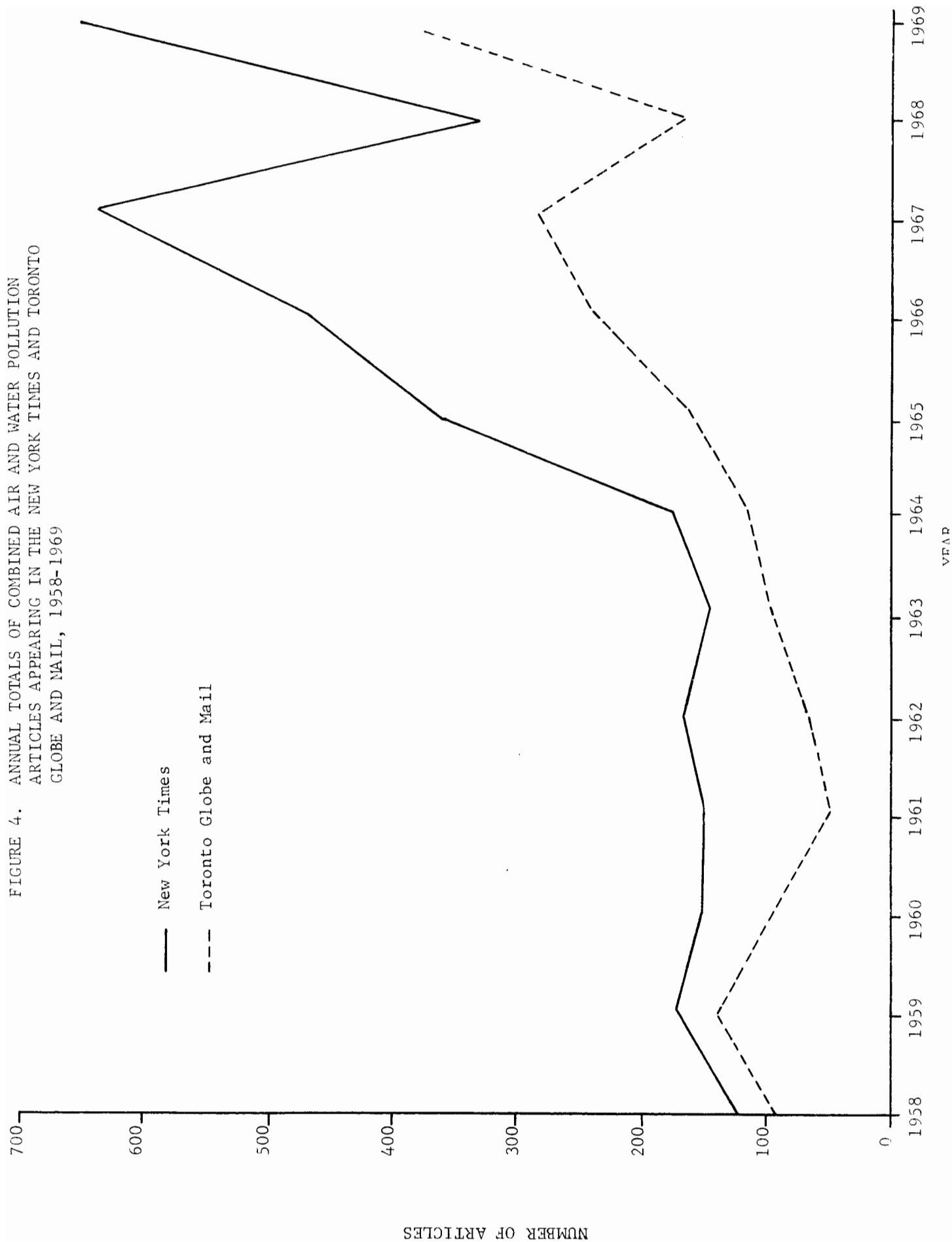
Pollutant	Olfactory Threshold Level	Physiological Effect Level	Concentrations per hour			Number of Hours in Year	Exceeding P.P.M.
			Mean		Maximum in Year		
			Worst Month	Year			
SO ₂	0.5	0.3	0.13	0.07	0.88	37	>0.4 ^c
NO ₂	0.1	0.3	0.07	0.05	0.50	3	>0.4 ^d
CO	-	2.7	0.17	0.10	1.15	112	>0.4 ^e
Oxidants	0.2 (in smog)	0.3 (in smog)	0.05	0.04	0.22	2	>0.2
Hydrocarbons	various	?	4.15	3.04	15.00	2648	>4.0
			0.03	0.02	0.13	0	>0.15
			4.14	2.10	15.00	4	>10.0

^aDepartment of Energy and Resources Management, op. cit.

^bFrom various sources in Air Pollution, edited by Stern, op. cit.

^cAverage of 5 stations. ^dLeast polluted station. ^eMost polluted station.

FIGURE 4. ANNUAL TOTALS OF COMBINED AIR AND WATER POLLUTION ARTICLES APPEARING IN THE NEW YORK TIMES AND TORONTO GLOBE AND MAIL, 1958-1969



Metro Parks Department in the summer of 1969 when a "public enquiry" was held by Pollution Probe into the death of a number of ducks, found by Probers on Toronto Island. Pollution Probe activities have included a mass procession and funeral service for the Don River, and publication of the phosphate content of particular brands of detergents, which was followed very quickly by an announcement by Federal Minister of Energy, Mines and Resources, the Honourable Joe Greene, that phosphates would be banned from detergents in Canada by 1972. Probe activities also played a role in the Ontario Government decision in November 1969 to ban the use of D.D.T. Recently Probe has been attacking the air pollution problem, specifically the sulphur dioxide emitted by Ontario Hydro's Hearn Generating Station. Dramatic Probe advertizements on air pollution have also been reaching the general public in the Toronto Telegram (Figure 5). Pollution Probe now employs four full-time personnel and has an army of volunteers working on various pollution problems.

In addition to joining and supporting the activities of GASP and Pollution Probe it appears, from the surveys reported above, that Toronto citizens are anxious to do more and see more done about the problem. The Shepherd survey asked about the appropriate use of penalties against polluters. The results are listed in Table 9. While a majority of 55% would prefer a warning to be used as the first government action, as many as 37% thought that action should begin with a fine, and 58% thought that eventual action should involve closing down the polluting

TABLE 9
SUGGESTED PENALTIES AGAINST POLLUTERS IN TORONTO*

Penalty	Percentage of Respondents Preferring as	
	First Action	Eventual Action
A warning	55	-
A token fine	14	1
A stiff, substantial fine	24	37
Closing down the polluting operation	6	58

* Q: Which penalties against polluters would you support as a first action? Which of these is the strongest measure you would not accept as unreasonable for eventual action?

operation. In addition two respondents urged jailing the offenders.

The Shepherd survey also asked about willingness to pay. Recognizing the limitations of this type of question in which the respondent only has to say what he is willing to do with no immediate fear of actually having to do it, it is interesting to compare Toronto responses with those in a recent U. S. national opinion poll run by Gallup for the National Wildlife Federation.¹⁸ The U. S. question asked about the willingness to pay increased taxes to improve natural surroundings. The Shepherd survey question was specifically directed to pollution control in Toronto. As indicated in Table 10, the distribution of responses in Toronto was more extreme than the U.S. national sample. In Toronto there

¹⁸Cahn, op. cit.

If we left it to most industries, the only plants that would ever grow in Toronto would be manufacturing. Not natural.

Industry is a great part of Toronto. It keeps thousands upon thousands of us employed. It turns out great products for our consumption. And attracts business from all over the world. That's good.

But industry does a lot of other things, too. It usually builds its plant by some nice unsuspecting body of water like (the Don, the Humber, Highland Creek, or the Lake) and then proceeds to pour its wastes (including the phosphates you've been reading about) into it. Then they get those smoke stacks working and fill the air with all kinds of junk that we get the lucky opportunity to put into our lungs. That's bad.

When we confront these kinds of industry, they tell us it's progress that's making this country go. That young people like us should find out that we can't change society. And besides, if the government wants to do anything, we're told, it'll have to be through tax priorities and so on.

It's kind of hard to believe that this is possible when to

begin with it's our water. And our land. And our air that they're dumping all this junk into. And now it would appear to get it cleaned up or even to get someone to think about cleaning it up will cost us to have it done. Somehow that doesn't seem right.

If you agree, join with us. Write to your Mayor; your Provincial Member; your Federal Member or even our Prime Minister. Find out what they're going to do about the way industry treats our environment. Find out how they intend to stop pollution before it becomes pollution. Find out why it can't be done now. Find out why it's allowed in the first place. Find out. And like we intend to do, don't stop until you get an answer. A damn good one.

If we've succeeded in planting an idea in your mind and some action in your concern, then we've planted a good idea. One that will grow and flourish naturally without the hazards of some kind of mental pollution our society will try to supply.

We can use anything you'd like to contribute to help us work toward cleaning up our polluted air, water and land. If you would like to help us, we'll send you a button and a receipt for tax purposes, if you send us this coupon. Thanks.

Cheques payable to: University of Toronto - Pollution Probe

Name: _____

Address: _____

City: _____

Do it. Pollution Probe at the University of Toronto.

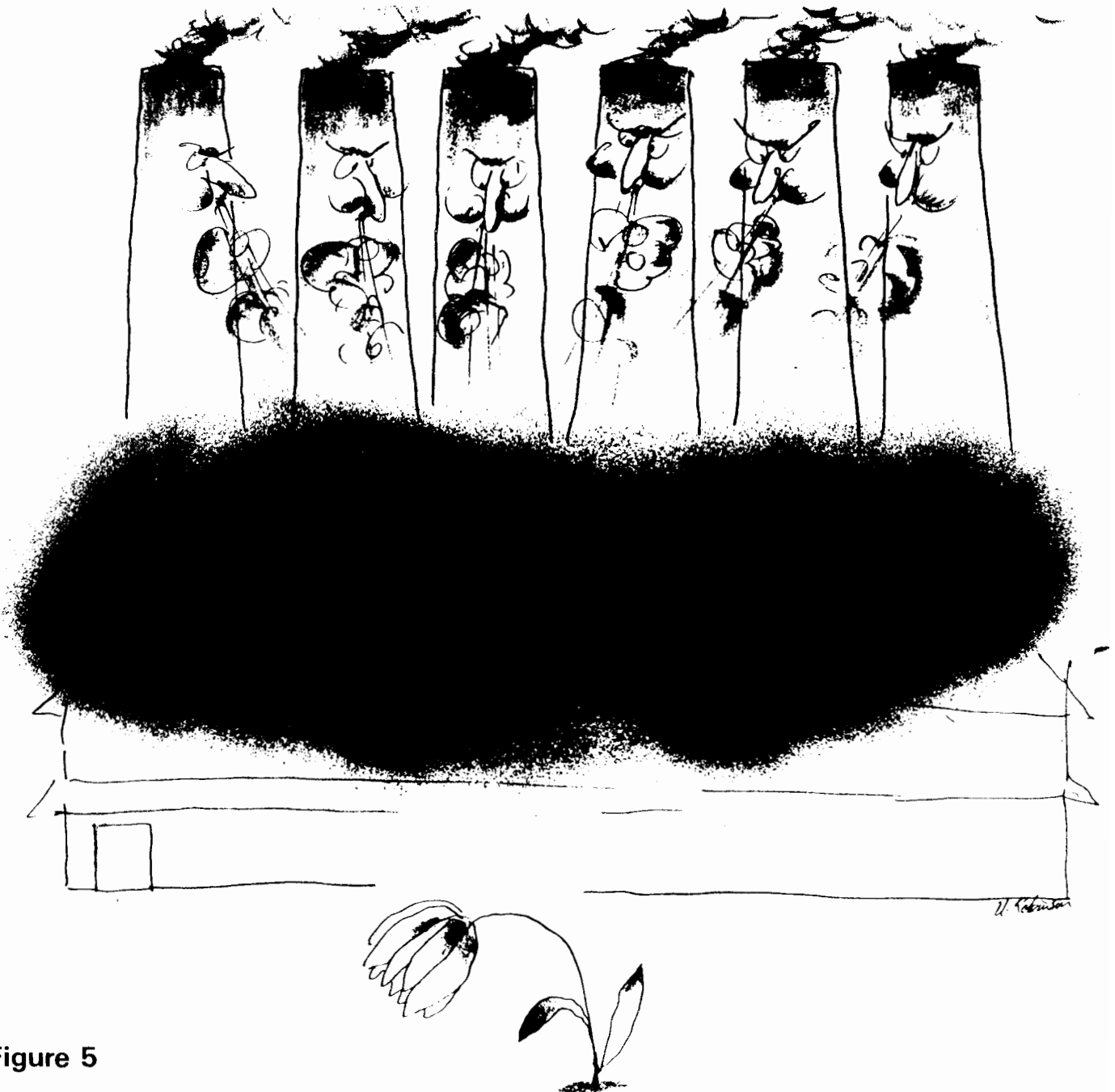


Figure 5

TABLE 10

SUGGESTED FINANCIAL CONTRIBUTIONS IN TORONTO AND THE U.S.*

	Percentage of Respondents Willing to Pay	
	Toronto	U. S.
None or noncommittal	41	27
Small amount (\$10 or less)	12	51
\$10 - \$40	14	-
Moderate or large amount (\$40+ in Toronto \$50+ in U.S.)	29	22

* Q: (In Toronto) Considering the problem of pollution and that in the final analysis the public, you, pays for it either in taxes or cost of goods and services, how much money in total do you think you yourself would be willing to contribute per year to eliminating pollution?
(In U. S.) How much would you be willing to pay each year in additional taxes earmarked to improve our natural surroundings?

were both more people unwilling to pay, and more willing to pay a moderate or large amount. Even with the high degree of public awareness, 41% in Toronto were unwilling to pay or were noncommittal. On the other hand, 29% of Shepherd's respondents did say that they would pay \$40 or more annually. In Toronto 58% thought that the polluter should bear the costs, 23% thought the government should pay and 15% supported a shared cost arrangement.

Implications for Public Policy

Toronto citizens are highly aware of air pollution, they are getting organized and they are anxious for something to be done. They are even willing to pay. Their awareness, however, has been generated to a considerable degree by the mass media and the potentially most dangerous pollutants are not those that can be readily detected by the senses. The problem is seen as more serious for the city as a whole than for a person's neighbourhood. Under these circumstances there is some danger that the sense of urgency will decline, that the crisis will pass and that the public will again become apathetic. The consequences of such an event would probably be that little would be done to curb the growth of the problem, and a steady decline would take place towards a disaster in the future.

There is therefore a need to seize the present opportunity. Government action has so far been cautious, deliberate and slow. Air pollution control in Ontario has now been taken over by the province. The Metropolitan Toronto Department of Works, Air Pollution Control Division, was replaced in 1967 by the Air Pollution Control Service, Ontario Department of Health, and in 1969 by the Air Management Branch of the Department of Energy and Resources Management. The attitudes expressed by public spokesmen, however, do not suggest that vigorous action is going to be taken. The approach being adopted is still fairly caricatured by the two cartoons shown in Figures 6 (Stevenson, The New Yorker) and 7 (J. Mirachi, True, The Man's Magazine). The pollution



Figure 6

'YES ?'



'We don't like to make a fuss. See if you can do something about it, will you?'

Figure 7

problem, however, by its nature is not one that is amenable to quick solutions. The process of cleaning up the atmosphere is one that will take a long time. It is to be hoped therefore that the present furor over air pollution will not collapse into unconcern or indifference, but that it will settle into a quieter but more solidly based and well-informed mould in which citizens organizations can play a useful watchdog role. To achieve this state of affairs strong government action on air pollution is needed. This should include not only legislation and its enforcement and of course more research, but also should involve the systematic provision of information to the public, perhaps through Information Canada among other ways, and a continual monitoring not of the pollution only but of the levels of public awareness and concern. A Toronto radio station has recently begun to broadcast air pollution observations along with daily weather information and similar reports are printed daily in the Toronto Telegram. Often government officials refuse to release information because they legitimately fear that it will be misinterpreted or misused. It is true that undue public alarm can be generated by giving unqualified people access to technical information, but in the present state of society that appears a lesser risk than the increasing suspicion, mistrust and alarm that can develop when the public wants information about a problem which it has reason to worry about and finds that governments are secretive.

Most of the information reported in this paper is subject to a degree of inaccuracy and the inferences drawn can only be tentative. Yet it

shows once again the need of the public to be reassured that governments are doing their job, and the need for governments in turn to be better informed about public attitudes and perceptions.