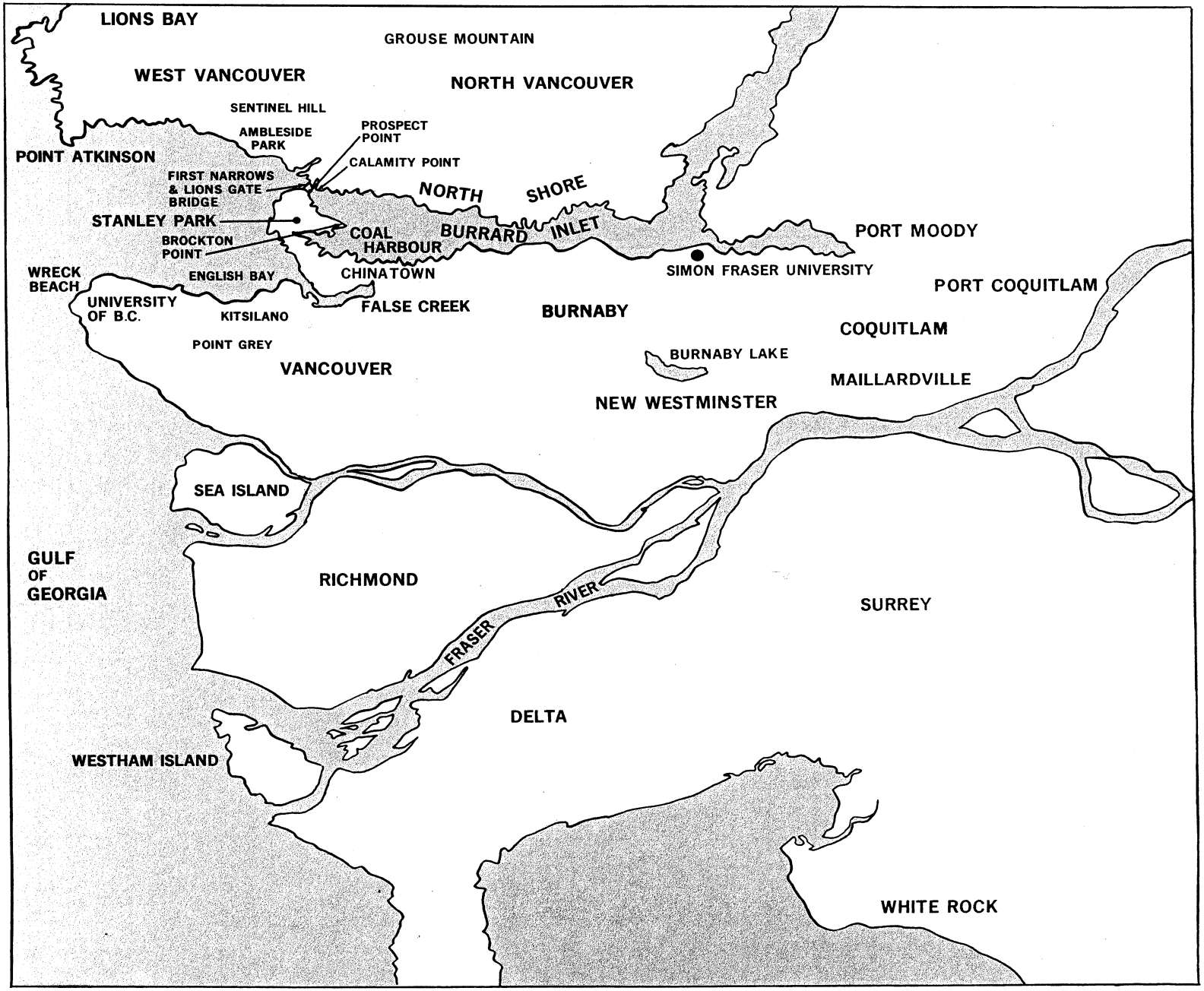
PART II: A THUMBNAIL HISTORICAL SKETCH


LIONS BAY
GROUSE MOUNTAIN
WEST VANCOUVER
NORTH VANCOUVER
SENTINEL HILL
AMBLESIDE PARK
PROSPECT POINT
POINT ATKINSON
CALAMITY POINT
FIRST NARROWS & LIONS GATE BRIDGE
NORTH SHORE
STANLEY PARK
COAL HARBOUR
BURRARD INLET
PORT MOODY
BROCKTON POINT
WRECK BEACH
ENGLISH BAY
CHINATOWN
SIMON FRASER UNIVERSITY
PORT COQUITLAM
UNIVERSITY OF B.C.
KITSILANO
FALSE CREEK
BURNABY
COQUITLAM
POINT GREY
BURNABY LAKE
VANCOUVER
MAILLARDVILLE
NEW WESTMINSTER
SEA ISLAND
GULF OF GEORGIA
RICHMOND
FRASER RIVER
SURREY
DELTA
WESTHAM ISLAND
WHITE ROCK

Elevation: sea level to 1200 feet.

Geographic position: latitude 49° 13'N; longitude 123° 6'W.

Geographic description: situated on a rolling upland between the mountainous north shore of Burrard Inlet, with the Strait of Georgia to the west, and the flat delta of the Fraser River to the south and east.

Born ca. 1865; incorporated April 1886; total 1973 population 1,070,916; total area 1,004.9 square miles.

Greater Vancouver Regional District comprises the following communities: Lions Bay, White Rock, West Vancouver, Vancouver City, Surrey, Richmond Township, Port Coquitlam, North Vancouver City, North Vancouver District, New Westminster, Delta, Coquitlam, Burnaby, Port Moody.

Industries: agriculture; forestry; fisheries; mining; contract construction; manufacturing; wholesale and retail trade; finance; insurance and real estate; services; government.

Air miles from New York: 3,063; London: 4,723; Tokyo: 4,699.

Principal Language: English.

Pinning down the extreme north-west corner of the populated part of the continent, Vancouver looks at most other North American cities with the eyes of an adolescent. And facing the neighbouring Pacific cities of the Orient, these eyes seem barely to have opened. There are men alive in Vancouver today whose fathers were among the first pioneers here. Vancouver still retains qualities of a frontier town to this day; the deer still run wild and black bears prowl for berries just beyond mountain suburbs. To the north, behind the Coast Range Mountains (snowcapped into mid-summer), dense forest wilderness stretches thousands of miles to arctic tundra. To the east, more forest, the Interior Plateau, and the Rocky Mountains. To the west, the Pacific Ocean fishing grounds and trade routes to the Orient and Panama.

Back in 1792 when Captain George Vancouver arrived at the site now known by his name, it was inhabited by several thousand Halkomelem, Squamish and Musqueam Indians, whose traditional life went back thousands of years and whose legends spoke of a time before the Flood. Here there was an abundance of fish, game and a hospitable climate; magnificent works of art were produced and a sophisticated system of mythology developed. Today the majority of the Indians live on reservations, of which there are four in the Vancouver area.

In 1827 the Hudson's Bay Company established Fort Langley near Vancouver and a thriving trade in furs and fish began. By 1865 a small settlement had grown up on the Burrard Inlet around the Hastings Sawmill. Vancouver was officially incorporated in April 1886, but in June of the same year it burned to the ground. It rose again quickly, encouraged by the excitement of the construction of Canada's first transcontinental railway, for the Canadian Pacific was building its western terminal at Vancouver. Completed the following year, the first CPR passenger train arrived on May 23, 1887. By 1910, crowds of settlers had pushed up the population to 100,000. In 1915 the Panama Canal opened the way for B.C. lumber and grain from the Prairies to reach Europe, and Vancouver established itself as a world port. Together with contiguous municipalities which make up the Greater Vancouver Regional District, Vancouver now has a population of over a million, and is the fastest growing of Canada's larger cities.

Vancouver is the centre of British Columbia's industry, commerce, and culture. The chief lumber, pulp-and-paper, fishing and canning companies have their headquarters here. Power lines bring electricity from dams on the big waterways, and pipelines carry oil and natural gas through the mountains from the Prairies. With considerable holdings in the city's core, the CPR, which stimulated Vancouver's growth in the beginning, continues to influence the shape of the city's downtown development.

Back to back with the CPR's sprawling warehouses and sheds lies Chinatown, which, as the second largest in any North American city, has contributed considerably to Vancouver's character. Although the greatest number of Vancouverites are of British extraction, numerous other ethnic groups have made distinct contributions to the city. The impact of each group is often not a question of numbers but of concentration. The Scandinavian population, for instance, is one of the largest, but its impact has not been as strong as the Asian. In addition to the Chinese, a fair sized Japanese population is centred in the fishing village of Steveston; and a substantial East Indian Sikh community has been scattered throughout South Vancouver since the early days. Among European peoples, the Germans and the Italians have had the greatest influence on the city. Vancouver's relatively small Jewish community is concentrated in the south-central Oakridge area, on the periphery of the area affected by Vancouver International Airport's noisy jet traffic. There is a small but concentrated French-Canadian community at Maillardville, now part of Coquitlam.

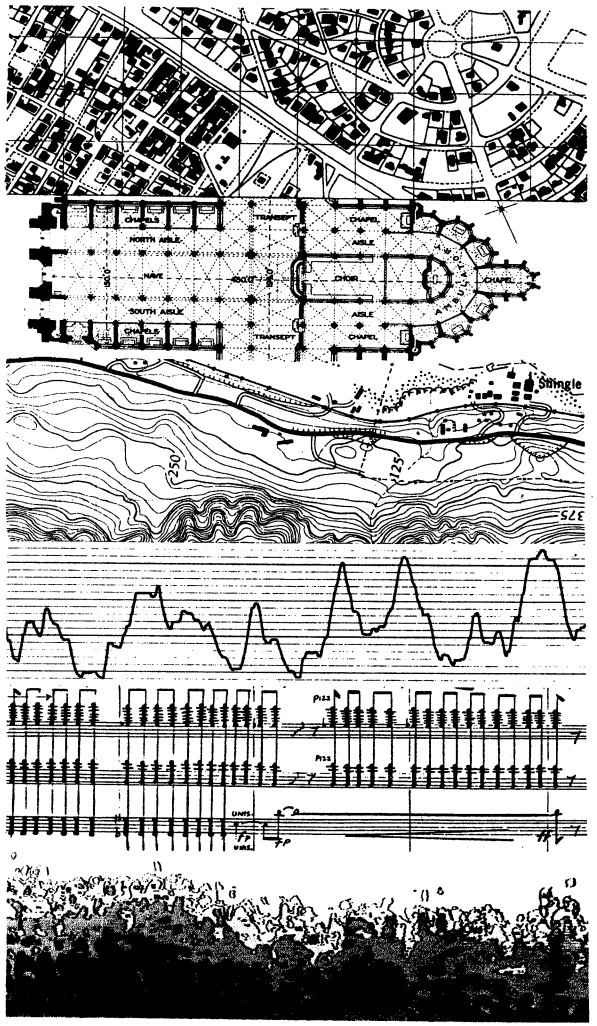
Vancouver is often considered Canada's most Americanized city, and it is true that the natural barrier of the mountains tends to isolate the city from other parts of Canada, while a peaceful border with the USA facilitates economic and cultural links with American west-coast centres such as San Francisco and Los Angeles.

Vancouver has considerable natural charms: mountains, ocean and moderate climate. People can be skiing atop Grouse Mountain while others are swimming and sunbathing at English Bay, or strolling through Stanley Park. This thousand-acre park, which occupies a promontory of land at the entrance to the harbour, may well be Vancouver's proudest possession. It affords over 22 miles of pathway through forests of Douglas Fir and Western Red Cedar and also houses the city's Zoo and Aquarium.

The soaring Lions Gate Bridge, across the Burrard Inlet at the First Narrows, connects a freeway through the centre of Stanley Park with the municipalities of North and West Vancouver, which each year push further up the flanks of the mountains. Many Vancouver houses have been landscaped to take advantage of the slope and vegetation, giving some areas of the city a luxuriant quality; but the skyline is now rapidly changing, particularly in the West End area close to downtown, where the original forest has been replaced by a new forest of utilitarian high-rise apartments, struggling with one another for a view of the sea and the yachts that cruise in English Bay or tinkle in their moorings along Kitsilano.

The city's two universities are situated in remote groves of forest at opposite sides of the city. The University of British Columbia, the elder, is at the western tip of the city peninsula, an area known as Point Grey, where it is effectively isolated by a large area of Endowment Lands. Less than a decade old, Simon Fraser University, where we work, is situated atop Burnaby Mountain with a view out to sea. Here we still occasionally see deer and bald eagles in the forest around the university buildings, though as scruburbia begins to creep up the hill below, we wonder for how much longer . . . .

PART III: FEATURES OF THE VANCOUVER SOUNDSCAPE



Examples of notations used by town planners, architects, geographers, acousticians, composers, and phoneticians.

KEYNOTES, SIGNALS AND SOUNDMARKS

Sounds of the city and sounds out of the city — I hear all sounds running together, confused, fused, and following . . . .

Walt Whitman, 1860.

What is a soundscape? We employ this term to mean the sonic environment. We can isolate a sonic environment as a field of study just as we can study the characteristics of a given landscape. However it is less easy to formulate an exact impression of a soundscape than of a landscape. There is nothing in sonography corresponding to the instantaneous impression which photography can create. Similarly, while everyone has had some experience reading maps, and many can draw at least significant information from other schematics of the visual landscape such as architects' drawings or geographers' contour maps, few can read the sophisticated charts used by phoneticians, acousticians or musicians. To give a totally convincing image of a soundscape would involve extraordinary skill and patience: thousands of recordings would have to be made; tens of thousands of measurements would have to be taken; and a new notation would have to be devised.

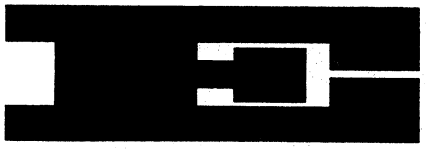
What the analyst must do is to discover the significant features of the soundscape, those sounds which are important either because of their individuality, their numerousness, or their domination.

From the earwitness accounts by Vancouver residents in the first part of this book, the reader will already be familiar with some of the main themes of the Vancouver soundscape. We categorize the main themes of a soundscape by distinguishing between what we call *keynote sounds, signals* and *soundmarks.* Each of these categories will be explained and illustrated in turn.

KEYNOTE SOUNDS

Keynote is a musical term; it is the note which identifies the key or tonality of a particular composition. It is the anchor or fundamental tone and, although the material may modulate around it, often obscuring its importance, it is in reference to this point that everything else takes on its special meaning. Keynote sounds do not have to be listened to consciously; they are overheard but cannot be overlooked; for keynote sounds become listening habits in spite of themselves.

The psychologist of visual perception speaks of "figure" and "ground", the figure being that which is looked at, while the ground exists only to give the figure its outline and mass. But curiously enough, the figure cannot exist without its ground; subtract it and the figure becomes shapeless, non-existent.



Even though keynote sounds may not always be heard consciously, the fact that they are ubiquitously there suggests the possibility of a deep and pervasive influence on our behaviour and moods. The keynote sounds of a given place are important because they help to outline the character of men living among them.

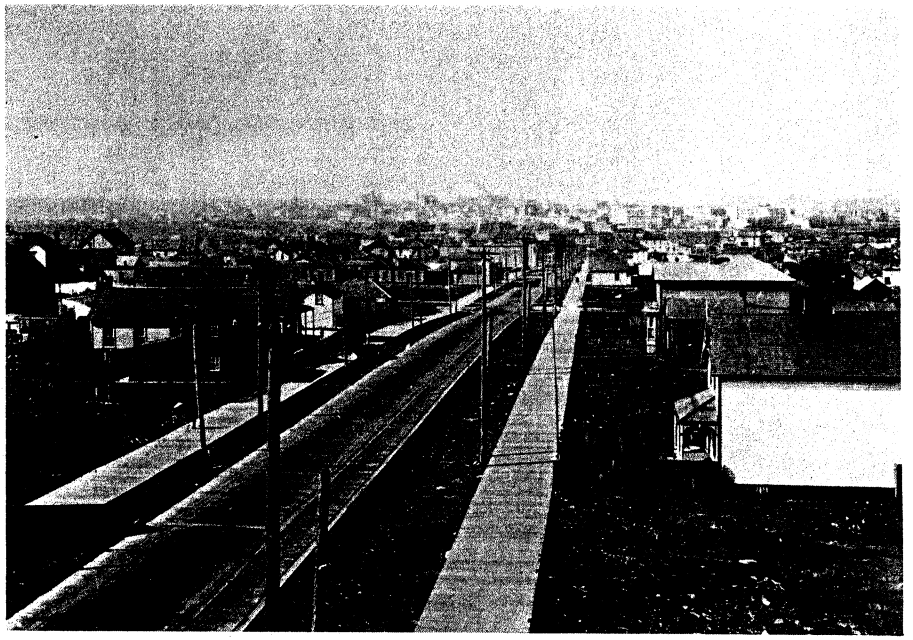
The first keynote sounds of Vancouver were those of the water and the forest. The water took many forms. At the sea it was waves and tides. Inland it was rivers and cataracts. The latter, often plunging hundreds of feet from icy mountains, caught the particular attention of early visitors. But the water sound most regularly heard throughout Vancouver is that of rain. The tranquil timpani of West Coast rain is unique in Canada, for unlike the great thunderstorms of the East and the Prairies, it is ambitionless, but falls gently and continuously on an average of 148 days each year. The painter Emily Carr describes it well:

> *I have full opportunity to note all the different sounds: the big, bulgy drops that splash as they strike, the little pattery ones, the determined battalions of hurried ones coming with a rattling pelt, the soft gentle ones blessing everything, the cleansing and the slopping and the irritated fussy ones. It is amazing that no two of them sound alike when you listen.* [1]

1) Emily Carr, *Hundreds and Thousands*, p. 193.

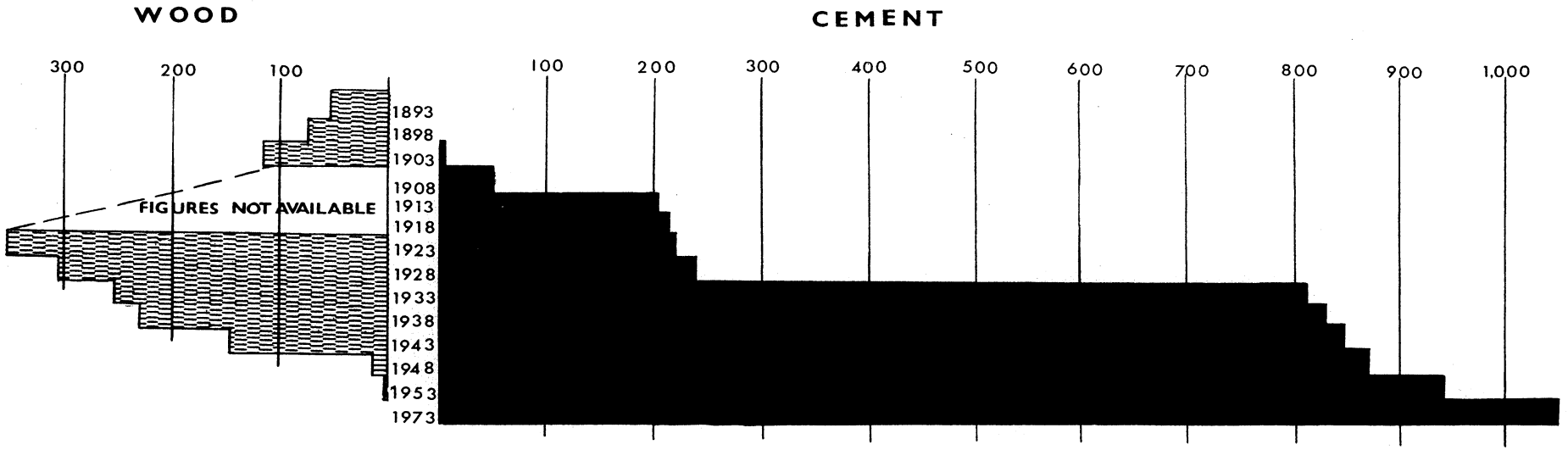
The sound of the British Columbia forest is also unique. Virgin evergreen forest in its mature, climactic phase, produces darkly vaulted aisles, through which sound reverberates with unusual clarity. When the wind blows here, there is nothing of the rustling familiar with deciduous forests, rather there is a low breathy whistle, like the sound of finely-sprayed water. In a strong wind the forest seethes and roars, for the needles twist and turn in turbine motion. The lack of undergrowth or openings into clearings keeps the forests unusually free of animal, bird and insect life, a circumstance which produced an awesome, even sinister impression on the first white settlers. Their uneasiness with the forest and their desire for space and sunlight soon produced another keynote sound, and one which can still be heard throughout British Columbia: the noise of lumbering. At first it was the woodsman's axe that was heard just beyond the ever-widening clearing. Later it was the cross-saw, and today it is the snarl of the chain-saw that resounds throughout forests and communities, for timber produces the material from which most West Coast houses are made, and it is also the Province's chief export. [2]

2) The clearing continues to widen. About 50,000,000 trees are logged annually in B.C., and are replaced by an estimated 44,000,000 replantings. (Information from B.C. Forest Services.)



In the early days Vancouver's streets and sidewalks echoed to the sound of wooden planks.

In the early days of Vancouver, wooden planks were also used in the construction of sidewalks and streets, providing another keynote sound under boot-heel, though in time the hollow melodies of these surfaces gave way to the uniform drudgery of asphalt and cement. (But what did the driveway of Stanley Park sound like in the 1890's when it was still paved with clam shells?)



Total Mileage of Wood and Cement Sidewalks, Vancouver 1893-1973.

Steam was once also a keynote sound in Vancouver. There were steamboats in Vancouver waters from as early as 1836 and they continued as an important means of transportation until 1928 when the last steamboat on the Fraser River gave way to the developing railway and road systems. As our earwitnesses have already recorded, the notable feature of steamboat travel was that it was quiet. Steam was also the power source of the locomotives, which terminated in Vancouver after long transcontinental runs, and which, while they were not quiet, are still affectionately remembered by those who heard them.

As time went on, the keynote sounds became less characteristic and more cosmopolitan. First came the interurban street cars, which began in 1890. Right from the beginning they were electric, and were one of the loudest features of Vancouver streets until after World War II, when they were replaced by busses and trolley coaches. The once-popular interurban lines to New Westminster, which had been introduced in 1891, were phased out by 1937.

The keynote sound of the modern world is that of vehicular traffic; it is the sound which we hear at all times in our life today. In more recent years the sound of electrical equipment, particularly that of the North American 60 cycle hum (and its harmonics) is beginning to compete with traffic noise, giving a tonal centre to modern life. [3] As modern man begins to trade off the natural environment of the past for the controlled interior environments of modern life, other keynote sounds such as the constant whish of ventilating systems or the subtle platitudes of Moozak begin with invidious persistence to take over the role once provided by the sea and the forest. Some local tone colours are being lost as the city trades in its geography for international technology.

3) The tonal centre of the 60 cycle hum, approximately B natural, contrasts with the 50 cycle hum, approximately G sharp, of Europe and much of the rest of the world.

SOUND SIGNALS

Signals are foreground sounds and they are listened to consciously. In terms of the psychologist, they are figure rather than ground. Any sound can be listened to consciously, and so any sound can become a figure or signal, but for the purposes of our community-oriented study we will confine ourselves to mentioning some of those signals which must be listened to because they constitute acoustic warning devices: whistles, horns, and sirens.

Train Whistles

The heart, or rather the gonads, of Vancouver lie at the foot of Drake Street where the CPR's sheds, roundhouses, terminals and offices sprawl chaotically from Chinatown to False Creek. Better than almost anything else, the sounds of her trains tell the story of Vancouver's trading-post economics, and it is here in the core of the city that the trains go to sleep, wake up, get washed, doctored and sent out to work. Of course, there are other rail lines, with other terminals and yards, but this is where it all began, and it really hasn't changed too much to this day. Even the shift whistle sounds much the same as when it was steam, rather than air-operated. (Record 1, Side 2.)

Besides the CPR, there are four main lines working the Vancouver area: Canadian National, British Columbia Railways, B.C. Hydro & Power Authority, and Burlington Northern Railway Co. The sound of their whistles signalling at level crossings is probably the most often repeated sonic event in the city: two longs, a short and a long.

Each engineer plays this message in his own style; some manage to put considerable personality into the pattern. A few engineers barely distinguish between the beats; others separate each blast with almost equal amounts of silence. With considerable artistry, still others manage to get the notes to slide in pitch by careful manipulation of the control valve. This is but one pattern in an extensive binary code of whistle signals, used by engineers for various signalling purposes, especially in shunting. Each railway has its own code, but in North America at least, there is little variation between the commonly used signals.

Besides the variation in the rhythmic pattern of whistle calls, the careful listener will also notice particular differences in the sound quality of each whistle. While many locomotives may be fitted with identical whistles, the way the sound reacts with the physical surroundings makes almost each utterance a unique event. Often the echo or reverberation will sound at a slightly different pitch than the original, creating a strange, whimsical, sometimes jarring combination of notes that can rival the music of modern composers for novel timbral effects. This is particularly noticed in hilly regions, of which

CPR & CNR ENGINE WHISTLE SIGNALS

Note: Engine whistle signals must be sounded as prescribed by this rule. The signals are illustrated by "o" for short sounds, " — " for longer sounds. Each sound of the whistle should be distinct, with intensity and duration proportionate to the distance signal is to be conveyed.

Sound	Indication
o	Apply brakes. Stop.
— —	Release brakes. Proceed.
— o o o	Flagman protect rear of train.
— — — —	Flagman may return from West or South. Flagman for track No. 2 may return.
— — — — o	Flagman for track No. 4 may return.
— — — — —	Flagman may return from East or North. Flagman for track No. 1 may return.
— — — — — o	Flagman for track No. 3 may return.
o o	Answer to any signal not otherwise provided for.
o o o	When train is standing — back. Answer to back up signal. When train is running— answer to communicating signal.
o o o o	Call for signals.
— o o	To call attention of engine and train crews of other trains waiting, or passing, to signals displayed for a following section, and must hear the answer.
o o —	Answer to previous signal.
— — o —	(1) At whistle posts. (2) At least ¼ of a mile from every public crossing at grade, to be prolonged or repeated according to the speed of the train until the crossing is occupied by the engine or cars. (3) At frequent intervals when view is restricted by weather, curvature or other conditions.
——	(1) One mile from train order offices, flag stops, the end of two or more tracks, junctions, railway crossings at grade and drawbridges. (2) When a train stops and trainman is required to replace torpedoes exploded.
— — o	As prescribed by Rule 90.
o —	When double heading — air brakes have failed on leading engine and engineman on second engine must at once take control and stop train. The same signal to be given by the engineman on second engine as soon as he has control of the air brakes.
Succession of short sounds.	Alarm for persons or animals on the track.
— o	When running against the current of traffic: (1) At frequent intervals and approaching stations, curves or other points where view may be obscured. (2) Approaching passenger or freight trains and when passing freight trains.
o o o o o o	To notify track forces of fire on or near the right of way.

Vancouver has many, and is caused by the phenomenon known as Doppler-shifting.

In Vancouver's industrial False Creek area, the shunting of the B.C. Hydro engines is marked by frequent short staccato toots, which, echoed at close quarters, become bouncy, double couplets. Invariably, the physical environment favours certain notes of the whistle over others; rarely is the "same" whistle echoed back, rather, a slightly altered version, often with the higher notes stronger than the original sound, effectively revoicing the chord. The musical term is used because it fits: train whistles (or strictly speaking, horns), are made up of notes in the traditional musical scale, tuned usually in triads. The commonest whistle in Vancouver (and in Canada) is an E^b minor triad in root position with the E^b as 311 Hertz. There is a beautiful variation on one of the B.C. Hydro engines around False Creek in which the root of the chord is the highest note (E^b at 622 Hertz), giving a brighter, clearer sound. (Record 1, Side 2.)

Vancouver is the home of a major manufacturer of train whistles, the Airchime Company, which makes whistles designed by a local jack-of-all-tradesman, Robert Swanson. It was Swanson who, in the early days of diesel, solved the problem of making a train *sound* like a train, when compressed air rather than steam became the operating force for whistles. The horns originally supplied by the locomotive manufacturer sounded so unlike the previous steam whistles, that several level-crossing collisions were attributed to this poorly thought-out technological transition; trains suddenly sounded like trucks. Swanson, with a background in steam whistle design and manufacture, recorded an old steam machine on tape, and analyzed the sound with various acoustical measuring devices. He came up with a horn he called the "M" (for "modulated") horn, which contained notes most clearly resembling those of the old steam whistles. This horn served as the model for most other train horns made in North America, and today can still be heard on a few locomotives. The M-5 horn, sounding what could be called an A major seventh chord, but which is not completely diatonic in its tuning, is truly a classic item among train whistles. But this model is no longer desirable, it seems, due to its cost.

In the immediate sense, train whistles are purely functional devices for warning and signalling purposes. Taken however as elements of the acoustic environment, as pure sound, they can contain other kinds of information: on one level they reveal the personality of the engineer, and on another, that of the culture as a whole. Why are European train whistles so markedly different from those in North America? In Europe whistles are bright and piping. In Canada they are deep and haunting. Is it the long haul from East to West across thousands of miles of lonely and spectacular landscape that makes the E^b minor Canadian whistle seem so appropriate?

Ships' Whistles

Another signal with spell-binding attraction is the ship's whistle. Vancouver harbour hears a great many whistles, for each ocean-going ship sounds one long blast within one-half mile of Lions Gate Bridge both when entering and when leaving port. From records of the number of ocean-going ships entering and leaving Vancouver it is possible to estimate quite accurately the number of this type of whistle Vancouverites hear annually or daily.

Year	Annual Number	Daily Number
1923	1146	3
1933	2226	6
1953	3066	8
1963	3706	10
1973	4080 *	12

* *(estimate based on figures January – May)*

But this leaves out some of the most familiar whistles — those of the many ferry boats which ply the coastal waters and once crossed to the North Shore. Vancouverites have always listened attentively to ships' whistles and have regarded them affectionately. In the past, ferry whistles were unique and uncounterfeiting; each was a soundmark of distinction.

> *The star attraction was the Princess Victoria, leaving the dock at the foot of Granville at 1 p.m. . . . . And that whistle! It was as saucy as Donald Duck on a scooter!* [4]

That was about 1910. For comparison, here is an eloquent account of the CPR's Princess Elaine, which retired in April, 1962.

> *We on the mountain slopes of West Vancouver were particularly saddened by her going . . .*
>
> *Elaine's deep distinctive low pitched whistle was her trade mark and could be recognized for miles away in the Gulf of Georgia. For us on the North Shore of Burrard Inlet her mellow voice was part of the nautical music of the harbour and when her whistle was silenced by her retirement, its tone was strangely missed.*
>
> *Twice a day Elaine sailed out through the First Narrows over the seas to Nanaimo and twice a day she returned, her running time being two hours and fifteen minutes. She was so prompt people set their watches by her sailings.*
>
> *Many times in dense fog, her whistled warnings were tense with urgency. The hazardous First Narrows gateway into Vancouver*

4) Russel R. Walker, Vancouver *Province*, November 3, 1962.

Harbour, through which she passed 22,600 times in the first twenty-three years of her life, is one of the most tricky and difficult marine gateways in the world. [5]

The end of the North Shore ferry traffic came in 1958, when Number 4 ferry docked for the last time. "Captain Simson gave three blasts on the whistle and remarked 'Well, that's it'." [6]

The steam whistles of the past were originals. With the transition to the standard tunings of air horns and with the contemporary build-up of seaplane drones (to which we will return shortly) the soundscape of Vancouver Harbour is becoming more monotonous.

But the city does retain one striking whistle event: in traditional fashion the New Year is ushered in at midnight by a festival of whistles from all ships lying in port.

Foghorns

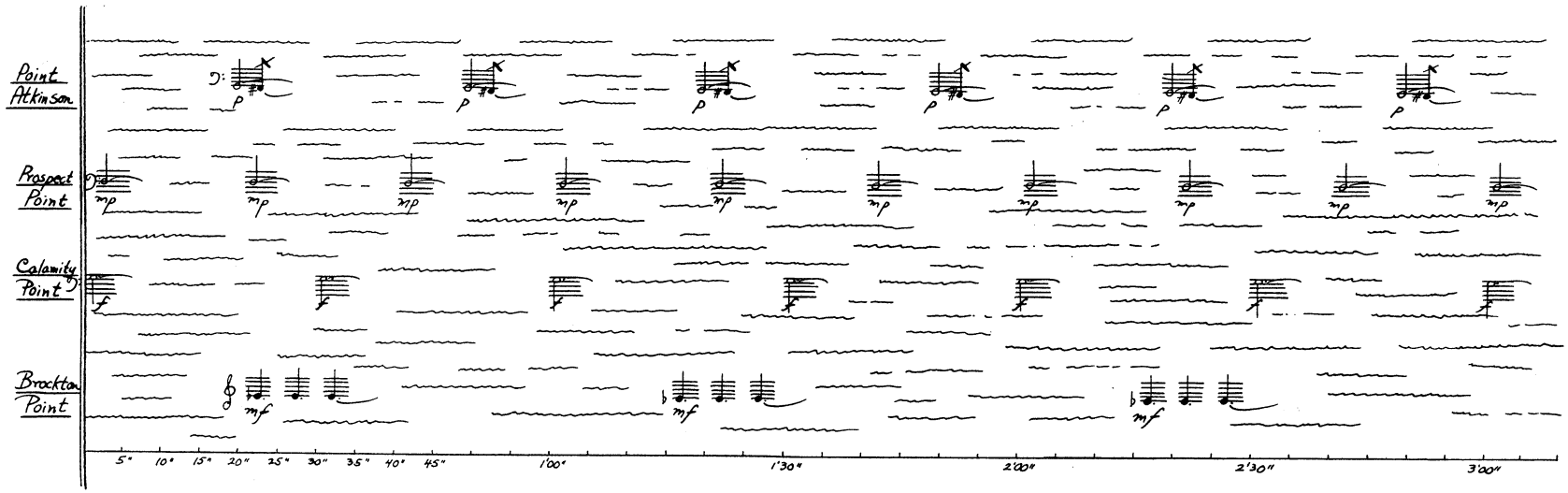
The foghorn comes thickly, shouting a stomachy blare like a discontented cow.

Emily Carr, *Hundreds and Thousands*, (1939).

The best time to hear foghorns in Vancouver is fall and winter. Most October months bring several days of continuous fog when the various horns can be heard in mournful concert in the dark air.

Within Vancouver harbour and along the navigated parts of the Fraser River to the south, there are many foghorns of various sizes. The eight principal horns are operated by the Ministry of Transport, but there are also many others, operated by private companies with wharfs or jetties; and there are also fog bells, usually located on buoys, sometimes operated electrically, sometimes by wave motion.

Each foghorn, small or large, operates on a unique recurring cycle and each has a distinctive pitch and intensity, so that when heard together they produce a stately counterpoint. Standing in Stanley Park near Lumberman's Arch the listener would hear something like the following composition.

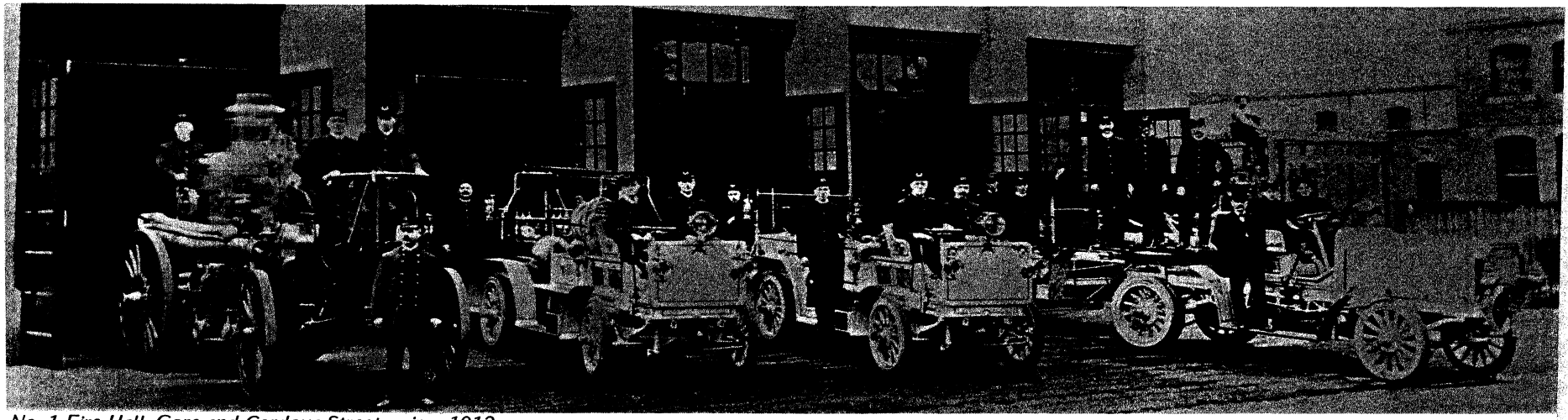


5) Ruth Greene, *op. cit.*, pp. 265-6.
6) Capt. James Barr, *op. cit.*, p. 69.

The great diaphone at Point Atkinson is both the oldest and the strongest horn (Record 1, Side 1). Built in 1912, it has a range of 10 to 20 miles, and produces an incredible 140 decibels at 20 feet. By its brute strength and carrying power it defines the western horizon on wet, winter days, providing an acoustic spaciousness to the invisible landscape, when fog and drizzle create a visually shrunken world. Situated at the junction point of the city harbour and coastal strait, the horn symbolizes Vancouver's link to the sea. This venerable old soundmark will disappear however, by the end of 1974, to be replaced by an automatic unit built by Robert Swanson. Although designed to imitate the diaphone's hefty "grunt", this new horn won't have the power, nor quite the character of its predecessor, which the Ministry of Transport claims is obsolete. This is unfortunate, for the more sophisticated system that replaces the "obsolete" one will produce an inferior sound, and rob Vancouver of one of its most historical soundmarks.

The present lighthousekeeper, Gordon Odlum, has served on various stations for over thirty years, and he knows the diaphone as well as any musician knows his instrument:

> *When it is foggy it is usually smooth. But when the wind comes back, you can hear the echo from the foghorn, bouncing off the rippled water. Then you know that it is getting breezy and that it is going to clear up.*
>
> *One of the strangest things happened a few years back when we had a very cold spell. There were patches of ice all over the Bay. When the echo came back from the ice it sounded like somebody ripping a large sheet of cloth.*



No. 1 Fire Hall, Gore and Cordova Streets, circa 1912.

Fire Engine Signals

After the big Vancouver fire of June 1886, which demolished much of the city, the emergency fire brigade was strengthened and updated. A reminiscence in the Vancouver *Province* of January 24, 1953, pictures the team: the captain holds in his hand a bugle with a green cord and tassel, which was used on parade and also as a signalling device during fires.

The first fire engine was purchased in 1899: it was a horse-drawn vehicle and its warning device was a bell:

> *Clang! Clang! See the fire apparatus clashing, dashing by in a shower of sparks; firemen hastily donning their helmets and rubber coats, men whose hearts beat vigourous and warm in life, men whose prospects are filled with bright hopes and expectancy!*
>
> *The wild plunge down the streets, the frantic speed of the horses, the drivers strapped to the seats, men clinging to the hose carts, ladder wagons and engines like flies!* [7]

In the early 1900's the Vancouver Fire Department was still manned by volunteers, as well as professionals. In order to call the volunteers to a fire, bells with long cords attached to them were rung at the fire halls, and any citizen spotting a fire would run to the fire house and ring the bell. The fire engines that emerged from the halls were, however, no longer the same.

7) *B.C. Saturday Sunset*, September 21, 1907, p. 13.

A long wolf howl, a sudden stopping of traffic, and a motor fire truck goes screaming down the street, leaving behind a clear track into which people and vehicles pour as the waters of the Red Sea followed on the wake of the men of Israel. Over the steering wheel the driver bends. At his side crouches a man who whirls the crank of the siren, sending ahead its shivering cry of fear. [8]

It was in 1907 that the Vancouver Fire Department bought its first motorized vehicle. The engine had a siren powered by the flywheel of the motor. When the motor was operating at few revolutions per minute the siren's sound was quite low in pitch and intensity and the Department added hand-cranked sirens to some of its early vehicles.

The oldest fire engine in Canada is a 1912 La France engine with a flywheel siren, now owned by the British Columbia Antique Fire Apparatus Association. This siren was measured at 88 dBA at 10 feet when idling and 96 dBA at the same distance when travelling quickly. (Record 2, Side 1.) The La France also has an electric claxon measuring 96 dBA at 15 feet.

In 1967 the Fire Department switched from the use of mechanical sirens to a type producing sound by means of an electronic oscillator. The unit chosen was the Federal Sign and Signal Corporation's "Director" with an output of 114 dBA at 15 feet. The new unit is concentrated more in the higher frequencies, thus it is more piercing and subjectively much louder. There are three settings: "wail" – a continuous chromatic glissando; "yelp" – a quick tempo whooping effect; and "alert" – an even more frenetic setting which is not used because of complaints by Vancouver citizens that it is too ear-splitting.

Police Signals

The Vancouver Police Department formed its first traffic division in 1899 and the division included both mounted and foot patrolmen, who were aided in their work by "tweet-tweet" whistles of the type used by the British police. About 1945 these whistles were changed and patrolmen were issued the type used by American basketball referees. Today they are hardly used at all.

The Police Department first purchased sirens for vehicles in 1924. These were one-toned electrically-powered mechanical sirens, and later modifications of the same type are still in use. About 1967 the various police departments around Vancouver began employing a new type of siren with both a "wail" and a "yelp" mode. We have measured these at 104 and 106 dBA at ten feet. (The constable operating the siren said he could make it go louder but didn't want to hurt his ears.)

8) "The Flame Fighters" by Garnett Weston in *British Columbia Magazine*, June, 1911, p. 562.

As a sidelight to the sounds of sirens it might be mentioned that in 1948 the Police Department introduced a gong on their radios to alert patrolmen in cars and on motorcycles whenever a major crime had been committed in the city.

Civil Defence Sirens

One of Vancouver's most elaborate siren systems is never heard today. In 1961, during the Cold War scare of atomic attack, the Department of National Defence equipped Vancouver with 45 sirens, manufactured by CLM (Canadian Line Materials) and the Federal Sign and Signal Corporation (Model 5-TT). Both models sound at an intensity of 105 dBA at 100 feet. The system was sounded once for an air-raid exercise in November 1961. It was heard again on three days in June 1971, when it was set off accidentally in South Vancouver. If it were ever used the code for this warning device would be:

1) A steady siren note for three or more minutes would indicate the possibility of an attack or that radioactive fallout from an attack elsewhere could be expected.
2) A rising and falling siren for three or more minutes would indicate danger of an immediate attack. Cover should be taken immediately.
3) The all clear signal (if it were to come at all) would be given by radio, not siren.

Conclusions

Emergency sounds must be loud enough to emerge clearly over the ambient noise level of the community. When they cannot be heard clearly the community is in trouble. In an account of an 1887 Vancouver riot between Orientals and Whites, we read the following:

On arriving in the Chinese camp . . . the mob immediately surrounded the shanties and amidst howls and yells commenced the work of seizing the Chinamen . . . Those who were caught in some instances were badly kicked by some of the crowd . . .

It was at this juncture that a whistle was heard, and the gigantic form of City Police Chief J. Stewart, followed by Superintendent Roycroft of the Provincial Force, emerged from the blackness of the night into the dim circle of light cast by the lanterns. [9]

The mob was immediately "stilled by the piercing note of the whistle" and order was restored. Compare this with a Vancouver riot in Gastown in 1971, when the police attempted to disperse a crowd by warning them over a loud hailer:

Most of the people . . . claimed they hadn't heard any order to

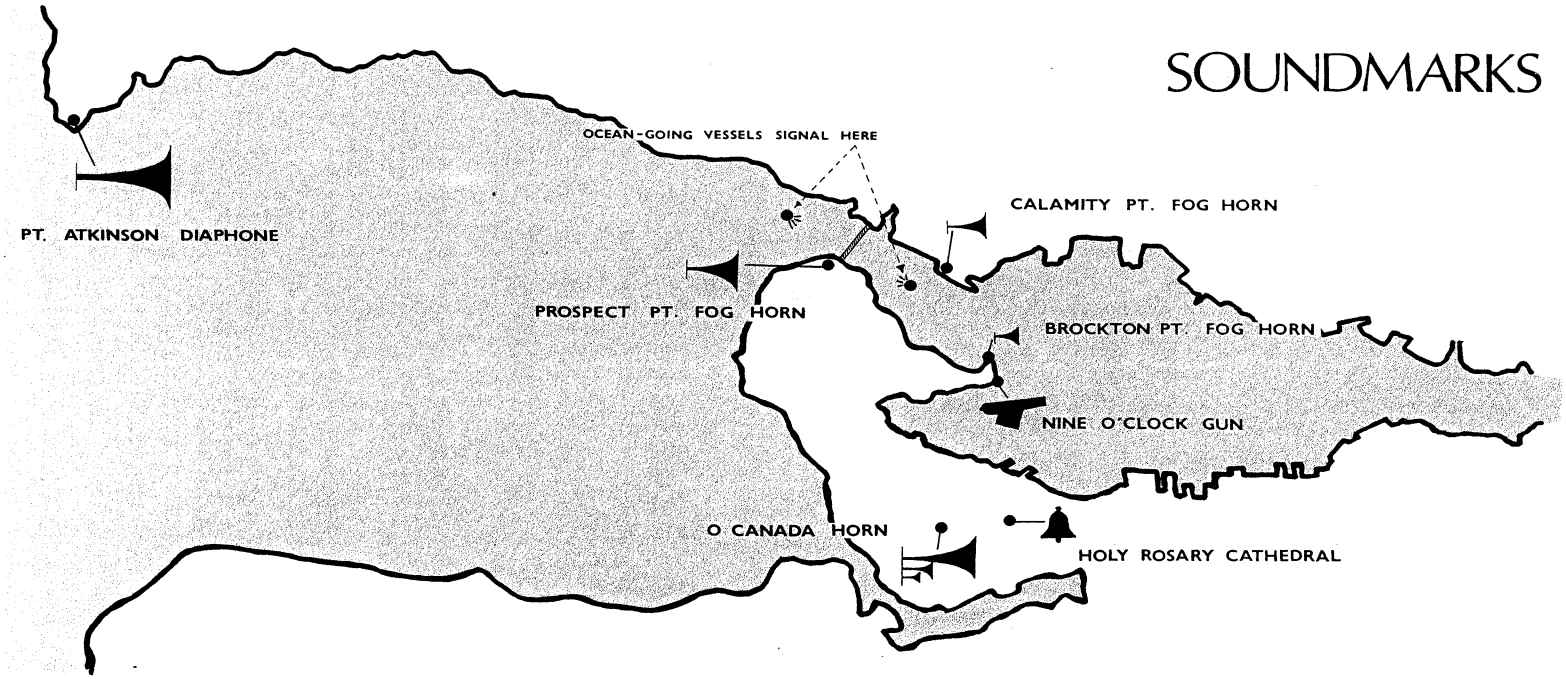
9) B.A. McKelvie, *Pageant of B.C.*, Toronto, 1955, p. 248.

disperse before the police charged. One man, however, claimed to have heard the order given by Inspector Abercrombie, but said the warning was too faint to be heard more than a few feet away. [10]

The easiest way to determine the extent to which the ambient noise of a community rises would be to study the changes in the community's emergency sounds. Although we cannot establish any quantitative basis for the ambient noise levels in early Vancouver, the difference between the 1912 La France fire engine (at 88-96 dBA) and the present sirens (at 114 dBA) suggests that the signals of emergency vehicles have risen some 20-25 decibels in 60 years. It is a fair assumption that there has been a rise of the same order of magnitude in the ambient noise levels of the city — that is, about one decibel every two years on the average. As a matter of fact, an extensive acoustic engineering survey, conducted in Vancouver in 1971, at great public expense, appears to confirm this conjecture (see page 57).

Since the newer sirens have reached an intensity where they are causing discomfort and possibly risk of hearing damage to the public, the technique of overcoming the ambient acoustic environment by producing emergency warning devices of greater magnitude has now reached its practical limit. Thought will have to be given to other ways of producing a favourable signal to noise ratio than by simple acoustic means.

A final question: since the ultimate emergency sound — the Civil Defence Siren — is no longer heard at all, how will the citizenry recognize it if it ever is? Sounds which are never uttered are called taboo, and they would form an interesting group to study. Traditionally, taboo sounds were always followed by death and destruction. This is true of the Chinese Yellow Bell (Huang Chung) and the Hebrew word "Jaweh". Could the Civil Defence Siren belong to the same category?



10) Vancouver *Sun*, August 9, 1971, p. 9.

SOUNDMARKS

We can tell much about the prominent institutions of a society by looking for its tallest buildings. Eventually such buildings may be affectionately referred to as landmarks. Looking at the profile of a medieval European city we at once note that the castle, the city wall and the church spires dominate the scene. In the modern city it is the high-rise apartment, the bank and the factory chimney which are the highest buildings. In the soundscape too, there are sounds which obtrude over the acoustic horizon. We can thus define soundmark as a prominent feature of a soundscape, possessing properties of uniqueness, symbolic power or other qualities which make it especially conspicuous or affectionately regarded. Once a soundmark has become established in the community it deserves to be protected, for soundmarks make the acoustic life of the community unique.

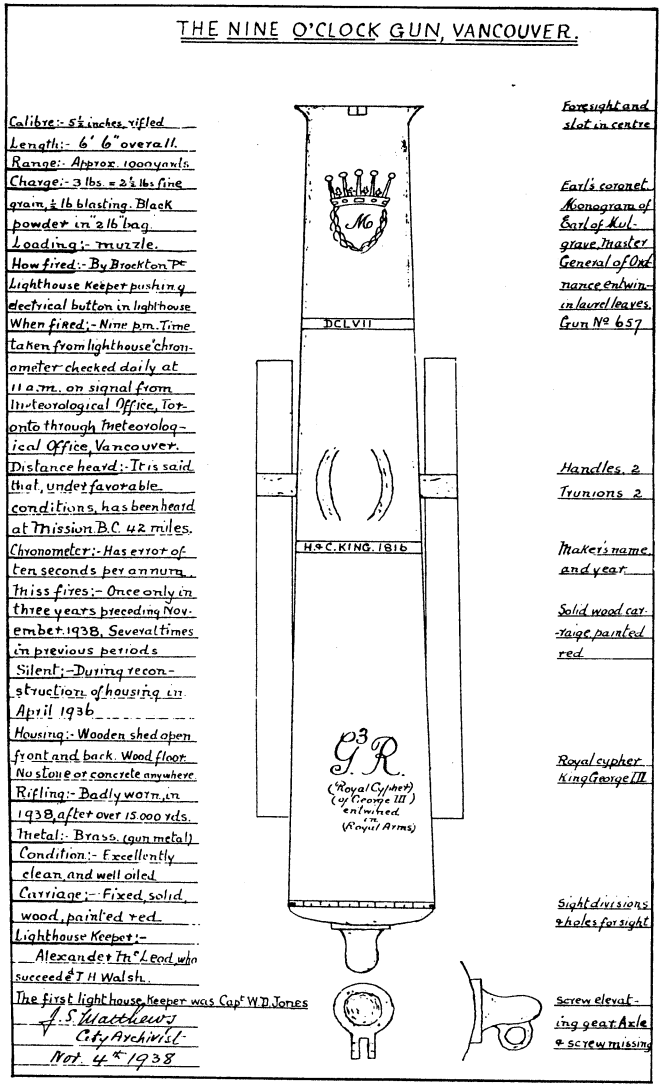
Vancouver has a few sounds in the soundmark category and these will be discussed in some detail.

Nine O'Clock Gun

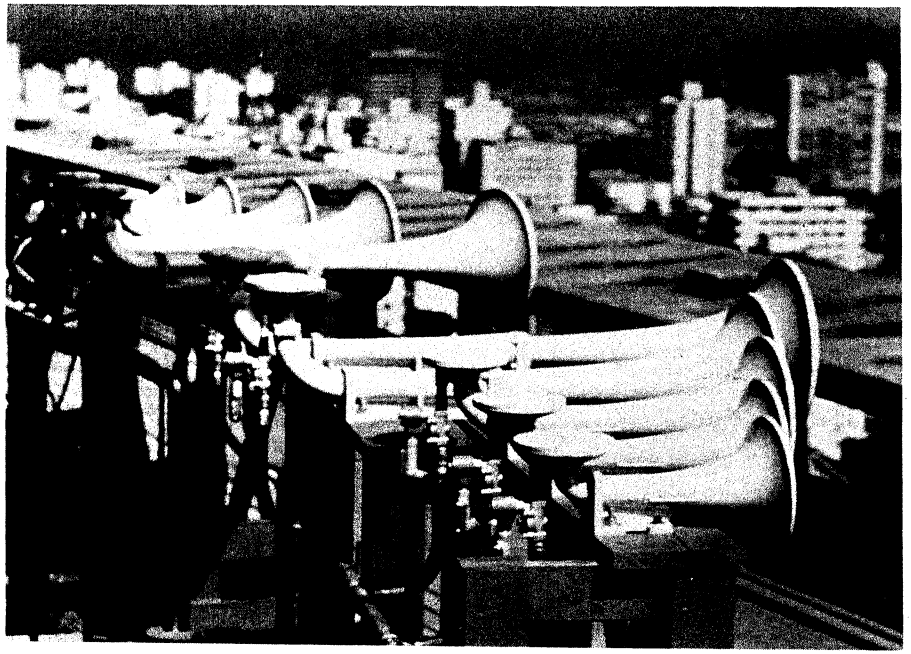
If the many times the Nine O'Clock Gun has been mentioned in the local press since 1900 is any indication, it must be judged Vancouver's most significant soundmark. Nearly everybody in the city can identify its nightly boom. The gun has survived Parliamentary stinginess, powder shortages, cracks in her barrel, vandals, several different gun-keepers, and still manages to be heard, on a clear, cloudless night, as far away as Mission, 42 miles to the east.

Built in 1816, and originally used (some say) under Wellington, the six-foot muzzle-loader was donated to the province in 1856, and came to Vancouver from Esquimalt in 1894. Fired at first at six o'clock to warn fishermen of the Saturday and Sunday closing during the commercial fishing season, the gun quickly took over from the bell on top of the old Water Street fire hall as the official community time signal. As the fishermen sailed farther to sea, the clock was changed to sound at 9 p.m., as it has sounded (with about 20 different interruptions, including a three-year wartime silence) to this day. In addition to marking time, it has also opened War Bond drives, inaugurated Vancouver's Diamond Jubilee, marked Remembrance Day services, New Year's celebrations, and in 1918, sounded the end of World War I hostilities with a blast at 3:10 a.m. It is even used as a weather beacon; some old-timers claim that a hollow ring to the sound forecasts a rainy day ahead.

The gun has had many different masters. At first it was charged by the Brockton Point Lighthouse keeper, and fired at the CPR company office on Hastings Street. Later, the lighthouse keeper himself fired it, until the late '50s when it was loaded by a parks



board gardener and fired from the signal station in the middle of the Lions Gate Bridge by a National Harbours Board attendant. It has recently been automated and is now operated by a clock. Back in the early days, the gun took only one pound of powder, but today three pounds are necessary to produce the required "throaty roar" in the noisier and smog-bound city. (Record 1, Side 2.)

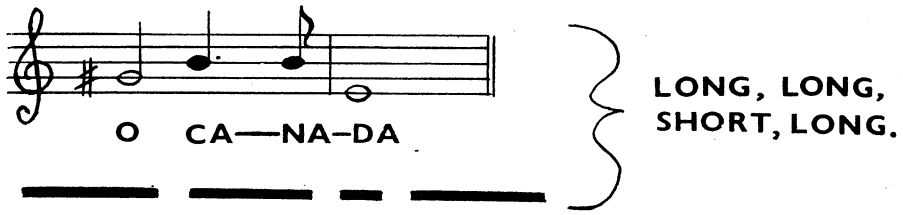


O Canada Horn

Unlike its counterpart, the 9 O'clock Gun, the ten cast aluminum trumpets that sound 12 o'clock noon on top of the B.C. Hydro head office are known by no popular name, nor do they enjoy quite the public attachment afforded the older Vancouver soundmark. The horn, which caricatures the opening phrase of Canada's national anthem, was first heard in Vancouver on June 19, 1967. It was the brainchild of local engineer Robert Swanson, who thought it up on his own to celebrate Canada's 1967 Centennial. Already, and for the same purpose, he had built similar but much smaller horns for the Centennial Train and Caravan, and when the Hydro building was finished, Swanson decided it too "needed a voice".

It has been playing (in E major) steadily ever since, except for a short interlude (January 26 - February 10, 1972) when, following a "mixed public reaction", it was silenced. "A more unlikely muezzin in a more unlikely minaret would be hard to find," commented the Vancouver Sun, with no regrets. However B.C. Hydro was urged to bring the horn back by disgruntled listeners who evidently still wished to hear it honk out the anthem phrase (which has been measured at an ear-splitting 108 dBA three blocks away, next to the Public Library).

This unique community soundmark shares basically the same rhythmic pattern as that made by trains at level crossings:



The difficulty in automating this pattern was considerable, and Swanson never really solved the problem as musically as he did that of pitch with his diesel train whistle 20 years ago. The O Canada melody is activated by a set of relays, which energizes solenoids, and opens the air valves in the required order, all of which makes for a mechanical sound. Since it plays a musical phrase, a musical criticism is justified; the horns play too *marcato* when they should be *legato.* The best way to accomplish this would be to have designed it as a hand-operated device. It is an unsatisfactory soundmark and its perpetuation can only be justified as a gross expression of national sentiment. (Record 1, Side 2.)

Bells of Holy Rosary

> *. . . the sound of bells, in whose strokes you may find every word which you can imagine.*
>
> Da Vinci, *Treatise on Painting*

Among all the bells, church and otherwise, of Vancouver, those of Holy Rosary Cathedral are unique and give Vancouver one of its most colourful soundmarks. Of 211 churches in Vancouver, only 11 have real bells at all; a mere 20 more play recordings of religious music and 180 are silent. In all of Vancouver, there are only two churches with a full peal of bells, and one of these is virtually mute. The bells of St. James Anglican downtown have no one to play them, and two of the bells are presently inoperative. At Holy Rosary Cathedral, another downtown church, the bells have had periods of inactivity as well, but at the moment, a campanologist from England has taken charge and now the bells have a number of apprentice ringers, who practise on Tuesday nights and peal regularly on Sunday mornings. The Cathedral's peal of bells consists of seven diatonic notes of a major scale which can be combined in a total of 5,040 (i.e. 1 x 2 x 3 x 4 x 5 x 6 x 7) different rows of changes.

On Saturday June 16, 1973, a visiting group of English ringers came to the Cathedral and for the first time in North America rang an "Eight-Splice Surprise Major" peal, lasting 3 hours and 3 minutes and consisting of 5,024 changes. This particular peal was a combination of several different styles of bell ringing, all spliced together. The concentration and physical stamina required for this is considerable as the sequence of notes must be perfectly even. (Record 1, Side 2; Record 2, Side 1.)

The last time anything like this happened in Vancouver was in 1911, when in honour of the coronation of King George V, a peal of "Grandsire Triples" was rung, lasting 2 hours and 59 minutes, and comprising 5,040 changes. At the death of the monarch, the bells were rung again, but muffled in leather caps.

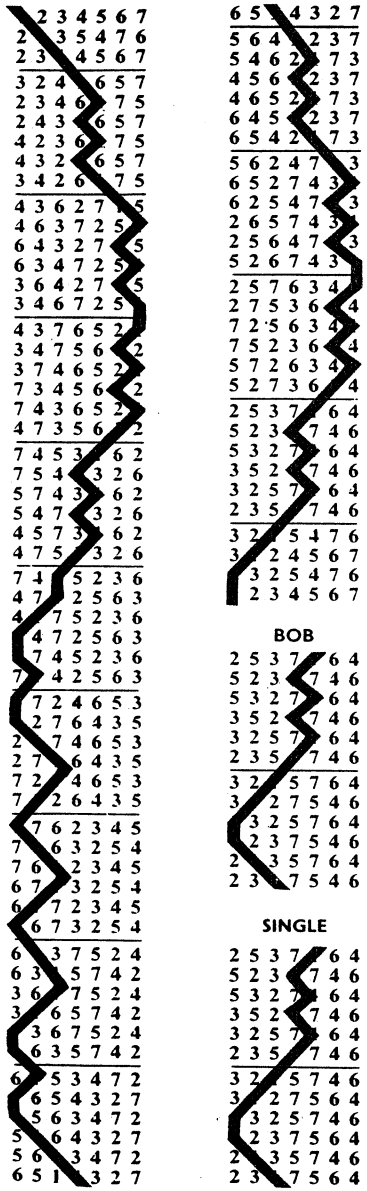
The recent peal at Holy Rosary went unnoticed by all but a small number of passers-by and one TV newsman who couldn't understand why the ringers were making "all this racket". The caretaker reported: "Forty or fifty years ago people came from all over to hear the bells — from Victoria, from the States. We phoned the radio and TV stations this time but no one was interested."

By comparison with the gun and the B.C. Hydro horn, the bells of Holy Rosary are a less conspicuous soundmark, though they are the richest musically and the most intricate and human in production. The accompanying map shows the furthest extent the bells can be heard before they disappear from earshot due to the obliterating traffic noise, (page 41.)

The cathedral used to ring a bell at noon but this practice was stopped due to complaints. Soon afterwards, however, the Royal Trust Building, a few blocks away, installed electric chimes, which ring on the quarter hour. Although they are of greater intensity than the cathedral bells, apparently no one has complained.

Bells used to be important community signals. The indifference with which the public today regards the Holy Rosary bells is extended even to Vancouver's most recent acquisition, the 330 note carillon in the new Ladner Clock Tower on the campus of the University of British Columbia. Built in 1967, the carillon has attracted little attention. The information officer we phoned had to look in the files for its ring schedule, even though she worked nearby, well within earshot. It sounds the Big Ben tune at 8:30, 12:30 and 5:30 daily, and on special occasions, such as Convocation, the carillon is played.

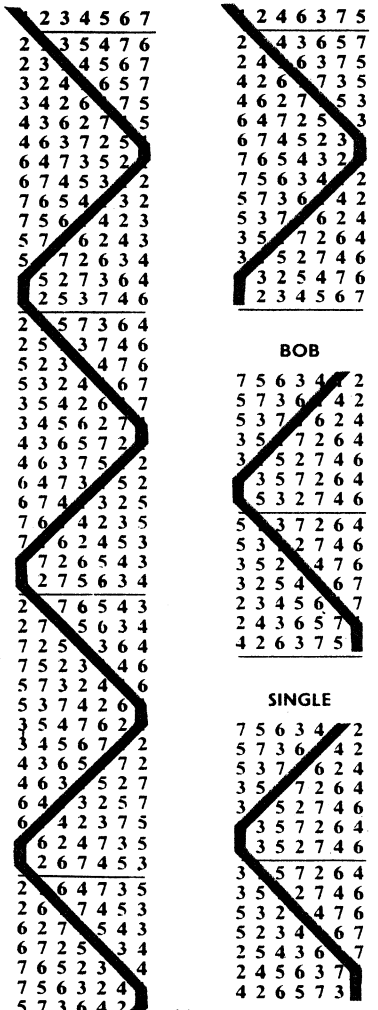
Stedman Triples



BOB

SINGLE

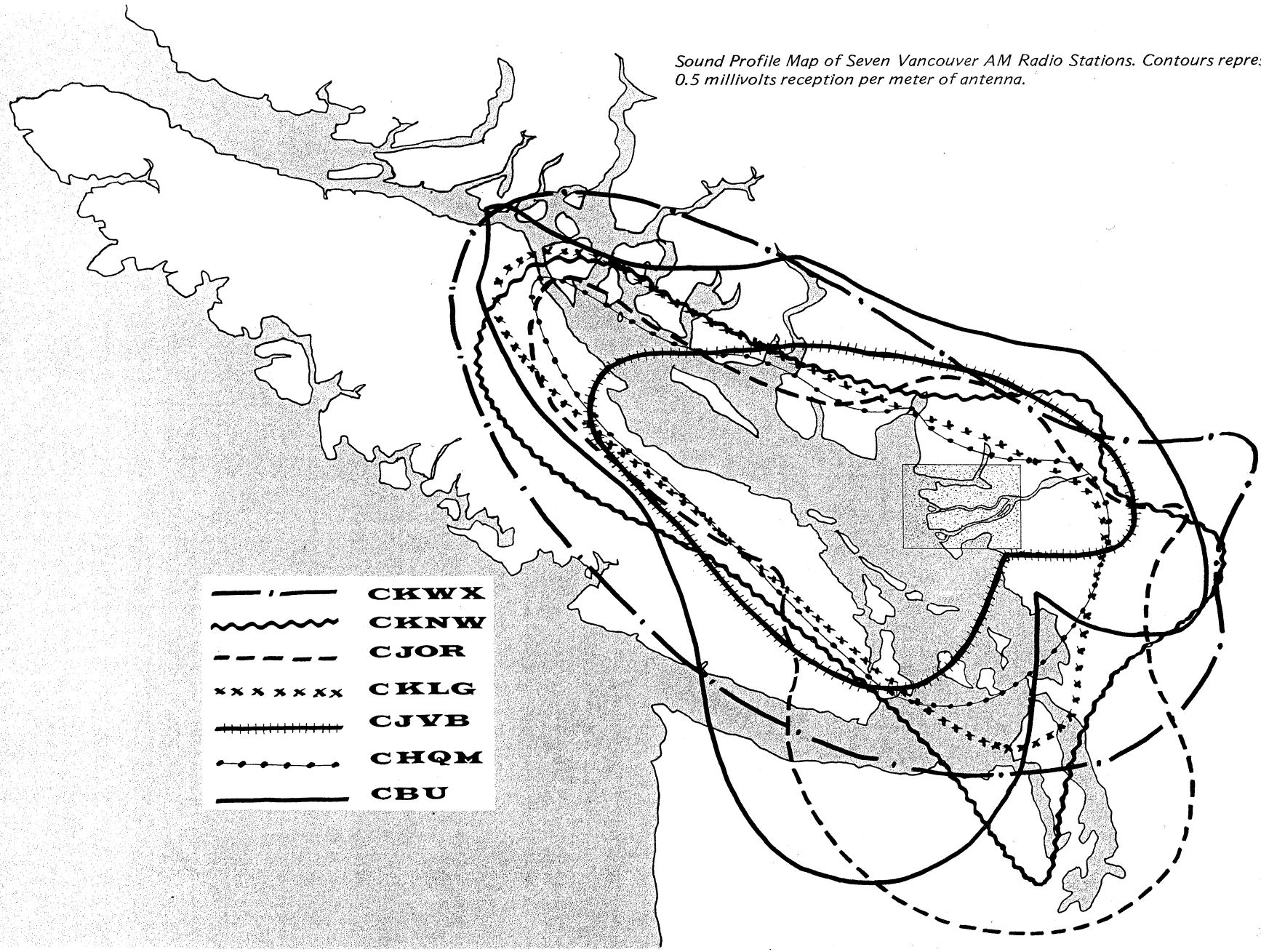
Grandsire Triples



BOB

SINGLE

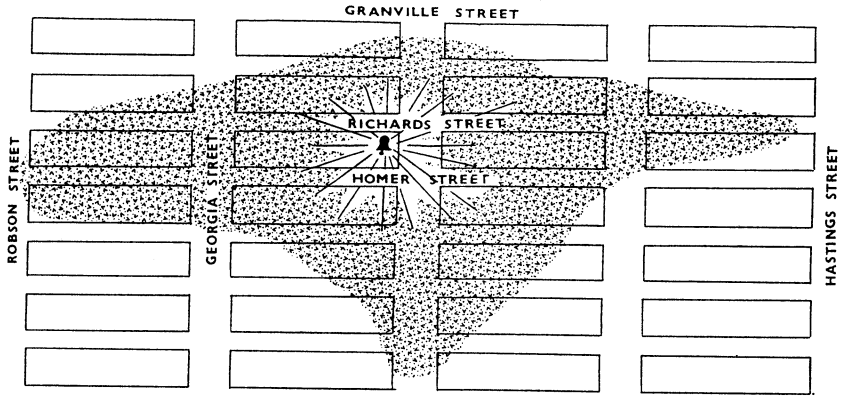
Notation used by campanologists for ringing bell changes. The bells are numbered "1" to "7", from highest to lowest in pitch.



Sound Profile Map of Seven Vancouver AM Radio Stations. Contours represent 0.5 millivolts reception per meter of antenna.

SCHIZOPHONIA AND THE INTERRUPTED/EXTENDED ACOUSTIC COMMUNITY

Signals and soundmarks define the acoustic spaces of the community. Profiles can be drawn for these sounds, showing the more or less unbroken areas of the city over which they may be heard. The parish used to be defined as that area over which the parish church bells may be heard; when you can no longer hear the bells you are in another parish — or none at all. The reduction of area over which the bells of Holy Rosary Cathedral are heard today — due to the rise in ambient traffic noise — synchronizes with the indifference of the Vancouver public to church attendance.



Sound Profile Map of Holy Rosary Bells, made June 16, 1973, during the ringing of the "Eight-Splice Surprise Major" peal.

Sounds such as school and church bells may be called centripetal — that is, they attempt to unify the community by drawing people to specific meeting points; others, such as fire and police sirens, are centrifugal — they disperse the community away from danger areas.

Today, new means of propagating sounds have given extensions to the acoustic community. Telephones and radio are examples of devices that connect points with sounds, leaving silent spaces between. These interrupted-extended profiles create both a larger community network, and one which is more variegated, less uniform.

We call telephones and radios *schizophonic*, meaning that they split sounds apart from their original sources to transmit them elsewhere. Like the related word "schizophrenia", we want schizophonia to have a nervous ring, for while the benefits such developments bestow are well enough known, we do not want to forget that they are contributing to the overpopulation of the soundscape.

The Telephone

Telephones were first introduced to British Columbia on May 8, 1880 with the incorporation of the Victoria and Esquimalt Telephone Co. Ltd. The first telephone exchange in the Vancouver area was that of the Port Moody Telephone Co. Ltd., which connected Port Moody and New Westminster and was completed in 1883. In 1885 a line was constructed to downtown Vancouver. As with all early North American telephones, users were connected to party lines; a code of up to ten rings (longs and shorts), heard along the whole line, indicated the party being called. The conversion to dial phones began in 1928.

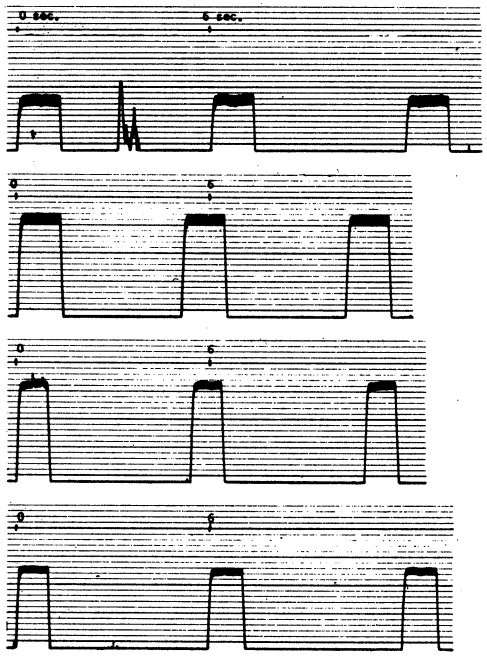
TWO CODES USED FOR OLD VANCOUVER MAGNETO TELEPHONES

	Phone No.	Ringing side of line	Code
A	1	+	1 long
	2	—	1 long
	3	+	2 short
	4	—	2 short
	5	+	3 short
	6	—	3 short
	7	+	4 short
	8	—	4 short
	9	+	1 long 1 short
	10	—	1 long 1 short
B	1	+	1 long
	2	—	1 long
	3	+	2 short
	4	—	2 short
	5	+	4 short
	6	—	4 short
	7	+	1 long 1 short
	8	—	1 long 1 short
	9	+	1 long 2 short
	10	—	1 long 2 short

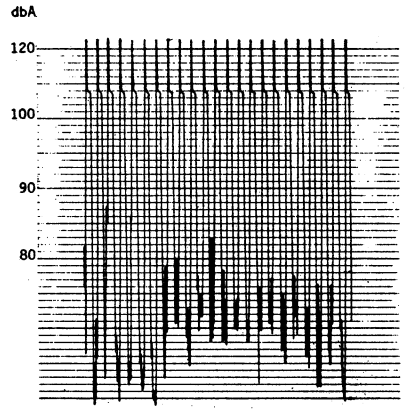
The telephone is a sound most people are accustomed to hearing many times a day. In fact, Canada was the most talkative nation in the world on the telephone between 1951 and 1968, after which it relinquished the record to the USA. The power of the telephone to interrupt is well known. (As a matter of fact, the British telephone, with its two loud rings followed by a pause, was intentionally constructed to total five units — two beats of rings followed by three beats of silence — because it was thought that this asymmetrical meter would be more attention-getting than a meter of 3,4 or 6.)

Vancouver phones, like those throughout North America, consist of single rings, caused by a mechanical clapper vibrating between two bells. The total duration of the cycle is calculated to be 6 seconds, with 1.8 seconds of ring and 4.2 seconds of silence.

But there are considerable deviations from this norm, as graphs of a few typical Vancouver telephones show.



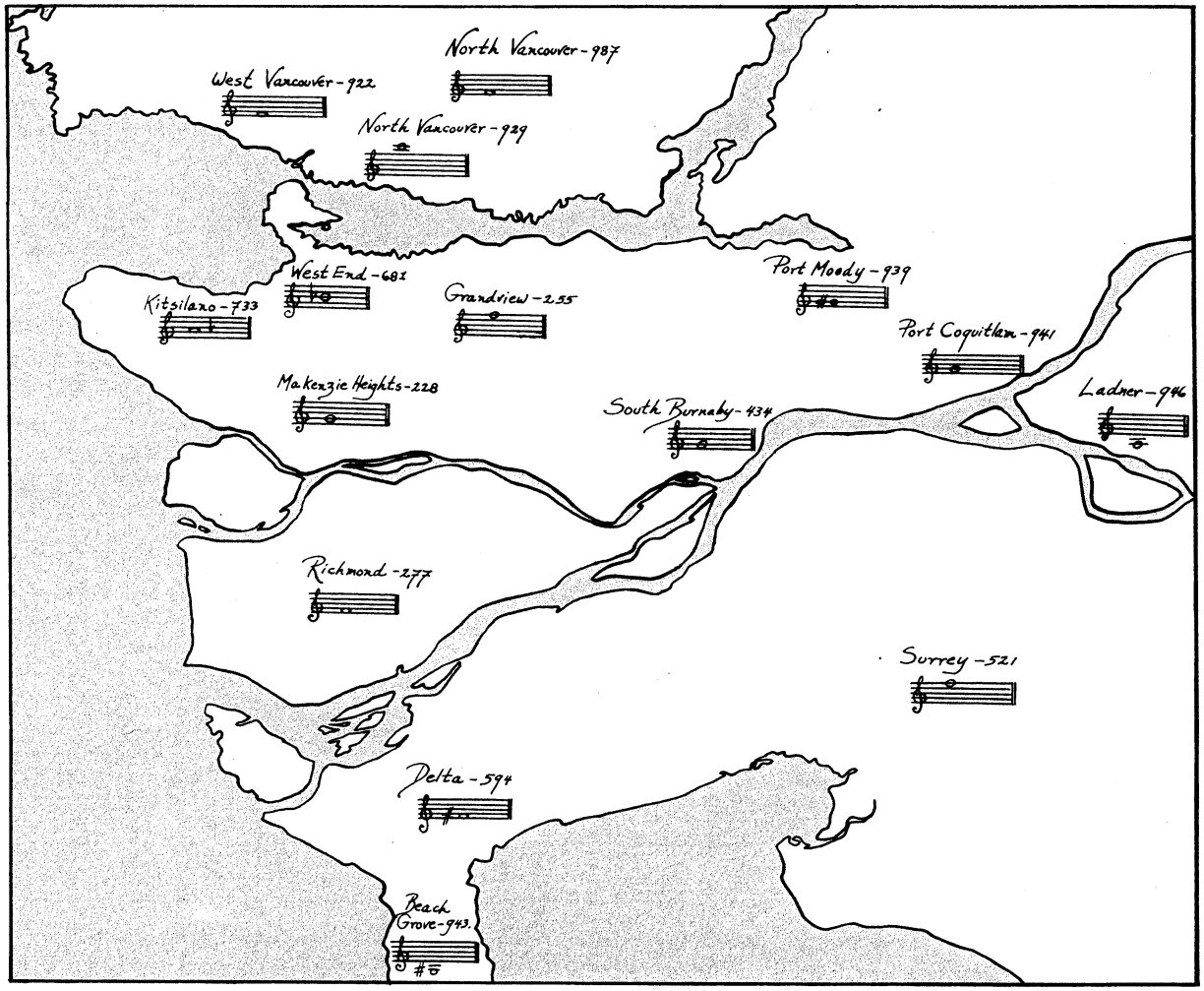
Although the intensity of the ring can be regulated to some extent by a dial on the bottom of the telephone, the intensity of the voice speaking, or the ringback sound (i.e. the ringing heard over the receiver when a call is placed) are not strictly regulated. In one of our research projects we have registered a busy signal at over 120 dBA and conversation at over 100 dBA at the point where the ear would normally make contact with the receiver. This is loud enough to be an aural health hazard.



Intensity of the busy signal on the Simon Fraser University telephone exchange. The output of a General Radio Sound Level Meter, type 1551-C, set on the A scale, was fed directly to a Brüel and Kjaer Level Recorder, type 2305. The Sound Level Meter was calibrated with a Brüel and Kjaer calibrating tone (93.6 dB at 1000 Hz.).

Although no attempt has ever been made to render the telephone musical, it does possess some interesting quasi-musical features. The ringback sound is electrical rather than mechanical and is generated at the exchange. It consists of a 20 Hertz fundamental over which various harmonics are added for the different exchanges, and the addition of these different harmonics gives the ring of each exchange a definite pitch.

As time goes on, telephones are expected to become more standardized the world over. Already with the new push-button dialing devices a uniform tone system has been adopted for the whole of North America. On these new 'phones the dial tone is a diad, or two-note interval, consisting of the frequencies 350 Hertz and 440 Hertz — the latter being (by accident?) the concert "A" of music. Each number on the dial is also made up of two frequencies, a low and a high, and tunes can be approximated by pressing the numbers. By this method the opening of Beethoven's Fifth Symphony becomes 0005 - 8883 -.



Ringback pitch of some Vancouver telephone exchanges.

Radio

The British Columbia painter Emily Carr, writing in 1936, had no love for the radio:

> *When I go to houses where they are turned on full blast I feel as if I'd go mad. Inexplicable torment all over. I thought I ought to get used to them and one was put in my house on trial this morning. I feel as if bees had swarmed in my nervous system. Nerves all jangling. Such a feeling of angry resentment at that horrid metallic voice. After a second I have to clap it off. Can't stand it. Maybe it's my imperfect hearing? It's one of the wonders of the age, simply marvellous. I know that but I HATE it . . . I spent the evening at a house last week where they had a beautiful, tip-top radio. It was turned on most of the evening in the next room; unconsciously everyone's voices were pitted against it! Oh, if I could have thrown it out the door! By 8 o'clock I was so nervously exhausted I could have cried.* 11

In 1922 Vancouver's first commercial broadcasting station CKMO signed on the air with 50 watts of radio power and a total of 103 licenced receivers in the city to pick it up. By 1932 the number had risen to 55,534. In June 1945 there were 72,595 licenced radios. As radios are no longer licenced in Canada it is difficult to know the exact number in the Vancouver area today (1973) but several local stations claim to have 300,000 to 475,000 listeners each day.

At the present time, there are eight AM stations in Vancouver and five FM stations. Layered over top of one another are numerous program environments, transmitted by these different stations to various social groups.

The forms of radio broadcasting could be studied with all the systematic detail devoted to musical compositions or poetry, but detailed studies of this kind appear never to have been undertaken. All we can do here is to suggest the general character of this work, and hope that we may be able to deal with the subject in depth in some future document.

For this purpose, four typical Vancouver stations have been selected.

11) Emily Carr, *Hundreds and Thousands*, pp. 230-231.

CBU (690 kc.) is the Vancouver outlet for the Canadian Broadcasting Corporation, a public enterprise that tries to be all things to all Canadians. It provides national and local news, interviews, live sports, concerts, theatre, pop music and some educational broadcasts. It tries to feel the pulse of the nation but it wears the diplomat's white gloves. Daily audience: 197,000; average age: 34.

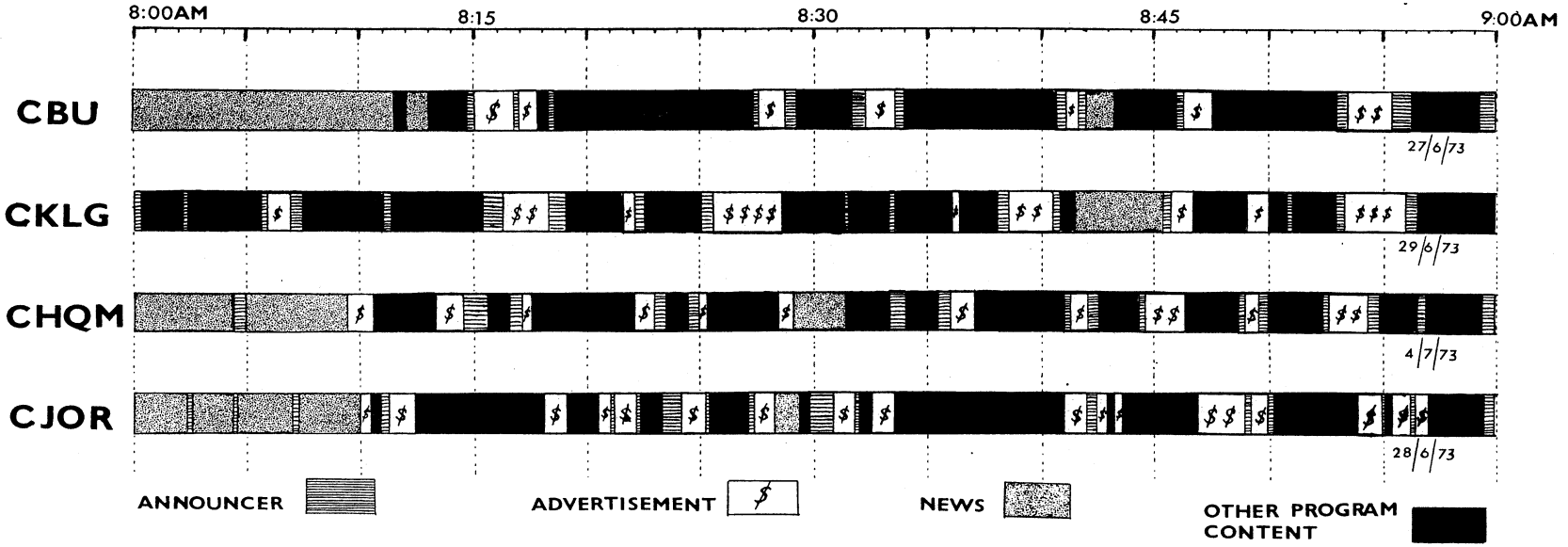
CKLG (730 kc.), Vancouver's fountain of youth, is a top forty pops station on which disc jockeys play and replay teenage hits in four-hour shifts. Their talk is made up of inane one-liners, their names, the station identity, the time and the weather. A panderer to the multi-million dollar market of skin creams, candies, and cynicism, 'LG is often heard booming from muscle cars while their owners prowl after that perfect chick they hear in the ads, or that smooth guy who plays the records. Daily audience is 425,000, consisting of adolescents of various ages.

CHQM (1320 kc.) came on the air in 1959 with the promise to avoid "Rock n' Roll, gimmicky newscasts, and frantic pitchman type commercials." It plays rock now, but of a quiet and luscious variety that hardly ever reveals the libidinous origins of this music. Hosts invite themselves into your home to inform you about the most sensible ways to conduct your business dealings; they talk endlessly about the weather, and they're very, very careful not to upset you. Daily audience: 225,000; average age: 37.

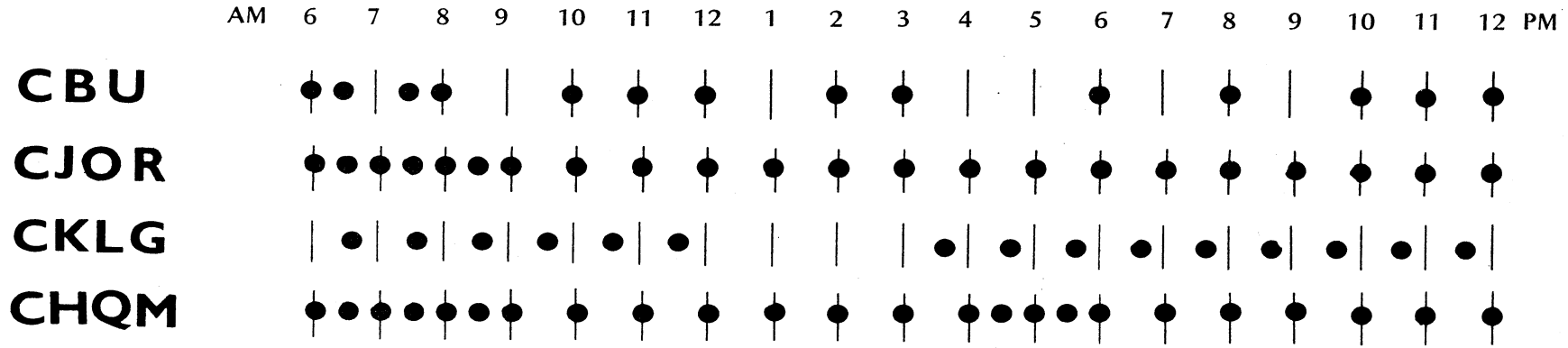
CJOR (600 kc.) is a type of "personality" radio in which commentator man telephones for four-hour hot-line shows each day, talking back, often in insulting ways, to individuals who phone in. No separation is made between program material and spot advertisements; listeners are encouraged in the same breath to visit Stanley Park and to "buy baubles for your bippy." Programming also includes news reports which concentrate on descriptions of gory crimes and devious political machinations. Daily audience: 300,000, centred on the 35-40 age group.

Radio in Vancouver began as a joyous experiment. There was considerable live broadcasting of music and theatre entertainments. A letter to the *Province* (May 31, 1951) states that the radio station which the newspaper operated in the early days was responsible for the first opera on radio, "Maritana", around 1923. But over the years Vancouver's radio stations (following the apparent pattern everywhere) have become increasingly conscious of the profit-possibilities of advertising. This began back as far as 1938, when a microphone was installed in the store of David Spencer, marking the first use of radio by any store in Canada for direct advertising.

At present the Canadian Radio and Television Commission permits a total of 250 minutes of advertising per 18-hour day, that is, an average of 14 minutes per hour. Many stations push this to the limit, as is shown by the sample peak hour for a typical weekday.



Radio broadcasting creates interesting rhythmic patterns. Each station has its own style of punctuation and its own methods of gathering the material of its programs into larger units, just as the phrases of language are shaped into sentences and paragraphs. Different events are repeated periodically in daily or weekly schedules, and within each day certain items may be repeated several times at fixed intervals. These patterns are called isorhythms. Isorhythmic recurrences may be fixed or variable; thus, certain recorded commercials or station logos may be repeated exactly, while other items, such as the news, may occur at fixed times but with fluctuating content.



Weekday Pattern of News Broadcasts on Vancouver Radio.

There are also items which recur unpredictably, but insistently enough to be called *leitmotifs*. For instance, our studies show that over a one-hour period on CKLG the disc jockey mentioned the name of the station 28 times and his own name 14 times.

Each station has its own tempo. In general the tempo of broadcasting has been increasing over the years. Material is being pushed together, overlapped. There are fewer pauses. The number of separate items recorded over a typical 18-hour sample day on the four stations ran as follows:

	TOTAL	HOURLY AVERAGE
CBU	635	35.5
CHQM	745	41
CJOR	996	55.5
CKLG	1097	61

Stations broadcasting popular music are the fastest-paced. In respect to this it is noteworthy that the average popular song, at one time limited to three minutes by the old ten-inch, 78 r.p.m. disc, has not changed appreciably in length since the introduction of longer-play recordings, which suggests that some secret law concerning average attention span may have been inadvertently discovered by the older technology.

Considerable ingenuity is shown in joining these brief fragments together. In fact, the study of joins in broadcasting is of considerable interest, for the connecting of two distinct acoustical environments is a surrealistic exercise under any circumstances. Since the advent of the singing commercial in the 40's, popular music has served the advertising industry well, so that by means of quick cross-fades, songs and commercials flow together uninterruptedly, and the ads can be insinuated into the innocent or gullible mind.

The final graph is a sound level recording of the four stations for a one-hour period. A sound level recording registers the fluctuating intensity of the broadcast in decibels. The graph shows how, on the popular music station, all program material rides at the maximum permissible level, a technique known as *compression*. Such broadcasting shows no dynamic shadings or phrasing. It does not rest. It does not breathe.

The bottom line on the graphs represents silence. Canadian radio avoids it. Only occasionally, during broadcasts of theatre or classical music, do quiet and silence achieve their full potentiality. From another CBC broadcast, a level recording of Debussy's *Nocturnes* is added for comparison. It shows the rich dynamic shading and wave-like depressions and surges of sound that characterize the more interesting soundscapes of Debussy's music.