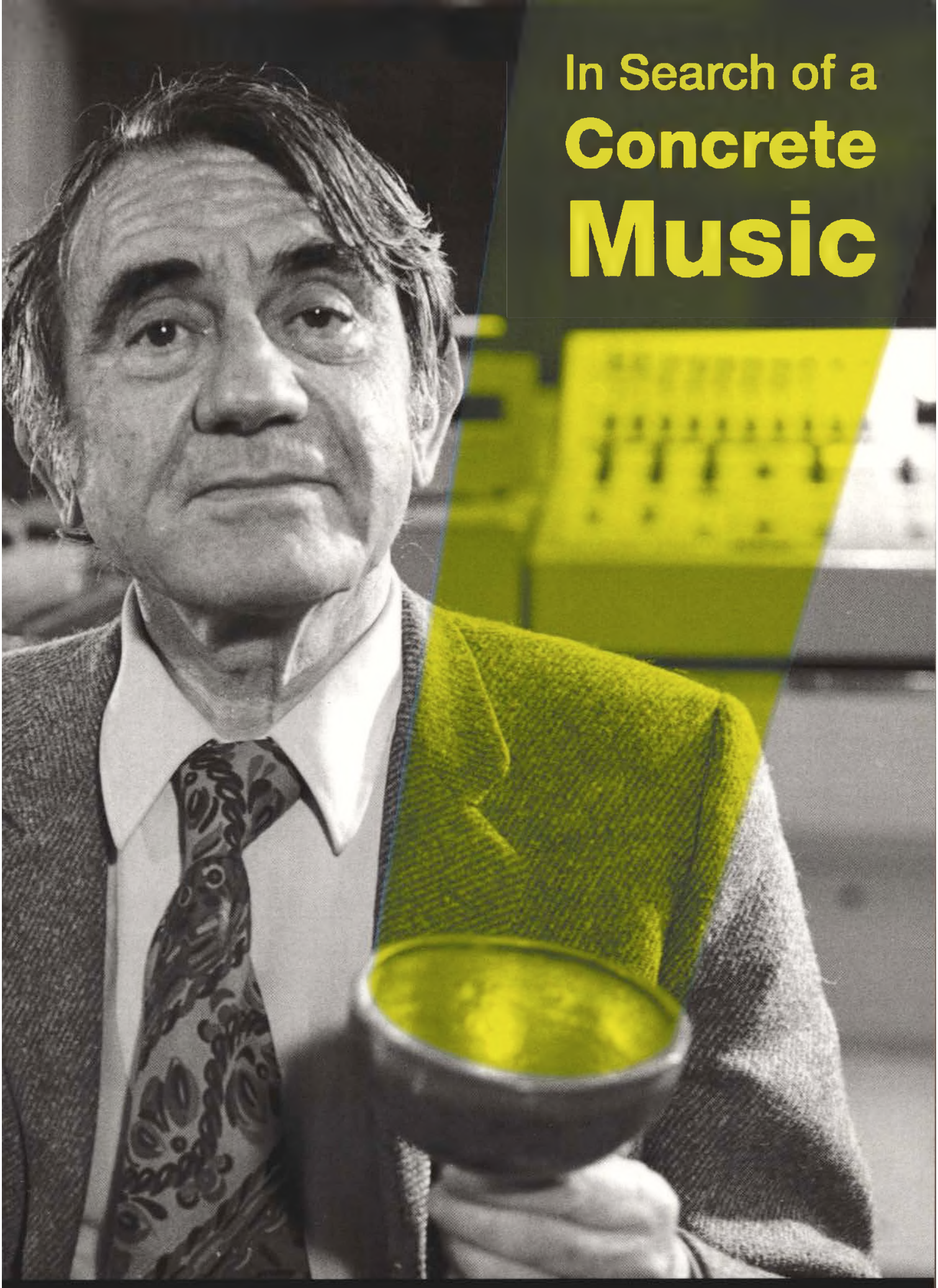

In Search of a Concrete Music

Pierre Schaeffer Translated by Christine North and John Dack

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In Search of a Concrete Music

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PIERRE SCHAEFFER

Translated by Christine North and John Dack

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Contents

List of Illustrations vii
Translators' Note ix

PART I FIRST JOURNAL OF CONCRETE MUSIC (1948–1949)

Chapter 1 3
Chapter 2 10
Chapter 3 21
Chapter 4 29
Chapter 5 37
Chapter 6 46
Chapter 7 59

PART II SECOND JOURNAL OF CONCRETE MUSIC (1950–1951)

Chapter 8 69
Chapter 9 78
Chapter 10 83
Chapter 11 90
Chapter 12 97
Chapter 13 102

PART III THE CONCRETE EXPERIMENT IN MUSIC (1952)

Chapter 14 The Concrete Approach 113

Chapter 15 The Experimental Method 123

Chapter 16 The Musical Object 131

Chapter 17 From the Object to Language 147

Chapter 18 From the Object to the Subject 157

Chapter 19 Inventory 167

Chapter 20 Farewells to Concrete Music 184

PART IV OUTLINE OF A CONCRETE MUSIC THEORY 189

Index of Names and Titles 223

Illustrations

Captions enclosed in brackets beneath the figures in the text have been supplied from the following list, which was included at the end of the French edition; those figures did not have captions in the original text.

1.	Tablature of the *Etude aux tourniquets*	17
2.	Serial structures of the *Etude aux chemins de fer*	26–27
3.	Recording spiral (symbolic representation)	32
4.	Closed groove (symbolic representation)	32
5.	Example of total transposition (*Suite* 14)	35
6.	Distortion of an initial form	40
7.	Breakdown of a form into fragments	40
8.	Transformation of an initial form	41
9.	Analysis of the first sequence of *Prosopopée I* *(Symphonie pour un homme seul)*	54–55
10.	Initial element of a fragment of *Concerto des ambiguïtés*	71
11.	Symbolic reduction of bar 1 of *Prosopopée I*	73
12.	First experimental score for concrete music *(Musique sans titre)*	74

13.	Examples of causal score and effects score (eighteenth century)	76
14.	Same example in concrete music	76
15.	Little example illustrating *Gestalttheorie*	94
16.	Manipulation of a complex note	137
17.	Example of a "large note" on the organ in Bach	140
18.	Development of a "large note" in a group	140
19.	Example of an autofugato *(Bidule en ut)*	142
20.	Example of a "total transposition" in classical music given by Maurice Le Roux (Berlioz, fifth part of the *Symphonie fantastique*)	144–45
21.	Variations on the autofugue through transformations of the monophonies	146
22.	Fragment of the score of *Antiphonie* (Pierre Henry)	178
23.	Fragment of the score of the *Etude sur un son* (Pierre Boulez)	180
24.	Absolutely pure sound	195
25.	Trihedron of reference	196
26.	Harmonic plane of a white noise	197
27.	Examples of natural or artificial attacks	203
28.	Example of the allure of the body of a note	205
29.	Example of prolongation by natural or artificial reverberation	206
30.	Example of various harmonic resonances of a C_3 on the piano struck at various intensities	208
31.	Spectra of a sound that is: a, poor; b, thick; c, rich	209
32.	Spectra of a sound that is: a, brilliant; b, bright	210
33.	Instantaneous spectrum of a complex sound in the course of development	211
34.	Instantaneous spectrum: a, of a noise; b, of a musical sound	212
35.	Instantaneous spectrum at the points t_1, t_2, t_3 of a complex sound in the course of development	213
36.	Summary table of the main sound characterology criteria defined in each of the planes of reference	216

Translators' Note

Pierre Schaeffer was indisputably a polymath. He described himself as an *écrivain*, and the range of his writings, which included not only fiction (the novel *Clotaire Nicole*) but also articles, essays, and books, many devoted to the increasing cultural significance of the broadcasting media, is impressive. An *écrivain*, therefore, he certainly was. But Schaeffer was also a broadcaster, composer, and music theorist. These activities are all the more remarkable if we consider the onerous nature of his duties as an administrator at the Radiodiffusion-Télévision Française (RTF)—which later became the Office de Radiodiffusion-Télévision Française, or ORTF—and the distraction of time-consuming visits to former French colonies, where he helped to establish radio stations.

However, a polymath's productivity can engender suspicion as well as admiration, and an accurate assessment of such a diverse body of work becomes problematic. Such an undertaking is particularly challenging in Great Britain, where, regrettably, intellectuals are frequently treated with mistrust—foreign ones even more so. Schaeffer's achievements are

acknowledged in books published in English on the history of electronic music, though they rarely situate his complex and subtle theoretical system within the broader sweep of the history of ideas. He is characterized as a radio engineer who developed an interesting, if somewhat idiosyncratic, method of composing music and investigating potential musical material by means of the technology of the radio station.

This is, broadly speaking, concrete music, and for most musicians it is Schaeffer's principal achievement. Indeed, his technique of manipulating recordings of real-world sounds is regarded as prescient. Not only the physical methods of studio practice but also the actual recorded materials are relevant to contemporary musicians in both technologically mediated composition and performance (though now the technology is overwhelmingly digital rather than analogue). Nevertheless, such accounts appear to be unacquainted with Schaeffer's formidable training as a radio engineer, his awareness of traditional musical skills, his emphasis on the listener's perceptual activity, and his profound knowledge of French literature and thought, particularly that of the post-Romantic era. And yet these are precisely what enabled him to explore in his own inimitable manner the relationship between broadcasting media and sound-based art forms—principally music.

Our intention is not to criticize these books on music history and technology. There has been a marked improvement in Schaeffer studies since the 1990s, and concrete music is no longer regarded as a colorful if rather inconsequential prelude to the more important activities of the Nordwestdeutscher Rundfunk (NWDR) studio in Cologne.

A la recherche d'une musique concrète contains the first hints of Schaeffer's sophisticated attitude regarding the effects of technology on the processes of composition and listening. Schaeffer frequently used the term *généraliser,* and it is important to remember that his ideas, particularly in later works such as the *Traité des objets musicaux* (1966), can be applied beyond their obvious origins of studio practice. For example, analyses of the status and role of the musical instrument (always a contentious issue in contemporary technological contexts) benefit from Schaeffer's insights. Moreover, his concern with sound classification and description transcended physical causality and has consequences for evaluating

how any sound might function at any structural level. Our description of him as, among other things, a "music theorist" is thus deliberate, though it is a music theory grounded in (although not limited to) studio practices of the immediate postwar period. Schaeffer's reputation in France is assured. The saying "A prophet hath no honor in his own country" (John 4:44) cannot be applied to Schaeffer. We believe the disparity between French opinion and that of the Anglophone community is largely due to the inaccessibility of Schaeffer's texts to those with a limited command of French. We thus believe that this translation of one of Pierre Schaeffer's seminal texts is urgently needed not only for its own intrinsic interest, but also for the contribution it can make to the reevaluation of this talented visionary.

From the translator's point of view, it is important to keep in mind Schaeffer's wit and self-deprecating humor, his readiness to criticize his own as well as others' ideas, and his love of language and literature, which can be seen in his playful or dry turns of phrase and his many indirect and direct references to other writers as well as mythological and biblical sources. The title of the work itself is a clear reference to Marcel Proust's famous sequence of novels, *A la recherche du temps perdu (In Search of Lost Time).* We have endeavored throughout to translate the text into academic English of the 1950s, with which we are familiar and which has many of the same features as Schaeffer's French. At the same time, keeping in mind that much of the work is in diary form, we have used more relaxed contractions and expressions where appropriate. A trend in modern translation is to produce a version—almost a revision of the original text—in a modern, accessible idiom, which purportedly communicates the work's essential meaning but also foregrounds the translator as an active creator in his or her own right. The drawbacks of such an approach, particularly in the case of academic works, are obvious: the translator's interpretation can only be one of many, and the modern idiom can become just as dated, if not more so, than the original, giving the reader an added level of interpretation to deal with. Although, of course, it is impossible for translators not to leave any stamp at all on a text, we have tried to be as faithful as possible to the original in order to give the reader, as nearly as we can, the experience of actually reading Schaeffer.

One of the problems arising from this approach is the noninclusive nature of Schaeffer's language, which was, of course, quite standard in his day. After much thought, we decided not to change the basically male-centered style, and we have left all pronouns in the masculine and referred to people in general as "men." We hope that readers will accept this characteristic as giving a sense of period to the text. However, where references to other cultures and peoples were concerned, we felt that Schaeffer's lack of what is now called "political correctness" might give real offense, and so we have changed expressions such as *"le tam-tam nègre," "nègre," "peaux-rouges,"* and *"Hottentot"* to terms we hope will be more acceptable to a modern reader (in these cases, "native tom-tom," "black," "Native American," and "native South African").

Another problem for any translator of an academic work in French is that the language is relatively abstract and theoretical compared to English; one might even say that the mode of thinking itself tends to be more schematic, with a readiness to see material for study in terms of highly abstract dualisms and correlations, which on occasion does not sit easily with the perhaps more pragmatic English language. This creates several problems of translation affecting key terms. Perhaps the most obvious of these is the word *concret/concrète* itself. The word in French, which has nothing of the familiar meaning of "concrete" in English, is used throughout the text with all its usual French connotations of "palpable," "nontheoretical," and "experiential," all of which pertain to a greater or lesser extent to the type of music Schaeffer is pioneering. Despite the risk of ambiguity, we decided to translate it with the English word *concrete* in most contexts, as an expression such as "real-world" does not cover the original's range of meanings, and in particular it would not link with the main subject of the book. In some cases, to avoid obvious or rather comical ambiguity, we have used quotation marks or changed the phrasing, using, for example, "concrete" musicians or "composers of concrete music" rather than "concrete musicians" or "concrete composers." Where the official title of experimental music and the group founded by Schaeffer are concerned, we have retained his own term, "Musique Concrète," which he later claims to have coined. Until this point (and in the title of the work), where Schaeffer is referring only to a possible "concrete music," we have translated the expression into English.

A further key concept underpinning much of this book is contained in the contrasted terms *sujet/objet* (subject/object): in Schaeffer's writing, "*sujet*" denotes the individual person, the subjective "I," and "*objet*" the external-world object of his or her attention or study, where English would tend to use "subject," as in "the subject of my thesis." To avoid confusion, we have retained Schaeffer's scrupulous distinction.

Another word that causes particular problems in this book is *expérience*, which denotes both "experiment" and "experience" in English. There are several instances in which it is almost impossible to know whether Schaeffer meant one, the other, or both, and indeed it is not clear whether the French mind makes this distinction at all. In some cases the ambiguity remains unresolved and the word retains elements of both "experiment" and "experience." Perhaps the most obvious example is the title of the third section, which we have translated as "The Concrete Experiment in Music," but which also suggests "The Concrete Experience." In this and many other examples, we would ask the reader to keep something of both meanings in mind.

This book introduces one of the many terms Schaeffer was to stamp with his own particular meaning, the word *allure*, which in French connotes "way of walking," extending into "speed of movement," "bearing." In this early work Schaeffer uses "allure" to describe the way that sound moves over time (see figs. 28, 36), but in his *Traité des objets musicaux* (Treatise on musical objects) he describes it as "more or less regular oscillations." To translate "allure" as "gait," perhaps the most accurate English equivalent, would both risk confusion with its homophone "gate" and miss Schaeffer's specific meaning. Words such as "movement," however seem too general. We have therefore decided to retain the French word despite its different meaning in English.

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We should like to thank above all Madame Jacqueline Schaeffer. This translation would not have been possible without her tireless support and constant encouragement. She has also given us invaluable practical help, not only in the provision of the photograph on the front cover of

this book, but also by helping us through her own personal experience to understand Pierre Schaeffer's personality and intentions. Our thanks also go to Professor Martin Laliberté of the Université de Paris-Est Marne-la-Vallée for his many indispensable insights and suggestions along the way. Furthermore, we are extremely grateful to Peter Williams of Middlesex University for producing the diagrams. In conclusion, we should, of course, like to express our gratitude to all the staff at the University of California Press who have guided and assisted us at all stages of this complex project. One final word of sincere thanks is due to Douglas Kahn, who first suggested that we undertake this translation.

MAY.

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WHO WAS KIND ENOUGH TO PROVIDE

RESEARCH INTO CONCRETE MUSIC

WITH THE RAREST OF THE FAVORS OF POWER:

CONTINUITY

PART I First Journal of Concrete Music

1948–1949

1

Need for the implicit. From the ski tow to the noise piano. Wherein the autodidact feels guilty. Wherein chance nevertheless comes to his aid. On the merit of accepting evidence, after denying it. That it is no longer the same. That the most general musical instrument possible is not inconceivable.

1948. January. Sometimes when I write I am envious of more intense modes of expression. Writing is always making explicit at the expense of other things. Mystery is sacrificed, and consequently truth and so everything. At these moments I am overwhelmed by a longing for music that, as Roger Ducasse says, "he likes because it does not mean anything."

February. The change of scenery makes me forget the weight on my mind. Without memories, without worries, I can feel stirrings deep within me. Ideas are seeking outlets other than words: Ta ra ra ra boom—whistlings—the snow—gusts of perfect fullness of sound—no will to conclude. On the windswept plateau, right at the top of the ski tow, iron hooks turn around the wheel, having scraped the frozen snow away. The whirligig of this

mechanism injures the frost-crystal. Yet these things must, of necessity, be in harmony. A heterogeneous universe torments us. People today return to nature in bouts of ski tows, half-tracks, Kandahar ropes, superlight alloys. Thus, perfectly equipped, chrome-shod, asbestos-gloved, nylon-clad, they sample the immaculate mountain air. They are caught between two fires that burn and freeze them simultaneously. I must find a way to express this.

March. Back in Paris I have started to collect objects. I have a "Symphony of noises" in mind; after all, there has been a symphony of psalms. I go to the sound effects department of the French radio service. I find clappers, coconut shells, klaxons, bicycle horns. I imagine a scale of bicycle horns. There are gongs and birdcalls. It is charming that an administrative system should be concerned with birdcalls and should regularize their acquisition on an official form, duly recorded.

I take away doorbells, a set of bells, an alarm clock, two rattles, two childishly painted whirligigs. The clerk causes some difficulties. Usually, he is asked for a particular item. There are no sound effects without a text in parallel, are there? But what about the person who wants noise without text or context?

To tell the truth, I suspect that none of these objects will be of any use to me. They are too explicit. Some wrangles with the Administration and, not without signing several authorizations, I take them away.

I take them with the joy of a child coming out of the loft with his arms full of embarrassing, albeit useless, things and not without a powerful sense of my ridiculousness, guilt even.

April 1. We shall better understand the unease of the concrete musician if we compare his intentions and his means. This, for example, is what we find in his notes:

> On a rhythmic ostinato, occasionally interrupted by a logarithmic rallentando, superimposition of circular noises; cadence of pure noises (?). Then fugue of differential noises. Conclude with a series of beatings with alternating slack and tight sounds. The whole thing to be treated as an andante. Don't be afraid of length, or slowness.

April 3. The objects are now put away in a cupboard in the Studio d'Essai (Experimental Studio). I need a metronome. The one that was sent to me does not beat in time, nor do the ones that followed. It is incredible how much a metronome can lack a sense of rhythm!

April 4. Sudden illumination. Add a component of sound to noise, that is, combine a melodic element with the percussive element. From this, the notion of wood cut into different lengths, of approximately tuned tubes. First attempts.

April 5. My bits of wood are pathetic. I need a workshop. It's already bad enough trying to cut them to different lengths and from various materials. Afterward, they have to be arranged so that they can be played easily. I'm up against the problem of the piano again. By "noise piano" I mean the pile of materials that are crammed into the studio. Regular visitors to the Studio d'Essai, who are no longer surprised by my eccentricities, now think I am a nuisance. I have been coveting the workbench in the workshop for a week. I'm asking for it to be moved out. It's sturdy and doesn't vibrate. I can nail all sorts of supports to it. I arrange my little bells and a row of bicycle horns on it.

I'm still not sure about these preparations.

April 7. Second illumination. All these clumsy bits of wood constitute a lesson in things; they are nothing other than resonators tuned to half wavelengths: they are fixed at a "node," and an "antinode" vibrates at their free end. My truancy comes to a sudden end; I am led back into the classroom: first lesson in acoustics and music theory. The Conservatory and the Faculty give me a poor mark.

Let us take the experiment as far as it will go. I need organ parts, not "a noise-piano." I go to Cavaillé-Coll and Pleyel. There I find parts of an organ destroyed in the bombing. I return with a truckload of "thirty-two footers" and tongued reeds. My originality will be not to play them like an organist but to hit them with a mallet, detune them perhaps. The war had already taken this on.

April 12. I need some helpers for my increasingly laborious trials. One of them blows into the two largest pipes, which are pleasantly only a "small tone" apart. (We laugh a lot at this expression, small tone or large semitone—as you please.) The second helper, armed with two mallets, covers with great difficulty an octave of xylophonic recumbent effigies. A third is in charge of the little bells. I compose a score of several bars. We rehearse, make mistakes, begin again, record. The result is woeful.

While the sound produced by the large square wooden pipe is curious, varying (according to whether it is struck at different places, on different supports), the score is pathetically inadequate. I now feel as if I'm going backward. I can hardly tolerate the deference that surrounds me. What do they want from me and these trials when I am so deeply convinced that I'm going down a blind alley?

April 15. I retain only two or three curios from these trials: a vibrating metal strip that you can bring into contact with any object. It then produces a "knocking noise." Dampen the vibration of a crystal glass, a bell, with your fingernail, or cardboard, or a piece of metal, and you mingle noise, sound, a rhythm.

Conversely, I am trying to construct an automatically vibrating metal strip (like a doorbell) that I can bring into contact with various sound bodies. In this way I get a mode of attack from these bodies, which superimposes the noise and rhythm of the attack on the sound. The results are profoundly monotonous.

Furthermore, all these noises are identifiable. As soon as you hear them, they suggest glass, a bell, wood, a gong, iron . . . I'm giving up on music.

April 18. You can't be in two places at once. I must choose between the Studio and the sound booth. This is where I finally took refuge. A window protects me from the Studio. I am among the turntables, the mixer, the potentiometers. I feel vaguely reassured. I operate through intermediaries. I no longer manipulate sound objects myself. I listen to their effect through the microphone. Which amounts to burying my head in the sand, since the microphone only gives the raw sound with some secondary effects and qualitatively adds nothing. However, the sense of secu-

rity that I feel in the sound booth gives me strength to continue these experiments for some days more, even though I now expect nothing from them.

April 19. By having one of the bells hit I got the sound *after* the attack. Without its percussion the bell becomes an oboe sound. I prick up my ears. Has a breach appeared in the enemy ranks? Has the advantage changed sides?

April 21. If I cut off the sounds from their attacks, I get a different sound; on the other hand, if I compensate for the drop in intensity with the potentiometer, I get a drawn-out sound and can move the continuation at will. So I record a series of notes made in this way, each one on a disc. By arranging the discs on record players, I can, using the controls, play these notes as I wish, one after the other or simultaneously. Of course, the manipulation is unwieldy, unsuited to any virtuosity; but I have a musical instrument. A new instrument? I am doubtful. I am wary of new instruments, ondes or ondiolines, what the Germans pompously call *"elektronische Musik."* When I encounter any electronic music I react like my violinist father, or my mother, a singer. We are craftsmen. In all this wooden and tin junk and in my bicycle horns I rediscover my violin, my voice. I am seeking direct contact with sound material, without any electrons getting in the way.

April 22. Once my initial joy is past, I ponder. I've already got quite a lot of problems with my turntables because there is only one note per turntable. With a cinematographic flash-forward, Hollywood style, I see myself surrounded by twelve dozen turntables, each with one note. Yet it would be, as mathematicians would say, the *most general musical instrument possible.*

Is it another blind alley, or am I in possession of a solution whose importance I can only guess at?

April 23. This time I am thinking in the abstract: science and hypothesis . . . Say, an organ with each key linked to a turntable that would have

appropriate discs put on it as required; let's suppose that the keyboard of this organ switches on the record players simultaneously or one after the other, at the moment and for the length of time desired, by means of a mixer switch with "n" commands; *in theory* we get a mother instrument, capable of replacing not only all existing instruments but every conceivable instrument, musical or not, whether or not their notes are at given pitches in the tessitura. For the moment, this instrument is entirely in my imagination, but, to a certain extent, it can be realized. In any case, as, for practical and economic reasons, it cannot be realized soon, it can act as a working hypothesis, the framework for a theory. What a blessing a scientific education is! Without means of experimentation you are allowed, for a time, to carry on with the experiment purely through the imagination. So for a time I am playing this *most general piano possible* in my mind—an instrument for encyclopedists. Isn't this the century for a new encyclopedia?

End of April. I spend these days in a state of half belief. If you invent, you must get a patent. A half smile: can you patent an idea? It seems you can.

I experiment tirelessly. It is surprising to note how *the same process* carried out endlessly and in different ways never entirely exhausts reality: there is always more to be learned, and always some unexpected outcome takes us by surprise. For the principle is everything.

I shall go over what has happened.

Where does the invention come from? When did it occur? I reply unhesitatingly: when I *interfered with* the sound of the bells. Separating the sound from the attack was the generative act. The whole of concrete music was contained in embryo in this inherently creative act with sound material. I have no particular memory of the moment when I made this recording. At first the discovery remained unnoticed. I give thanks for my stubbornness. When you persist against all logic, it's because you're expecting something from a chance event that logic couldn't have foreseen. My merit is that I noticed the one experiment among a hundred, apparently just as disappointing as the others, which provided a way out. I also needed the boldness to generalize.

Besides, very often we don't get anything from revelations that come from experimental accident. Here is an example: everyone has played

sound backward. It's a strange phenomenon, and we sometimes get surprising effects from it. But, as far as I know, no one has ever drawn *general* conclusions. No one has ever considered sound played backward as musical material that can be constructed and structured. Yet sound played backward already doubles, at least a priori, the number of known instruments. The musical community doesn't care; however, for twenty years the experiment has been taking place every day.

Of course, the experiment only pays off if it gives rise immediately to experimentation: piano chords played backward are only interesting subject to certain conditions. Then you can get organ sounds, or peals of bells from the piano. The instrumentalist is then no longer the winner of the Prix du Conservatoire but the sound engineer.

2

On the use of the railway engine as an orchestral instrument. Diabolus in Mecanica. *The whole art is in hearing. The sound object in itself. Definition of concrete music. Wherein quantity becomes quality.* The diapason concertino. L'Etude aux tourniquets *(Whirligig study).* L'Etude violette *(Purple study) and* l'Etude noire *(Black study).* L'Etude no. 5, *the "saucepan" study.*

Easter. Two days in the country banish my enthusiasm for the most-general-possible piano. I realize that I have made scarcely any progress in my plan to express something with noises. I've experimented for two months and composed nothing. All I've discovered is a tool. A tool—isn't that something? No, in this age of productivity, and for the busy people that we are. How can I justify time spent (more than two months without results . . . concrete ones), records wasted (about a hundred already)? And then, experimenting is all very fine, but self-expression is so tempting!

So I'm already turning my back on fortune and departing from the narrow—and thus the longest and the most tortuous—way; I am, quite wrongly, looking for a shortcut.

Certainly the idea of a concert of railway engines is exciting. Sensational. Too much so. I've already forgotten the failure of my organ pipes.

Why should whistles, just because they come from boilers, be more interesting? But once again I have to learn from experience.

May 3. So here I am on my way to Batignolles station, escorted by a mobile sound unit and naïvely cherishing my wrongheaded bright idea.

Six engines at the depot, taken by surprise, as it were, at home. I ask the drivers to improvise. One to start, the others to reply. These engines do certainly have voices of their own. One is hoarse, another harsh; one has a deep voice, another a strident one. I eagerly record the dialogue between these mild-mannered whales. At their conductors' desks the Batignolles drivers watch me but quickly grow tired. You can sense that engines can't like being performers. What a divide there was between my momentary infatuation—this instant when, in the cold light of day, the recording vouchsafes me a panting, feeble conversation entirely lacking in rhythm!

I should have liked precise variations: the noise of the engine with its wheels spinning downhill, its rapid panting echoing back into the distance, the clash of buffers and their delicate ornamentation, the hammer blow, with that long-handled hammer that they use to tap the bogies . . . I'm a bit disappointed: no wheels spinning downhill, the leisurely puffing of a solo engine. A tiny, gentle touching of buffers, with neither semiquaver nor grace notes. It's a good job the record library has a large selection of sounds of coaches going along railway lines.

May 5. Further irresolvable difficulties. I have composed a score. Eight bars getting under way. Accelerando by solo locomotive, then tutti of coaches. Rhythms. Some are very fine. I have isolated a certain number of leitmotifs that I must make into transitions and counterpoint. Then slow down and stop. A cadence of buffer clashes. Da capo and reprise, more energetically, of the preceding elements. Crescendo. Effect of trains passing each other in opposite directions with that inflection when moving things pass each other and their sound goes down one tone, an augmented second, sometimes a third. But truly it's difficult not to be led by these records. How can I compose them if I reject the idea of a dramatic scenario?

As soon as a record is put on the turntable a magic power enchains me, forces me to submit to it, however, monotonous it is. Do we give ourselves over because we are in on the act? Why shouldn't they broadcast three minutes of "pure coach" telling people that they only need to know how to listen, and that the whole art is in hearing? Because they are extraordinary to listen to, provided you have reached that special state of mind that I'm now in. How much I prefer them in their raw state, rather than in the state of vague composition (decomposition) where I have finally, and with great difficulty, isolated eight pseudobars in one pseudorhythm . . .

I lower the pickup arm as one rhythmic group starts. I raise it just as it ends, I link it with another, and so on. How powerful our imagination is! When in our minds we pick out a certain rhythmic or melodic outline in a sound fragment like this, we think we have its musical element. We link things together, we contrast, we superimpose them. We even attempt to write down notes. We are momentarily filled with enthusiasm. In reality, when we listen again, impartially, to what we have composed, obtained after long hours of patience, all we find is a crude concatenation of rhythmic groups resistant to any regular rhythm. I imagined I had extracted a three-four, a six-eight from the moving coach. The train beats its own time, perfectly clear but perfectly irrational. The most monotonous of trains has constant variations of rhythm. It never plays in time. It changes into a series of isotopes.

But then, what subtle musical pleasure a practiced ear could find learning to listen to, to play this new-style Czerny! Then, without the help of any melody, any harmony, you would only need to be able to discern and savor, in the most mechanistic monotony, the interplay of a few atoms of freedom, the imperceptible improvisations of chance . . .

May 7. I'm spending two sessions on the noise of buffers. I've finally got some quite good ones, particularly if I set them up on the double turntable to echo each other. I try a sort of canon. They answer each other pianissimo, then sforzando. It's exciting, but is it music? Isn't the noise of buffers first and foremost anecdotal, and thus antimusical? If this is so, then there's no hope and my research is absurd.

May 10. My composition hesitates between two options: dramatic or musical sequences.

The dramatic sequence constrains the imagination. We witness events; departures, stops. We observe. The engine moves, the track is empty or not. The machine toils, pants, relaxes—anthropomorphism. All of this is the opposite of music. However, I've managed to isolate a rhythm and contrast it with itself in a different sound *color.* Dark, light, dark, light. This rhythm could very well remain unchanged for a long time. It creates a sort of identity for itself, and repeating it makes you forget it's a train.

Is this a sequence that can be called musical? If I extract any sound element and repeat it without bothering about its *form* but varying its *matter,* I practically cancel out the form, it loses its meaning; only the variation of matter emerges, and with it the phenomenon of music.

So, every sound phenomenon (like the words of a language) can be taken for its relative meaning or for its own substance. As long as meaning predominates, and is the main focus, we have literature and not music. But how can we forget meaning and isolate the in-itself-ness of the sound phenomenon?

There are two preliminary steps:

Distinguishing an element (hearing it in itself, for its texture, matter, color).

Repeating it. Repeat the same sound fragment twice: there is no longer event, but music.

May 15. The problem of the train is very different from that of the bells. The manipulation of the bells removed from them their identity as bells. They became unidentifiable. I had obtained a musical element that was pure, composable, and had an original timbre. With the trains I was a long way from the field of music and, in effect, trapped in the field of drama. Now, if I take an "extract" from the train and demonstrate its existence by repetition, I get a material that can be composed, which calls for a certain type of music. So suddenly both problems find a common solution, except that the "bell" element presents as a fairly pure sound, whereas the "train" element is a "sound complex" with a poorly defined rhythmic and melodic makeup.

For the "concrete" musician there is no difference between the cut bell and the piece of train: they are "sound fragments." For the classical musician there is a difference due to habit. He could, just about, compose a score for a cut bell, which could theoretically be played note by note on the gramophone. To compose a "Railway Study," on the other hand, you have to isolate the various sound fragments, manipulate them, and link these "sound complexes" together. Algebra of the note, geometry of the fragment, is what these two musics are, if indeed there are two.

Similarly, architecture is not bothered about chemically pure materials but about their form. If I put stones together, I will be interested not so much in their striations and veins as in their volumes and alignments. So the internal rhythm of a "train" element that, from the music theory point of view, is very important becomes negligible when this element forms the elementary material of a composition.

I have coined the term *Musique Concrète* for this commitment to compose with materials taken from "given" experimental sound in order to emphasize our dependence, no longer on preconceived sound abstractions, but on sound fragments that exist in reality and that are considered as discrete and complete sound objects, even if and above all when they do not fit in with the elementary definitions of music theory.

May 25. One month spent on this "Etude aux chemins de fer" (Railway study). The result is monstrous the more the two methods are juxtaposed. Because of their "popular appeal" I haven't dared to abandon the dramatic sequences, but secretly I hope that one day there will come together an audience that prefers the theoretically less rewarding sequences, where the train must be forgotten and only sequences of sound color, changes of time, and the secret life of percussion instruments are heard.

May 26. I have obtained some quite remarkable transformations by playing a fragment recorded at 78 rpm at 33 rpm. By playing the record at rather less than half speed, everything goes down a bit more than an octave and the tempo slows at the same rate. With this apparently quantitative change there is also a qualitative phenomenon. The "railway" element at half speed isn't the slightest bit like a railway. It turns into a

foundry and a blast furnace. I say foundry to make myself understood and because a little bit of "meaning" is still attached to the fragment. But very soon I perceive it as an original rhythmic group, and I am in constant admiration at its depth, its richness of detail, its somber color.

I conclude from this that concrete music will differ from classical music on another important point. In classical music a *do* is a *do* whatever its situation in the tessitura. In concrete music a sound, generally "complex," cannot be separated from its situation in the sound spectrum. It is part of its quality; nothing can be superimposed, divided, transposed.

May 28. Although I'm working hard, I've given up my original plan, any idea of a "Symphony." "Study" is a more appropriate title for my attempts at composition, each one concentrating on a particular area. The studio is no longer full of an unusable miscellany of objects. It's all happening in the sound booth. For example, I only need to record an empty tin can rolling about for a bit. I can work from this recording for hours, and the sound is so transposed and unrecognizable that the tin can disappears. Indeed, from a box of matches can come melody, harmony, percussion . . . Sound material in itself has inexhaustible potential. This power makes you think of the atom and the reservoir of energy hidden in its particles, ready to burst out as soon as it is split. Instead of composing a series of studies I would do well, if I were logical and worked without bothering about an immediate result, to record only "samples," each one taken from an initial noise. After all, isn't this noise the same as an orchestra makes? In the Erard Hall I find an amateur orchestra conducted by Pierre Billard. After the clarinet, a general "A" is unleashed, adorned with embellishments that I record with care.

May 29. My experiment succeeds beyond expectation. From this multiform "A" I have drawn out interesting sound cells. This time it's really music. But it's difficult to link the various elements. And the elements call for a response. Hence the idea of a dialogue, and the use of a solo instrument that has all the instrumental resources of ordinary music.

May 30. Jean-Jacques Grunenwald has agreed to play the concertante piano. He responds with great virtuosity to the "concrete" themes with a

music that I would call abstract were it not so spontaneous. It is abstract insofar as it comes from his imagination, and it is expressed through his expert fingers and obedient keyboard. Obedience is certainly not a quality of our gramophones, which send strange sequences to Grunenwald in the studio. There is, alas, a lot of background noise with these sounds, for it has to be admitted that all these manipulations ultimately do an enormous amount of damage to the sound quality, despite all the efforts of my colleague Jacques Poullin, a sound engineer.

J.-J. Grunenwald, who is in quite a hurry, leaves as soon as he has recorded his responses. I envy him for making such pleasing music in such a short time, whereas we will need a fortnight to produce links and transitions, many of which are clumsy. And so I obtain a strange tutti that is occasionally incoherent yet full of sound treasures, most of them unheard in the etymological meaning of the word.

This study for piano and orchestra is still a compromise. The dialogue between the concrete elements and J.-J. Grunenwald's piano is shaky: two such different worlds cannot work together so easily. In any case the experiment was worth it.

June 2. Where does the clumsiness of the *Diapason concertino* come from? Certainly not from the material itself, since J.-J. Grunenwald's concertante piano responds to sequences that themselves were taken from orchestral matter. So it must be that concrete manipulations *create forms* that clash with the usual musical style.

I have a new proof of this with the *Etude aux tourniquets.* At the time of the very first experiments, faced with the impoverishment of bits of wood, I turned to Gaston Litaize and asked him to develop the themes for two whirligigs and three zanzis livened up with a xylophone and a ring of bells, relying on the score to bring it out of its impoverishment. Although I had given him a complete outline in theory (fig. 1), I had great difficulty in obtaining a short score from Gaston Litaize, out of friendship rather than real enthusiasm. Indeed, the results were pathetic, despite the goodwill of the zanzi and whirligig players, all Conservatoire prizewinners. The bar lines, which Gaston Litaize had imposed somewhat aggressively on the whirligigs and zanzis, destroyed all their charm. In vain I had suggested that the handles of the whirligig should be turned irregularly

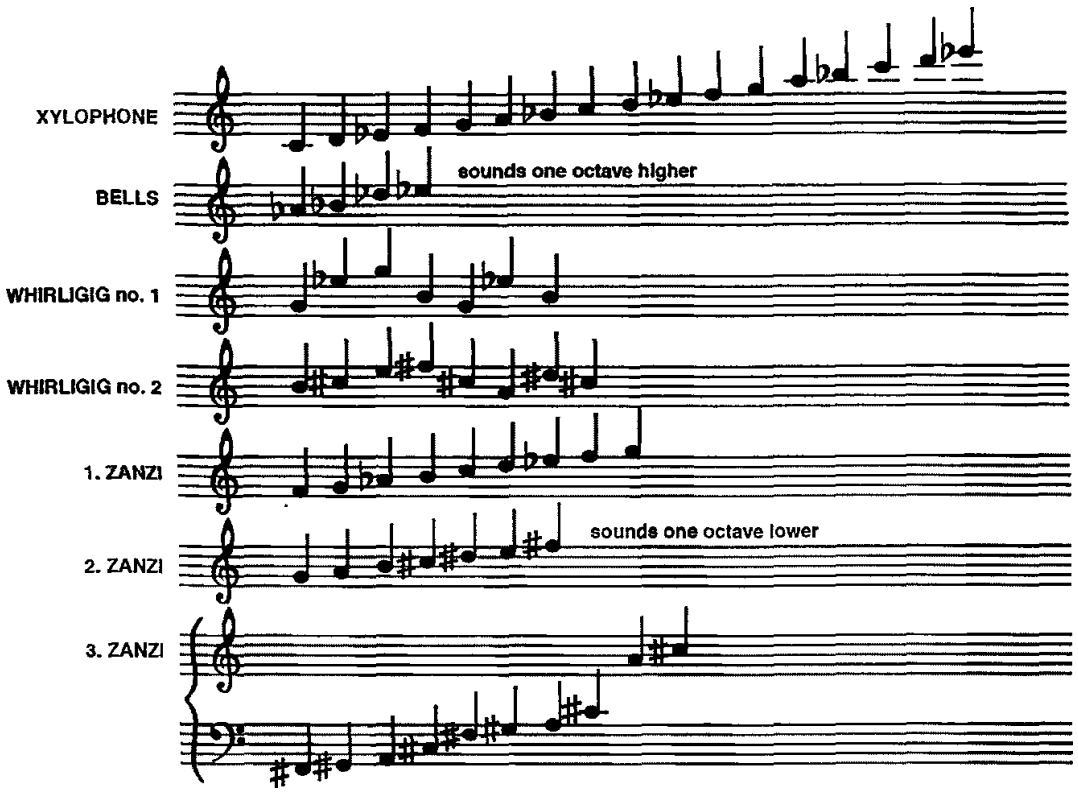


FIGURE 1. [Tablature of the *Etude aux tourniquets.*]

and the zanzi blades be used for their indeterminate tonality. Gaston Litaize wanted to impose order on everything, and the objects had resisted. The performance itself smacked of the baton, the ruler of strictly measured playing. Gazelles die like this, behind bars.

When, some weeks later, I again took up the record that witnessed to these pointless efforts, I had the idea of treating it as raw material from which I could take extracts. Ignoring the score, I took short pieces, preferably from all the "odd moments" of the performance. I chose the most interesting. Then the whole process of concrete music took place: transformation of these fragments by varying speed, timbre etc. . . . Then synthesis. Thus was born the real *Etude aux tourniquets,* a radioactive isotope of the previous one, this time neither impoverished nor childish but amazing and densely packed. The musical ideas from the original score disappeared almost entirely, because the splices created new structures that had no connection with the original compositional intention. If some initial elements were recognizable, they were like fossils, where ultimately

only their chemical composition interests us. So the proliferation of forms cancels out form, which turns back into matter.

June 4. There is no instrument on which to play concrete music. That is the main difficulty. Or else we have to imagine a huge cybernetic-like machine that can achieve millions of combinations, and we're not there yet. As long as I have no more than two or four turntables that make only approximate transitions, I shall remain horribly imprisoned in a discontinuous style where everything seems to have been hacked out with a billhook. Is there a compromise?

I instinctively turn to the piano. The preceding manipulations have in fact taught me that a piano could well replace all sound effects equipment. You can strike the strings directly, or scratch or lightly stroke them, but you can also use the keyboard, not as a musical instrument, but as a convenient way of attacking the strings, which will have undergone some "preparation."[1] So every note on the keyboard has a more or less musical sound or noise, which can be quite precisely regulated. In this instance the keyboard is no longer a modulating instrument but must be considered a commutating instrument.

However, playing the "prepared piano" does not, for all that, lead to concrete music; the characteristics of instrumental play remain and preserve traditional forms: play is always more or less in time and melodic. Nevertheless, acoustically amplified, the piano can become a super–percussion section. So, using the piano as both a percussion instrument and a source of concrete sound leads to a technique that, of course, does not resolve the previous difficulties but to a certain extent turns them around.

If I ask Pierre Boulez to record a series of chords in different styles (classical, romantic, impressionist, atonal, etc. . . .) on a given theme, I can, by manipulating this "sound stuff," construct groups that will still have something in common with the initial sound but without being

1. The term "prepared piano" was used systematically by the American John Cage, whose works I was unaware of at this time. The use of the piano is similar in both cases, but with John Cage it leads to a music that still remains fairly abstract in its conception and performance.

recognizable as clearly as the whirligigs. At least these series will have the merit of providing an element of continuity, even a melodic development, whereas the concrete, concertante fragments will still have their discontinuous character. The merit of these initial piano studies is that we avoided having to use the "prepared piano," which later was to create effects that were more brilliant but less pure. And so the *Etude violette* and its twin sister the *Etude noire* came into being, the first more uneven, the second more melodic.

June 6. Now that the decks are cleared, real work can begin. There have been so many materials over the last four months that simply using them could take as long again. More than five hundred records are unworked stone, ore that must be refined. And precisely at this moment I am being sent on a mission to Washington. I must abandon the fruits of this long labor, which I have scarcely glimpsed. And the works that I have sketched out seem hardly usable, for any audience!

This worries me constantly. What will the radio administrators think of this mess of records, this apparent waste of time, this "Symphony" not even begun?

On this evening of my departure I can't resist coming in for a final studio session. I am making a last attempt to be clear in my mind about *voices.*

The inclusion of vocal elements has tempted me for a long time. I have no actors and even fewer singers (but for weeks I've been doing without performers). There are still old forgotten records lying around in a studio. The one that comes to hand contains the wonderful voice of Sacha Guitry. "On your lips, on your lips . . . ," says Sacha Guitry. But the recording has been interrupted by the continuity girl's coughing, which explains why the record was rejected. I grab this record, I put the deeply peaceful rhythm of a good old barge on another turntable, and then whatever comes to hand on two other turntables: an American accordion or mouth organ record and a Balinese record. Then follows an exercise in virtuosity with the four potentiometers and the eight switches.

Fortune favors fools: *Etude no. 5,* called *with saucepans* (because this study begins and ends with a sequence from a spinning tin can), is done in a few minutes, the time needed to record it.

In the four preceding studies you can see how much the development leaves to be desired, how clumsy the crescendos are and how unskilled the transitions. In the *Etude aux casseroles* (Saucepan study) the French canal barge, the American mouth organ, the priests from Bali miraculously begin to obey the god of turntables; they form a skilled group, in charge of its effects; and when the insistent "On your lips" (three times) interrupted by coughing occurs, the listener, invited to listen for the first time, is rightly astonished by a composition so skilled, so harmonious, so masterly. This is how the classics of concrete music come about.

3

On international conferences as a concrete concert. Absent friends are not always wrong. Nature never repeats itself. The article from Polyphonie. *Is there an abstract concrete cycle?*

Hurriedly abandoning the studio for the plane, I was not to have anything more to do with concrete music for a year. I was going from a confined atmosphere to broader horizons, and from a problem so specific that it seemed to concern me alone to problems so general that they required the presence of delegates from all over the world. These delegates from Atlantic City, Copenhagen, Mexico were going to share wavelengths among the ninety countries on the planet. Months, years were going by without the slightest chance of agreement. In short, I was going from a difficult technique to an insoluble policy. Sometimes, in the course of endless sessions, I would listen to the delegates' pronouncements with a "concrete ear" and perceive all the better their perfectly illogical workings. No argument could convince anybody, and other laws governed persuasion: the patience of some, the violence of others, the endurance of one group, the cleverness of another; it was all about who could get the

last quarter of an hour. Four booths of interpreters labored away completely pointlessly translating the speeches. You could hear the Russian without understanding him: an insistent melody and a multiple and inexhaustible rhythm are more convincing than the meaning of the words. The Anglo-Saxons operated in blocks of blunt syllables, suave or sharp halftones. The South Americans spoke with their hands, conducted orchestras, so comfortable with artifice, so expressive, that any more and we would have thought them sincere. And among other, indigenous, musics, those that we foolishly accuse of exoticism, African, Hindu, Arab—truthfully, almost the only disciples of Descartes—defended fair shares, the geometrical mean—in short, a so-called "Western" rationalism. They alone in this concert were worthy of the Médaille de solfège (Medal for musicianship) and the Prix de Rome.

In common with concrete music these international conferences were resolutely empirical. They too made a great noise in which, as in the case of the railway, variety had to be sought out amid endless monotony.

What happened during this year of inactivity? On Tuesday, October 5, 1948, the first "Noise Concert" had been broadcast, not on an experimental station, but on the station that was theoretically most popular: the "Parisian." I expected complaints; I rather dreaded scandal. Twelve letters arrived, friendly and enlightened.

> . . . I was overcome by the symbols, the richness, the diversity, and the novelty of some of the groupings . . . —Y. L.

> . . . I must tell you straightaway about the profound, deep-seated emotion I felt while listening, and which I still feel, as in those compelling dreams that are only dispelled long after we awake and that we never entirely forget . . . It was as if I were listening to superb Balinese music; the music that you could imagine coming from the center of an atom: the ultrasonic music created maybe by the movement of the planets: the music that Poe and Lautréamont and Raymond Roussel would hear inwardly. The noise concert is not only the first concert of surrealist music;[1] it contains, in my opinion, a musical revolution . . . —G. M.

1. In fact, the Italians, with Marinetti, were precursors twenty years before this. But they were concerts of direct noises, leading, as we have seen, to a dead end.

> . . . An amazing explosion in which the dream finds its proper place . . . A new way which will deliver us from the stagnation and deadlock into which slowly, surely, poetry is sinking . . . —C. C.

Two of these letters already contained in embryonic form an indication of the two different paths that concrete music could have followed. One is from a film director, the other from a music composer:

> . . . These sound treasures must next be organized with a goal in view, focused and classified; as far as possible the *other norm* of sound art, as opposed to musical art, must be sought . . . —M. P.

> . . . Should a noise work have form or not? I think so; your *"étude pathétique"* left me with the most vivid memory because of its form (perhaps, as well, because of the greater use of "pure" noises). I think that one could start by using existing musical forms, of course reserving the right to create new forms adapted to this new music . . . —M. C.

The problem was clearly stated: is there a case for seeking out a new sound domain on the borders of music, or, on the contrary, should these new concrete music materials, presuming they finally become more malleable, be incorporated into a musical form?

My correspondents also explained their projects to me.

> . . . A radio work: *Bruits et voix de mon corps* (Sounds and voices of my body)—particularly the unheard, inaudible, internal sounds . . . *Ce que le ciel écoute* (What the sky listens to)—from the hertzian wave to the wind, the sounds of the earth . . . —M. P.

> . . . I remember having done an experiment *in music* that could perhaps be relevant to you. As conductor for Radio Bucharest, I used one of my rehearsals to do the following: we detuned all the stringed instruments. For example, the violinist on the right of the desk was tuned F, E, G♯, D; his colleague on the left of the desk G♭, D, G, E♭ . . . I transposed all the wind instruments: horns in A were in F, trumpets in D played in C. Then we played the first part of Beethoven's Seventh Symphony. The result was astonishing: we created an almost new work (there was nevertheless a bit of Beethoven here and there), and this new work had a value of its own because of the form of the symphony . . . —M. C.

The study called *"pathétique"* had the acclaim of all my critics. They acknowledged the technical qualities of the study called "with piano."

But a sort of unanimity had spontaneously arisen to exclude the study called "concertante." Finally, the best-informed correspondents appreciated in the *Etude aux chemins de fer* and the *Etude aux tourniquets,* the effort to abstract the noise from its dramatic context and raise it to the status of musical material.

Most of the letters asked for clarification. I decided to give them a journal, the day-by-day account of my various activities, as it was too soon to formulate any theory. This journal appeared in a special edition of *Polyphonie* on "mechanized music."

It gave an account, as I have just done, of the beginnings of concrete music, together with some diagrams that it might be useful to reproduce here.

One is in effect the first attempt to make a concrete music score. It represents the most interesting sequence of the *Etude aux chemins de fer* but also perfectly illustrates the concept of fragment or musical object and its substitution for the concept of note or pure sound. The sequence in question was composed of several "series of fragments" such as the series I, 1/I, II, 1/II, etc. . . . (fig. 2 [pp. 26–27]).

The part of the composition used here can be summed up thus. Take, for example, fragments *a, b, c, d,* chosen for their decreasing durations, each of which can, by and large, suggest a 4/4, 3/4, and 2/4 bar, respectively, and in one tempo, then "punctual" elements *e, f, g.* A series *a, b, c, d, e, f, g* would probably have no expressive character at all. After all, nature can provide a series like this without any discernible creative involvement. (Perhaps when I talk about fragments, you are wondering which fragments I mean. It doesn't matter, but, to focus the mind, let us say they're taken from coach rhythms, but it's of no consequence; it can be any sound at all.)

If I compose a series doubling each fragment *aa, bb, cc, dd,* then quite clearly there appears a will that can under no circumstances be mistaken for a chance encounter. *Nature never repeats the same thing twice.* I can then follow this series of double fragments with the simple series *e, f, g,* because the series without repetition will take its willed character from what comes before.

If I then compose another series with the same structure out of elements that I notate with the number 2, I obtain a variation on "theme" I.

Again, it could be something quite different from the elements obtained from the train rhythms. It is clear that, whatever the sound material arising from pure chance, a will to compose is manifest in the imposition of structure. To put it another way, the same thing has been repeated twice.

This should also be noted: as soon as a draft structure has been notated, a host of combinations may take shape; and it would be easy to yield to the temptation of paper, which is contrary to the spirit and the method, and even the potential, of concrete music. However constructed these sequences may appear, a listener, in the act of hearing, will sense a vague organization but will be nowhere near to perceiving its rigor. The pursuit of such a Cartesian rigor in construction, as well as coming up against insoluble instrumental problems, is no guarantee of aesthetic effect. It would be strange if concrete music could be constructed from a geometrical diagram. The ear—and the inspiration it conducts—is sensitive to combinations of figures that are more complex and more "irrational," in a different sense, than the figures on my little drawing.

The article in *Polyphonie* contained another diagram that showed the two musics in parallel and with their symmetrical stages:

ORDINARY MUSIC *(so-called abstract)*	NEW MUSIC *(so-called concrete)*
PHASE I. Conception (mental)	PHASE III. Composition (material)
PHASE II. Expression (notated)	PHASE II. Drafts (experimentation)
PHASE III. Performance (instrumental)	PHASE I. Materials (making)
(from the abstract to the concrete)	*(from the concrete to the abstract)*

The adjective "abstract" is applied to ordinary music because it is initially conceived in the mind, then notated theoretically, and finally executed in an instrumental performance. As for "concrete" music, it is made up of preexisting elements, taken from any sound material, noise, or musical sound, then composed experimentally by direct montage, the result of a series of approximations, which finally gives form to the will to compose contained in rough drafts, without the help of an ordinary musical notation, which becomes impossible.

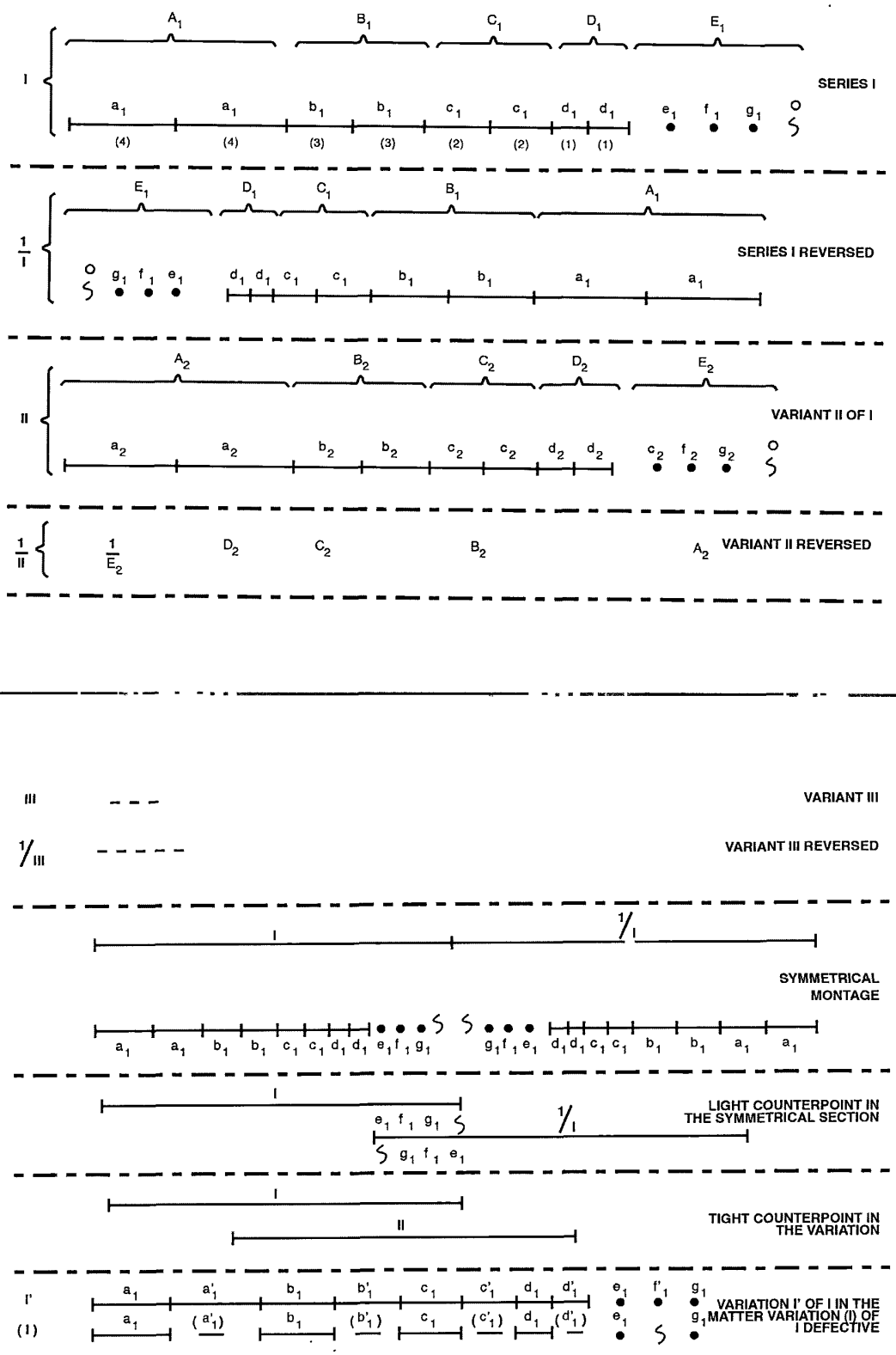
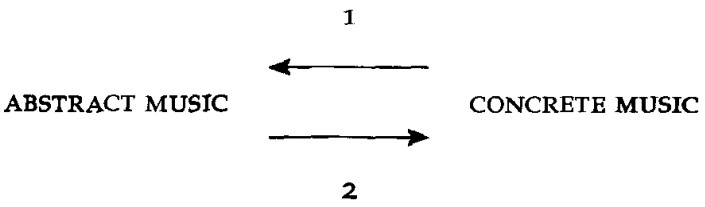


FIGURE 2. [Serial structures of the *Etude aux chemins de fer.*]

These two diagrams [on p. 25 and pp. 26–27] can be studied first of all for their fundamental differences. They can also be studied for their relationship to each other, that is, it is possible to see prefigured the process of exchange that could one day take place between the ancients and the moderns. It would no longer be a matter of seeing two movements, equal but opposed, but of seeing a cycle that could be set down thus:



Arrow number 1 denotes the potential effect of experiments in concrete music on the imagination of a musician who is happy to use the traditional orchestra. It could even be said that, if his imagination fails, the musician would use the discoveries of concrete music to kick-start his inspiration. Arrow number 2 represents the preliminary contributions made by classical methods to the composer of concrete music. Ultimately, the use of the two domains simultaneously and the normal functioning of the cycle may dispose other kinds of composers to alternate the preconceived and the experimental systematically and *repeatedly.*

For myself, I could quite well see how to use arrow number 1. I could have been a composer who wanted to write an original work based on the *Etude noire* or *pathétique,* the concrete study providing both a sound model and a climate of inspiration. I could not see quite so well how to put the resources of abstract music into the service of concrete music, yet I had to do this. Interesting results had been obtained from crude noises, so better ones could be hoped for by applying the same methods to a more elevated sound matter. Should a score be composed beforehand for this? Could any existing work be used to extract fragments that it was known would become unrecognizable?

Arrow number 2, during my enforced inactivity, represented the line of force of my curiosity. It showed me the way down which I was soon to rush more or less headlong as soon as I could return to France and get a studio. Arrow number 2 led to *Suite* 14.

4

A tough summer. Economy and discretion. The Suite pour 14 instruments *(Suite for 14 Instruments). A* Prelude *that goes well. A* Courante *that is an instant success. A back-to-front* Rigodon *(Rigadoon). A disobedient* Gavotte. *The* Sphoradie. *Frozen words.*

Arrow number 2 involved a starting point, a journey, a destination. The starting point was a return to customary orchestral methods; the journey, the transformation of these by concrete procedures; the destination, a new music. The experiment in carving musical fragments from train noises, whirligigs, rolling tin cans showed that a structure was possible. It would be all the more so if I allowed myself less difficult materials to start from. At least that was my thinking when, on my return to Paris, I took over the studio again. It was August 1949, and by special dispensation, everyone being on holiday, it opened its doors to me alone.

For economy's sake, I limited my orchestra to fourteen instruments. For discretion's sake, I didn't ask anyone to write down the score. Once this score was destined for vivisection, I didn't want to cast a slur on someone else's work. I preferred to write it down in my own amateur

way (it's a bit clumsy, said Jean-Michel Damase politely, as with dazzling virtuosity he helped me with the orchestration). At least I was sure of having certain effects at my disposal in advance: combinations of timbres, symmetrical arrangements that the procedures of concrete music would later take up and prolong. In this way I imagined five pieces forming a suite called *Suite* 14, the "14" referring to the basic starting point, the sounds of fourteen instruments. In fact, the composition was to be more and more disrupted, with each of the five pieces moving further away from the original score.

Apart from the intention to increasingly disrupt the original score, the idea was to use each piece for the application of a particular procedure. The first movement, entitled *Prologue,* was to remain faithful to the original composition and have only acoustic adjustments: reverberation almost to the point of echo, artificial doubling almost running into rhythmical counterpoint. The second piece, *Courante,* was a monody, distributed amongst the fourteen instruments, at first phrase by phrase, then cell by cell, and even note by note. It was difficult to perform, especially at a rapid pace. I was relying on acceleration to give virtuosity to the whole thing. A number of cells, cut out from this monody, would then be assembled vertically or horizontally. The third movement was a *Rigodon,* very rhythmical, at a cheeky pace, with drums and trumpets to accentuate the rhythms. I specifically wanted to disarticulate this *Rigodon* to bring in sound symmetries played backward, and to develop cadences announced by some trumpet sound that could be repeated, imitated, distorted in every possible way. As for the *Gavotte,* the fourth piece in the *Suite,* the initial score consisted of a very consonant short phrase with a dozen variations, each variation played by three of the fourteen instruments. These successive trios combined timbres more and more oddly. The oddness would be reinforced by a certain number of complete transpositions, for example, by multiplying or dividing the playback speed, affecting both tessitura and tempo, in a relationship determined in advance.

In short, it was a series of studies rather than a suite. In the first four movements quite a lot of emphasis was placed on experimenting with procedures; the fifth and last movement was the real essay in expres-

sion. To emphasize that the author had complete freedom, it was called *Sphoradie.*

It was a miserable holiday. Sometimes, as if to pull myself together during that radiant month of August, I played the five sides of the records on which the initial score was recorded. A waste of time . . .

All around me lay piles of records bearing fragments of this raw material, decomposed, compressed, and stretched, de-ossified, inverted, shattered, pulverized. I was like a child who has taken the growl out of his teddy bear, pulled out his dolly's eyes, and smashed his clockwork train. I had to admit that I had invented amazing techniques for destruction but that every attempt at synthesis fell to bits in my hands. Furthermore, at every stage of my activities, pitiless contradictions arose. Sound objects multiplied, but their proliferation brought no enrichment, at least not in the way that musicians mean: the musical idea, or shadow of an idea that persisted throughout these contortions, remained unchanged, and what a lot of misshapen forms, and *concrete* variations for the same idea! The variations themselves were contradictory, too musical and not musical enough—too musical because the banality of the original composition persisted, not musical enough because most of these sound objects were harsh, offensive to the ear.

Would I have to give up? Even if, two years later, it becomes clear that the cause of some of these contradictions is perfectly comprehensible, how can one be clairvoyant when in mid-experiment?

The paradox was that for two years I had been practising concrete music but without having yet discovered it. I had discovered operational procedures, I was capable of manipulating, and I was nowhere near being as advanced on the theoretical level. I was a prisoner of my closed grooves. A famous song by Edith Piaf illustrates the closed groove. Before becoming a method it appeared as a "gimmick," a sound "effect." But from being an effect, it can become a cause and a means of discovery. The latter arises from a symbolic difference: the difference between a spiral and a circle. It turns out that the disc cutter is a machine that draws its own symbol (fig. 3). The cutter's spiral is not only the material realization but also the affirmation of time going by, time gone by, which will never come again. If the cutter closes its magic circle in on itself, one

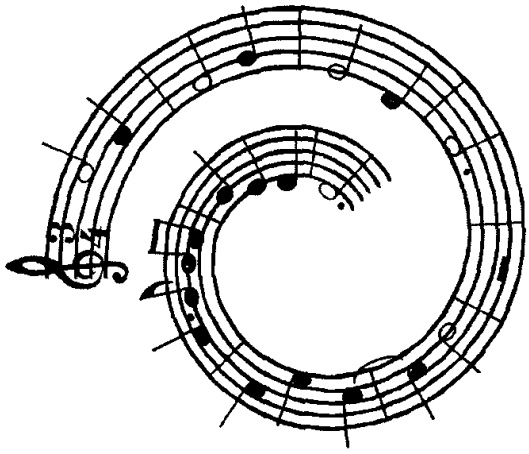


FIGURE 3. [Recording spiral (symbolic representation).]

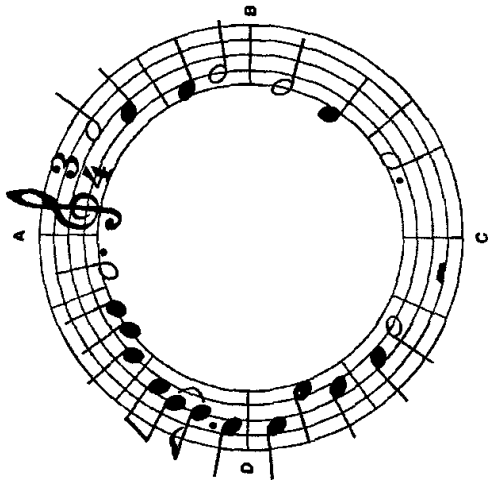


FIGURE 4. [Closed groove (symbolic representation).]

of two things can happen: either it is an accident, and, when the inattentive operator notices it, he finds the machine damaged because the cutter has scratched the record right to the heart (for every record has a metallic "heart" that is easily harmed when the thin layer of lacquer is pierced); or he has done it deliberately, and, skilfully raising the cutter once the groove has "bitten its tail," he has isolated a "sound fragment" that has neither beginning nor end, a sliver of sound isolated from any temporal context, a clean-edged time crystal, made of time that now belongs to no time (fig. 4)—when played, the closed groove can start at A, B, C, or D. But where it began is soon forgotten and the sound object appears in its entirety, with neither beginning nor end.

When, by an extraordinary stroke of inventive genius, Rabelais imagines "frozen words" in *Pantagruel*, he does more than foreshadow the recording of sound. Swearing, shouting, the neighing of horses, the clash of arms, yells, screams of terror are suddenly isolated and set hard, separated from History, and piled up, frozen, in a chaos of oblivion. The warmth of a hand melts them and they are tossed around like stones. Here time past is not just reconstituted; it bursts out. Depending on Pantagruel's mood, the thousand bits of sound compose a different sym-

phony, not in the order in which they occurred, but as the hand picks them up, or in any order imposed upon them.

I had been right to use the *Courante* for an in-depth trial of the closed groove. The fact that I had a monody and not a polyphony simplified the experiment and allowed me to observe more clearly. We had become used to making these grooves, and Jacques Poullin and I set about it with a will. So, like spontaneous generation in full fermentation, we spawned a number of little "motifs," the issue of the original monody, and among them there were some very remarkable ones. A statistician could have enjoyed himself counting how many of these children of chance had received some precious gift: rhythm, intonation, expression, surprise. Statistics could have recorded the percentage of grooves having particular rhythmic or melodic characteristics, the percentage with rational note values, or even the percentage of grooves that could not be notated in quavers or semiquavers. Another peculiarity of these little sound creatures was that in some way they eluded the language of music. Initially assembled to make phrases, they had escaped like the words from a dictionary and were going tirelessly round and round on the turntables all by themselves. This phenomenon could well appear unimportant to the inattentive ears of so many professional musicians. Poets, much more aware, opened theirs up. A similar thing had already happened to words. Freed from the label "realistic" and taken for themselves in their chance or artificial encounters, words had provided enough experimental material over some decades to make people take notice. So, while musicians started to grumble, poets displayed a well-informed curiosity. It didn't matter that these sound objects resisted all syntax, expressed nothing. They came hot off the press, landing on the ear with no conceptual baggage. If they showed little grace in letting themselves be manipulated, it was perhaps that we were ungracious in forcing them. Perhaps these sound objects were meant never to return to this courante—even a concrete one—that was made from them? Perhaps their vocation as objects was to appear in some herbarium, one of those catalogues provided for the amateur, and that he consults, only too pleased that these objects are offered in a logical order and not according to some perfectly pointless and subjective author's whim?

Can we say that one mushroom is better grown than another? That a lizard is superior to a tortoise? Taste determines the choice. But science alone establishes a hierarchy of the kingdoms. Because we hadn't got the science, we were at the stage of preferring one groove to another, as a lizard might be preferred to a tortoise. There were quick ones, slow ones, pallid ones, brilliant ones. There were unforgettable ones that never would have been heard while they were surrounded, stuck in their original matrix. Already drugged by this new substance, we "played" them, showed them to each other when they seemed well formed . . .

Surprisingly the new courante—made, as we have seen, out of bits and pieces—turned out to be a success and displayed a distinctly dodecaphonic tendency. Was this nothing more than chance or contamination? Or was there an explanation? To some extent, it was both. It could be said that the cutting out had completely destroyed the tonality, though very marked, of the initial score. In reality it was rather the disjointed facture of the new courante that made it resemble a piece by Webern. As it all went very quickly and the cells were much more unexpected than the original phrases, performance was like one of those performances fraught with difficulties, where the conductor is not at all sure that everyone will come together at the double bar line. Similar adventures have been seen in dodecaphonic concerts . . .

But the experiment was to become more complicated with the *Gavotte.* No closed grooves in the *Gavotte.* Only transpositions. But large- and small-scale. A rather scholarly schema had been drawn up, establishing precise relationships between these transpositions: fifths and sixths, twelfths and twenty sevenths. To my great surprise, these intervals were no longer relevant. From the moment we were sure that the variations had obediently locked on to the theme, the transposition interval and the tonality no longer mattered. Nor did the "modulation" effect: there remained a sort of permanence, as in a piece of music emerging through a geological catastrophe that has disrupted all its layers (fig. 5). In the *Courante,* the "musical word" detached itself from the phrase and existed in its own right. In the *Gavotte,* the phrase detached itself from the piece and rose to the heights, descended to the depths. The steps of the scale were no longer of importance, nor was the tempo. An accelerando reply fol-

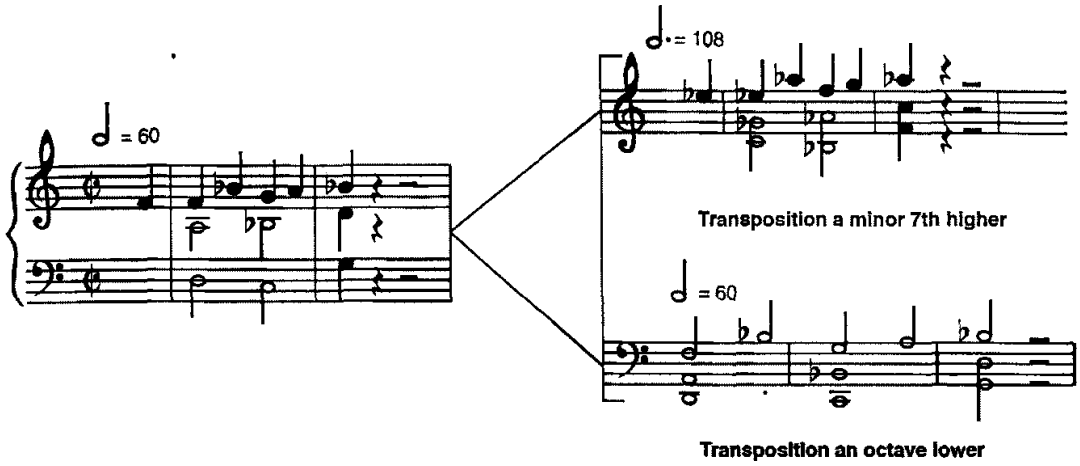


FIGURE 5. [Example of total transposition (*Suite* 14).]

lowed a rallentando without clumsiness: the piece continued. Nothing is as indestructible as a musical structure. Nothing is as independent.

As for sound played backward—we had done this experiment many times before—it bore no relationship to sound played the right way around. Not only because the structure of the sound was changed, but because the development of the musical discourse, deeply attached to the sense of time, was not reversible. With the exception of certain structures prepared in advance, such as the ones I had written for the *Rigodon*, there was no apparent connection between a fragment of sound and its reverse version, at least within the usual dimensions of customary music. On the contrary, within the dimensions of concrete music, and at that level of analysis, the forward and reverse fragments could very well form structures and contrasts, and their symmetry could be perceived.

The *Sphoradie* was at first judged unacceptable by its first listeners and defended only by the author. It must be said that everything in it shocked the ear. After an "exposition" of closed grooves cut out from full orchestral sound, in, as it were, violent snatches, you suddenly came upon a Franck-like string quartet that gradually turned back to front, then back to its true romanticism. After all, in a hundred years—if any trace of such things remains, and if ears have had the time to get used to them—who will make any distinction between sound played forward and sound played backward, which will be used as well? But it must be admitted

that the first experiments are testing. After a few fade-ins and fade-outs, of which the least that can be said is that they elicited the disapproval of both camps, ancient and modern, *Sphoradie* ended with an extension of the tessitura in both directions: extremely high violins, taken from a harmonic, vertiginously bestrode a bass ostinato, whether from a piano or a kettledrum could no longer be determined. The author had made that concession to the public, and his detractors concurred in finding the end of this *Sphoradie* sublime, and he willingly handed it over to them . . .

5

Stage effects or creation? Distortion or transformation? The stumbling block of concrete music. Splitting of the musical atom. Matter and Form? Wherein the order of magnitude dictates quality. Incompetence of musicians.

In short, audiences for *Suite* 14 fell into three groups. The first, after listening to the *Prelude* and *Courante,* had their minds put at rest. Claude Arrieu grumbled, "Writing isn't enough for you, you're composing! Go and play these two pieces at the Colonne concerts, they're as good as most . . . ," rather as one might say, "You used to sing? Well, now dance!" For the *Courante,* although as highly worked as split bamboo, was still bamboo. After the *Rigodon,* it all fell apart. It's all right applying concrete procedures to noise. But distorting music right to the limit presented musicians with such a caricature of their art that they were really angry, and they were not wrong. The second group of music lovers, who hadn't got much to learn from the *Prelude* and the *Courante,* acknowledged some experimental merit in the subsequent pieces but felt annoyed . . . We'd expected something from noises, but you're already turning tail, you're

going back to the musical and clumsily at that! As for the third group, I think I was it: it was the group of those of two minds. In the *Sphoradie,* between those dizzying chasms that separated two worlds, I was the only one, not to feel comfortable, but for the moment to chance several perilous leaps: my fade-in–fade-outs, somewhere between Franck and gut-wrenching inversions, seemed to me to point to the future.

Of course, I realized, too late to redeem that long month of endeavor, that I had been wrong to use an orchestra, to write a score in which every note remained indelible, every phrase imperishable, every form indestructible. It was clear now that if the musical was there at the outset, it would most likely still be there at the end, and, in effect, where I most expected to find a creative phenomenon I might find only stage effects. A machine can only work on what it has: the initial material informs the whole result. From the moment I fed notes and phrases, harmonies and melodies into its jaws, it gave back the words, the phrases, more or less well digested. It was the same language, but instead of the primitivism I had expected, I got distortion and decadence.

At that time I came very near to giving up the whole enterprise.

Where, indeed, could novelty and originality come from? I only gradually fully understood this.

My first step was to reject musical material, to acknowledge that my mistake had been in going back to musical instruments, musical notation, musical thought patterns. Going back to noise would in fact have been the surest way to find solid, and at least unexplored, ground.

But if, for example, I took a creaking door, an animal cry, a thunderclap, wouldn't I find myself faced yet again with the same difficulty? I had already experienced it with the railways: I needed to tear noise away from its dramatic context and, in the same way, musical sound from the prison of notes, of the words and phrases of musical language.

In other words, even if noise material guaranteed me a certain margin of originality compared to music, in both cases I was brought back to the same problem: tearing sound material away from any context, dramatic or musical, before giving it form. If I succeeded, there would be concrete music. If not, there would be nothing but stage and radio sound effects.

Now, the closed groove had given me the feeling that I was possessed of an undeniably powerful analytical tool. Despite its discontinuous character—reminiscent of early surrealist collages—the closed groove had freed from matter as difficult as the "pure coach" elements of montage, which, unquestionably, lent themselves to being constructed without any idea of imitation. But in *Suite* 14, with the exception of the *Courante,* I was abandoning the closed groove, running away from its discontinuous character, hoping to achieve the desired continuity once I had applied the procedures to more extensive pieces.

In doing so I was turning my back, if not on concrete music, then on its future potential. I needed a new resource for invention, as important as the one that had inspired me on the day I had cut off the attack from the bells.

This time invention took place not in experimentation but in my thoughts. It had nothing to do with manipulation, but with method. A very simple and very general schema easily demonstrates this.

Imagine, then, that we start with a "form" symbolically represented by a drawing. The coordinates of this curve are very vague: they can be time in abscissa and tessitura in ordinate. So it is a melodic diagram. But what follows is so general that it really applies to any form, that is to say, every development of one element varies in relation to another. It would be as valid in space as in time, if, instead of temporal functions, as could be the case in concrete music, we had spatial functions, as in a plastic application of this theory.

So then I imagine that I conduct a series of manipulations, distortions, transfers, etc. on this "form."

I will then obtain, from an initial form F (fig. 6), forms F_1, F_2, F_3, etc., which will nevertheless be reminiscent of form F. This, generally speaking, is what happened in the *Suite* 14 (second, third, and fourth movements).

If, instead of these "distortions," cuts *ab, cd, ef,* etc. are made in form F (fig. 7), and different arrangements and combinations are made with these cuts, we obtain forms S (fig. 8), which this time are perceptibly different from the initial form F. Generally speaking, the form as such is no longer recognizable. The matter, on the contrary, remains.

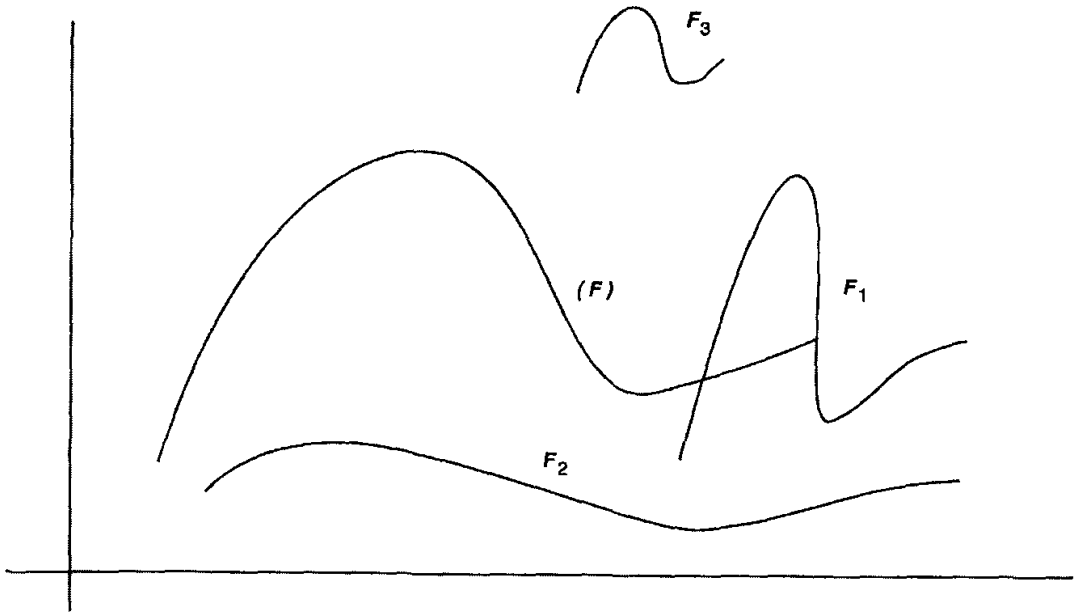


FIGURE 6. [Distortion of an initial form.]

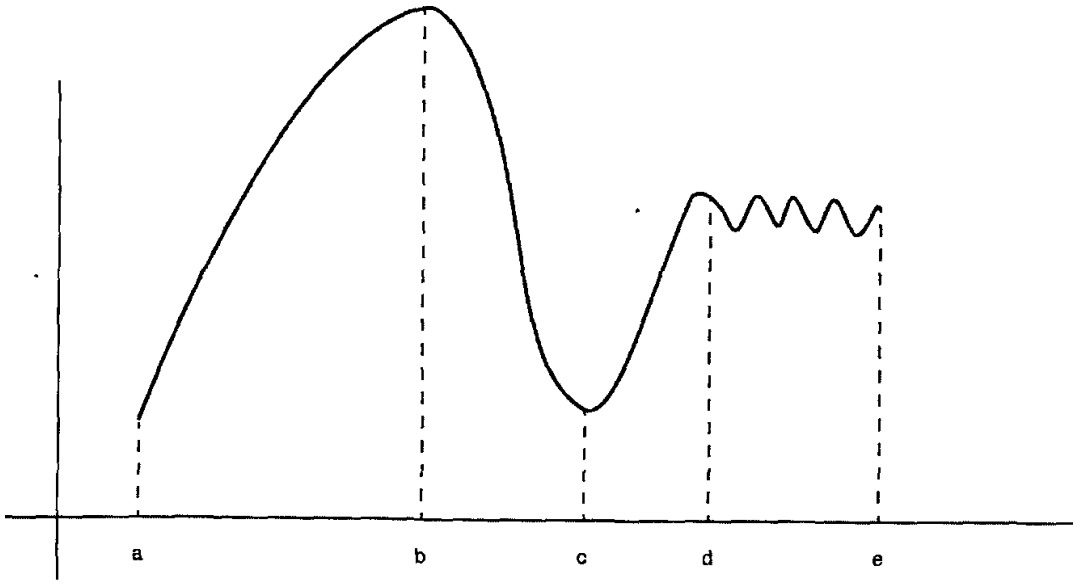


FIGURE 7. [Breakdown of a form into fragments.]

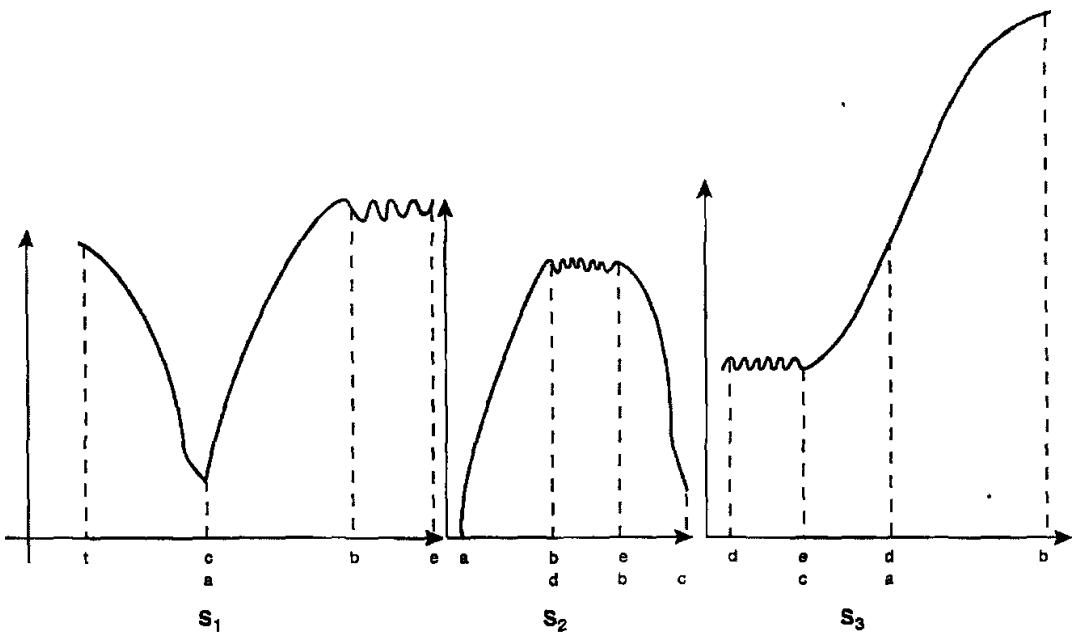


FIGURE 8. [Transformation of an initial form.]

Now let us improve on the procedure. The manipulations F1, F2, F3 were macroscopic. The process that leads to S1, S2, S3 . . . was the beginning of an analysis followed by synthesis, but on a coarse, intermediate level. If I take the analysis and synthesis on to a more refined, microscopic or infinitesimal, level, my arrangements and combinations will go beyond transformations, I will obtain transmutations. Beyond the form, I will have power over the matter itself. A closed groove belongs to this latter group. If my analysis is in the region of one-tenth of a second, this changes everything. Everything can become unrecognizable. It is at this level that the bell becomes a human voice, the voice a violin, and the violin a seabird. All that is needed is patience and, of course, mechanical resources capable of dealing with the enormous increase in the number of manipulations.

This is the stumbling block of concrete music.

The difficulty is that a short demonstration such as I have just given will easily convince a scientific mind. The prestigious power of the analytical process is the basis of all modern progress. Anyone who can distinguish between a function, its derivative, or its integral knows there is

a change of form and phenomenon. It is more difficult to persuade a musician of the interest, the extreme novelty, of this sort of process applied to music. Sometimes I thought it best to mock with the mockers. *L'Etude pathétique* or *aux casseroles* elicited smiles or gravity depending on the mood or the inclination of the listener. But for a musician, especially an orthodox one, what a boon! "To the saucepan!" immediately shouts the young critic, finding my explanations inadequate . . . "Even cut up into tenths of seconds, a pan will still be a pan." Wrong . . . an atom cut into pieces is no longer the same atom. It becomes another material, gives off unexpected energy. Everything, precisely, depends on the level of analysis.

Here the comparison with atomic phenomena is in fact useful. It demonstrates to both well- and insufficiently informed minds that division involves more than a change in size and results in a change in quality. If this is done in ordinary chemistry, the end result is always the same thing. If the analysis goes deeper, into atomic structure, the end result is, in effect, a "transmutation." Scientifically, our age knows enough to prove the irrational minds of alchemists right. Without taking the analogy too far, we could ask ourselves at what stage of division sound will demonstrate these qualitative phenomena. The answer is simple. As soon as around one-tenth of a second is reached, phenomena are too short to be perceived, either as sound matter or form. All analysis, followed by synthesis, which operates at this level of division, has therefore every chance of acting on both matter and form, and in so radical a way that every original element will be unrecognizable. There will be neither noise nor musical sound, neither drama nor symphony; there will be new materials for a new way of constructing sound.

I am constantly using the terms *matter* and *form*. It might well be asked exactly what they mean. In effect, the analogy with the plastic arts is striking enough, but this is more than an analogy; this time we need a precise definition that must satisfy both a scientific and an aesthetic mind. In effect, every sound phenomenon has a certain duration. In the course of this duration there are "things that develop" and things that mediate this development. Matter and form thus seem to be opposing concepts, two entities as different as stone and the geometry that sculpts

it. In the plastic arts space, the pure space of the geometry of forms is readily contrasted with matter, impure matter that has a grain, a color, a density, a hardness, and which one could go on describing endlessly. But, after all, what is this matter over and above the qualitative perceptions of our senses but more space, structural geometries, this time of the infinitely small? If, instead of our eyes we used a spectroscope or the schemata of atomic scientists, a brick, stone, plaster are yet more rhythmical spaces, arrangements of numbers, of orbits, in space. So, at least in theory, matter and form are not so different: space within space, these would be our structures of matter, except when the *order of magnitude* removes all common measure from the two spaces and gives them sensory—and therefore aesthetic—qualities, with no connection between them.

What makes the problems fairly clear in plastic materials is that the orders of magnitude are very great. There is a respectable number of zeros between the dimensions of an atom and those of a statue; something like Avogadro's number, that is, a number with twenty-three zeros, more than a billion cubed, and thus almost inconceivable. In music, on the contrary, the periodic phenomena that play the part of "matter" and that constitute the time within time that every sound form is made of are very near to durations, which we can directly perceive. You can hear a thirty-two-foot reed "beating"; musical sound is born from the moment we lose ourselves in counting the beats. So there is, in music, a curious common border between matter and form. Beat the air with a vibrating rod ten times a second and you have a rhythmic form. Double the frequency and you begin to have a sound, perceived not as a form but as matter. So instead of the abyss of Avogadro's twenty-three zeros, which, in plastic materials, separates form and matter, we have no abyss at all but contiguity, very dangerous for aesthetic disinformation.

How can we be surprised if, in music, problems of form have taken on the characteristics of a chemistry of matter and not a physics of forms? In effect, all music is mainly based on the postulate of resonances, on an architecture of frequencies, frequency being the dominant element, algebraic, almost separable from the phenomenon itself so much importance does it assume. So, abstracted, stripped of its sensory context,

music has always appeared to be without those plastic characteristics that today we must restore to it.

If, on the contrary, we once again begin to distinguish, in an interval of time of about one second, the phenomena that belong to that interval from those that are about one-tenth of a second, the concept of matter and form becomes clear. Below a tenth of a second—the "atomic" dimension of sound—there is no perception of form. Sound matter can in general be perfectly well defined from the content of a tenth of a second. A variety of periodic or pseudoperiodic phenomena that have taken place during this tenth of a second have every possibility of continuing to take place during the subsequent infinitesimal intervals. They are, in a way, predictable. Take, for example, the C above the A of the turning fork (440 hertz), i.e., 1,056 periods per second. In a tenth of a second there will be 105 of these periods, which is easily enough to identify the pitch of the sound. Moreover, the timbre will also be present. The strength of the note as well. The tenth of a second, therefore, contains the "matter" of the violin note. If the violin plays hemidemisemiquavers, there may be a lot of them in one second, but the matter will not change for all that: the sound will evolve from high to low, become less loud, and the timbre may change, but, in general, with continuity, so that we will have the impression that the matter has received a form, melodic, rhythmic, or of sound color.

In short, in music, matter and form are made of the same elements—frequency, intensity, duration—but these elements have the contradictory qualities of being permanent and of varying. Insofar as they are permanent, in a short space of time they constitute a matter: insofar as they evolve, in a space of time only ten times longer they give rise to forms. Every sound phenomenon, including music, definitely can and should be analyzed in this way.

To understand the extent to which we have learned to "abstract" music, we only have to compare the graphs of real sound and its musical representation. So where are the notes and the chords in the amazing tangle of oscillations? Give an oscillogram like this to a specialist to read and he will be very embarrassed. Listen to sound as a gramophone reads it, and a child will say, "It's a third, on the piano." But no one realizes how inadequate this—doubtless rapid and brilliant—response is. The child

has given two pieces of information: he has given a description of the frequency, which, after all, is also easy to find on the oscillogram. And he has *recognized* the piano. Take away the known instruments and play, not to children but to good musicians, sounds that are artificial, not identifiable through habit: what confusion, then, not only of impressions and reactions but of vocabulary! Without a system of reference for instruments, for the identification of frequencies and simple rhythms, the best musicians are incompetent. As soon as a sound phenomenon of the slightest complexity is presented to them, they have no resources to describe, analyze, or evaluate it. Hence the importance of a method that can at last give a way in to the entire sound phenomenon in all its generality. And only the concepts of matter and form can achieve this.

It goes without saying that this chapter is frankly trying to anticipate the moment of *Suite* 14. The failure of this work inclined me to look in this direction, but my ideas were still far from being clear enough, and I didn't have the mechanical means to apply my analysis rigorously enough. At least another year or two were to go by before method and machines made common cause in this respect. Meanwhile, what could I do except grope around in the dark and try to make up for the lack of means by the originality of my expedients?

The paradox is that, although concrete music was viable as a method, over the subsequent years, as far as realization was concerned, it was reduced to self-mimicry, to attempts that were on the fringes of its true method. But I needed to gain time, both for ideas to mature and for machines to be thought up, built, tried out.

6

Many called and few chosen: Symphonie pour un homme seul *(Symphony for a lone man). Pitfalls of Rhetoric. The Symphony in all its states. Human caving. Beginning of the score.* Prosopopée *(Prosopopoeia)* I *and* II. *The concert guide.*

Subsequent research therefore still had to make do with any means it could find. The future lay in two parallel developments: extending instrumental potential by constructing new equipment, and extending theoretical knowledge by studying fragments and their rules of composition. But first I had to secure the present, because it was difficult to stop an experiment like this one, even though we were expecting new technical means. The present, then, meant laboring with approximations. This was the fate of works in progress, particularly a *Symphonie* I was preparing, with a significant title: *Symphonie pour un homme seul.* It will be seen later that the title had nothing to do with the solitude in which Jacques Poullin and I found ourselves in the studio. But if the title could have a double meaning, that was fair enough. We were indeed very much alone. Looking forward to the future meant thinking up machines, making

them, trying them out. All of the musicians whom until then we had invited to join us had practically run away from a musical undertaking bristling with difficulties and defended by the barbed wire of technique. Composers, conductors, virtuosi had passed through the studio. We had also appealed to jazz musicians, trusting in their improvisatory abilities and their unconstrained sense of sound material. But jazz, even more than the classical orchestra, makes its music with nerves and muscles. The jazz musicians declined as well. Finally there appeared a young prize-winning composer from the Conservatoire with a respectable background (he had worked in the Messiaen class), who could start straightaway. A pianist but, most of all a virtuoso percussionist, he was predisposed to violence because of his frail appearance. An instinct for power, very characteristic of his generation, inclined him to maximum disruption, minimum melody and harmony. Invited for a trial session, Pierre Henry came into the Studio as so many others had done. This, as I had assumed ephemeral, passing presence was not to leave it again. The *Symphonie pour un homme seul* began with the friendship of two isolated people.

Of course the *Symphonie* was presented as a reaction to *Suite* 14. As the orchestra had played such a mean trick on me, I decided to choose my initial elements from a field opposed to music, the field of noises. I would use no mechanical noises with sharp peaks, cyclical time, and clear timbre but instead noises devoid of any formal element. I concentrated on the organic and the living. The lone man had to find his symphony within himself, not by simply thinking up music in the abstract but by being his own instrument. A lone man possesses much more than the twelve notes of the trained voice. He shouts, he whistles, he walks, he punches, he laughs, he groans. His heart beats, his breathing accelerates, he pronounces words, calls out, and others call in reply. Nothing echoes a lone cry more than the hubbub of the crowd.

Severely limited by musical expression, weary of seeking from machines help that they were powerless to give, I turned to radiophonic expression. My correspondents had anticipated this step, and I conceived the *Symphonie* without remembering that one of my first listeners had had the same idea (I realized this when going through some old letters for this

little book). The inclination that leads the mind to use such resources is therefore natural.

Without some experience of concrete music I should probably have composed the *Symphonie* as a sort of poetry or radiophonic drama. The extent of the orchestration of noises would not have been enough to bring this work into the domain of musical expression. In reality, I was very divided between the two forms, as can be seen from the notes in which I outlined my project at the time. Escaping into the domain of poetry involved turning, explicitly or implicitly, to the text. Drama, even without a text, involved suggestion.

SYMPHONIE POUR UN HOMME SEUL: Plan

Title (spoken), then (spoken), Exordium!

The man gets up and yawns, like this: *Yawn.*

So, he shows his gums and you can see that he has hardly any canines left. Otherwise his yawn would be like a wild animal's, like that: *Yawn with special effects.* But this is not so different from that. It could be that they are one and the same thing.

The man, once up, begins to walk like this: *Steps.* These are the steps of a lone man. But the steps of a crowd are made of as many steps, thus: *Many steps.*

Lastly, the man is breathing and his heart beats; he is so used to it that he doesn't hear the noise it makes: *Noise (breath and heart).* It is no different from the noise of a forge or a machine: *Amplified noise.* Wild animal, crowd and thing, that is what a man is, if you listen to his chest, and this is what no one dare reveal, or let anyone hear, because it's frightening. This exploration is in darkness. You go down with winching gear, the listening device on the end of a line, a line to explore man: the man of his own caves. It may not be beautiful, it doesn't seem true when it's magnified ten times, a hundred times, but it can be instructive (strings break: it's the highest strings of the violin that break. We had deliberately overstretched them to make this happen.) Because we want to play the game: no instruments, nothing but man. Man is an instrument that is too seldom played.

And we're not dealing with words either, blow them! A man-music. A man sings, yep, he shouts, that's better: *(shout);* he whistles, he blows into his palms, like this: *(whoo).* He stamps, beats his chest, may even beat his head against the walls.

This is what man has a right to do, what is given to him for today, to express himself if he can.

Machines will do the rest.

Oh! yes, if he picks a blade of grass on his way he has the right to use it, like this: *(grass).*

Let's begin! First we have to put across how lone the man is, and how much he is made to walk. *(Sequence of steps.)* (At the end, section, halt, attention, stand at ease, pause.)

(Spoken) Symphony for a lone man, second item. Exordium!

As for what is specific to man, here it is: *Sequence of laughter.* (In an undertone) minim rest.

(Spoken) Third part: Exordium! Stop sniggering, Man of little faith, stop pitting your voice against mountains, learn the solitary ways. A shell against your ear will make your blood sing to the rhythm of the sea. This is because there are two universes, similar in every way, separated only by the surface of your skin; and your vacillating senses scarcely make you aware of it. *Symphonic sequence* (finishing on the word *absolute*).

Fourth part, Exordium!

How did it all start? Nothing very nice in a man's snoring. The noise of a sleeper is also the sound of a dying man. In truth there is no difference between a snore and a death rattle; has anyone pointed this out? I have. So, let's say he was sleeping like a child. God approaches. Now God, it will be remembered, created me with his breath. It is from that particular sound that I hear God. But why is He waking me up? I was sleeping like an angel. Ouch! *(amplified cry)* Good God, you're hurting me!

I had hardly got over my surprise when already . . . But yes, the wound had been closed up as at Lourdes; nothing but a little chloroform discomfort, and something other had been born of me. *(Doubling of the voice.)*

I didn't know how alone I was, and it is not good that man should be alone, God had said (repeat an octave lower). Let us give him a companion like unto himself. Oof, like! . . . Why not different, to make a bit of a change? Still me, me again. Disappointment of love. I love you, I love myself, I love only you, you of me, me of you, oh! oh! (voices).

Erotic sequence. And then, how alone one is together (two similar voices).

Pause.

Fifth part: Exordium!

And man is also made to fight.

Conflict sequence. And man is made to fight (murmur in canon form, which ends with . . . And finally dies away).

Funeral sequence (interrupted by a burst of laughter, voices played backward).

Here ends the *Symphonie pour un homme seul,* made of the noises man can make, with the help of nothing, nothing in his hands, nothing in his

pockets, even as we shall be at our final ending, which we shall indeed have to play alone, with no help from any equipment, and without even a microphone. Amen.

The first draft has no commentary. It may be a good radio drama. Poetico-dramatico-musical. It simply needs a broadcaster.

SYMPHONIE POUR UN HOMME SEUL: Second plan

Amboise–Paris train, X-20-51. In the fog of a headache, ideas for the *Symphonie.*

Not to go back to yesterday's dithyrambic tone; make it into something very tightly constructed, organic, fleshy. Begin with a cry?

Proportion of the commentary. Is it possible to have a commentary and still keep the surprise effect of some words like: "absolutely"?

Limit self to such a short commentary that it announces without explaining, and that it goes straight into the poem, then into the sound matter.

E.g.: After a difficult life (laughter).

Nevertheless there is love (or: there was love),

or I fall into sleep as into an egg,

or follow the guide, I'll show you round everything. Here, the aorta, the ladder goes down into the left ventricle (noises above). I go down the internal staircase with my basket of words, I stumble, they spill out everywhere, bounce about (I can only find a few of them), they were so well arranged (shower of words coming back).

There are some words, which if you dared to say them would terrify you. The word *fear,* for example. Play with words, do you know how to do that? *Jouez?* (Play?) *Prêt?* (Ready?) The first words must go, clear off into the general fuzz; waves of echoes, and, without a moment's rest,

Tour of the brains. Memory scrolls (In fast motion).

Last words (Voice played backwards).

Semisolitude (going upstairs, voices on the other side of the door, going back down, or else, solitude alone, solitude with someone else (the couple). Light and shadow. Solitude in the crowd. Inventory. Mortal solitude. Human words (the word basket). Reckoning. The Word (juggle with words).

Finally, I see:

I. Fugue (marches, hummed themes, staircase, sound of voices, crowd),

II. Nocturne (forest, whistling),

III. Stocktaking sales (heart, lung, memory, words: I'm serious),

IV. What is specific to man (laughter etc . . .),

V. The Word or word-play.

Could the fugue finish with man and woman? (*Verbum caro factum est—and the Word was made flesh.*)

In III, follow the panting or asthmatic voice, or grammar mistakes or shout like a deaf person, in short the inflexions of sincerity.

Accelerate or slow down. The voice disappears into its boots. (Ask the technician about the problems of modulating a noise with the voice, pebble-filter.)

First, try things out. Avoid systematic development and aim for harmony and rhythm.

The two projects were no more than two scarcely differing attempts. When the poet gets involved in music, even if it's a three-year sentence (without reprieve), he should make himself a prisoner. I did not succumb to escaping. Clutching at the bars of my cell, I remained, and, like an ascetic, I rid my project of all poetry, all scenario. This made it very much more difficult to unite inspiration and execution. Once again, I was on the verge of giving everything up, as on the day of the whirligigs and the birdcalls. The project on paper had to be slimmed down, the words disappear, become signals, symbols, and music. So no more scenario, a sort of divergent itinerary where even the intention will no longer be discerned.

SYMPHONIE POUR UN HOMME SEUL: Definitive version

I. March;

II. Quartet (accordion, guitar, violin, trumpet);

III. Percussion (recomposition of I.—prepared piano responses);

IV. Vocal (elaborated hummed and articulated elements; outline of a theme);

V. Percussion (live, as an echo);

VI. Perpetuum (violin and prepared piano, violin perpetually going up to the highest register, piano percussion gradually descending until a violin string breaks in the highest register);

VII. Shouts (development of IV, with counterpoint of prepared piano and trumpet);

VIII. Percussion (straight, John Cage style, short and dramatic);

IX. "And the earth was without form and void . . ."
in a voice played backward, followed by expanding circular progressions moving toward the very violent, and interrupted by short rhythmic spasms that are swallowed up and yield at the reprise.

X. Quartet, as at II, perhaps double.

XI. Ostinato (backward) "I think, therefore I am," counterpoint of words taken from the dictionary of rhymes with key words: organ, heart, memory . . .

XII. Duet, man's voice seeking woman's voice, light percussion accompaniment, erotic sequence, and Tahitian record,

XIII. Drum roll,

XIV. Chorale.

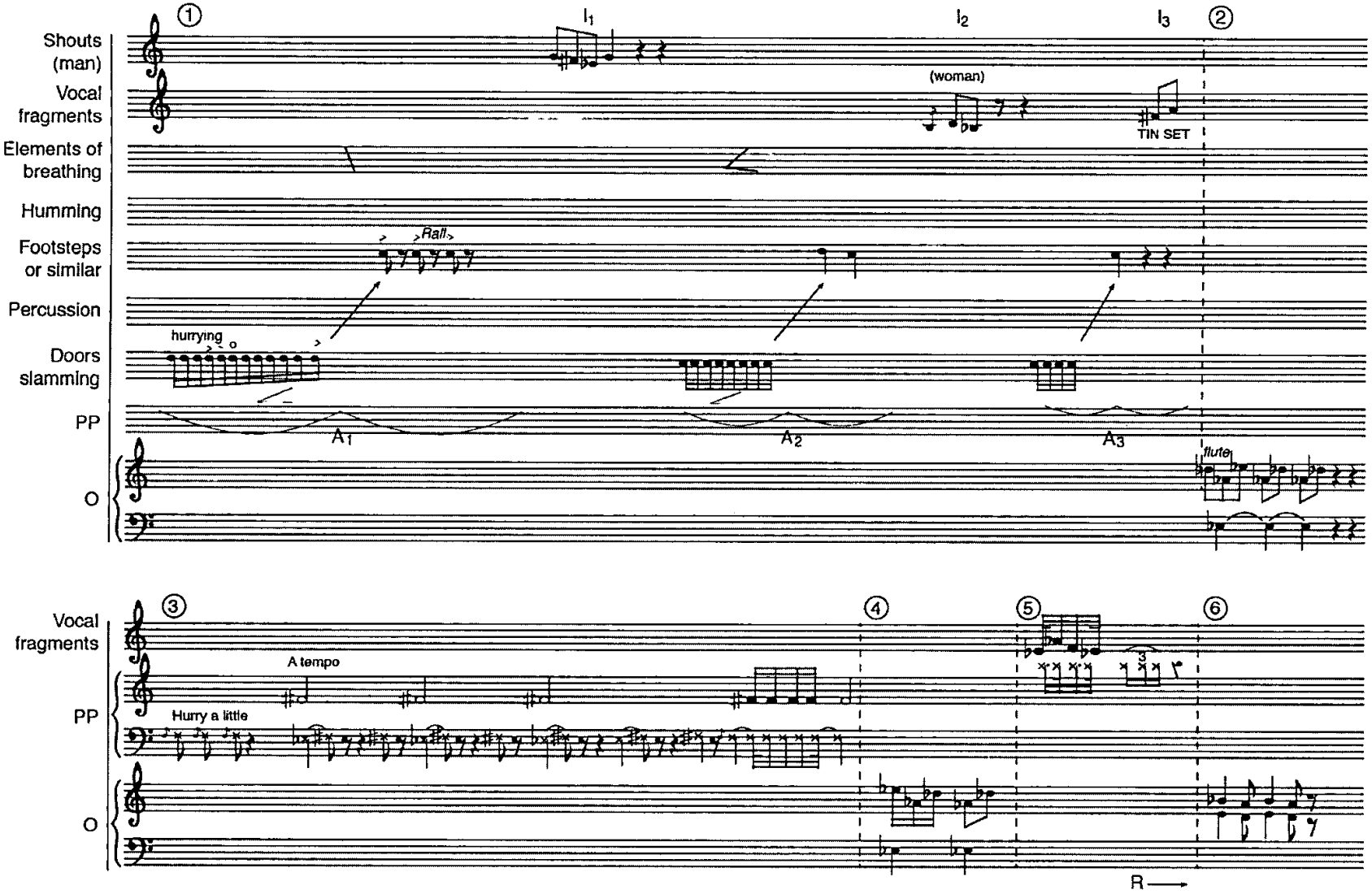
These sequences, one of them boldly entitled "March," were not to be realized in that form. But they were the beginning of a solution. The first being the most difficult, I had not been wrong to tackle the first sequence in the spirit of "seeing what happens," in order to have experimentally an idea of the parameters of a sound universe that would be that of the *Symphonie*. I was forced to treat sound matter in its macroscopic state, because all I had was six simple turntables, quite inadequate for an in-depth analysis of sound in concrete music. Rather than overexploit the "closed groove" effect (which nonetheless I was to use a great deal), I was inclined to work on long fragments, tracks each lasting several seconds, which did not have sound matter in a very divided state. I was looking for certain acceptable relationships between these soundtracks. Having adopted this technique, I still had to discover the principle that would govern the way the developments were constructed, unless they were completely arbitrary. Given that the *Symphonie* was to be composed from the fourteen sequences of plan no. 3, I still had to find the angle that would interlink the different soundtracks that I was going to assemble. Had I already learned the explicit lessons from *Suite* 14? Not yet, perhaps. But instinctively I did the opposite. The *Gavotte* had failed because a single musical phrase was transformed in different ways, and the meaning of this identical phrase masked the variety of the matter. So I needed to get rid of the musical phrase, that succession of words or meanings, and replace it with a series of sound objects, with no explicit meaning or

plastic value. This initial series could certainly constitute a phrase, a theme, provided it did not produce variations but varieties from it. So the *Symphonie* began with a series that I considered particularly important and that I acknowledged to be absolutely arbitrary, but it was highly probable that this initial series, once given, would influence both the development of the first piece and the makeup of those that followed.

Thus, right from the first seconds, the listener was obliged to take on board a sound universe determined by certain data: sound objects were considered for themselves without the necessity of identifying them in relation to an instrument or a meaning. Although some elements were consistently vocal, others were taken from the gestures of a walker and their sound context (footsteps, tapping noises, whistling and breath). Finally, as far as the musical accompaniment as such was concerned, he found himself in the presence of altered elements that made keyboard notes into a knock on the door, using a number of effects from the prepared piano. The so-called "Cage" element—from the name of John Cage whom I had met a few weeks earlier—was a simple beating in octaves, in an interesting rhythm, on two or three prepared piano strings, not unlike four knocks on a door. The "Cage" element was itself transformed by concrete procedures until it moved toward noises that John Cage himself would not have suspected. These noises covered almost the entire range between the noise of a door and a piano keyboard. They went from the most to the least musical. If there was an orchestra, it was stretched out between the piano, an undeniably musical element, and the footsteps of a lone man, which, although they were in semiquaver rhythms on a prepared score, remained dramatic.

Assuming that the kettledrums in the Vth Symphony had served as a model, I obtained an instrumental gradation that could be notated thus:

	interior to man:	*exterior to man:*
	Elements of breathing	Footsteps or equivalent
FROM NOISE	Fragments of voices	Knocking on the door
TO MUSICAL	Cries	Percussion
SOUND	Humming	Prepared piano
	Whistled tunes	Orchestral instruments.


Shouts (man)
Vocal fragments
Elements of breathing
Humming
Footsteps or similar
Percussion
Doors slamming
PP
O
①
I1
I2
I3
②
(woman)
TIN SET
Rall
hurrying
A1
A2
A3
flute
Vocal fragments
PP
O
③
④
⑤
⑥
A tempo
Hurry a little
R

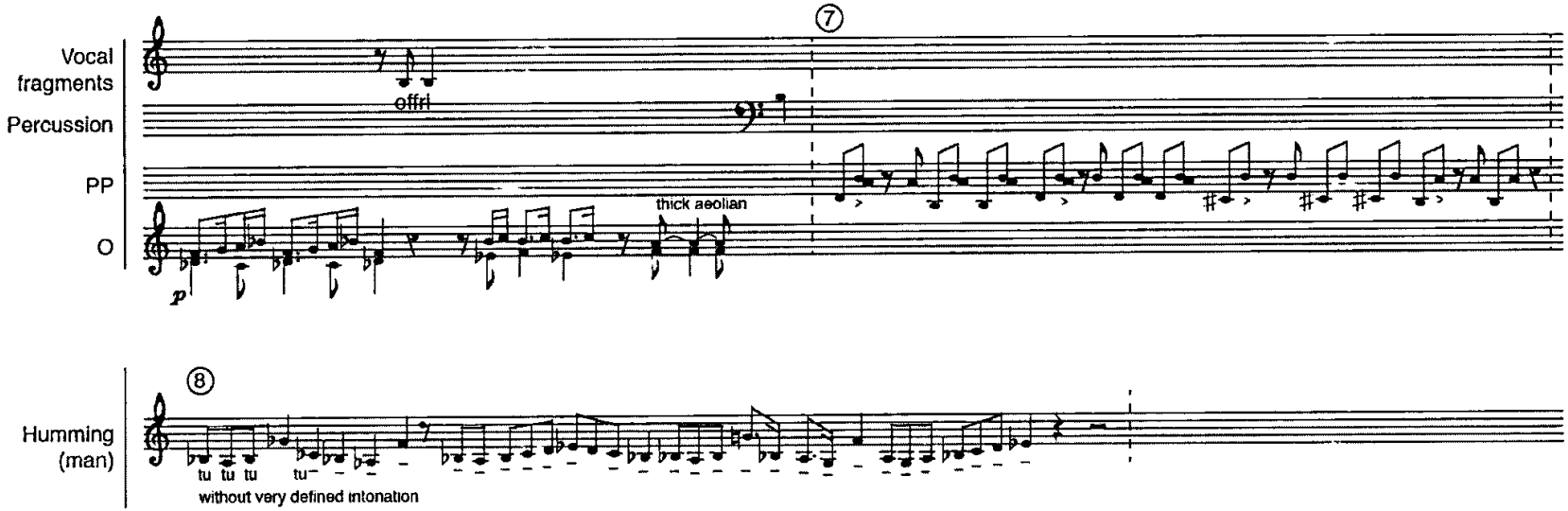


FIGURE 9. Analysis of the first sequence of *Prosopopée I (Symphonie pour un homme seul).*

1 Triple rhythmic introduction (recalling the three introductory blows of the wooden staff in the theater) A^1, A^2, A^3, interspersed with incidental vocal fragments I^1, I^2, I^3.
2 Orchestral fragment with a flute predominating.
3 "Cage" theme on the prepared piano.
4 Repeat of 2
5 Variation of I (aeolian).
6 Reprise and variations of 2 ending with a loud "thick aeolian."
7 "Syncopated theme" on the prepared piano.
8 Entry of a man's voice humming.

What dominated was the marching theme, the title of the first sequence, and waiting. Then came the idea of an outside as opposed to an inside, in physical space as much as in the psychic climate. So that listeners with dramatic inclinations could simply look for a scenario, a sort of puzzle, while those who preferred music had time enough to enjoy a concrete score that for the first time was fairly rigorous and where the live elements were employed like voices accompanying an orchestra. The balance between these elements had to be very subtle, for I only had to cut off a few bars of footsteps, for example, for the whole sequence to go from the dramatic to the rhythmic. So the first piece was unbaptized, and the title *Prosopopée* replaced *March.* This is the dictionary definition of "Prosopopée": "Rhetorical device in which inanimate objects are presented as alive." It was still a provisional title, a halfway house, as was the work. Besides, how can a work, if it is authentic, be described in words? This is the absurdity of all musical analysis. But custom requires that enlightened listening should have some reading matter on the program. It was not difficult to provide something, rather like a prospectus, for the *Symphonie* at its various performances, in concert or on the radio:

> The *Symphonie pour un homme seul* comprises, rather than the four or five traditional movements, about ten pieces—or "sequences"—that are connected to each other in a clearly perceptible manner, like the links of a chain, symmetrical or asymmetrical, contrasting or blending, depending on their matter or form.
>
> The first four are respectively: *Prosopopée I, Partita, Valse, Prosopopée II.*
>
> *Prosopopée I* establishes the setting for the whole work.
>
> *Prosopopée II,* and, between the two prosopopoeias, a transitional *Partita,* then a waltz, open the gates upon a universe swarming with human life, with the waltz of voices, deliberately scrambled, for the rhythm of voices, their pure presence, is enough for their music. These are followed by:
>
> *Collectif* (Collective), *Erotica, Scherzo, Cadence.*
>
> The domain of voices glimpsed in the *Valse* develops: Murmuring, mysterious voices in the *Collectif.* The suggestion of a single burst of laughter in *Erotica,* and, in the *Scherzo,* the commotion of high-pitched voices.
>
> Finally, after the *Scherzo,* where the prepared piano responds to voices that seem to come from playtime at a village school, the *Cadence* repeats the most important rhythmic theme in the work.
>
> The Symphony ends with: *Eroïca, Apostrophe* (Utterance), *Strette* (Stretto).

Contrasting with the previous sequence, *Erotica, Eroïca* again has as its central motif a human noise, this time whispering as opposed to laughter, man as opposed to woman.

The *Apostrophe* seems to want to introduce an element of intelligibility into this now more tragic atmosphere.

The voices, until now scrambled, desire to escape from indistinctness and pronounce a word at last. An important word, which had initially been emphasized like a dominant in the first version of the work. But now, in the definitive version, a word henceforth pronounced rapidly and in an undertone, for anything explicit seems to be forbidden in a work of this type.

Finally, the *Strette* owes its name to the fact that it begins with a short reprise of the main elements heard previously. It develops rapidly and makes room for completely new elements that eventually attract the attention, which until then had been unfocused. These elements, mostly cyclical, intermingle, and in a series of approximations finally achieve pure stridency, crowning the whole work with its final chord.

So, the need for explanation placed the accent on the dramatic elements of the *Symphonie.* If concrete music had been part of a musical tradition, people could have written, still in the same style: "The exposition of the theme in the string section is repeated by the tutti of woodwinds. Then the first theme ends rapidly while a second theme is reprised by the horns. A rapid sforzando then interrupts the development."

The words *theme, development,* apart from suggesting a disarming facility of tempo, give this musical literature advantages that concrete music is very far from possessing.

Of course, in the *Symphonie* there was no question of exposition of theme in strings and reprise by woodwinds because there were no strings and above all no theme. It was already glorious to have Pierre Henry's prepared piano respond to vocal patterns bursting out of this mass where, for the first time, there were formal relationships. The twittering of voices interpreted in the program as the evocation of a school playground was only incidentally that school playground. They were fragments in a certain rhythm, evolving within certain limits of the tessitura, not at all like pure sounds, but like more or less bulky bursts of sound. The piano, which itself varied between normal sound and weird

percussions, could be imposed on the voices in harmony or counterpoint. So, from time to time, the *Symphonie* returned to the rules of music. As for the—only glimpsed—laws of concrete music, they were sometimes applied: the objects of the initial series were perfectly recognizable in their astonishing variety, and widely differing groupings of them with identifiable relationships could be found. So, for example, the *Cadence* isolated the "Cage" element and made it into an autodevelopment without needing any aid. *Prosopopée II* took up the themes of *Prosopopée I*, with variations. The *Scherzo* and the *Collectif* used voices in two different ways, one in the upper register, the other in the lower. Certainly, some motifs were recapitulated, forming bridges between *Strette* and *Eroïca*. Some pieces, such as *Erotica* and *Valse*, constituted independent parentheses and abruptly introduced a little element of originality, for a moment imposing their individual domains. The overall climate, restated in *Apostrophe*, was revealed in one word, one only, as naked as the man himself, a word spelled out slowly, laboriously. . . . And perhaps no word was needed at all, not even this perfectly enclosed word: *absolument*. This choice had probably been determined by the memory of a conversation I had with Claudel: "French has no inbuilt stress." Claudel sniggered: "No stress? It has as much as you want. You can say ábsolument, or absólument or even absolumÈNT . . ." This word, for ten years, went through and through my mind, claiming its three stresses and their triple degree of freedom. Doubtless this was one of youth's last errors, an influence from which the *Symphonie* would finally set me free. As for the *Strette*, it was an apotheosis of noises in the highest register, extraordinary noises, worthy of Rimbaud and the "Sonnet des Voyelles" (Sonnet on Vowels). Pierre Henry, who went valiantly from the studio to the recording booth, was making his debut in concrete music with a burst of sound so remarkable that I immediately chose it to round off the *Symphonie* and invalidate its pessimistic title. Overcurious listeners asked: "Where did you drag up that extraordinary noise like a sawmill?" They would have been very surprised by the revelation that Pierre Henry had extracted it, with a grimace of pleasure, from the delicate E string of a violin.

7

Our actions follow us. Red labels. Important indications. Should we envy men of other ages? Fissures of randomness. Congratulations and red tape. Future plans. A classical epilogue. A Greek philosopher beside a concrete sea.

A new international conference, this time in Italy, was to keep me from the studio again, and for a fairly long time. On my previous absences, I had put the key under the door cheerfully, without thinking about my return. But the situation had changed. Our actions—and all the more if they are concrete actions—follow us. My research had become firmly established, and I was no longer alone.

Pierre Henry had abandoned his kettledrums and was giving all his time to the studio. Within a few months he had acquired skills in manipulation that amazed even sound engineers. His wife, who came at first out of curiosity, then as a voluntary assistant, was soon changed into the mistress of the house. It was none too soon. The proliferation of objects required cupboards, tidying, filing. Michèle Henry took charge of the cupboards with authority, energy, and kindliness. Within a few months

the ancient boxes where I stacked the records from number 2002 to 5997 had given way to filing cabinets where green, red, blue, and yellow labels executed an initial classification. The system of colored labels had been made fashionable by Maurice Le Roux. In other words, we were beginning to set up shop and I had to go away again. How could we consolidate our position during my absence?

There was, of course, radio. Paris-Inter had broadcast the *Suite* 14 in 1949 without any noteworthy reactions. What is more, concrete music was not intended only for radio. As this was a musical experiment, we had to play the game to the bitter end, stop broadcasting, and risk the adventure of a concert hall performance. It seemed difficult to carry out this plan before I left for Italy. Two invitations anticipated our wishes. One came from the Triptyque, suggesting the hall in the Ecole Normale de Musique for a first concert on March 18; the other was from the Sorbonne Groupe de Philosophie, offering the Richelieu amphitheater for a conference. Raymond Bayer was to introduce us at the Sorbonne, and Serge Moreux at the Triptyque. On the invitation was a quotation, a little text by Serge Moreux, much too complimentary for my taste and which—with his permission—I have soft-pedaled a bit: "There are important moments in the birth of the arts: taking part in them is not always pleasant. The first real concert of concrete music is one of these moments. Listening to Pierre Schaeffer's musical scores has nothing to do with musical civility, puerile and honest. It is somewhat like discovering a sound continent as virgin as Robinson Crusoe's island. However arduous, these sorts of expeditions afford some pleasure . . . of the unforeseen at the very least." The program was in two parts: the "classical repertoire" and the first performance of the *Symphonie pour un homme seul,* in a—too-long—version with twenty-two sequences lasting forty-five minutes. Serge Moreux gave a speech, the gist of which was

> The material of concrete music is sound in its native state as provided by nature, fixed by machines, transformed by their manipulations.
>
> Between these fragments and those derived from them, there are no affective or acoustic relationships other than those that preside in the scattered and glittering physical universe.
>
> The space filled by concrete music is the space ruled over by the machine and what lies beyond it, that world of vibrations, colors, and vol-

umes unknown to our musicians' ears, still in thrall to all the mechanisms of music.

It is amazing that a man should wish to build works of the mind with these. Despite the many imperfections of their initial construction, they stand out with their own logic, their psyche at the limits of our own, their dialectic of the fortuitous.

There was a Middle Ages of stone: they carved it. There is a Middle Ages of sound waves: we capture them. The artist need not choose any other avant-garde. Between the byzantine interplay of syntaxes and the return to forgotten or dried-up sources, the modern musician can, in Pierre Schaeffer's words, try to find a breach in the wall of music that surrounds us like a fortress.

I was, myself, fairly ill at ease. I went over to a sort of desk in the front row of the stalls, which had on it the potentiometers of a mixer that controlled the sound in the concert hall. Jacques Poullin had installed the turntables on the stage between two loudspeakers. Thus we occupied, fairly recklessly, the magic circle where the usual sight is strings vibrating, bows susurrating, reeds palpitating under the inspired baton of the conductor. The audience had to be content with an infinitely more disappointing sight: turntables and potentiometers, cables and loudspeakers. Such were the objects we were obliged to display.

Jacques Poullin, who was busy "synchronizing" the records, was relatively relaxed. I, on the other hand, was troubled by contradictory feelings. Was I in charge or wasn't I? Should the loudspeaker volume be adjusted once and for all, or, following a vague intuition, should some sort of presence respond to the audience's presence, not leave it alone in front of the turntable, add a level of performance, however minimal, to the automatically produced recording? It was only after the event that I took stock of my legitimate boldness. I had indeed to be there, and, to however small an extent, (apparently), interpret. But I also had to put any regret behind me, not feel like a disillusioned conductor, and carry it off before a somewhat dazed audience, with no other means of expression than imperceptible hand movements that added to or reduced the general sound level by a few *decibels*.

I had revealed my difficulties in some paragraphs in the program. These indicated my anxiety. This concert had been too hastily prepared, I knew. It was, however, necessary not so much to show concrete music

in performance as to direct future research. It was an experiment, and I accepted its results, positive or negative, in advance. But I couldn't get rid of some unease: insolence, usurpation. What harm was I doing to that respectable place in the first violins that my father had occupied for thirty years?

> Should we envy men from other ages, their laborious slowness, their complicity with time? Or should we glory in what we can do, engraving time on a piece of wax that holds all the sounds in the world but that the world hardly gives us time to examine, which we explore with the speed of Vandals and which we rush to display, not without secret shame, but with the apostolic fervor of the discoverer of continents?
>
> If atomic rhythm had not yet invaded the planet, if the works of modern humanity could be developed and pursued slowly and secretly in some Cartesian retreat, then indeed it would not have been necessary to perform this "concrete music" immediately, while scarcely out of limbo, full of technical imperfections and aesthetic uncertainties. But for us XXth-century men, our reflections are explosive, our laboratories are in the marketplace, our arts are machine-made, but this should be no cause for scandal. Who dares to throw the powerful tool aside because it is too new?

There followed a paragraph on rendering to Caesar that which was Caesar's:

Contemporary Industries need to offer fissures of randomness for the poetic adventure to slip through. There are not many of them. French Broadcasting occasionally lends itself to such breaking and entering. It is certainly the only one in the world. Thank God for it.

And it was very true that there were indeed not two radio stations in the world where the adventure of concrete music could have been born. I had traveled enough to know this.

The manifesto continued with an appeal:

> We have taken up the tool that technology gave us, we have not balked at the task, and the result, after all, is not entirely our work. The child of gods and men, of will and chance, it is a found and not entirely willed object that we are displaying to find out if it can be of use.
>
> The musician-engineer, once he has managed to extract something from the humming of machines, also has a right to be relieved of duty.

> Let the ingenious musician take over. Not, of course, one who wants a prefabricated object. But one who would enjoy the material and that unexpected way of playing a multiple instrument, and who would give up his manuscript paper for the ever-changing hues of discs. Let someone like this come to the rescue if he wishes.

Despite the somewhat Gionesque lyricism of this passage, the appeal was to be for the moment in vain. As for the public, they were put on their guard with good reason:

> And let the public not be too hasty in judgment, either for or against. First, they must listen again. Once is not enough. For us it is not so much a matter of expressing ourselves in front of an audience as of persuading them to consider the object. It is perhaps the object that has something to say to us.

This statement, which I always think is one of the most important, fell, like everything else, on astonished, but well-meaning, ears.

As for the press, it showed some sympathy for our endeavor. So Roger Richard wrote in *Combat* (July 19, 1950):

> The performances already given at the Club d'Essai, or, last March, at the Ecole Normale de Musique, have proved that an audience, without being specially prepared or informed, coped very well with the shock of this unprecedented music . . . Concrete music is ready to come out of the laboratory. It is time for musicians to bring it out . . . The fact that musicians and musicologists such as Roland-Manuel, Olivier Messiaen, and Serge Moreux are showing interest gives us hope that this will be the case.

Serge Moreux, who had supported us with so much understanding, called the first true concert of concrete music a "historic event," and in the *France-Asie* review, in June 1950, René de Obaldia, who saw me as the devil incarnate, nevertheless added:

> We must, however, mention here the extraordinary degree of pathos and tragedy that these first attempts involve us in. And with good reason. We are placed before the reproduction of that mechanical universe that has become our own, and that every day dominates us more. Pitiless testimony. The drama of our time is engraved on wax without honey.

And Clarendon, in *Figaro*, August 4, 1950:

> Faced with the first experiments in concrete music, I would like to explain to readers who have asked me what it is all about and straightaway give my personal feelings about what I have just read and heard. The idea of a "concrete music" must have arisen from a pessimistic observation. The language of music is evolving rapidly and equally rapidly wearing out. We must constantly find new forms of expression, which, incidentally, is less difficult than discovering a completely new way of thinking . . . More seriously, let us say that we are, if not at the beginning of a true art, at least at the birth of a procedure whose future and whose applications it is still impossible to foresee.

In general, these different reactions echoed our own uncertainties. One of our critics castigated us with the Chinese proverb: "Whatever makes a noise does no good and whatever does good makes no noise." But the Chinese, as well, make music . . . One thing, however, was certain. Concrete music existed. But to us it seemed premature to make value judgments about it. Pure experimentation is morally neutral, and it is only through the ways they are used that discoveries enter into the world of values. Whatever the case, after the first concert we should have preferred a real battle, one of those polemics that consolidate discoveries. It is a strange time, and Paris a strange country, where everything possible is conceivable, where even scandal is immediately cross-faded onto an understanding smile, and scornful or amused irony.

At the same time, some friends, including Maurice Le Roux, took some of our records abroad with them and played them at international gatherings, such as the one at Salzburg.

Independently of any fundamental debate on the principle of concrete music itself, the concert at the Ecole Normale de Musique demonstrated to us that no disservice was done to concrete music by recording it on records or tape. But performing it in a concert hall presented several problems.

The first was purely technical. It was to ensure the best sound projection, by accommodating our equipment to the acoustics and size of the hall, by installing our loudspeakers in the best places, and above all by achieving a three-dimensional projection. We knew that by carrying out

more experiments we should eventually be able to work out valuable rules for the future, but for the moment we were only at the first attempt at a public concert, and this was not without trial and error, and great anxiety.

A second problem was human interaction with the machines. We had to give a little flick of the thumb to the potentiometers and create some interpretative space, however small, to facilitate contact with the public. What if the conductor, apart from the dynamics, were in charge of the three-dimensionality, if his gestures sketched out in space the trajectory that the sounds would make in the hall? Would not this, for the public, be the new performance mode, in which sound objects, although prefabricated, would appear dynamic and alive, once more part of the visible art of a performer?

And so new problems were added to the various problems we had already identified, such as the problems of the theory of concrete music and of instrumentation, with the result that the talk given some days previously at the Sorbonne was already out of date, and the field of our research extended.

Some days before I left, I was given an invitation by a mathematician friend who had been won over by the concert at the Ecole Normale. How could we help others to share what he had experienced? A rather skeptical philosopher was there too. After the analyst's speculations, the philosopher, a specialist in Greek philosophy and himself a Greek, asked if concrete music could rightly be called music . . . I explained my scruples to him myself. Classical music, it appears, abstracts forms from all matter. Concrete music, on the contrary, turns its back on these pure forms and, while it revitalizes matter, it also presents itself as a sort of huge deterioration. Greek philosophy was against me. For the Greek philosophers, everything deteriorates once it leaves the idea. For them, the tragedy of the world is to wrest the world from chaos. Saving the world means giving form, creating the existent snatched from nothingness. Hence this definition of music: "That which is wrested from time, yet made of time, but giving form to time." For example, said the philosopher, if, as has happened unforgettably to me, I listen to the sound of waves while sitting deep within a cave, is that music? I reply, yes, just about. Even if there is no musical work on the part of the object, is there not musical

work by the subject in the very fact of extracting this sound element from its chaotic context, hence of drawing from it, subjectively, a form? It's yet another way, said the analyst, of rescuing time, and therefore of creating music . . . I expand on the subject: the concrete experiment in music consists in constructing sound objects, no longer from the interplay of numbers and metronomically marked seconds, but with pieces of time wrested from the cosmos. If, in the example of the cave, music just about exists, it is because, through an act of pure will, the subject takes the sound of the waves from external chaos into conscious order. So, for there to be music, all that is needed is that a relationship be established between subject and object, and the initial act in music is willed hearing, i.e., selecting from the chaotic hubbub of sounds a sound fragment that one has decided to consider. Here the memory acts as a closed groove: it retains, it records, it repeats. This fragment must be considered for all it contains: matter and form. It can be repeated, imitated, combined with others. Hence a subject could create a music for himself out of a continuous chaotic chain of sound by imposing externally a form that comes from within him, provided that he can go a little faster than external time, and, when he has scarcely started listening, is agile enough to hear, as if he were creating it himself, the emerging form that he is doing more than listen to: which he recognizes. Do we need to point out that the example of the waves, which allows me to compose an inner music, is not chosen altogether at random? In pure chaos, it is probably impossible to hear a music in its emergent state. The sound of waves is not chaos: there is rhythm and pulsation, and each wave is a variation on an immutable theme. By a fortunate chance, the Greek philosopher's example was too well chosen. Some time later, informed by further equally useful conversations, this time with physicists, I could have given him the key to the enigma, thanks to so-called "information" theories. If the noise of waves has a chance of being musical, it is because, like music, like every message, it is affected by *redundancy* . . .