A Sound Education

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100 Exercises in Listening and Sound-Making

R. Murray Schafer

Arcana Editions

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For Keiko Torigoe and Yu Wakao, who encouraged me to complete these exercises; and for Marisa Fonterrada and Violeta de Gainza, who allowed me to try them out in their classes.

Introduction

The subject we are concerned with is sound, and the task is to suggest ways teachers might help students to listen more effectively. As a musician I have my own reasons for wishing this to happen; but listening is important in all educational experiences, whenever verbal or aural messages are exchanged. Listening goes on continuously whether we like it or not, but the possession of ears does not guarantee its effectiveness. In fact, many teachers have told me they detect an increasing deficiency in the listening abilities of their students. This is serious; nothing is so basic as the education of the senses, and of these, hearing is among the most important.

Obviously we listen in different ways to different things, and there is much evidence to suggest that not only individuals but societies listen differently. For instance, there is a difference between what we might call focused listening and peripheral listening. Why do we focus on certain sounds and merely overhear others? Are some sounds discriminated against culturally so that they are not heard at all? (An African once said, '*Apartheid* is a sound!') Are some sounds filtered out or rendered inconspicuous by others? And how does the changing acoustic environment affect the kinds of sounds we choose to

listen to or ignore?

I call the acoustic environment the soundscape, by which I mean the total field of sounds wherever we are. It is a word derived from landscape, though, unlike it, not strictly limited to the outdoors. The environment around me as I write is a soundscape. Through my open window I hear the wind rustling the leaves of the poplar trees. The young birds have just hatched from their nests, for it is June, and the air is filled with their singing. Inside, the refrigerator suddenly comes on with its shrill whine. I breathe deeply then go on puffing at my pipe, which makes little popping noises as I smoke. My pen rides smoothly over the clean paper, the sound swirling irregularly, then clicking as I dot an 'i' or add a period. Such is the soundscape on this peaceful afternoon in my farmhouse home. Take a moment to compare your soundscape as you read these notes. The soundscapes of the world are incredibly variable, differing with the time of day and season, with place and with culture.

Everywhere in the world today the soundscape is changing. Sounds are multiplying even faster than people as we surround ourselves with more and more mechanical gadgetry. This has

produced a noisier environment, and there is growing evidence that modern civilization may be deafening itself with noise.[1] But aside from the physiological dangers of noise pollution, how is our hearing psychologically affected by these changes? Is there a way of filtering out unwanted sound and still allowing the desired messages through? Or does sensory overload finally beat us into a state of dopey submission or frazzled desperation?

It is easy to despair. When I initiated a course in noise pollution in the communications department of a university (about 1965) I quickly sensed the futility such an exclusively

1 From the many statistics, here are a few: 33 per cent of students entering the University of Tennessee in 1981 had defective hearing in the higher registers. An investigation at the University of Zürich showed that 70 per cent of disc-jockeys and rock musicians examined had 'considerably reduced' hearing, and another Swiss investigation revealed that while 50,000 young people entering military service in 1968 showed signs of hearing loss, by the early 1980s the number had jumped to 300,000.

negative subject provokes. Experts came and showed the students diagrams of the inner ear and decibel charts of jet engine noise. Lawyers explained the difficulty of winning a court case for hearing loss. Town planners read anti-noise bylaws that were weakly enforced. Acoustical engineers pleaded that more time and money were necessary to conduct more research. It was evident that many of these professionals had an interest in preserving noise as a means to continued employment. My students reacted listlessly. 'So the world is noisy,' they said, 'what do you expect us to do about it?' In fact, the modern soundscape has stimulated an appetite for noise. With increased sound levels in working environments and on the streets, higher levels of sound have been demanded in music and recreational activities. Generally ignorant of the dangers this poses for health, the modern citizen may actually be opposed to a reduction of noise, feeling it would bring about a loss in the vitality of life.

In *The Tuning of the World,*[2] a book that discusses the whole

2 *The Tuning of the World* is published by Arcana Editions.

history of sounds in our lives, I described a method for flipping the whole negative subject of noise over into the positive quest for soundscape design. To me soundscape design is not design from above or abroad but from *within,* achieved by stimulating larger and larger numbers of people to listen to the sounds about them with greater critical attention. Which are the sounds we wish to keep? How can they be encouraged so that the essential character of our environments can be preserved and become more beautiful?

I believe that the way to improve the world's soundscape is quite simple. We must learn how to listen. It seems to be a habit we have forgotten. We must sensitize the ear to the miraculous world of sound around us. After we have developed some critical acumen, we may go on to larger projects with social implications so that others may be influenced by our experiences. The ultimate aim would be to begin to make conscious design decisions affecting the soundscape about us.

How could I put all this in the most cogent manner for teachers and individuals who might be interested in such a program? I decided the simplest form would be the best: a collection of exercises – I would call them Ear Cleaning

Exercises. I have used them all in my own teaching with both children and adults. The vast majority require no special training to undertake. Many could be performed alone, but a group would be best for most of them.

Of course I don't imagine them being performed systematically from start to finish. They are intended for casual performance as the occasion demands. I have gathered them loosely so that those at the beginning are concerned with aural perception and imagination, while those in the middle deal with the making of sounds, and those at the end deal with sound in society. Included among some of the exercises are reports from individuals or groups who have already tried them. Take them; they're yours. Adapt them as necessary to your own situation and add others as they occur to you. There is no end to this project, just the continuous struggle to beautify the world in whatever ways people with good ears can imagine.

R. Murray Schafer
Indian River, August 1991.

A Sound Education

1.

We begin with a simple exercise. WRITE DOWN ALL THE SOUNDS YOU HEAR. Take a few minutes to do this; then, if you are in a group, read all the lists out loud, noting differences.

Everyone will have a different list, for listening is very personal; and though some lists may be longer than others, *all answers will be correct.*

This simple exercise can be performed anywhere by anyone. It would be a good idea to try it several times in contrasting environments in order to get into the habit of listening.

2.

Now we are going to divide the lists in various ways. Start by assigning the letters N, H or T to each sound depending on whether it is a sound made by nature, a human sound or a technological (machine) sound. Which category predominates?

Now place an X beside each sound you produced yourself. Were most of the sounds on your list produced by you or by others?

Some sounds continued unceasingly throughout your listening period; others may have been repetitive, occurring more than once, and some were heard once only. Assign the letters C for continuous, R for repetitive and U for unique before each sound on your list. (By the way, can you think of a sound that has been going on continuously ever since you began the exercise though you hadn't noticed it until asked this question?)

3.

Take another sheet of paper. Let the top of the page stand for loud and the bottom for soft. Arrange the sounds you heard up and down the page according to how loud or soft they seemed to be.

Now let the top of the page stand for pleasant, the bottom for unpleasant, and list your sounds this way.

Turn the page over. Draw a medium-sized circle in the centre. Place all the sounds *you* made in the circle. Arrange all the others according to the distance and the direction from which they came to you.

The intelligent teacher will encourage discussion during these exercises, which are intended to demonstrate that sound may be regarded in many different ways. You can never keep sounds prisoner in one category alone. They are polysemous, always changing, always rendering new meanings.

4.

Some sounds move past you and some remain stationary as you move past them. And then some move with you as you move. The exercise might begin by considering examples in each category. For instance:

Stationary Sounds	*Moving Sounds*	*Sounds You Move*
church bells	traffic	your voice
factory whistles	aircraft	your footsteps
heating & ventilation systems	birds	your clothing & jewellery
		your car or bicycle

When sounds move they change character. I often try to illustrate this by having the group listen, with eyes closed, to the variations in my voice as I stroll about. (There will be many exercises to be performed with closed eyes in this collection, and students should get used to the idea from the beginning.) So I stroll about talking while the group follows me with their ears. Can they locate my voice by pointing to it as I move? Many differences in sound quality can be made evident by the strolling speaker. Am I facing you or turned away from you? Am

I standing in a corner or moving through a doorway? Does my voice become more muffled as I pass behind a curtain? All these changes can be heard. And within a few minutes of patient listening a group can be trained to hear 'acoustic shadows'. There are very subtle changes as I pass behind smaller objects such as a desk or a chair. The group will be amazed to realize how well they can begin to 'see' with their ears – exactly as the blind do.

5.

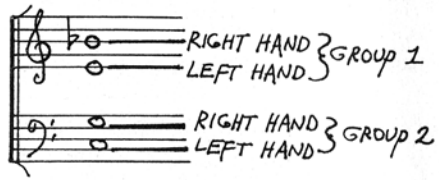
An exercise for training our perception of moving sounds. A volunteer is asked to find a portable sound and move around the room with it while the group, with eyes closed, points to it. Anything will do; keys rattled, a tapping sound, a repeated word.

Now a second volunteer is asked to find a contrasting sound and move about in different directions while the group points to both sounds, the first with the right hand, the second with the left.

Another complication. Add two new sounds, again moving at random. Half the group follows the first pair of sounds and half follows the second pair.

Allow everyone to open their eyes periodically to check how well they are doing. Care should be taken to ensure that the four sounds are sufficiently different to allow accurate detection. It is not easy to isolate the two desired sounds and ignore the others, but one's ability to do this will improve with practice.

More difficult still is to follow two notes in a chord while four singers move them about the room. For instance:



I have found that people of all ages respond to the challenge of this exercise. It could be repeated from time to time since it is an important one for people living in the modern world, where more sounds are moving faster than ever before. Traditional Ear Training Exercises deal with static sounds. This one is dynamic, and shows that sounds need not occur in one place to be studied.

6.

A real life situation with many moving sounds would be a street corner. We might go there and stand quietly for a few moments with eyes closed, listening to all the sound movements. If we have chosen a busy street corner most of the sounds we hear will be close to us, often frighteningly so. If our street corner is less busy we will hear more distant sounds.

Thus we discover that the soundscape expands or shrinks according to the amount of activity in it. This is generally true for vision also. Tall buildings limit our view to a few meters, while in the country we can see and hear over greater distances.

Listen out for the most distant sound you can hear. What is it? Can you estimate its distance from you?

As people have moved to cities over the past century they have developed a preference for close-up sounds, as is evident in the recording and broadcasting industries. One might almost say we have lost the ability to hear at a distance. But sounds heard this way have a special charm, and it would be good to contrast the experience of listening on a busy street corner with that in an open environment.

7.

We will assume that you have chosen a busy street corner. I want you now to direct your attention to one category of sounds only. Let's take car horns, and for a specific period, say ten minutes, let's count them. This is a good drill for children since they love counting things, but it could be useful for everyone, and in performing it you will notice the various ways horns are used by motorists – sometimes even conversationally.

For comparison, here is a list of the average number of car horns heard per hour at busy intersections in some of the world's largest cities. The counts were done in 1974-75, and I suspect if they were done again today they would be higher. Our method was to count for ten minutes per hour over a nine-hour period and to average out the results.

Moscow 17; Stockholm 25; Toronto 44; Sydney 62; Vienna 64; Amsterdam 87; London 89; Tokyo 129; Rome 153; Athens 228; New York 336; Paris 461; Cairo 1150.

8.

We could listen to other sounds in the same way, say the number of times squeaky brakes are heard, the number of barking dogs, or the number of motorcycles that pass by. By focusing on specific sounds we are becoming acquainted with the entire soundscape.

9.

Let's direct our attention to footsteps. You will hear many kinds of shoes on a busy street, and no two walkers sound exactly the same. Some people walk phlegmatically, dragging their feet, some walk with a quick decisive stride, and there are many variations in between. Then there are the materials of shoes, enormously varied throughout the world. How many different types of shoes do you hear on your street corner?

For comparison, here are a few phrases describing shoes from novels I've read:

'... the clacking of men's heels and the shuffling of their soles.' (Ireland)
'... the clack clack of high-heeled shoes on the hard floor.' (Canada)
'... padded soles, yet making the snow screech angrily.' (Russia)
'... sandals clack clacked.' (Nigeria)
'... the mill-girls' clogs down the cobbled street.' (England)
'... the slip-slip of slippers sliding.' (Canada)
'... the flat, soft steps of the barefooted.' (rural Canada)
'... footsteps, smart as the blows of a mallet.' (England)

'... the substantial cobblestones of Zürich clicked under his feet.' (Switzerland)
'... the violent clatter of their hobnailed wooden-soled shoes.' (rural France)

Store this away for later. It's an exercise devised by the Brazilian music educator, Marisa Fonterrada. Everyone brings a pair of shoes to class. Then each person is asked to find all the other shoe sounds that are similar to their own: boots, high heels, sandals, running shoes, etc. Each group is given ten minutes to work out a little improvisation. The improvisations are then joined together to form a larger composition. I've done this exercise frequently. You'll be astonished at the variety of sounds and rhythms that can be produced from such unpretentious objects as shoes.

10.

Here are a few more exercises to perform while on the street corner. Find a continuous tone (electrical or ventilator hum) and hum the tone. Take a walk around the block still humming it and return to the original sound. Are you still humming the correct pitch? If you walked quickly, chances are your tone rose in pitch. If you walked slowly, it may have dropped a semitone. Why do you think this happens?

11.

Now move into various shops until you find the one with the quietest ambience. What kind of shop is it?

How many shops have radios or music playing?

What other kinds of sounds can be heard that are special to certain establishments?

12.

Find a place where people are walking up and down stairs. Do the walkers going up make the same sound as those coming down? Which is louder?

13.

On our way back to the class we are going to take a Listening Walk. In order to ensure that each person has the best opportunity to listen we will walk in single file and in such a way that each person is just out of earshot of the footsteps of the person ahead. If you hear their footsteps you are too close and should slacken your pace. Returning to the classroom the group is asked to write down answers to the following questions (or those most appropriate to the occasion).

a) What was the loudest sound heard on the walk?
b) The softest sound?
c) A soft sound destroyed by a loud sound.
d) The highest-pitched sound heard.
e) Three sounds that moved past you.
f) Three sounds that moved with you.
g) Three sounds heard from above.
h) One sound that changed direction as it moved.
i) One sound made in response to another.
j) The ugliest sound heard.
k) One sound heard twice only.
l) A sound made by something opening.

m) A different sound heard through the opening.
n) The most remarkable (memorable) sound you heard on the walk.
o) A sound with a distinctive rhythm. (Can you notate or repeat the rhythm?)
p) The most beautiful sound heard.
q) The sound that came from the greatest distance. How far?
r) One sound that either slowly rose or slowly fell in pitch.
s) The sounds you would like to have eliminated from this soundscape.
t) One sound you missed that you would have liked to have heard.

Discuss the various replies.

14.

I am going to ask you to keep a Sound Diary while you do the remainder of these exercises. I'd like you to write something every day – notes on unusual sounds heard, your reactions to them, general thoughts on the acoustic environment, anything you consider significant.

Of course the diary is for your own benefit and need not be shared with others, but it could be interesting to have portions of diaries read out loud to the entire group for discussion, and sometimes I even have people exchange diaries for a few days to experience how different our reactions to sounds can be.

15.

Here are some flash questions for your diary:

What was the first sound you heard this morning on waking?
What was the last sound you heard last night before sleeping?
What was the loudest sound you heard today?
What was the most beautiful sound you heard today?

16.

Something else for your Sound Diary: what is the most memorable sound experience you have had in your life? Describe it in a paragraph or two.

17.

Here is a deceptively difficult exercise: DECLARE A MORATORIUM ON SPEECH FOR — HOURS. You decide how long you think you can manage. It would be best to prepare friends and family beforehand lest your refusal to talk be misinterpreted. A twenty-four hour moratorium would be desirable, though in most cases is probably impractical.

Many world philosophies and religions recommend periods of silence and contemplation to counteract the haste and confusion of our lives. I recommend it as a means of achieving clairaudience. Ultimately all listening exercises move us towards contemplation and a respect for silence. Along the way the quiet listener will find much to listen to.

Keep your diary handy during this exercise and record your impressions periodically.

18.

Consider this problem: Is it possible to recognize a person by the sounds they make? Can you identify friends simply by the tempo of their walk, the sounds of their shoes or clothing? Everyone close their eyes and have someone walk in front of the group. Even if the identity can't be revealed completely, can you at least tell the sex and relative weight and height of the walker, or when they walk near you can you tell the material of their clothing? Are they wearing jewellery or other objects producing giveaway sounds? Supposing they say something like, 'I am the mystery person,' can you now identify them? Try this exercise with various individuals, chosen, of course, after everyone's eyes are closed.

19.

Almost everyone carries a set of keys. Would you recognize the sound of your own? All key rings are passed in and everyone listens, eyes closed, as the group leader shakes each in turn. Put your hand up if you think you detect your own and it will be dropped behind you. Have all sets of keys found their rightful owners at the end?

20.

Different classes of people in any society have their own sets of sounds. For instance, not only do the voices of men and women sound different, but each sex has a broad array of other sounds that keep it distinct. Make lists of typical sounds associated with each sex.

Some Montreal students provided me with these results in 1980. I imagine there would be some changes today.

Men	*Women*
loud burping	weeping
razor on rough whiskers	lipstick container popping
change jingling in pocket	jewellery jangling
pipe popping	nylon stockings
punching a punch bag	filing nails
spitting	handbag being snapped
loud swearing	sounds of giving birth
chain saw	sewing machine
jackhammer	knitting needles clicking

21.

Here is a bit of homework. Go to a park or a garden. You are to remain stationary, listening (perhaps with your eyes closed) until sounds pass by you in all four directions, one travelling east, one south, one west and one north. What were the sounds?

Of course, it doesn't really matter what they were. The exercise is one of concentration, and while you are waiting for the sounds that will release you, you hear a myriad of others. The exercise could be done by a group as well as on your own, and in fact it might be more interesting to do it in the company of others.

22.

The next exercise will take some advance planning and may not in all cases be feasible, but I highly recommend it as a powerful experience that won't be easily forgotten. The idea is to place listeners, who are blindfolded, in an environment they do not know and to have them describe it by listening to it.

In order for the participants to sense the selected environment as alien it may be necessary to transport them to it in cars or on a bus. The teacher should have a few assistants to help lead the blindfolded participants gently to the chosen spot, which, of course, should be selected in advance. When the site is reached the participants may be seated on the ground.

At first it will be difficult to describe the environment with accuracy, but if the leader asks the right kinds of questions it will soon become possible to **see** it quite clearly with the ears. The wind will reveal the presence of trees, grass, flags, tunnel areas, etc. If the leader shouts in different directions, walls or other obstacles will become evident by reverberation. Smaller objects will reveal acoustic shadows if the leader moves around them while talking. Fences or poles will be revealed if they are

tapped, and the materials of the ground surfaces will be discovered when walked on. But the acoustic picture imagined will never be identical with the real one. The moment when the blindfolds are removed always proves to be a remarkable experience.

23.

Exercise 22 could be followed by inviting a blind person to the class to discuss how it is possible to navigate by means of aural clues from the environment.

24.

Hearing gets to places where sight cannot. Ears see through walls and around corners. When something is hidden, sound will reveal its location and meaning. Make a list of all the sounds you can think of that come from hidden places, sounds that are made by objects you have never seen.

Here are some examples Canadian students gave me:

water in a drain pipe
squirrels overhead on the roof
wind
thunder
an echo
a voice on the radio (telephone)
a prompter in the theatre
mice in a wall
stomach growling

25.

Some of the sounds that occurred to you in the last exercise may have come from your own body. Remain still for a moment with your eyes closed and listen to the sounds beneath your skin. How many of the following do you hear?

breathing
heart beating
stomach sounds
swallowing
cracking of bones, knuckles, etc.
ringing in the ears

Do you hear others?

26.

Sometimes there is a contradiction between a sound and the object producing it. One may be attractive and the other unattractive. Can you think of some sounds that are attractive but come from visually unattractive sources?

Examples from Canadian and American students:

fat tenor with a glorious voice
water flowing in a polluted river
raindrops on a windowpane during a grey day
a frog
a baby robin
ticking of a bomb
toilet flushing

27.

Now try to think of some unattractive sounds that come from visually attractive sources.

Examples:

handsome man burping
a cat in heat
a Concorde aircraft
a peacock squawking
a child pounding the piano
new shoes squeaking
a balloon exploding
the breaking of a crystal glass
squeaks from an oboe

28.

How many sounds can you list that come from a greater distance than the objects producing them can be seen?

Examples:

wolves howling
a distant airplane
pistol shot
a fog horn
cars on a country road
outdoor rock concert
train whistle
waterfall in a wooded area

29.

In these and the following exercises we are being encouraged to use our imagination. Here is another pair of questions along these lines.

A. Give three examples of high, shrill sounds produced by fat heavy objects. Examples:

squealing pig
the singing of a dolphin
truck's brakes squealing
whistle of a steam engine
Oriental gong when struck on its edge

B. Give three examples of deep, heavy sounds produced by small, thin objects. Examples:

hair dryer
stick of dynamite exploding
the lowest note on a clarinet

30.

Imagine I have a shovel in my hand. With your voice try to produce the sound as I shovel into the following substances:

coal
sand
gravel
snow

Of course it is difficult to imitate these sounds exactly, but you should try to imagine what the differences might be.

31.

Even sounds we think we know well can be deceptive. Imagine I have a sheet of paper in my hand. I am going to crush it. With your voice make the sound a real sheet of paper would make when my hands come together. This is worth repeating several times. Are you sure you are giving a fair approximation of the real sound? Let the leader take a sheet of real paper and crush it. Discuss the differences between what was imagined and what was heard.

32.

Now I am going to throw the crushed paper ball against the wall and I want you to make the sound. The leader (filling in for me here) makes a few imaginary throws against the wall while the group tries to provide the sound or sounds – for this is a quite complicated action. Then throw the real ball of paper. The attentive listener should hear

a) the sound of the arm being raised
b) the sound of the paper leaving the hand
c) the ball whistling through the air
d) the ball hitting the wall
e) the ball dropping to the floor

Careless listeners will just make the sound of the paper striking the wall, leaving it stuck there to defy both gravity and memory – an illustration of how weak our ability to remember sounds accurately has become.

33.

Let us now try to imagine a total environment. Make a list of all the sounds you might expect to find in each of the following places:

office
kitchen
park
airport

Try to be as specific as possible. If convenient the group could later visit these places and make a second list of the actual sounds heard, noting the differences and omissions.

34.

For this exercise the group should be very calm. Let them close their eyes. The following sounds are to be imagined in the 'eye' of the ear. Reading the list, the leader should leave pools of stillness around each phrase to allow the sound to be properly evoked in the mind of each listener. (It goes without saying that some items on the list may require substitutes to work in different environments.)

a wood fire crackling...
a slowly turning waterwheel...
walking on dry leaves...
Niagara Falls...
a thousand carpenters hammering...
church bells ringing...
a flock of birds...
children playing...
in the still air a fountain...

'Tis night: now do all fountains speak louder. And my soul is also a bubbling fountain.' Nietzsche, *Zarathustra* XXXI.

35.

Have you ever had an acoustic dream? Have you ever dreamed music? A girl once told me she had had a dream in which she was trying to harmonize the members of her family by bringing them together to make interesting chords. I have often had dreams of music too, and sometimes dreams in which other sounds play a significant role. Many of the dreams in the Bible are acoustic, since God was often heard though never seen. The group might discuss dreams they have had in which sounds or music played a significant role.

36.

We have been listening to sounds and imagining them. The exercises now take an active turn as we search for specific sounds. We begin in a most general way. Tomorrow I want you to BRING AN INTERESTING SOUND TO CLASS.

The next day the sounds are performed and discussed. Each person is asked to explain why the chosen sound was considered interesting. All are invited to comment. Sometimes I have sent a student home to find another sound if the first one was judged to be not particularly interesting. But most sounds *are* interesting if really listened to, and it is the leader's responsibility to make sure each is given a fair hearing.

37.

A new homework assignment: Each person in the group is asked to bring a sound of specific character. For instance:

Bring a buzzing sound to class.
Bring a tinkling sound to class.
Bring a thumping sound to class.
Bring a scraping sound...
A crumbling sound...
A rumbling sound...
A jagged sound...
A bubbling sound...
A snapping sound...
A flaky sound...
A corrugated sound...

Sometimes I just select three or four of these types to limit the exercise so we can compare different solutions to the same problem. Again discussion follows. Which sounds best illustrate the desired qualities?

38.

Another way: find sounds that best illustrate the following words:

thump	dribble
crunch	whack
gargle	crinkle
squeal	pop

39.

Ultimately the task could be made very specific and complex:

Find a sound that scrapes at the beginning and ends with a ring;
Find a sound that makes a low thud followed by a high twitter;
Find a sound which, while dying away, rises in pitch.

The point about making the task specific is that the student will have to go through a lot of sounds, analysing and rejecting, until the right one is found. In this way we become more active participants in the soundscape.

40.

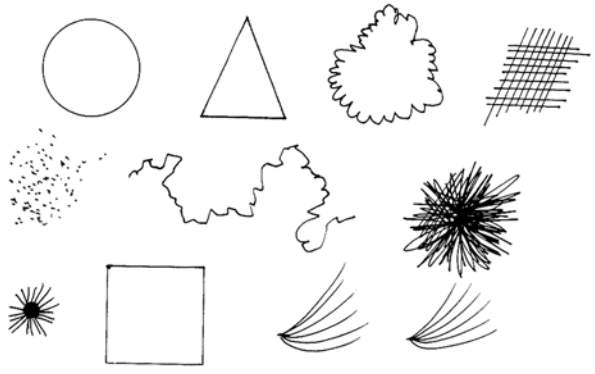
This might be a good point to try to match sound with images. I have never seen a sound so I cannot say what some of your sounds might look like, but just for fun you might take some of them and try to draw what you *imagine* they look like. It is best to do this at the exact moment the sound is made, timing your drawing to end when it does. In this way you will not have time to draw objects but to give impressions only – textures, shapes, rhythms. Take some of the sounds in your collection and try this. Compare the results.

41.

Do sounds have colours? For some people they do. Discuss what colours some of the sounds in your collection might be. Why?

42.

Try finding sounds to match the following shapes and textures.



Can a sound be round or triangular? I once played sounds on a tape to a group of students and found that two very dissimilar sounds were considered round. One was church bells and the other was an air conditioner. You may have your own choices and they should provide material for an interesting discussion.

43.

In the next set of exercises we will use our voices. Only by uttering (outering) sound can we demonstrate that our perception has been complete and accurate. We learn a language by listening, but we demonstrate that we know it by speaking.

Aural societies have little inhibition about using their voices in sound imitations. The ethnomusicologist Marius Schneider has written:

> One must have heard them to realize how realistically aboriginals are able to imitate animal noises and the sounds of nature. They even hold 'nature concerts' in which each singer imitates a particular sound (waves, wind, groaning trees, cries of frightened animals), 'concerts' of surprising magnificence and beauty. (*The New Oxford History of Music*, Vol.1, London, 1957, p.9.)

So we begin by creating a 'nature concert' with our voices. To do this we divide into groups of six to ten people each. Choose an environment you know well (either urban or rural) and take

a few moments to create a little composition imitating its sounds, using only your voices. The leader should limit the preparation time here to 10 or 15 minutes, for the composition need not be complicated. Return and perform the various compositions for the audification of the other groups, who might listen with their eyes closed.

44.

The compositions should be discussed and criticized. (We are novices in the field and should not be so arrogant that we cannot benefit from criticism.) Which composition did you prefer? Why? Some sounds were probably imitated very effectively, but others, either because they were too difficult or were not prepared carefully enough, were less persuasive. A particular birdcall, a frog croaking, a motorcycle or fog horn – could they be imitated more effectively by someone else? This is a task in which the entire group should be invited to participate.

45.

Take one of your 'nature concerts'. Can it be taught to another group? Let the first group perform it again while an identical number of listeners observes, each person paying special attention to one of the performers in the original group. Let the second group now perform the composition.

Like so many of the other exercises in this collection, this exercise bears repeating a number of times, perhaps by returning to it another day. In this way what at first seems impossible gradually becomes attainable. After all, the performance of most music is an imitation of a former rendering, and though our compositions may not be strictly music, the same procedure can be applied as a training method here.

46.

No one knows how language began, but one theory is that it originated as an echo of the soundscape, the so-called onomatopoeia theory. All modern languages have colourful words to describe sound qualities. Numerous exercises could be devised to explore language onomatopoeia, starting by simply making lists of words in your own language that illustrate in sound the notion or object they are describing (gurgle, splash, bubble, smack, pop, etc.). But an exercise I prefer is to invent words in your own private language with onomatopoeic qualities. Try inventing some to illustrate the following:

bell
sneeze
a bomb exploding
a cat purring
moonlight

Here, for example are some onomatopoeic inventions for 'moonlight' given to me by 11-year-olds:

Nuyuyul
Noorwahm
Maunklinde
Malooma
Sheelesk
Lunious
Sloofulp
Shiverglowa
Shimonoell
Neshmoor

47.

Water is a good substance for verbal invention because it has so many transformations. Let each person in the group invent words for raindrop, stream, waterfall, river, ocean waves.

Some examples from students:

Raindrop	*Stream*	*Waterfall*
plittertonk	gurglewoo	claspy-shash
piddlip	bliblibоop	hwoosh
shplot	bubblelet	shooka-swish-kish
dilippett	spankle-spickle	geeshian
plip	schlimeringen	haroompush
piddledink	bibble-gooshing	flimmery
tickety-takety	trinkle-trip	retzensplats
tiliripula	blabelicious	thummersplish
tittipini	blubelits	spestalash
splertsderp	pli-pli-plish	zammandassah
boppel		
pulish		

River	*Ocean Waves*
glubamurk	wooshom
hummfer	kershawa
buwash	rollorums
moofloon	ramanash
flahl	ah-shoosh
mooveroomer	wavallisee
moriandevlou	wahvenwoosh
drumgrassenwasswe	arythmion
lamanassawary	wisherwick
muwolla	swishle-suash

I once composed a piece called *Minnewanka* in which a choir imitated the sounds of water from raindrops to ocean waves; but actually any group could compose such a piece, for you now have a fine repertoire of words. Try pronouncing them in imitation of the states of water they describe; let the voices of the entire group patter together with the raindrop words, bubble like a stream, gush like a waterfall, meander with the river words, and roar in imitation of ocean waves. The more energy and emotion the words evoke the more musical the sequence will become. Afterwards you might listen to *Minnewanka* for comparison.

48.

Almost every language has onomatopoeic words to describe the sounds made by common animals.

In English a cat goes purr-purr.
In French a cat goes ron-ron.
In German a cat goes schnurr-schnurr.
In English a bee goes buzz.
In Arabic a bee goes zuz-zuz.
In Japanese a bee goes bun-bun.
In Vietnamese a bee goes vu-vu.

What are the sounds made by dogs, sheep, crickets or other animals in all the languages you know? Why is it that they are so different? Do different cultures perceive them differently or do the animals, birds and insects of the world really speak different dialects just as we do?

49.

We are still at the threshold of music and language. In this exercise we will use the voice to give directions without using words. Try modulating the voice in whatever ways necessary to direct someone in the performance of a specific task, say, going to the door and opening it, or sitting in a certain seat. No gestures or eye movements are permitted. More specific exercises will be more difficult; for instance, try getting someone to sit down on the floor and take off their shoes, or find a partner and perform a waltz.

What we need is a repertoire of signals understood by both parties: GO FORWARD, GO BACK, TURN RIGHT, TURN LEFT, PICK UP, PUT DOWN, etc. Divide into groups and let each group work out whatever vocal cues seem necessary in order to direct one of their members in various tasks. Then let each group assign a task to another group after the volunteer who will perform it has left the room. Using their voices alone, the remaining members of the group will try to communicate instructions to the volunteer.

This exercise can be a lot of fun and it helps to make us aware

of that ancient time when soundmaking was half musical and half verbal.

50.

Here is a name game. Someone goes to the centre of a circle. Each person calls out his or her name in as imaginative a manner as possible – singing, whispering, murmuring, wailing, moaning, bleating, crying. The person in the centre chooses the pronunciation he or she thinks is the most imaginative; that person goes into the centre and the game continues.

51.

Another name game is to assign leaders to different groups and let each leader perform his or her own name in as many different ways as possible: singing, whispered, shouted, staccato, sustained, rhythmically repeated or broken into fragments. The group repeats exactly what they hear. Body movement could also be incorporated here, and the spectacle of several groups performing names in counterpoint and acting them out can be quite beautiful and often exciting. Let the leaders change from time to time so that new names keep appearing and everyone has a chance to direct a group.

52.

The 'Name Games' might elicit considerable laughter. Very well, let us consider that. Nothing is so spontaneously personal as laughter. Nothing is so quintessentially you. But laughter is impossible to fake. Try it. Without something really funny to stimulate it, it sounds stilted and silly. Crack a joke and laughter bubbles up like a fountain. Can you laugh naturally and really listen to yourself laughing? Try it whenever laughter erupts during the following exercises.

53.

A voice game for four groups. Group one are wolves; group two are horses; group three are cows; group four are roosters. Mix everyone up. Either blindfolded or with eyes closed, each group must locate all the other members of their own group by making the appropriate animal sound and listening for those that correspond. Hold hands on finding an animal mate and seek the others.

I have played this game with large groups of a hundred or more people. The next variation is to let the four groups try to speak languages (which, of course, they can't really speak any more than they can speak wolf or rooster languages). Let group one be Russians, group two be Chinese, group three be Africans and group four be Arabs.

A final variation, possible only with musicians, would be to give each group a different interval and have them locate all the others singing the same interval. Group one sings an ascending fifth, group two a descending fourth, group three a descending third, group four an ascending minor second – or some such arrangement.

54.

To free people up I often have them walk about greeting others and carrying on conversations in nonsense languages. After this has been done for a while, we should be ready to try to modulate the voice in more exacting ways. Let individuals try to imitate

a military dictator
an opera singer
a disc jockey
a three-year-old child
a bear
an eighty-year-old person
a stutterer
a simpleton
a lion

55.

We remember that the theatre director Stanislavsky used to demand that actors produce forty different interpretations of a single word before they were allowed on the stage. Take any random text (this morning's newspaper will do) and try pronouncing the words so that

the voice is a beautiful flower
the voice is running
the voice is a machine gun
the voice is a siren
the voice is a baby
the voice is a snake
the voice is dying

56.

Expression is trained by imitation. Musicians know this and spend many hours imitating musical sounds. But any sound can serve as a model for imitation. Once I brought a set of bamboo chimes into a class and asked the class to come as close as possible to imitating the chimes with their voices. We listened to the original, then tried to reproduce it, listened again, tried again, until we began to comprehend all the parameters of this devious sound. You could do the same with other sound-producers: an alarm clock, a mechanical toy, the sweeping of a broom, a child's rattle, etc. The main thing is to keep at it, listening and imitating, until you come as close as you can.

57.

Of course the voice cannot reproduce all sounds effectively, though it is amazing how this skill can be improved with training. Sometimes I have tried to discover how effectively two voices can imitate one another. Can they be matched so perfectly as to become indistinguishable? Let one person try to reproduce the timbre of another's voice as they speak the same word alternately. The class could close their eyes and raise their hands with each repetition – the right if they think the first voice spoke and the left if they think it was the second. Mix the voices to try to deceive them. At times I have witnessed total confusion.

58.

One sound I have never succeeded in matching is hand clapping. Let one person clap and another try to reproduce the same sound. Such a simple sound, but seemingly incapable of duplication. You probably can't even clap the same way twice yourself. Try it. The simplest things in life are always the most mysterious.

59.

Another exercise in sound imitation is to have two people approach one another, each making a sound of their own choice. As they pass they exchange sounds. The sounds produced could be sustained pitches or rhythmic reiterations. The main thing is to aim for an accurate exchange. Several people doing this in a large geometrical formation can produce a very interesting polyphonic improvisation.

60.

I have given other exercises for vocal soundmaking in the book *When Words Sing*, but here is one I have found particularly interesting.

We are going to tell a well-known story *without words, with sounds alone*. The sounds may be produced with the voice or the body. Divide into groups as before and choose a story that seems particularly full of sounds, one that everyone might recognize. A fairytale may come to mind or a recent event in the news. The Bible is also a source of good acoustic stories. Work on the presentation and perform it for the entire group. If they guess the story, you have done well, if not ... well, perhaps you should try another one.

Some stories that work well:

The Three Little Pigs
Noah's Ark
Hansel and Gretel
Jack and the Beanstalk
The Nativity Story
Goldilocks and the Three Bears
The Bremen Town-Musicians
The Frog Prince
Snow White and the Seven Dwarfs

Each presentation should be followed by critical discussion. Every sound chronicle can be improved in the retelling.

61.

The better you get to know a sound, the more it changes. It takes on totally new and unexpected meanings. Take a single word, for instance the word 'animal', and repeat it over and over for several minutes, like a mantra. At a certain point it ceases to signify anything and just seems to hang in the air as a meaningless sound object. But you must repeat it for a sufficient period of time. The whole group could do this together, eyes closed, repeating slowly: animal ... animal ... animal ...

I am reminded here of a story told of John Cage. One day he began to beat a gong before a group of people. At the end of half an hour someone said: 'Stop it! I'm going crazy!' Cage stopped. Another person said: 'Why did you stop? It was just beginning to get interesting.'

62.

When a sound turns into something else and takes on a new meaning, we may speak of aural illusions. The world of aural illusions has been little explored, even though its effectiveness is well known from meditation exercises. Leonardo da Vinci once wrote of 'the sound of bells, in whose strokes you find every word you can imagine.' Sometimes waves, or waterfalls or conch shells can seem to hold mysterious sounds, like the crying of voices buried deep within them. This is the first class of aural illusions, but there is another: hearing sounds that seem to come from nowhere – ghost sounds, for which there is no rational explanation. The group might discuss aural illusions that individual members have experienced.

Here are some examples of the first kind reported by American students:

> I have heard a primitive ritual in the perking of a coffee pot.
>
> Sometimes in bed the stuffing in the pillows sounds like the murmur of soft voices.

> I hear a telephone ring in the shower even though I have no telephone.
>
> Often while on a plane or a train I have heard the refrains from popular songs in the continuous vibration.
>
> When I practise drums I think I hear my mother yelling up the stairs ... or a telephone ringing.

And the second kind:

> When I lived in the country in upstate New York I heard little voices talking to me. It frightened me. I never figured where the voices came from. They were children's voices, but there were no children where we lived.
>
> I felt I could hear someone whispering to me ... but that person was 7,000 miles away at the time.
>
> Before going to sleep, after a long and hectic day, I hear a variety of voices speaking to me simultaneously. The speech

is rapid and it sounds like these people are right in my ears. The blabber is usually not comprehensible but very audible.

Before leaving aural illusions, let me mention one more, associated with bells.

'Oranges and lemons say the bells of St. Clements,
You owe me three farthings say the bells of St. Martins.'

George Orwell gives these lines in his novel *Nineteen Eighty-four* and comments: 'It was curious, but when you said it to yourself you had the illusion of actually hearing bells, the bells of a lost London that still existed somewhere or other, disguised and forgotten.'

63.

Then there are sound paradoxes. The Greek philosopher Zeno pointed out one of the most peculiar. He said that when a kernel of corn is dropped on the floor it makes a particular sound, but if a whole sack of corn is dumped on the floor it makes a sound that is not the sum of all the individual kernels of corn, but a totally different and seemingly unrelated sound. Can you think of other examples of such sounds where sums produce differences?

Here is another paradox. Two things collide but only one sound is produced. A ball hits the wall, I drop a pen on the floor, I tap my foot against my desk – in each case a *single* sound results. We might call it a case of one plus one equals one, which is a mathematical impossibility. Utterly illogical but perfectly natural.

64.

The Greek philosophers were extremely interested in sound, and their interest was not merely speculative but empirical. They *listened.* Witness the following questions posed by Aristotle in his book of *Problems*:

Why are sounds more audible at night?
Why are newly plastered houses more resonant?
Why does cold water poured out of a jug make a shriller sound than hot water poured from the same vessel?
Why does salt make a noise when thrown on a fire?
Why does one hear less well when one is yawning?
Why is it easier to hear sounds from outside in a house than those from inside a house outside it?
Why is it that when one person makes a sound and a number of persons make the same sound simultaneously, the sound produced does not reach correspondingly further?

The Works of Aristotle, Vol. VIII *Problemata*, Book XI, trans. E.S. Forster (Oxford University Press), 1927.

Aristotle's problems can still be tested – for instance, try the one about the hot and cold water. Although modern physics might be able to explain the phenomena more effectively than the Greeks could, it is the habit of using the *senses* to explore the environment that characterized the thinking of the Greeks, and that is what concerns us here.

65.

Modern 'civilised' societies have lost much of the evocative power of sound by allowing it to become a scientific subject. For instance, an echo *can* be explained technically, but the delight we experience in hearing our own voice flying back at us will always seem closer to magic.

In ancient times, places where sound produced strange echoes and resonances were oftened considered sacred. I shall never forget visiting the Shah Abbas Mosque in Isfahan, where, directly under the main cupola, one may hear seven echoes, while one step off-centre in any direction there is no echo at all. Often buildings with roofs shaped in parabolic curves will give strange sonic effects, casting small sounds, such as whispers, a great distance. I have heard effects like this even in modern subway stations and under bridges. A room with highly polished surfaces will retain a sound for a very long time. A stairwell is often a place for long reverberations.

Let the group find locations where the environment modifies sound in an exceptional way either by reinforcing it or cancelling it – as is the case in a lot of over-upholstered modern rooms.

Let them learn how a soundscape designer could shape environments to produce desired acoustic effects.

66.

I haven't mentioned tape recorders in these exercises because they may not always be available; besides, a sound education can be accomplished without them.

If a camera puts a frame around a picture, the tape recorder can frame a sound. Just as we try to photograph the intended object clearly and centrally, we must try to record sound objects clearly and without interference. A good first exercise is to record simple objects such as the following:

a passing train
a church bell
a factory whistle

Avoid recording soundscape panoramas. Select specifics and try to record *only* the desired sound, without it becoming marred by unwanted noise. This is much more difficult than it seems.

67.

Choose a sound that seems to be disappearing from the soundscape. Record it as if you were preserving it for a museum collection. Try to imagine that your recording may be the only surviving specimen of a precious lost sound object. What information would you want to accompany the recording? Date of recording, history of the object recorded, date of origin, present location, etc. Get into the habit of cataloguing material recorded for later reference.

68.

Select one type of sound for recording and try to obtain as many contrasting examples as possible. Typical sounds might be:

doors
gates
car horns
vacuum cleaners

This is your introduction to sound morphology, the study of variations within specific classes of sounds.

69.

In order to illustrate the effect ambience has on sound, record the same voice speaking the same text in a dozen different environments and compare the results.

Such tasks could be extended. For instance, record your own footsteps walking on a dozen different surfaces (wood, leaves, pebbles, snow, etc.).

Exercises with tape recorders should be made as specific as possible, and the results should be judged on the cleanness of the recorded sound. However, sound recording is a special discipline and to do it properly one requires a great deal of expensive equipment, not available to everyone. With cheap equipment, particularly microphones, one will experience more frustration than satisfaction, so I want to leave the subject at this point and rely again on the ear as our microphone.

70.

What does silence mean to you? Complete the sentence SILENCE IS ... in any way you think appropriate.

Here are some examples I've received from children:

Silence is keeping your mouth shut.
Silence is thinking.
Silence is daydreaming.
Silence is sleeping.
Silence is not talking when the teacher leaves and everyone talks.
Silence is darkness.
Silence is doing detention.
Silence is being interested in a subject.
Silence is doing your work.
Silence is keeping a secret.
Silence is watching a silent movie.
Silence is being afraid.

And some examples from adults:

Silence is only a state of mind.
Silence is as elusive as freedom or peace.
Silence is impossible.
Silence is being unconscious or dead.
Silence is tranquility.
Silence is boring.
Silence is what you hear after three hours of rock music.
Silence is isolation, terrible isolation.
Silence is emptiness.
Silence is when all I can hear is the ringing in my ears.
Silence is most noticed at times of intense fear.

The attitudes of the adults seem more negative than those of the children. These replies were all from North Americans. I wonder if other cultures might see more positive values in silence?

71.

Here are some simple exercises designed to reach the still centre.

STAND UP AND SIT DOWN AGAIN WITHOUT MAKING A SINGLE SOUND.

The leader should stress that if any sound is accidentally produced (the brushing of clothing, the floor creaking, a joint cracking) the person who made it should freeze, analyse why the sound occurred and try to avoid making it again. Presumably the person who moves the slowest is the winner.

72.

A variation. If the room has moveable chairs, MOVE YOUR CHAIR OUT OF THE ROOM AND BRING IT BACK AGAIN WITHOUT MAKING A SINGLE SOUND.

In my experience, the effective execution of this exercise may take fifteen or more minutes. I recommend these exercises for particularly unruly groups of people. It is really quite amazing how they can be brought to a point of absolute concentration while doing them.

73.

Another variation. PASS A SHEET OF PAPER AROUND THE ROOM FROM PERSON TO PERSON IN ABSOLUTE SILENCE. Is this possible, or don't we hear the pianissimo brushing of the paper as we pass it from hand to hand?

74.

Now the sheet of paper is a musical instrument. How many different sounds can you make with it? Tapping, waving, shaking, snapping, tearing, wrinkling, rolling, striking, crushing. Pass it around the room and let each person make a *different* sound from any that has been heard before. The exercise thus becomes more difficult and calls on greater powers of the imagination.

75.

A whole series of exercises can be devised to train the aural memory. Here are a couple. You may think of others. Everyone closes their eyes and when the leader taps each person on the shoulder they speak their name. After about six names are sounded, ask the group to point to each person as you call out their names at random. Add more names, perhaps a dozen, and try again. (It goes without saying that if the class has a traditional seating pattern, it should be scrambled before beginning. Only the ears should do the work.)

76.

How good is your aural memory? Try giving the group a word or a phrase and ask them to repeat it later the same day or the next ... or the next. The same exercise could be done with a clapped rhythm.

77.

Or with a musical tone. How long can a musical pitch be remembered? Ask the group to sing the given tone back at intervals of a few minutes as you proceed with other affairs, gradually extending the intervals. Can you remember the pitch for five minutes, ten minutes, twenty minutes?

I once gave a group of Portuguese music teachers a tone to take home overnight and bring back the next morning. Of course I had to do the exercise myself. I hummed the tone all the way back to my hotel and while I prepared for dinner. I hummed it in the restaurant until, in the middle of an excellent fish dish, I realized I'd forgotten it. After dinner I tried to recover it. You can more or less sense the pitch because of the tension in your vocal chords – but can you be sure? The next morning I asked the class to sing the note they had taken home. The result: exquisite chromaticism.

78.

The soundscape is constantly changing. Old sounds are constantly disappearing. (Where are the museums for them?) How many sounds can you remember hearing from your youth that are no longer heard today?

Here are some sound memories from North American university students, 1970 to 1980:

old cash registers with bells
wringer on old washing machines
washing clothes on a wash board
butter being churned
hand water-pump
pulley clothes line
razor being stropped
fountain pen being filled
return bell on a typewriter
hand-rung school bell
rosary beads clicking on nuns
Latin spoken in churches
hand-pushed lawnmower

sounds of graniteware
scratchy old gramophone records (78 r.p.m.)
sound of weights being dropped on scales
hand-cranked coffee grinder
clinking of glass milk bottles
treadle sewing machine
water being poured into a wooden tub
sleigh bells
scythe cutting grass
wooden rocking chairs on wooden floors
street criers
spinning wheel
bicycle bells
quiet explosion of old cameras
horses on cobblestones
motor car being cranked
steam locomotive
wristwatch ticking
kids playing marbles
manual egg beater
hand-cranked telephone

The lists should be read aloud. Perhaps some of the sounds can still be heard today but are no longer in your environment. The exercise should provide an interesting discussion and get everyone thinking about soundscape changes.

79.

Exercise 78 might be followed by talking to an old person (for instance, a grand-parent) about the sounds they heard in former times (or places) before you were born.

Here are a few memories of octogenarians recalling the sounds of New York City in the early years of the twentieth century, as collected by Lou Giansante.

> Newspapers had special editions. 'Extra! Extra!' the vendors would holler. In the middle of the night everyone would hear 'Extra! Extra!' as they'd run through the streets. They'd mumble the headline to get you to come out and buy the paper.
>
> I remember the 'clank-clank' of the trolley cars. The trolley cars on East Broadway seemed to be more refined than those on Grand Street because the cars were smaller. It was a lower pitched sound. These sounds were never as harsh or raucous as today's automobile horns.
>
> Many of the streets were cobblestone, and the sound of horses and wagons was everywhere. It was a repetitious drone. The wagons they pulled had their own sound depending on the age of the wagon. Some had a sound of creaking hinges that seemed ready to fall apart.
>
> I used to be so afraid of the fire engine! Oh, what a noise it made ... the bell was ringing and the horses made so much noise with their hooves. I'd run in the house and hide. The whistles and the bell ... they kept pulling the bell all the time.
>
> Pedlars used to go through the area hollering, 'Potatoes! Potatoes! Strawberries! Strawberries! Bananas! Bananas!' And people ran out into the streets to buy them.
>
> Pedlars and ragpickers used to have a bell that was tinkling all the time. As the truck moved, the bells swung and moved. You could hear them two or three blocks away.
>
> You could almost count the cars. You'd see taxicabs once in a while, but mostly horses and carriages, especially around

Central Park. I remember hearing the vendors selling fruit from their push-carts, and hearing the mules and horses plodding along, pulling the carts.

80.

Another way to investigate the soundscapes of the past is to find an acoustically rich literary or visual document (novel, story, painting, photograph) and note all the sounds it contains. Everyone should find their own document and present the results to the whole group.

81.

We should not forget our own past. An assignment for your Sound Diary: write a short essay recording the first sounds you remember from your own childhood.

Of the large collection of sound memories I have from former students, I draw out one at random to give you an impression.

> One sound I remember was the doctor making a house call. His leather bag always had a sqeaky tone as he would walk. I remember his cough as he would come up the driveway, and he always wore shoes with taps that would scrape along the pavement. If I needed an injection he would always use this metal pot that sounded funny as the needles were dropped into it, and if you listened, you could hear the water boiling. I was always scared when the noises stopped because it meant that pain would follow!

82.

New sounds are constantly invading the soundscape. Make a list of all the new sounds that have entered the soundscape within the past year or two.

When Lou Giansante asked the same New York students who had done the interviews above for examples of new sounds they mentioned the following:

beeps on video games
electric voices in cars ('Don't forget your seatbelt!')
beeps of the electric pagers people wear
food processors
silent (non-ticking) clocks with electric alarms
touch-tone telephones
electric cash registers
beeps from a microwave oven
electric stapler
electric lawn trimmers
clicking of computer keyboards
beeps on computer

That was in 1983. Already many of these sounds are quite 'normal'. Then what are the newer ones?

83.

Acoustic ecology is concerned with the relationship of sounds to their environment. When the relationship is not balanced and harmonious we speak of noise pollution. This is not the subject of this book, but in as much as it is a fact of contemporary life, it cannot be ignored. Too often we find ourselves in an excessively loud environment, posing a real threat to our hearing.

At this point a good exercise would be to discover whether your community or country has any noise abatement legislation and to find out what kinds of sounds it restricts. Laws of this sort seldom come into existence without social agitation, but often they are old-fashioned and do not deal very effectively with modern problems. When was your noise abatement legislation passed into law? Is it effectively enforced? How? Does it cover all contemporary noises? These are questions for class discussion.

The chapter entitled 'Noise' in *The Tuning of the World* will give you some background on varieties of noise legislation around the world.

84.

A good way to discover whether your anti-noise legislation corresponds to reality would be to conduct a social survey in which you ask a large number of people in your community to list the sounds that bother them most. Presumably up-to-date legislation would cover the predominant noises on your social survey. Does it?

85.

Perhaps your community has no anti-noise legislation at all. Then a good project would be to draw up a model by-law reflecting contemporary opinion on the subject.

When your model by-law is complete, you should not hesitate to pass it forward to the authorities for their consideration. Attach your social survey on noise as a justification for it. Often one discovers that government officials are considering improvements in nuisance laws and will be thankful to have your thoughts and efforts on the subject.

86.

A social survey on noise will give you the opportunity to share your concern with others. One type of survey I have sometimes conducted is to interview neighbours on a given street and ask them to estimate how many of a particular type of sound they hear on an average day – say, how many motorcycles pass down their street or how many aircraft fly over their homes.

The next task is to find out how many of these sounds there really are by taking numerical counts over extended periods (students can alternate to do this).

The two pieces of evidence are then matched. In my experience the estimate is always a fraction of the real number – sometimes as little as 10 per cent of it. What does this mean? Either people are not listening or they are suppressing the number to convince themselves that the noises can't be that bad.

87.

Just as every community has landmarks which make it special and give it character, every community will also have original soundmarks. A soundmark is a unique sound, possessing qualities that make it special to a community. Communities derive their character as much from soundmarks as from landmarks. Soundmarks may be prominent public sounds such as clocks, bells, whistles or horns. But they may also be indoor sounds related to special trades or pastimes.

No two communities sound the same. What sounds make yours different?

Once the unique sounds have been identified, they deserve attention. What is their history? When and where can they be heard? Are they likely to survive? If not, perhaps they should be recorded for posterity. What is the attitude of the people who live or work closest to them – do they like them? dislike them? barely notice them?

A community needs to be as vigilant about preserving its soundmarks as it is about the preservation of landmarks. The

first task is to recognize them and give them special status by studying them.

88.

I said in the beginning that these exercises were all tending towards soundscape design. What is that? Designers attempt to organize things to stimulate a higher sense of aesthetic satisfaction. The landscape designer organizes the vegetation in a park or garden. The architectural designer organizes a city square or public building. An interior designer organizes the decor of a room.

But the soundscape is not private property. Therefore it cannot be organized by specialists alone. We all own a part of it because we are all makers of sounds. Therefore we all have a part to play in improving its orchestration. First we learn to listen; then we learn to think about sounds; and finally we begin to organize them in more satisfying patterns.

We are at that point now. Again we begin with a simple exercise. FIND A SOUND TO ENHANCE THE ENVIRONMENT OF YOUR HOME (ROOM, GARDEN). Wind chimes or an aeolian harp for the garden? A unique door knocker for your home? The choice is entirely yours. Place it prominently so that it will sound frequently. Let its vibrations

fill the space that it occupies, becoming special to that place.

89.

Now a corollary. ELIMINATE A DISAGREEABLE SOUND FROM YOUR HOME, OR GARDEN OR ROOM. At first this may seem like a strange or futile exercise. All the disagreeable sounds seem to originate from outside the house (street noises, neighbours, etc.) or perhaps from other members of one's family – who certainly can't be eliminated. But critical listening will soon reveal what can be done, for there are always distracting or irritating noises around that we have been too lazy to attend to: a squeaky window, a banging door, a scraping chair, a rattling fan.

90.

Add a pleasant sound to your own person – one which you can carry with you, and which you think might bring pleasure to those around you.

91.

Subtract an unpleasant sound from your life, one which others have told you they don't like. This may be a certain word or expression in your vocabulary, or a way of raising your voice, or of whining, or of blowing your nose offensively. Can you eliminate it? Try.

92.

Now let us consider soundscape changes within the community. We begin with a park. Let the group choose one and go there to perform the following exercises. Visit it several times at different hours in order to become thoroughly acquainted with it. Questions for discussion in the park: in what specific ways does your park provide pleasant attractions for the ear? In what specific ways does it fail to achieve this?

93.

A large park should provide a variety of acoustic environments. In some places recreational activities may predominate (children's playground, sports field); elsewhere one may discover groves of stillness for relaxation and nature study (paths, benches, trees, water). Does your park have these varieties? If not, can you think of ways to alter it (without changing its size or shape) to accomplish a greater variety of acoustical settings? Notes and sketches may be appropriate here.

94.

Various people have designed large sound sculptures for installation in parks, and I have designed some myself. If the opportunity exists, the group might consider building one and donating it to the park. This might be something resonating with the sounds of nature (wind harp, *jeu d'eau*) or it might be something that sounds when passersby play on it, a sort of musical game. Even if it cannot be constructed, try to design something that might adorn the park in a pleasant way. The chapter entitled 'The Soniferous Garden' in *The Tuning of the World* might give you some ideas.

95.

Now let the imagination run wild and create a plan for a model park, showing all the acoustical attractions it might contain: sound sculptures, musical games, waterwheels and *jeu d'eau*, bandstands, fountains, ponds and trees to attract birds, nature trails, various walking surfaces to mute or enhance footsteps, and perhaps at the centre a Temple of Silence to stimulate repose and meditation.

Assume the park has busy roads on two sides. How would you deal with traffic noise? Trees are a less effective barrier to noise than high fences or earthmounds.

96.

Now take the street on which you live. If you were an architect with complete authority to redesign it, how would you change it to improve its soundscape? For instance, if you decided to eliminate all traffic, what kind of sounds would you replace this with, or what kinds do you think would begin to occur naturally? Try to think this problem through as a real designer would.

97.

Assume that you could restrict certain sounds to special times of the day or week: street traffic, lawnmowers, radios and music making, parties, festivals, etc. Prepare a time chart with your suggestions, one that you think would be consistent with what the majority of your neighbours might want.

98.

Our task is now to involve as many people as possible in considering the community soundscape. The last three exercises do this. They require considerable advance planning by a small group of soundscape designers and may then be run as social events in which as many people as possible may participate.

I shall call the first A Sound Treasure Hunt. It consists of a list of questions describing selected sounds in a given neighbourhood and a blank map on which to place the positions of these sounds when found. The first person to place all the sounds on the map correctly is declared the winner. The sounds may be easy or difficult to locate, or a combination of both. Of course the sounds selected must be restricted to continuous sounds or at least sounds that will be heard when the Treasure Hunt is played. This restricts the possibilities considerably, but a diligent team of designers should be able to come up with a good assortment, and the list may include sounds that the participants have to find by making them, that is, from objects normally mute until played or struck.

Examples might be:

Questions	*Answers*
1. A dumb animal that roars.	A stone or wood carving of an open mouthed animal.
2. A tone with a constant pitch that you can start and stop.	Dial tone of a public telephone.
3. A xylophone.	A slatted wooden fence.
4. A ventilator hum over a doorway.	This would exclude any other ventilator sounds that were not over doorways.
5. Water heard but not seen.	Water flowing in a sewer or drain pipe.
6. Six metal gongs side by side.	Six adjacent drain pipes or metal sign boards.

Etc.

99.

The next exercise might be called A Sound Treasure Walk. It should be more demanding. The idea is to lead the participants on a walk through a particular area of town employing only sounds for clues as to the correct direction to follow. A blank map of the area of town selected is provided, and the participant must draw the route correctly. The first to return to home base is the winner.

The Sound Treasure Walk needs a lot of preliminary planning. There is no point in asking listeners to find a certain ringing drainpipe as a directional clue if all the drainpipes in the area ring in the same way. The organizers need to know the soundscape of the chosen area intimately, and the desired route should be well tested in advance to make sure that the clues are unambiguous and can lead the attentive listener forward to the goal.

Questions	*Comments*
1. Follow nine steel drums and stop.	These might be metal poles or standards. Once the first one is located they will take one down a street in the desired direction.
2. Keeping the traffic noise in your left ear, advance 20 paces until ...	By designating the position of the traffic there can be no confusion as to which way to walk.
3. ... you hear water flowing.	This might be a manhole cover over a sewer beneath your feet.
4. From here the birds will show you the direction until ...	If there are trees or a park nearby birdsong will be strongest there.
5. ... you find a creaking gate (mailbox, door).	Make sure there is only one.
6. Of the two streets in front of you, follow the quietest until ...	We are presuming that one street is very busy and the other is not.
7. ... you come to a place where your footsteps sound hollow.	An underpass or tunnel.
8. Now you will hear dishes in	An outdoor restaurant.

your right ear.

9. Listen for the hum and proceed towards it ...	An electrical or ventilator hum.
10. ... to the place where the ground will crunch under your feet.	A gravel path.

Etc.

It is clear that, if the directions are specific and the chosen sounds are not too distant from one another, it is quite possible to thread one's way through the streets and describe a quite complicated route gradually leading one to a goal, which may be the place from which one started.

Your Sound Treasure Walk could be organized on a weekend in such a way that anyone could start whenever they wished and their performance from start to finish could be timed. A prize could be offered the winner.

Several years ago I organized such a walk in Basel, Switzerland,

and I was surprised, when I returned to the city years later, to find almost all the sounds still intact so that I could still follow it from start to finish.

100.

I shall call the last exercise A Sound Mobile because it is concerned with sounds that are in motion. Like the others, it needs to be organized in advance. The idea is that within a certain area of several blocks specific sounds produced by volunteers may be heard along with the general hubbub of the city during a certain period of time. The sounds are not so extraordinary as to be out of context and are made by the volunteers as they move about the streets or through the shops. A shopping day with busy streets would be the best time to try out this exercise. At the start the participants are given a list of the sounds they are to listen for and are told the area of town in which the sounds will be found – say four blocks square. When they hear one of the sounds, they approach the maker and will be given a card or coupon. The first person to bring back a complete set of coupons is the winner.

Examples of sounds I have used:

1. A bicycle with a flapper in the wheel
2. A shrill police whistle
3. A young boy with a cap pistol

4. A dog with a bell on its collar
5. A person with a tapping cane
6. A radio turned to the noise between stations, hidden in a purse

Such exercises or games as these (and others that could be devised) are intended to increase public awareness of all sounds in the environment. They are not merely children's games, and I have played them with people of all ages.

I have always insisted that soundscape design must begin from within, must be demanded by sensitive citizens before it can be truly effective. It is an educational process that begins with the individual or small group and gradually broadens, like ripples on a pond, to include larger numbers of people, until it finally affects the entire citizenry and, ultimately, governments everywhere. Then, and not until then, can we expect the world soundscape to change and improve in elegance, beauty and local character.

We have reached the end of our exercises for the present. Now it is up to you to extend the work begun with these experiences in any ways your imagination might take you.