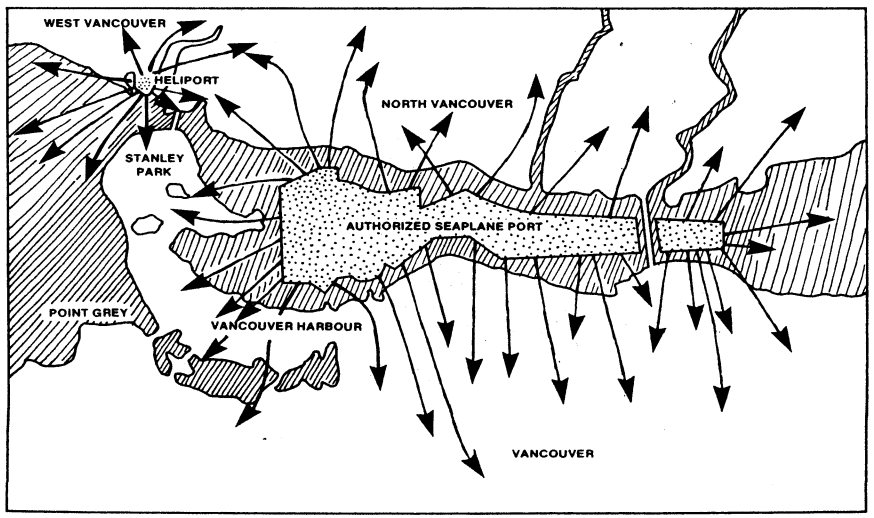
PART II: HI-FI TO LO-FI SOUNDSCAPE

A hi-fi system is one possessing a favourable signal to noise ratio. The hi-fi soundscape is one in which discrete sounds can be heard clearly because of the low ambient noise level. The country is generally more hi-fi than the city; night more than day; ancient more than modern. In a hi-fi soundscape even the slightest disturbance can communicate interesting or vital information. In a lo-fi soundscape individual acoustic signals are obscured in an overdense population of sounds. For the most ordinary sounds to be heard, they must be increasingly amplified, which in turn raises the ambient noise level. In the ultimate lo-fi soundscape the signal to noise ratio is 1 to 1 and it is no longer possible to know what, if anything, is to be listened to.

The lo-fi soundscape results when accidental, trivial or boring sounds are allowed to proliferate unchecked. The purpose of this part of our study is to show how Vancouver is slipping steadily into the lo-fi condition. To do this we will concentrate on a few characteristic examples.

Vancouver's Seaplane Menace

We have already mentioned how Vancouver's interesting ferry whistles are today being replaced by seaplane drones. It is not unique to have an airport in the heart of a city, but Vancouver's in-town airport is unusual, for it is situated in the inner harbour. Several seaplane companies operate both regular and charter flights out of the harbour, and the aircraft on take-off are permitted to fly in all directions over the city. Normally aircraft are required to keep to minimum altitudes, but this does not apply over Vancouver since the aircraft are taking off and landing.



The Ministry of Transport has measured the noise at 94 dBA at take-off a few blocks away at a downtown bank (as a result of complaints). As the flight movements of seaplanes are not monitored, no accurate figures of the annual traffic would seem possible; nevertheless, the MOT's public relations staff have pulled out the following hopeful figures:

1968 — approximately 15,000
1969 — 8,070
1970 — 12,614
1971 — 7,373
1972 — 6,874

This appears to be outright deception. We offer our own figures, based on actual counts. On three separate days in 1970, observers stationed in Ambleside Park counted not less than 61 overpasses per 8-hour day; that would be an annual traffic of 23,000. In July 1973 we confirmed a substantial upward trend by repeating our three day count and discovered that over an eight-hour period the number had increased to 106 overpasses on the average, i.e., 38,700 per year. These counts represent the traffic at one end of the harbour only.

In 1969 we conducted a social survey on seaplane noise among 32 residents on Sentinel Hill, next to Ambleside Park, where we made our counts. We repeated this again in 1973 among 30 residents in the same area. The principal results are shown below.

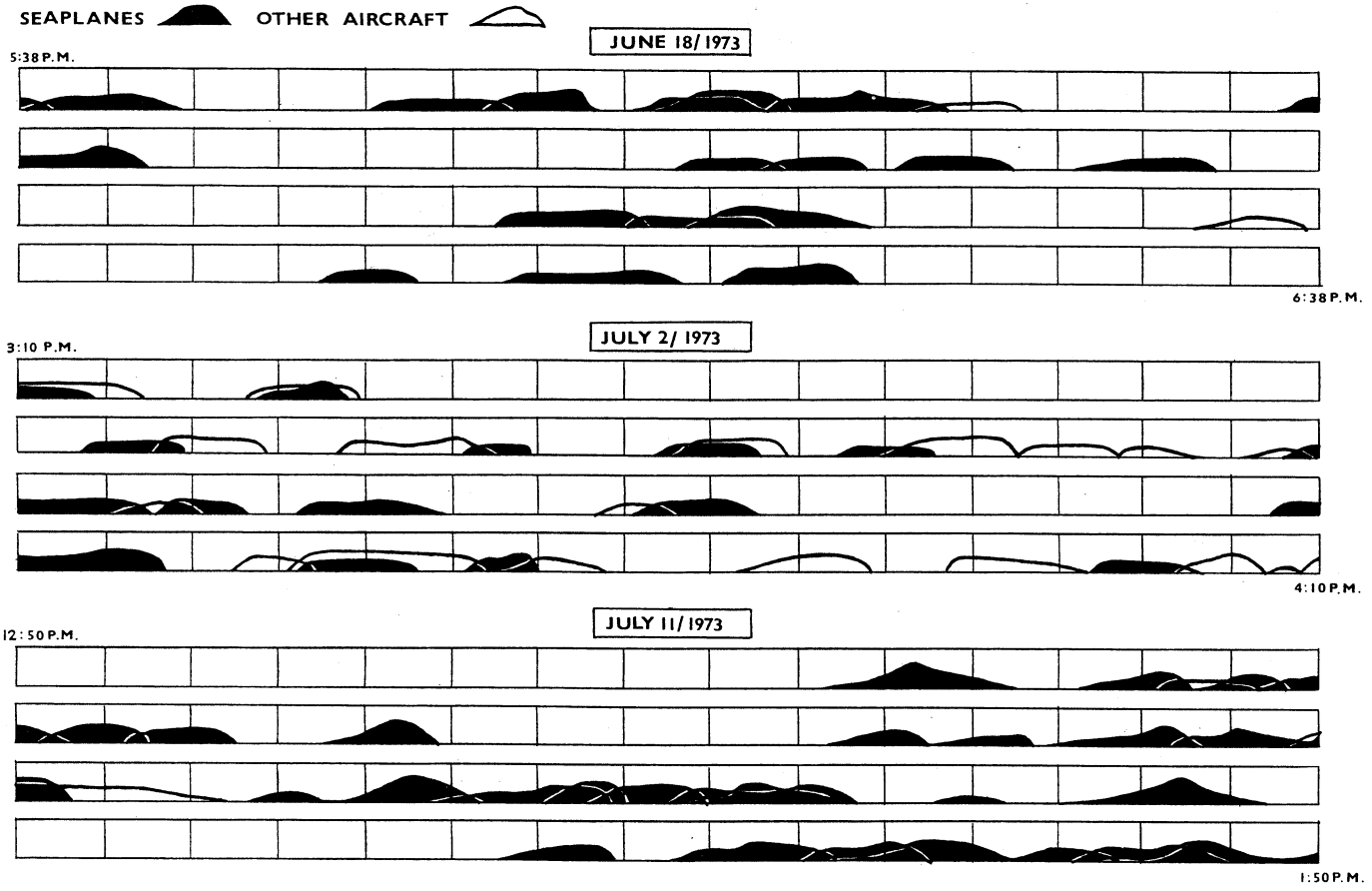
Question	1969 Survey	1973 Survey
Have you ever been bothered by the sound of seaplanes?	Yes 8 No 22	Yes 7 No 23
How would you describe this?		
Very annoying	1	2
Annoying	1	2
Occasionally annoying	8	9
Not annoying	20	16
Never notice them	—	1
Could you estimate in numbers how many flights of these aircraft there are per day over your home/work?	8 average	16 average
Do you think over the past year these flights have been increasing?	19	18
about the same?	5	12
decreasing?	1	—
Have you ever complained about the noise?	Yes 0 No 32	Yes 1 No 29

The most startling fact in this survey is the discrepancy between the number of planes residents imagined they heard and the number that were actually present: 1969 — compare 8 with 65; 1973 — compare 16 with 106.

We have also recorded similar discrepancies with other sounds. In one survey we counted the number of motorcycles passing down a given street and then asked residents on the street to estimate the number passing. The actual number was approximately ten times the estimated number. Further studies of this kind could help illuminate the workings of aural perception, how certain unnoticed sounds may be drawn forward into relief to become what the psychologist would call figures. It is a fact that every society hears differently because they are conditioned to listen for different things, but how these changes in perception take place is still a mystery.

Why are we so anxious to draw sounds like seaplanes forward to conscious attention? If they are inconspicuous to most people why create trouble? Because little by little they are menacing other more delicate or interesting sounds in the environment, so that by the time they rise to the level of consciousness, irreparable damage may have taken place.

An illustration: The diagram shows the amount of time the sky over Stanley Park is filled with aircraft noise, from the moment each aircraft appears on the acoustic horizon until it disappears. In 1973 this amounted to 27 minutes per hour. From our seaplane counts and time logs, we can now make an educated guess as to when the drone of aircraft noise over Stanley Park will be total and uninterrupted if the present trend continues: 1981.



Parks and Parkways

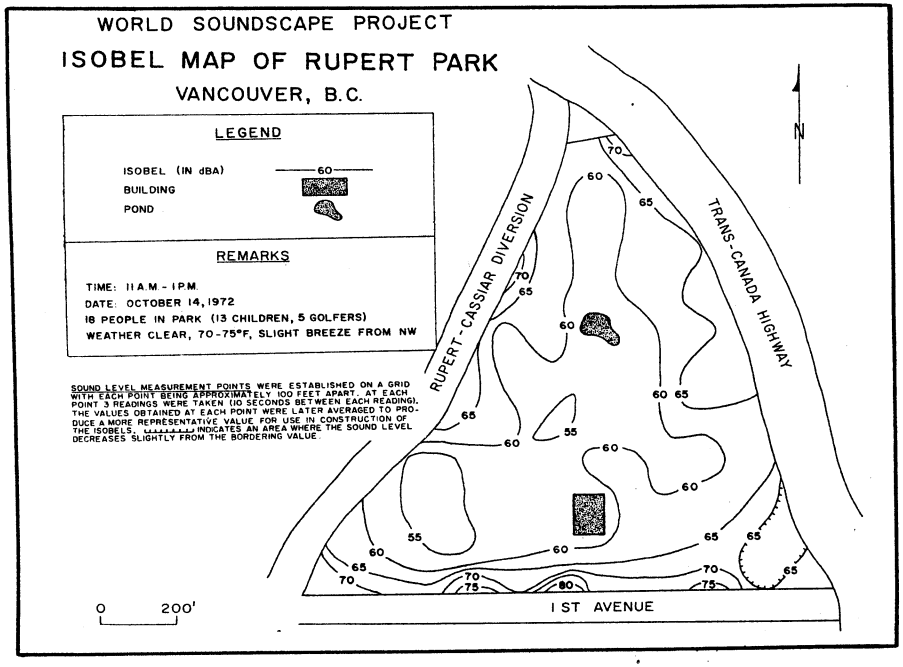
Stanley Park, from a brochure put out by the Board of Parks and Recreation:

> *It is a haven of tranquility and wonder nestled in the heart of a great city.*

Vancouver has many picturesque parks, but tranquility is not one of their features.

The most egregious example of bad park planning is Rupert Park. A triangular area, surrounded on three sides by main arterial roads and a freeway, Rupert Park has little to offer in the way of respite from city life. The traffic noise is continuous and nowhere in the park does it drop below 45 dBA in the daytime. The average is closer to 55, eight decibels above the maximum level established for normal conversation at 12 feet. [12] Rupert Park has never attracted many people to its treeless expanse, which includes a pitch-and-putt golf course and a football field.

12) D.W. Robinson, "An Outline Guide Criteria for the Limitation of Urban Noise", *Aero Report AC39*, National Physical Laboratory, March, 1969.

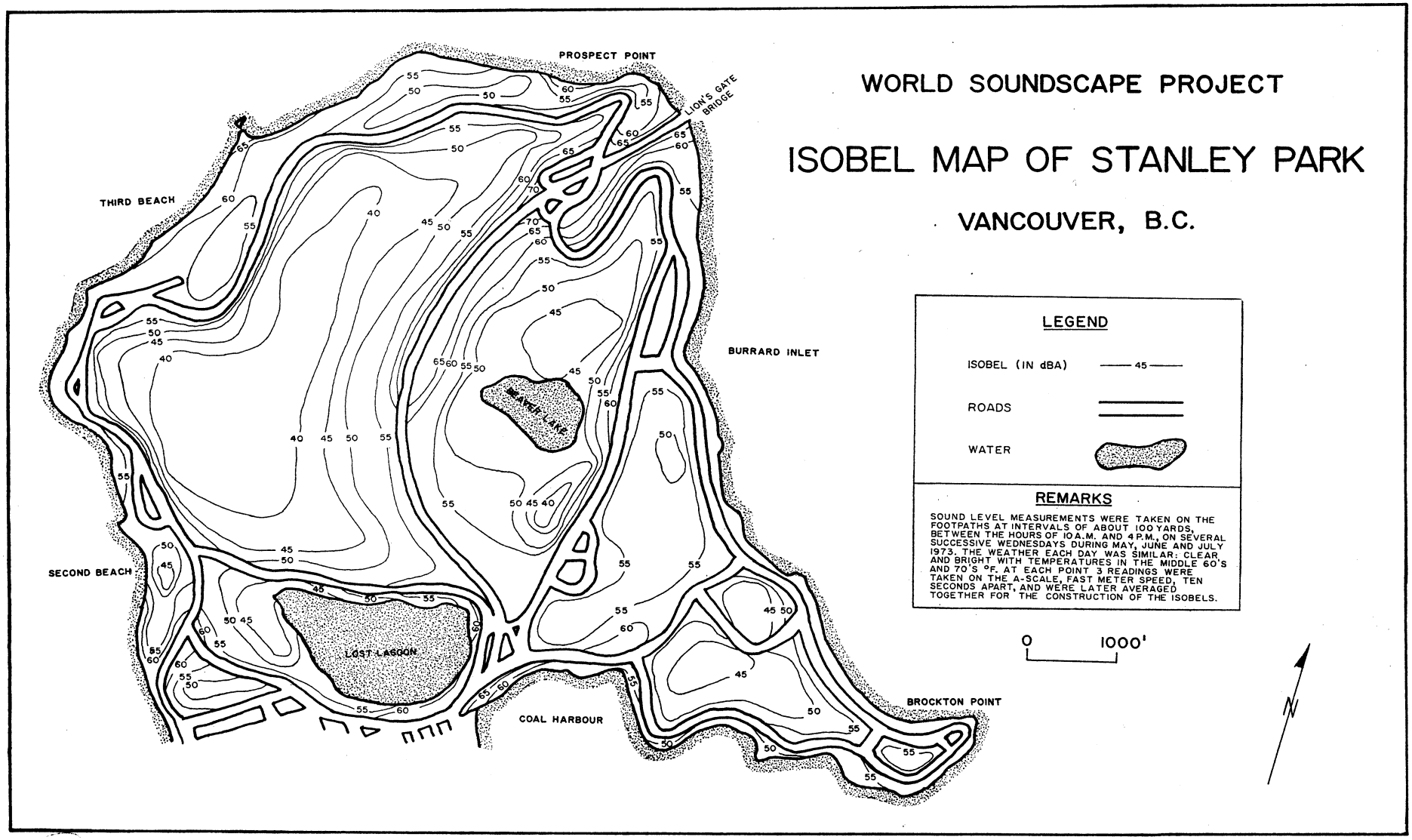


The best time to visit Stanley Park is on a windy day, when the traffic noise in some of the more remote areas is obliterated by the sound of fir and cedar carried in the wind, or when the surf on the western shore is strong. Another good place for listening is at Lost Lagoon. Soft breezes make pretty music through the weeping willow trees, and in spring one can hear myriads of songbirds and nesting waterfowl. A unique little bridge spans a small creek which pours into the lagoon. By standing at the right point beneath the bridge and clapping, the listener will hear a chattering echo of up to 50 repetitions of the original sound. Whistling in short bursts produces an even stranger effect. (The phenomenon is explained by the parabolic construction of the bridge-sides, which reflect sound waves, originating from a point called the "focus", with almost perfect fidelity.) (Record 2, Side 2.)

The soundscape of the western side of Stanley Park, with its natural, open, windward expanse of forest and sea, is very different from that of the eastern side with its Zoo, Aquarium and general harbour ambience. This division can be quite noticeably heard as one walks around Prospect Point from west to east; the sound of waves is replaced by that of humming industry and train whistles, all mixed with the droning traffic noise high above on the Lions Gate bridge.

On busy weekends the developed, harbour side of the park is alive with sounds. The puppet shows, the whale shows, the popcorn men and the Zoo's animals are all there, mixing with several fountains, the inevitable overhead seaplane parade, the portable radios, crying infants, and the constant tooting of the toy railway's steam whistle. But the loudest sound of all is that of the Hoolack Gibbons, whose amazingly human cries spill out of their cages at a peak level of 110 dBA. (Record 1, Side 2.)

The tragedy of Stanley Park is the major highway which divides it in half, sending traffic speeding to and from the Lions Gate Bridge and the North Shore. Until that road is buried in a tunnel and the Coal Harbour seaplane traffic is sunk, Stanley Park will continue to disappoint any tourist in search of more than visual pleasure.


WORLD SOUNDSCAPE PROJECT
ISOBEL MAP OF STANLEY PARK
VANCOUVER, B.C.
PROSPECT POINT
LION'S GATE BRIDGE
THIRD BEACH
BURRARD INLET
SECOND BEACH
LOST LAGOON
COAL HARBOUR
BROCKTON POINT
LEGEND
ISOBEL (IN dBA) 45
ROADS
WATER
REMARKS
SOUND LEVEL MEASUREMENTS WERE TAKEN ON THE FOOTPATHS AT INTERVALS OF ABOUT 100 YARDS, BETWEEN THE HOURS OF 10 A.M. AND 4 P.M., ON SEVERAL SUCCESSIVE WEDNESDAYS DURING MAY, JUNE AND JULY 1973. THE WEATHER EACH DAY WAS SIMILAR: CLEAR AND BRIGHT WITH TEMPERATURES IN THE MIDDLE 60'S AND 70'S °F. AT EACH POINT 3 READINGS WERE TAKEN ON THE A-SCALE, FAST METER SPEED, TEN SECONDS APART, AND WERE LATER AVERAGED TOGETHER FOR THE CONSTRUCTION OF THE ISOBELS.
0 1000'
N

The Bad Breath of Buildings

Buildings have always made sounds. Floors creak, timber snaps, radiators crack, furnaces groan. It is a fascinating exercise to study the way deserted buildings breathe with a life of their own, independent of the sounds man may make in them. But although buildings of the past made characteristic sounds, they cannot compete with modern buildings for the strength and persistence of sound emitted. Modern ventilation, lighting, elevators and heating systems create strong internal sounds; and fans and exhaust systems disgorge staggering amounts of noise into the streets and onto the sidewalks around the buildings themselves.

Architects and acoustical engineers have often conspired to make modern buildings noisier. A well-known practice today is to add white noise (a continual hissing sound) or mechanical vibrations to new buildings to help mask footsteps, typewriters or even speech. Following this well-defined international practice, a local firm of acoustical consultants recently recommended the installation of a white noise generator in the new Sedgewick Library at the University of British Columbia.

Walking around the city with a sound level meter (General Radio Model 1551-C) we took a number of readings. Sound level meters generally have a number of weighting networks, designated as A, B and C. The A scale discriminates against low frequencies, while the C scale does not. It is normal for readings on the C scale to be a few decibels higher than those on the A scale, because of the inclusion of normal low frequency sounds, but when they are as much as 10 decibels higher, the presence of excessive low-frequency rumbles and vibrations is revealed. This was almost uniformly the case with the following readings.

The quietest place we could find downtown was the library of the Courthouse (built 1908) at 55-62 dBC. The Vancouver Public Library, on the other hand, was 60-72 dBC; and inside the elevator this rose to 78-82 dBC! For some of the city's major downtown hotels we obtained the following readings:

Georgia Hotel	— Lobby: 62-73 dBC
	— Elevator: 62-68 dBC
	— Upper corridor: 60-69 dBC
Devonshire Hotel	— Lobby: 61-70 dBC
	— Elevator: 68-76 dBC
	— Upper corridor: 65-72 dBC
Hotel Vancouver	— Lobby: 62-74 dBC
	— Elevator: 70-80 dBC
	— Upper corridor: 64-70 dBC.

Man has a need for quiet groves and times. In the hearts of cities, the quiet vaults of churches should serve this purpose, as should libraries and hospitals. In Christ Church Cathedral, in the centre of Vancouver, we measured the sound at 60-70 dBC. We then stepped out the door and measured the traffic at 82-92 dBC. Other churches fared a little better. Holy Rosary Cathedral was 51-64 dBC; the First Baptist Church was 60-63 dBC in the Chapel and St. Andrew's Wesley measured 46-50 dBC at the altar.

Most studies recommend a maximum level of about 45 dBC for hospitals and convalescent homes. At St. Paul's hospital we took these readings:

First Floor by elevator:	60-68 dBC
In various patients' rooms:	61-69 dBC
	58-60 dBC
	80-84 dBC (with construction noise)
	62-72 dBC (without construction noise)
	54-58 dBC
	60-62 dBC
Blood Bank Lab:	76-80 dBC (door slam at about 96 dBC)
Haematology Lab:	78-81 dBC
Pathology Lab:	64-72 dBC (empty)

Among downtown stores the old Birks Building (scheduled for demolition) was the quietest at 62-70 dBC. It was also the only one without Moozak. The Hudson's Bay Company's downtown store gave 71-78 dBC on the first floor and the newest building of all, Eaton's downtown store, completed in 1973, gave 67-75 dBC. Also at Eaton's we measured an external ventilator, stupidly placed above a sidewalk, at no less than 84 dBC.

The ambient sounds, which account for the readings obtained here, are mostly unnecessary and boring. They tend to mask other more delicate sounds. They make speech more difficult. And, of course, they destroy the tranquility of the mind. One of the purposes of walls is that they should isolate sounds, but today we have isolation produced by walls of sound. One of the most insidiously abusive sound walls is that created by wired background music systems, to which we give the bovine name of Moozak. (Record 2, Side 2.)

Moozak

One Sunday afternoon in spring, amid a great sprawl of utilitarian buildings, monster-scale boulevards and a continuous air-conditioner roar so pervasive it surely conditions more than the air — all this known as the University of British Columbia — a young mother decides to show her tot the Faculty of Agriculture's herd of milk cows. Sticking their heads in the cowbarn they perceive stalls of cows wearing tin number plates rivetted to their ears, rolling their soulful brown eyes and slavering as the wired background sound system blares on with the "Love Theme" from the film *Doctor Zhivago*. This sound-slick, which spreads its artificial sweetening to all levels of the community, is called by its manufacturers a product of Human Engineering; but it recognizes no marked difference between humans and cows.

Moozak now affects everyday life over much of the globe, and it is expanding rapidly to cover the rest of it. There are half-a-dozen distributors listed in the Vancouver directory. One of the ads boasts:

> MUZAK IS MORE THAN MUSIC/PSYCHOLOGICALLY PLANNED — FOR TIME AND PLACE/JUST FLIP THE SWITCH — NO MACHINES TO ATTEND/FRESH PROGRAMS EACH DAY — NO REPETITION/ ADVISED BY BOARD OF SCIENTIFIC ADVISORS/OVER 30 YEARS OF RESEARCH/ PAGING AND SOUND SERVICE/FAST ROUND-THE-CLOCK SERVICE/MUZAK BRAND EQUIPMENT/OFFICES — INDUSTRIAL PLANTS — BANKS/HOSPITALS — RETAIL STORES — HOTELS AND MOTELS/RESTAURANTS — PROFESSIONAL OFFICES/
> *Specialists in the Physiological Applications of Music* [13]

There is no doubt that sonic brainwashing is big business, and although no precise growth statistics have ever been made available to the public, it is safe to say that the application of Moozak is constantly rising in public places. Offices, banks, restaurants, supermarkets and shopping malls all have built Moozak into their construction. Numerous schools in Vancouver have Moozak in the corridors and Simon Fraser University has been so propositioned as well.

Facts on Moozak program design are hard to find. The programs are selected and put together in several large American cities for mass distribution. The pieces chosen for inclusion are always "pretty"; for just as wallpaper is never sad, Moozak never weeps. The arrangements are planned in rhythmic cycles, (i.e. a steady build in dynamics and tempo, repeating every 15 minutes). This is supposed to give a sense of what advertising calls "a progression of time" — that is, the illusion that time is dynamically and significantly passing. The implicit malaise behind this claim is that for most people time is not dynamically and significantly passing.

We talked to some of the local Moozak distributors. Each said that "research" was done by the parent companies in the USA, but that they didn't know the details themselves. All they had were the brochures advertising the product.

The method of presentation varies from company to company, ranging from on-location LP-record units to wired-in services from a remote source. The cost to install and maintain Moozak depends on reproduction 'quality', but high fidelity is not a basic concern.

We visited several shopping malls in the Vancouver area and talked to employees and consumers. We interviewed 108 consumers. They represented a cross-section of the shopping public, a close balance between males and females of varying ages and occupations. We spoke to mill-, dock-, sheetmetal and officeworkers, sales-, garbage-, fire- and repairmen, teachers and students, clerks, nurses, retired and unemployed people; we met housewives, a minister and a manager, a telephone operator and a cook, a bus driver, and a welder.

Standing near a speaker outlet, we asked each consumer the same questions. Most of them said they frequently shopped there and had noticed the Moozak playing. About half found it "pleasant", "soothing", "relaxing" or "easy to listen to". About a quarter, generally younger, called it "noise pollution", "annoying", "disgusting". The others couldn't say or didn't seem to care. Two-thirds said they neither sang nor played musical instruments, and graded their experience with music as moderate or slight. The musicians inevitably disliked the Moozak. The majority of shoppers polled said at first — almost automatically — that Moozak made the mall a "nice" place with a "nice" atmosphere for shopping and browsing. Most of these same people agreed that the idea was to coax them to buy more, yet they thought that they were free of this influence.

We also asked questions — some the same, some different — of 25 employees working in the malls. Most of them wished they themselves had control over the Moozak output. They complained that the speakers were poorly positioned and that it was hard to get distributors to fix faulty speakers. Some would prefer to play their own favourite music, or to be able to adjust the volume control themselves. When told that Moozak was used to increase work production, most of the employees stated that it did not affect them. And finally, while 75% of the consumers believed that Moozak did not make them buy more, 60% of the employees believed that it did.

13) *Vancouver Telephone Directory*, "Classified Section", British Columbia Telephone Company, 1972, p. 424.

PART V: VANCOUVER'S NOISE POLLUTION PROBLEMS

In the last section of this study we documented the ways in which the Vancouver soundscape was slipping from a hi-fi to a lo-fi condition. This slippage is now taking on the aspects of a pollution problem. In 1969 we conducted a social survey of 650 Vancouver residents and asked them: "To what extent do you find noise a problem in modern life?" The replies ran as follows:

Major problem	17.4%
Important problem	41.4%
Minor problem	30.5%
No problem	10.7%

To the question: "Are you in favour of more research into the problems of noise, even if it costs you money?" 76.1% replied "yes". We also asked Vancouverites to rank order many of the commonest sources of noise complaint with the following results:

Item	Found noisy by no. of residents
Trucks	549
Motorcycles	497
Cars	482
Helicopters	407
Sirens	357
Power Saws	303
Power Lawnmowers	298
Construction	298
Jet Aircraft	271

When we asked Vancouverites whether they were familiar with existing noise legislation in their city, 73.3% were not.

The various municipalities making up the Greater Vancouver Regional District each have their own anti-noise by-laws, and the variation from one district to another is dramatic. After an extensive study of all existing noise abatement legislation in Canadian communities, World Soundscape researchers came to the conclusion that the municipality of Burnaby possesses the best legislation in the country. This by-law, passed in 1972, sets limits in decibels for most common technological noises; but more than this it contains provisions for reducing these limits over a series of five-year intervals. [14] It is the first community legislation in Canada to indicate the intention to *reduce* the noise-pollution problems, though 18 months after passage only 3 charges had been laid. Burnaby hopes to educate the public so that strict enforcement will not be necessary.

By comparison with the Burnaby by-law, those of most municipalities in Greater Vancouver are sloppy or antique. Witness this paragraph from Vancouver's (By-law No. 2531, 1938):

No hawker, huckster, peddler, petty chapman, news vendor or other person shall by his intermittent or reiterated cries disturb the peace, order, quiet or comfort of the public.

There are no provisions in this by-law for the noisier sounds of technology except to prohibit construction noises in the middle of the night — and the Mayor may even grant dispensations for this abuse.

As a demonstration of how this shoddy legislation operates in the protection of the heavy-weight noises of technology and against human beings, the infamous case of *Regina vs. Clay Harold* is noted. On March 19, 1971, the Vancouver Court of Appeal, employing this by-law, tried and convicted some members of the Hari Krishna sect for singing and worshipping God on the corner of Georgia and Granville Streets in downtown Vancouver. The conviction was appealed but the appeal was also lost. At the same time as this case was proceeding, we measured the noise of the construction of the Pacific Centre building on the opposite corner at over 90 dBA across the street — that is considerably louder than any human could ever sing or shout at that distance.

14) The limits established by Burnaby's Noise By-law No. 6052 (1972) are as follows:

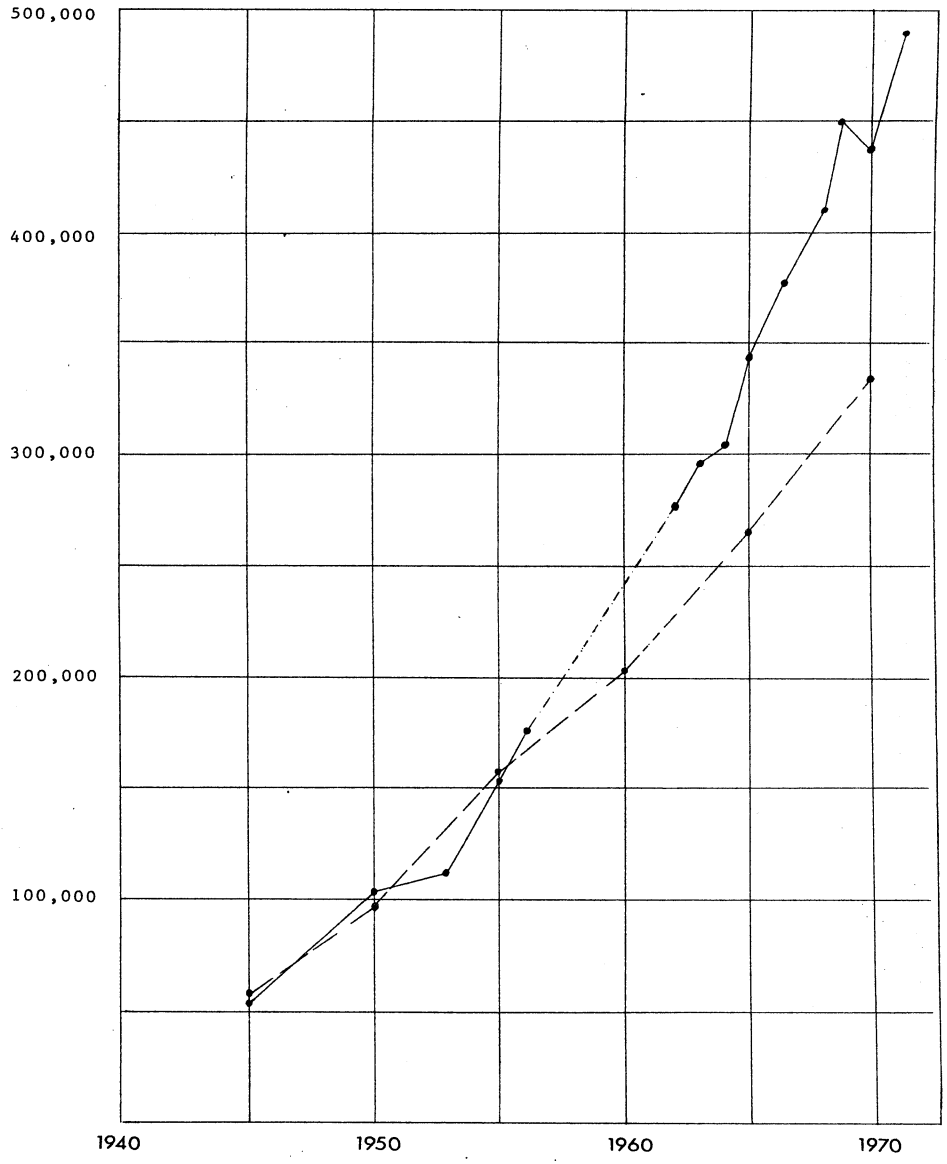
Source	Minimum Distance from Source	Maximum Allowable Noise Level In dB(A) re .0002 Microbar		
1. Continuous sound in a residential, public and institutional or multiple family district.	on or within 20 ft. of the property line	55 (day) 45 (night)		
2. Continuous sound in a commercial, industrial, comprehensive development or agricultural district.	on or within 20 ft. of the property line	To June 1/73 70 (day) 65 (night)	June 2/73 To June 1/78 65 (day) 60 (night)	After June 1/78 60 (day) 55 (night)
3. Non-continuous sound in a commercial, industrial, comprehensive development or agricultural district.	on or within 20 ft. of the property line	After June 1, 1978 80 (day) 75 (night)		
4. Passenger vehicle or truck with rated gross vehicle weight of 6,000 lbs. or more.	20 ft. from exhaust pipe opening	To June 1, 1978 88 (30 mph zone) 92 (faster zone)	After June 1, 1978 80 (30 mph zone) 87 (faster zone)	
5. Passenger vehicle or truck with rated gross vehicle weight of less than 6,000 lbs.	20 ft. from exhaust pipe opening	To June 1, 1978 80 (30 mph zone) 85 (faster zone)	After June 1, 1978 70 (30 mph zone) 80 (faster zone)	
6. Motorcycle	20 ft.	To June 1, 1978 80 (30 mph zone) 85 (faster zone)	After June 1, 1978 75 (30 mph zone) 80 (faster zone)	
7. Power lawnmower or power gardening tool.	on or within 20 ft. of property line	To June 1, 1978 87	After June 1, 1978 77	

In 1971, the Greater Vancouver Regional Council commissioned an extensive engineering survey of noise in the Vancouver area. The report concluded: "Traffic noise is the most significant noise at all times. During the day hours local traffic noise was found to be responsible for 40% of all noise sources, while distant traffic constituted 13%. At night the corresponding values were 30% and 26%." [15] Comparing their findings with those of similar surveys conducted elsewhere, the researchers concluded that the noise of Vancouver was some 6-11 dBA worse than that of some American cities in 1954. This is not a particularly meaningful comparison, and this survey will only become useful if it is repeated in Vancouver in an identical manner at some later date. Even then, without an integrating social survey, its value will be dubious. In any case, we have already revealed a much less expensive method of studying the rise in ambient noise by measuring the acoustic signals of the community.

When or if Vancouver ever decides to tackle the noise problem, we suggest they might consider installing several large meters at particular intersections, similar to thermometers or clocks but giving the ambient noise level in decibels. The decibel is a unit of measurement with which people are becoming increasingly familiar today and a display meter would put forward the evidence in an immediate and thought-provoking manner. The display might read:

Below 40 dB is pleasant
Below 60 dB is tolerable
Above 70 dB is annoying
Above 85 dB is dangerous
THE NOISE INDEX AT THIS LOCATION IS CURRENTLY — DECIBELS.

As the decibel is a logarithmic unit, an increase of 10 decibels means a tenfold increase in sound intensity, a 20 decibel rise a hundredfold increase, and a 30 decibel rise a thousandfold increase. The tendency for noise in cities to rise by as much as half a decibel per year must be regarded with alarm. The increase in automobile registrations in Canada indicates that traffic noise will continue to rise unless something is done about it; and Vancouver is well ahead of the increase for the country as a whole; but these facts do not seem to have ignited any special determination to confront the problem by the city administrations.

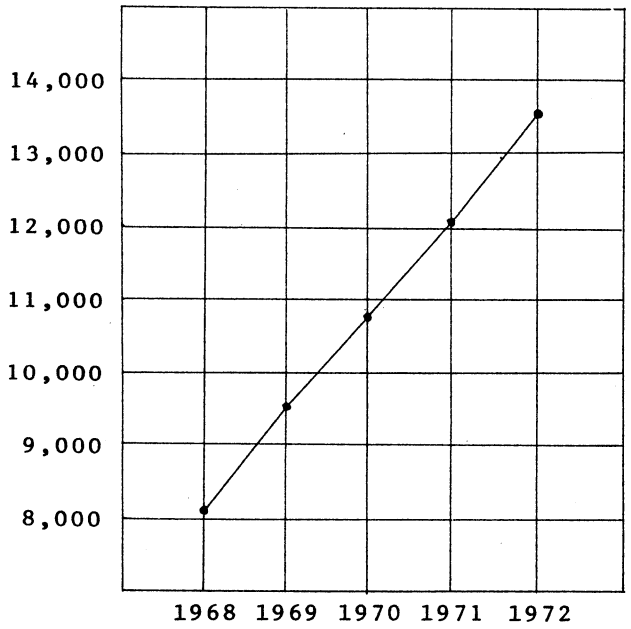


Passenger Vehicle Registrations 1941-1971.

15) *A Community Noise Survey of the Greater Vancouver Regional District,* Barron and Strachan, Consulting Acoustical Engineers.

On the contrary, they appear more inclined to revel in increased noise. In July 1973 an epochal parade took place. Alongside the more traditional activities of the Sea Festival Parade, a new sound was glorified for the first time: the internal combustion engine. First there was a souped-up automobile, which engaged in a series of mock accidents with a troup of clowns, by revving the engine and squealing the brakes. Later the Vancouver Police Motorcycle Squad, which had up to that time confined itself to roaring past the fringes of the crowd, came forward for a musclebound demonstration of their own. Dawdling flatulently in front of the television cameras, they throttled their engines in a manner which under normal circumstances would be enough to warrant police action. The conclusion of the parade was a drag race in which three cars screeched down Granville Street while the spectators reeled back out of the way. For a long time the machine has been the unofficial favourite in Vancouver streets; now it is the official victor.

We have already shown how the sky is becoming a sound sewer. Vancouver's International Airport is rather closer to town than many major airports. Since it is situated on Sea Island, in the municipality



Motorcycle Vehicle Registrations
Vancouver Regional District 1968-1972.

of Richmond, a certain amount of take-off and landing noise is dissipated over the ocean, but much also falls directly over totally built-up residential areas such as South West Marine Drive, three miles to the north.

In the fall of 1972 the Federal Government's plans for expansion of the airport were revealed to the public. The proposed expansion calls for the construction of a major east-west runway one mile closer to the South West Marine Drive area than the existing facility.

The Ministry of Transport is here, as in other Canadian cities such as Toronto and Montreal, trying to bulldoze the plans through on grounds of air traffic demand forecasts; but here as elsewhere vigorous opposition is being encountered from citizens' groups and even local administrators. The Greater Vancouver Regional District in this instance has joined the opposition.

> *The airport is the single noisiest industry in the region. Expansion of the airport threatens to extend the noise pollution from the airport to the point that it may seriously degrade the living environment of approximately 140,000 people, and detract from the pleasurable use of more than 20 parks, 11 golf courses and beach recreation areas.* [16]

Opposition to noise pollution is at last gathering strength in Vancouver. Organizations such as SPEC (Society for Pollution and Environmental Control) established in 1968, and the Vancouver Citizens' Committee for Noise Control, established in 1973, have played an important role. In 1968 the first course in noise pollution at any Canadian University was given at Simon Fraser University.

Whether or not noise pollution will be brought under control by greater conscience for the environment or only as a result of energy shortages and the collapse of industrialism remains to be seen; but the dangers of excessive noise are clear enough. What was once merely a health hazard in specific industries has now swept out to become a world-wide problem, affecting all who live in urban communities. The term given to hearing loss from non-occupational noise exposure is *sociocusis* and the study of sociocusis is beginning to receive careful study. [17] Aside from hearing loss, other research has revealed that noise may contribute to loss of sleep, tension, headaches, reduced vision, sexual impotence, heart disease and mental illness. [18]

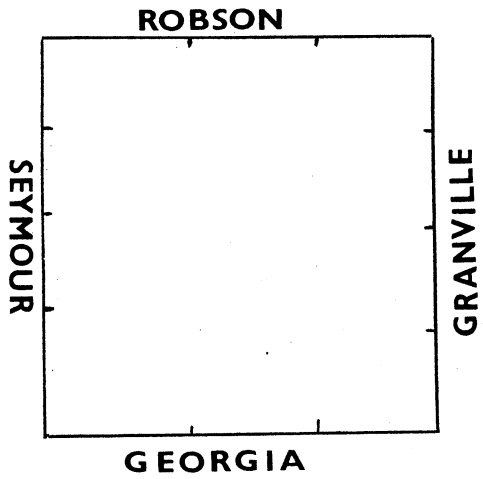
16) *Proposal Re: Vancouver International Airport and Related Issues*, Greater Vancouver Regional District, March 31, 1973.

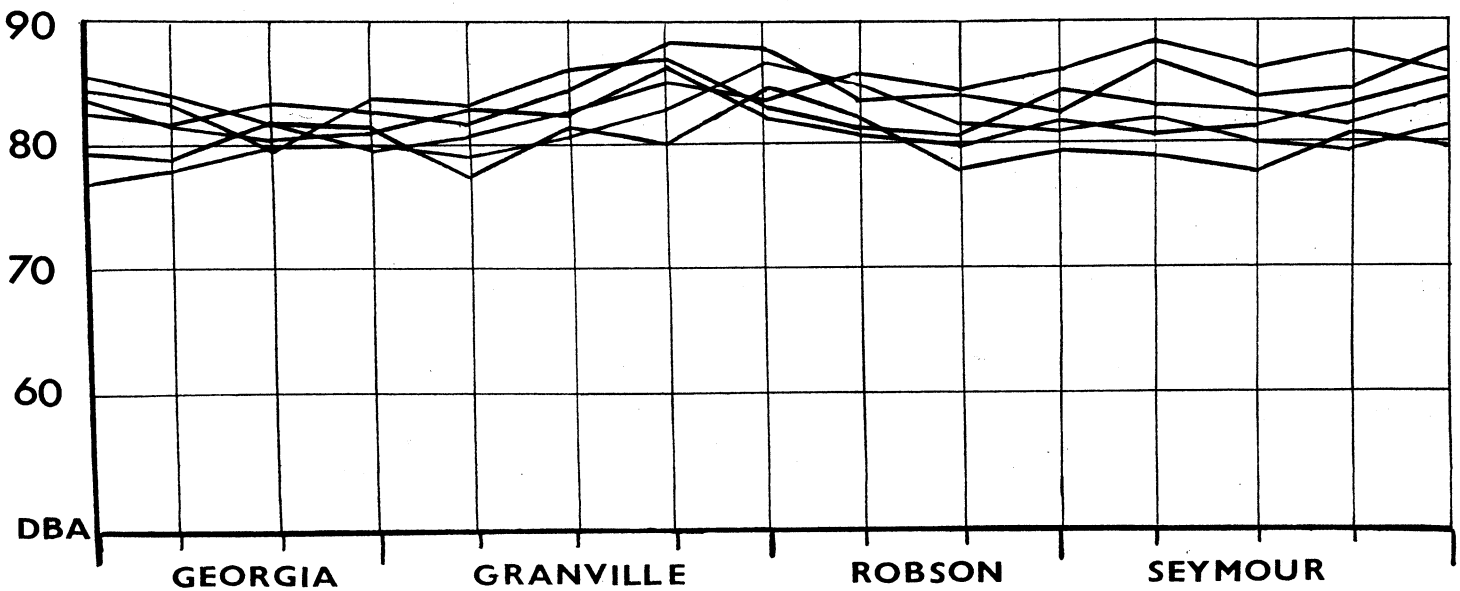
17) See: Alexander Cohen *et al.*, "Sociocusis — Hearing Loss from Non-Occupational Noise Exposure," *Sound and Vibration*, 4:11, November, 1970; and J.D. Dougherty and O. Welsh, "Community Noise and Hearing Loss," *New England Journal of Medicine*, 127:14, October 6, 1966, p. 759.

18) For discussions of noise pollution problems see R.M. Schafer, *The Book of Noise*, and *A Survey of Community Noise By-laws in Canada (1972)*, World Soundscape documents nos. 1 & 4.

Noise beyond, or almost beyond, the hearing range may also affect humans adversely. For instance, high-frequency warning systems (increasingly used in Vancouver stores, where they are often left to run 24 hours a day, transmitting a 19.8 kc. wave pattern throughout the premises) seem to be the cause of several reports of discomfort reported to us in recent months.

The extent to which noise is responsible for these and other ailments still needs further study. Whether community noise has reached levels sufficient to cause hearing loss may be debatable but we might point out that a carefully prepared report by one of our students showed that curbside traffic at the intersection of Georgia and Granville Streets frequently approached the noise level adopted as safe by the B.C. Workmen's Compensation Board for normal working days. In other words a hawker or news-vendor might soon be able to apply for compensation — if he isn't picked up for disturbing the peace first.





Hourly Curbside Traffic Intensity in Downtown Vancouver (1 p.m. - 6 p.m. October, 1972).

BE PACIFIC!

It is often alleged that despite the adverse effects noise may have on our lives, modern man prefers his noisy environment and would have it no other way. While we may habituate ourselves to certain aspects of our environment, there is no reason to assume that man would not, given an opportunity, prefer a return to the purity of the rural hi-fi soundscape.

This was the subject of a study undertaken by John Carter for the World Soundscape Project. Carter interviewed 58 people, 28 living in central Vancouver and 30 living in the country on Vancouver Island, and asked them an extensive series of questions designed to probe their aural sensibility. First, taking a list of ordinary sounds, he asked all interviewees to order them as pleasing, displeasing or neither, to determine whether in the abstract there might be differences between city-dwellers and country-dwellers. The sounds given were: siren, motorcycle, lawnmower, church bell, train whistle, bird song, barking dogs, ocean waves, cat's purr and wind.

Results:

CITY				COUNTRY		
neither	displeased	pleased		pleased	displeased	neither
0	0	28	bird song	30	0	0
0	0	28	ocean waves	29	1	0
1	2	25	cat's purr	27	3	0
1	6	21	church bell	28	1	1
1	5	22	wind	19	11	0
2	9	17	train whistle	23	7	0
3	18	7	dog's bark	9	18	3
3	22	3	lawnmower	7	21	2
1	25	1	motorcycle	7	23	0
2	25	1	siren	3	26	1

The interesting thing here is that the two columns are so similar. In principle then, the most pleasing sounds for both city and country people remain those of nature (birds, ocean, cat's purr) followed by the more well-established sounds of civilization (church bells, train whistle); while the most displeasing are the recent technological sounds (sirens, motorcycles and lawnmowers) — though it will be observed that country dwellers, hearing such sounds less frequently, were less opposed to them.

When asked to describe the sound environment of their neighbourhood as quiet, medium, or loud, differences predictably occurred.

City Quiet 11; Medium 11; Loud 6.

Country Quiet 28; Medium 1; Loud 1.

Only 17 city residents were content with their sound environment while the figure was 28 in the country. When asked to give examples of pleasing sounds, however, the results were especially interesting. The country people, in all cases except one, mentioned sounds from their immediate environment. The exception was "a loon's call" which one woman heard while hunting with her husband on a northern lake. The city people, however, were often thrown into inventing or remembering beautiful sounds heard outside their immediate environment. For example, one city girl mentioned "the sound of snow falling into a lake as the sun warms over hanging drifts", and "the squish of walking on damp moss" — both of which she had heard while on hiking trips in the country. A man remembered "mice rustling in the bushes" and "a beaver tail slapping on the lake", which he heard during trips to a rented cottage. Aside from such examples, city residents were less precise and descriptive in their examples than those who recalled sounds from the firsthand experience of living with them.

This miniature survey needs to be extended. But as far as it goes it does support our hypothesis: Man continues to prefer natural sounds to those of technology, and among the sounds of technology themselves there is a distinct preference for the older.

Another brief survey shows similar results. Very simply we asked Vancouver young people to write down the most exciting, boring, beautiful and ugly sounds in their lives. Here is a representative selection of the sounds they considered the most beautiful and ugly.

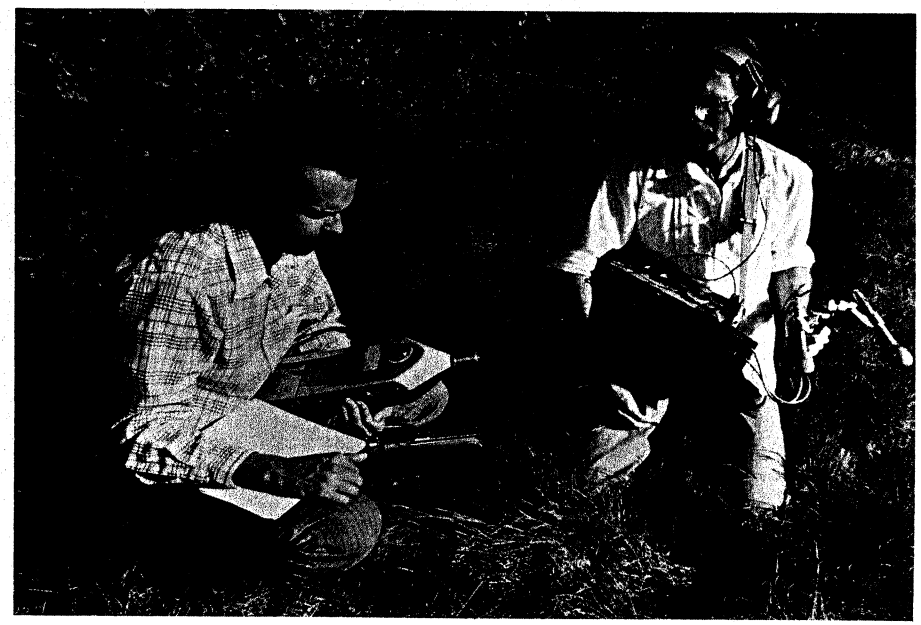
BEAUTIFUL	UGLY
Waves (7)	Heavy traffic; honking; tires skidding (8)
Birdsong (5)	Power saw (5)
Crackling of fire (4)	Wail of sirens (3)
Tinkling of bells or chimes (4)	Gunfire (3)
Waterfalls (3)	Dentist's drill (3)
Wind (3)	Screams of humans and animals in pain (3)
Rain (3)	Belching (3)
Children laughing (3)	Construction
Pieces of music mentioned by name (3)	Roll of thunder
Leaves rustling (2)	Clearing of throat
Flute music (2)	Fist hitting flesh
Dip of canoeist's paddle in water	Drilling on pavement
Whinnying of mare and colt	Alarm clock
Harp	Loud argument
Guitar	Radio in a nature setting
Crunching snow underfoot	Unanswered telephone
Trumpet playing 'taps'	Car's tailpipe scraping along road
Leaves falling	National anthems
The stillness of new snow	Politicians
Sunrise symphony	Crash of car
Crickets	
Cooing of a baby	
Horse eating hay	

Enough has been said to show the considerable discrepancy between the images Vancouverites have of an ideal acoustic environment and the realities they have to live with. Many of the sounds for which they have the greatest affection are disappearing altogether or are being masked out by those they do not wish to hear.

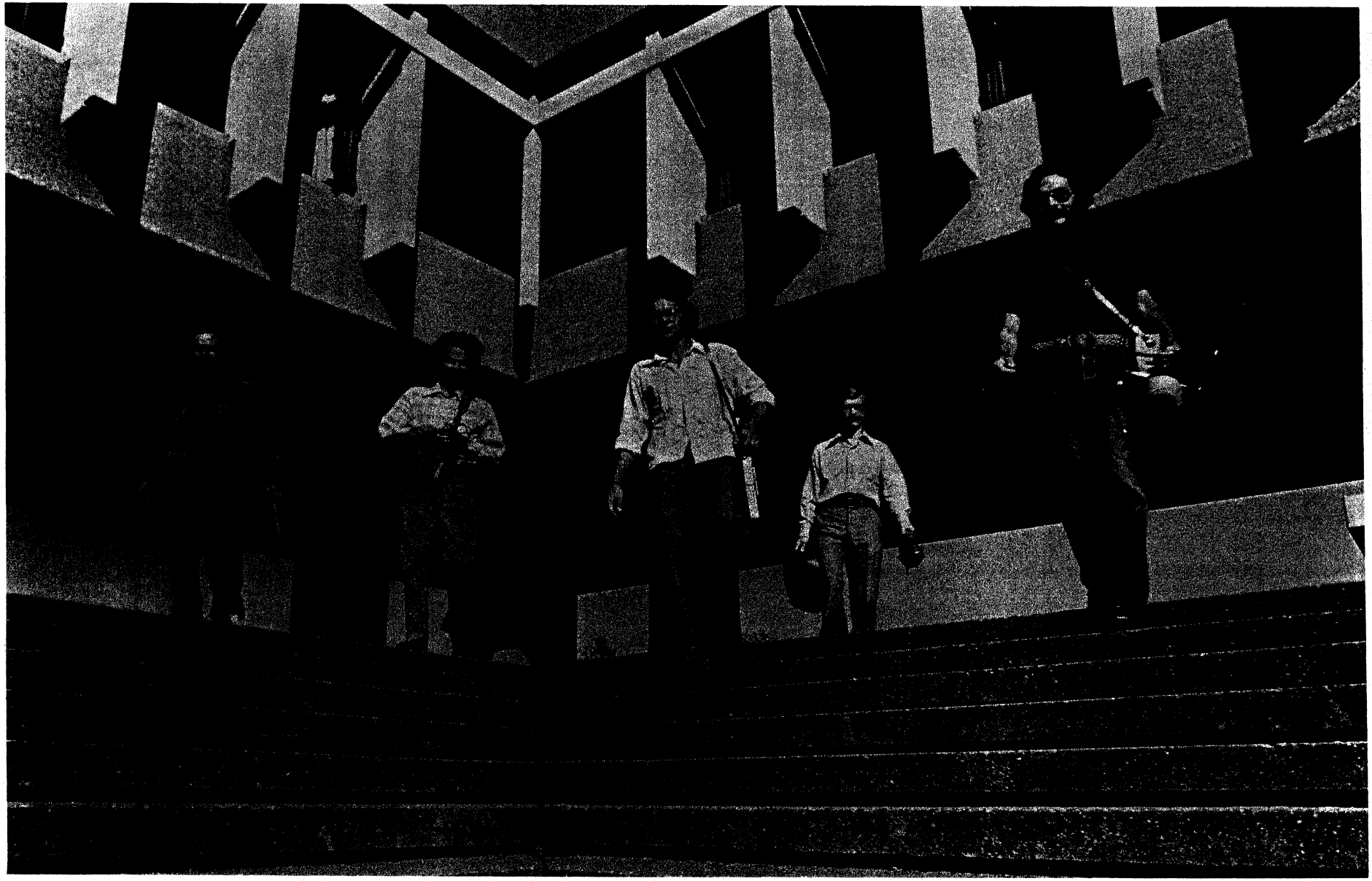
Why do we cling to these older more natural sounds? Is this mere sentimentality or habit; or is there some deeper reason which has to do with the sounds' symbolic power? For time lends each sound an aura or colouring over and above its physical characteristics or its obvious or immediate meaning.

We are faced today with an overpopulation of sounds. Critical decisions are needed to determine those which we will want to keep and those we need to eliminate. In the comprehensively-designed acoustic environments of the future, the study of sound symbolism will help us to make meaningful decisions in regulating the phasing-in of new sounds and protecting attractive ancient sounds from extinction.

The task of The World Soundscape Project is carefully to gather the documentation necessary to lay the groundwork for the science and art of acoustic design. To this end we extend an invitation to sympathetic listeners around the world to participate with us in this new study program. In the last section of this report, therefore, we turn the subject over to you.



Soundscape researchers, Bruce Davis and Peter Huse, during field recording.



World Soundscape Project research team (1973), including (left to right) R. Murray Schafer, Bruce Davis, Peter Huse, Barry Truax, Howard Broomfield, Hildegard Westerkamp (absent).

PART VI: TOWARD ACOUSTIC DESIGN

A huge musical composition is unfolding around us ceaselessly. We are simultaneously its audience, its performers and its composers. How do we feel about it? With noise pollution looming as a world problem, some experts have predicted universal deafness as the ultimate consequence unless the problem can be brought quickly under control. Then the quality of the soundscape would cease to matter.

Noise pollution results when man does not care about sounds. Noises are the sounds we have learned to ignore. Noise pollution is today being resisted by noise abatement. This is a negative approach. The World Soundscape Project came into existence as an attempt to make environmental acoustics a *positive* study program. Which sounds do we want to preserve, encourage, multiply? When we know this, the boring or destructive sounds will become conspicuous enough and we will know why we must eliminate them. Only a total appreciation of the acoustic environment can give us the resources for improving the orchestration of the soundscape. Acoustic design is not merely a matter for acoustic engineers. It is a task requiring the energies of many people: professionals, amateurs, young people — anyone with good ears; for the universal concert is always in progress, and seats in the auditorium are free. Artists, who have too long remained aloof from society, must now return to give direction to human navigation. For artists are not only the secretaries of history; they are its conscience. Where do we begin?

Listening

The first task is to learn how to listen. Ear Cleaning is the expression we use here. Many exercises can be devised to help cleanse the ears, but the most important at first are those which teach the listener to respect silence. An exercise we often give our students is to declare a moratorium on speech for a full day. Simple? Not so, as those who have tried this will confess.

Listen to the world; it is a challenging, even frightening beginning. Here are just a few of many other exercises to try:

1. Some sounds move, others stand still, and some move with us. Identify some of each.
2. Facing south, stand still and wait for a sound to pass you travelling from south-west to north-east.
3. Find a sound with a dull thud followed by a high twitter.
4. Write down all the sounds you hear in a particular environment. Classify them in various ways — natural, human, technological; continuous, interrupted; smooth, rough; rhythmic, non-rhythmic, etc. 19

A good exercise is to take a listening walk. This should be at a leisurely pace, and if it is undertaken by a group, a good rule is to spread out the participants so that each is just out of earshot of the footsteps of the person in front. By listening constantly for the footsteps ahead, the ears are kept alert; but at the same time a privacy for reflection is afforded. Sounds heard and missed can be discussed afterwards.

Documentation

The sounds of the environment have never before been systematically documented. A broad work, therefore, lies ahead. We have printed here a number of local documentations, but our findings need to be extended and they need to be compared with statistics from other parts of the world.

Single sounds can be isolated and counted, and the activity of bringing sounds forward to the focus of attention is a useful ear training exercise; and as documentation is assembled it will give a quantitative impression of the density of certain sounds. For instance, we have been counting car horns in some of the world's cities to show how the density of these sounds varies from one place to another. The technique is to select a main intersection and count the horns for ten minutes on each hour from 11 a.m. to 7 p.m. on a normal working day. The tabulations are then totalled and divided by nine to give an hourly average. Here are some results for cities in which we have already made such counts:

Moscow	17 per hour
London	21 per hour
Vancouver	34 per hour
Utrecht	37 per hour
Toronto	44 per hour
Sydney	62 per hour
Boston	145 per hour
Rome	153 per hour
Athens	228 per hour
New York	336 per hour
Cairo	1150 per hour

19) Listeners will find many other such exercises in R.M. Schafer's booklets *Ear Cleaning, The New Soundscape, When Words Sing* and *The Rhinoceros in the Classroom*, Berandol Music, Toronto, and Universal Edition, London and Vienna, 1965, etc.

Motorcycle and airplane counts can also be taken. Social surveys could be conducted simultaneously in which citizens are asked to estimate the number of such sounds they imagine they hear. In this way ear cleaning is extended to a wider public. To be reminded about a sound is to think about it; to miss it is to listen for it next time.

Keynote sounds, signals and soundmarks vary in different parts of the world, and it would be useful to know these differences. Soundmarks in particular deserve study, and they deserve the same affectionate protection accorded landmarks. What types of sounds serve as community signals (clocks, bells, alarms, sirens)? How do they function? At what times of the day or night are they heard? Can their acoustic profile be traced over the community?

Are there unique natural sounds in the area (birds, animals, insects, etc.)? Where and when are they heard? Such sounds will have both daily and seasonal rhythms and they should be noted. The notation of these rhythms in the natural soundscape will form the basis of one of our future studies but before this can be undertaken much more information needs to be compiled.

The soundscape is constantly changing. New sounds are being added and old sounds are disappearing. The soundscape researcher should keep a diary of precisely when these changes occur. Sounds threatened with extinction should be noted in particular, and if possible they should be recorded before they disappear. The sound object should be treated as an important historical artifact, for a carefully recorded archive of disappearing sounds could one day be of great value. When we record sounds we accompany them with cards providing the following information:

No.	Title		
Date recorded	Name of recorder		
Equipment used	7½ i.p.s. 15 i.p.s. other	mono stereo quadraphonic	
Place recorded	Distance from source		
Atmospheric conditions		Intensity	dBA dBB dBC
Historical Observations			
Sociological Observations			
Additional Observations			
Names, ages, occupations and addresses of local people interviewed.			

Another important area involving recording, which has to date only been touched by ethnomusicologists, is that of street cries and street music. In what parts of the world are they on the increase or decrease? In Vancouver we note that after their demise in the 1930s and 1940s, there has been, since about 1965, a resurgence of street cries and particularly street music, mostly performed by young people. We take this as a barometer of things to come, a defiance of motorized traffic which currently dominates our streets, a humanizing of the soundscape.

Along the same line we note the tendency in recent years in many cities of the world to close off certain core streets to traffic, returning them to the pedestrian. It would be useful to keep records of these changes as they take place.

Another simple form of documentation would be extended lists of the most beautiful, ugly, exciting and boring sounds from people of different nationalities. Is there any unanimity of sentiment about sounds belonging to these or other classifications; and if so can we identify certain sounds as having cross-cultural symbolism or archetypal qualities?

Sounds identified as ugly could be compared with the prohibited noises of community by-laws. Are prohibited noises and ugly sounds the same? Does the noise by-law reflect fairly current feeling about the subject or is it antiquated, as is ours in Vancouver? How effectively is it enforced? Only municipal records of prosecutions and convictions will reveal this, and as these are on the record, they can usually be obtained for study. [20]

No specialized training or expensive equipment is required for most of these exercises — only sharp ears. They represent only a beginning of course, and advanced students of music, sociology, acoustics or other disciplines will be able to devise more sophisticated documentary projects.

20) This was the subject of World Soundscape Project Document No. 4, *A Survey of Community Noise By-laws in Canada (1972).*

Acoustic Design

The final stage of all work on the soundscape must be to engage in redesigning it. It is a formidable task and it needs to be approached in stages.

A simple first exercise is to plan soundwalks. The perceptive tourist does not merely sight-see and it is an impertinence of all tourist publicity to assume that he does. One could also be a tourist in the soundscape and a booklet of interesting soundwalks could afford a new source of pleasure to travellers. The Vancouver soundwalk printed as an appendix to this document is merely one of many. It illustrates how one can be both audience and performer on a soundwalk, with a map and commentary functioning as a score. At a future date we would like to publish a booklet of indigenous soundwalks for the major cities of the world. We invite our readers to become the composers.

Another of our current projects is to create a "Listeners' Guide to Good Eating in Vancouver" — a project which could also be extended to other cities. Although one goes to a restaurant primarily to eat, we are concerned here to document the uses to which restaurants put music, and the other sounds that form the environment of their premises, such as voices (loud or subdued), kitchen sounds (attractive or foul), and so forth. At the present time (1973) the best restaurant in Vancouver is the Muckamuck, a Northwest Coast Indian restaurant, where one may obtain fish, barbequed Indian style, a large variety of local fruits and forest vegetables including Labrador Leaf tea. There is no Moozak, and the tables are spaced widely enough apart to ensure privacy of conversation. But the most delightful acoustic feature of this restaurant is the floor of pebbles, which make a crunching sound as the waitresses move deftly over them with platters of delicious food.

Does a restaurant have live or recorded music? Is it characteristic of the establishment or merely the drool of Moozak that is nobody's favourite? And will the management turn down the "mooze" on request or turn it off completely? The aurally discriminating gourmet deserves to know these facts.

Somehow we must begin to resist the slop and spawn of recorded music, which is now reaching epidemic proportions. In this respect it is useful to bear in mind the 1969 resolution of the General Assembly of The International Music Council of UNESCO:

> *We denounce unanimously the intolerable infringement of individual freedom and the right of everyone to silence, because of the abusive use, in private and public places, of recorded or broadcast music.*

It goes without saying that part of the work of acoustic designers must be to support the work of noise abatement organizations everywhere; but this is not enough. Although we do not yet have enough facts to undertake the comprehensive acoustic design of communities of the future, the imagination leaps forward in spite of intellectual diffidence. Schematics can already be produced for the ideal city, noting the types of sounds, the permitted intensities, frequencies and periodicities to be featured in different zones. For instance, our work on the Vancouver soundscape gives us a good instinct for recognizing its noisiest and most tension-ridden sectors. For these we project the erection of temples of silence, anechoic-like chambers to which people could go to rehabilitate the spirit, temples where one could read or meditate, without the interference of speech or music.

We can also begin speculatively to prepare plans for acoustic parks, which would afford both reservoirs of stillness and areas where the ear and mind could be delighted in new and imaginative ways. Here, behind high embankments of earth to screen out unwanted traffic noises, there would be a place for John Grayson's children's musical playground. There would also be a public instrumentarium for adults, beautiful outdoor instruments of metal, membrane, glass and wood to which groups of people might come as the Balinese come for communal instrumental practice. And there would be large free-standing instruments, played by the elements: aeolian harps on hills, water organs and elaborate musical fountains like those of Italian Renaissance gardens. But nothing involving electroacoustical devices should appear in our park. This would introduce an incongruity into the landscape that would merely duplicate the synthetic environments of modern life, which we are painfully questioning.

We must return to the Vancouver soundscape the flavour of its original elements — cataracts, swift flowing waters and ocean waves, the inimitable sound of wind in evergreen trees, and the natural resonances of wood, shells and stone. That will be our task.

And yours, dear readers, will be to design your own houses and communities and parks without betraying the natural keynotes of your own unique environments.

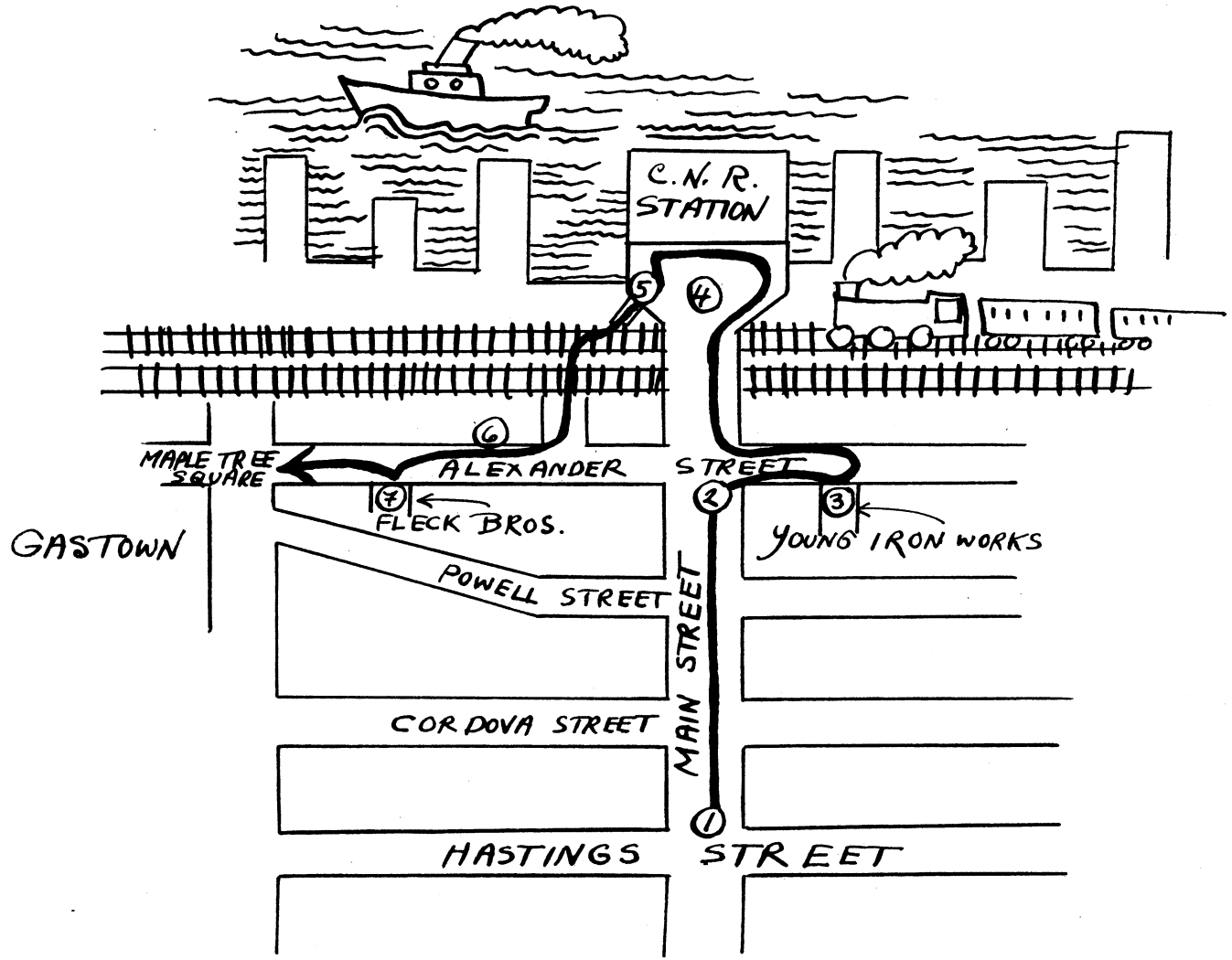
APPENDICES

VANCOUVER SOUNDSCAPE TIME CHART

At the beginning:	Ocean, forest, birds, animals, winds, Indian life.
1836	Arrival of the "S.S. Beaver", first steamboat to enter Vancouver waters.
1865	Planked sidewalks in Vancouver.
1878	First demonstration of the telephone in Vancouver.
1883	First telephone line between Port Moody and New Westminster.
1885	First telephone exchange in downtown Vancouver (Carrall Street).
May 23, 1887	Arrival of the first steam-driven train.
June 26, 1890	Opening of Vancouver Electric Tramway (six miles of tracks).
October 28, 1891	Start of regular interurban electric trains of New Westminster.
1894	"Nine O'Clock Gun" introduced (fired at 6 o'clock).
1899	First fire engine purchased (horse-drawn, with a warning bell).
1899	Vancouver Police Department traffic division formed (using "tweet-tweet" whistles).
1907	Vancouver Fire Department buys its first motorized vehicle. (Siren powered by the flywheel of the motor).
March 25, 1910	First airplane arrives in Vancouver.
July 1, 1911	Holy Rosary Bells sound 5,040 changes for coronation of George V. (Peal of "Grandsire Triples").
1912	Installation of Point Atkinson diaphone.
1913	Vancouver's first noise abatement by-laws (against detonating dynamite in the city and rowdiness by adolescents).
July 16, 1917	First seaplane flies over Vancouver.
November 11, 1918	3:10 a.m. blast from the "Nine O'Clock Gun" to mark the end of World War I hostilities.
1922	Vancouver's first commercial broadcasting station CKMO signed on the air.
Around 1923	First opera on radio, "Maritana", directed by Arthur Foxhall.
1924	Police Department first purchased sirens (one-toned electrically powered).
1928	Last steamboat on the Fraser River.
1928	Conversion to dial phones begins.
September 12, 1938	Vancouver introduces its "No hawker, huckster" Noise By-Law No. 2531.
1938	First use of radio by any store in Canada for direct advertising. (Microphone installed in David Spencer's store).
June 5-8, 1942	Three-night blackout of radio along West Coast in fear of Japanese air attack.
1948	Vancouver Police introduce a gong on their radio to alert patrolmen in the case of a major crime.
September 17, 1950	Last run of B.C. Electric Railway open observation cars (which began in 1910).

April 25, 1955	Last street car in Vancouver.
1958	End of North Shore ferry whistles (and service).
1961	Department of National Defence equips Vancouver with 45 civil sirens.
November 1961	First Vancouver air-raid exercise using newly installed civil sirens.
April, 1962	CPR ship "Princess Elaine" retired.
About 1967	Vancouver area police departments begin using "wail" and "yelp" sirens.
June 19, 1967	B.C. Hydro's "O Canada Horn" introduced.
1967	Vancouver Fire Department switches from mechanical sirens to those using electronic oscillators.
1967	330 note carillon installed in Ladner Clock Tower at U.B.C.
Autumn, 1968	First course in noise pollution given at any Canadian university at Simon Fraser University.
February 22, 1969	Hovercraft service initiated between Vancouver harbour and Nanaimo.
October 1969	Hovercraft service between Vancouver and Nanaimo suspended.
April 1970	Clay Harold convicted under Vancouver's Noise By-Law No. 2531 for worshipping God in the street.
3 days in June 1971	Vancouver's civil defense sirens accidentally set off in South Vancouver.
June 1972	Burnaby introduces its Noise By-law No. 6052, the first in Canada to attempt to reduce noise by employing a five-year reduction clause.
January 26, 1972	"O Canada Horn" stopped due to complaints.
February 10, 1972	"O Canada Horn" recommenced (also due to complaints).
June 1972	Vancouver's ethnic radio CJVB goes on the air.
June 16, 1973	Holy Rosary Bells sound "Eight - Splice Surprise Major" peal for first time in Canada, consisting of 5,024 changes.
July 14, 1973	Vancouver employs drag-races and other glorifications of the internal combustion engine for first time in the Sea Festival Parade.

A VANCOUVER SOUNDWALK



When you take your ears for a soundwalk, you are both audience and performer in a concert of sound that occurs continually around you. By walking you are able to enter into a conversation with the landscape. Begin by listening to your feet. When you can hear your footsteps you are still in a human environment, but when you become separated from their sound by the ambient noise, you will know that the soundscape has been invaded and occupied. A sketch of a soundwalk through a historic part of Vancouver follows, but your best guide will still be your ears and imagination.

Take a Hastings or Victoria bus in downtown Vancouver as far as Main Street. As you deposit your fare, notice the different sounds made by the various coins. Ask the driver to call out Main Street. If you are fortunate, you will encounter a truly professional driver who has his street-calling technique developed to a bardic form. En route, close your eyes and listen to the environment around you. How many languages are being spoken? What sound patterns occur at each stop?

1) Disembark at Main Street and walk north towards the waterfront. Note how the traffic noise changes on the way and at what point you are re-united with the sound of your footsteps.

2) At the corner of Main and Alexander, stop and listen to the hum of the Western Electric neon light. Can you find its predominant pitch by humming with it?

3) Follow Alexander Street east until you reach the alley beside Young Iron Works. Here you will find several different types of road surfaces — gravel, wood and stone blocks, concrete and asphalt. Listen to the sound of your feet as they scuff and tap over these surfaces which are representative of the history of Vancouver's pavement technology. The old lamp posts in the area should not be neglected either as their resonant columns will also respond to your exploration.

4) Wooden walkways take you from the corner of Main and Alexander to the old CNR station, giving you a chance to experiment as a pedestrian percussionist. The quiet old station has now been transformed into an Oompapa restaurant which features a ten-piece Bavarian brass band, but with your imagination you may be able to reconstruct the sounds that surrounded it when it was still young and active. Walkways on either side of the restaurant, one wooden, the other metal, lead you closer to the water and introduce the harbour soundscape. How does it differ from what you have already heard, and which sounds from the city still join with those of the harbour? How many non-man-made sounds can you hear in this soundscape?

5) From the west side of the station platform, a resounding metal stairway will lead you to the gravelled parking lot below, where you can cross the railway tracks and return to Alexander street. If you arrive at an opportune time, trains will be rumbling by with their bells ringing, shunting cars to and from the docks.

6) Along Alexander Street a wire-mesh fence on the right beckons invitingly to have its tingling sound join your walk, and across the street the clock at Fleck Brothers rewards the patient listener with a special whirr-click sequence as the minute hand advances.

7) If you have taken this walk during the day, the industrial sounds of men and women at work in shops and factories, trains and boats, will have added their own particular rhythms to your ongoing soundscape composition. But now, proceeding further down Alexander towards Maple Tree Square in Gastown, the renovated "skid row" area that has become a circus of boutiques, cafes and entertainments, you will probably lose your footsteps' accompaniment.

Here we will leave you to follow your ear to the most appealing soundpaths that will provide the concluding episode in your soundwalk concert. Strains from itinerant street musicians will join the collage of young voices at play, old voices in reminiscence, and the new voices of commerce, but it will be your choice as to how you interpret them. Every time you repeat the walk, new impressions and variants of old ones are inevitable — you need only listen for them!

PHOTO CREDITS:

Vancouver City Archives – 4, 7, 10, 12, 22, 29, 34.
B.C. Hydro – Cover, 38.
Lynn Vardeman – 47, 61, 62.