Introductory Remarks

The Historical Situation of Music

NEED FOR A REAPPRAISAL

Although the taste for controversy is widespread in some quarters, it is, we believe, unheard of for a radical revision of accepted ideas to be undertaken lightheartedly or through the arbitrary decision of an adventurous mind.

Discoverers themselves, when they first start, fail to recognize their discoveries, making every effort to force them to fit into the thought systems they have learned to use; new methods are rarely grasped in their own originality, for what they enable us to do, but only as so many means of building on what we already know; new facts are perceived as the continuation of the past or, when this becomes impossible, as anomalies, something supplementary, an exception—until the moment when the real is decisively transformed, before the concepts that would allow us to account for it are changed.

Suddenly these concepts, which appeared both obvious and exhaustive, turn out to be challengeable and outmoded, inappropriate for a comprehensive understanding of phenomena. What, in relation to the inventory drawn up by our predecessors, appeared eccentric now becomes the chance to reexamine everything that was most universally accepted. This is when every serious researcher should adopt Cartesian asceticism for himself: "to rid (himself) of every opinion which (he) had until then accepted as true, and start all over again from the basics."[1]

Music today is in the same historical situation. Over the last decades, the contemporary musician, whether he wants to or not, and sometimes despite himself,

1. Renée Descartes, "Remarques sur septièmes objections, Méditations métaphysiques" (1641).—Trans.

has seen his horizon expand. The new phenomena that have appeared are less well known to the public, more misunderstood by music lovers than are, in painting for example, surrealism, cubism, abstract art, or, in every imaginary museum, the growing influence of primitive arts. They are no less capable of revolutionizing music, not only in all its manifestations but also in its principles.

THREE NEW PHENOMENA

We will quote them in the order of the importance that is generally given to them, while, for our part, being of the opinion that this importance should be in reverse order.

The first is *aesthetic* in nature. Greater and greater freedom in the way works are put together has, in half a century, allowed a rapid development in Western music. In return this void demands its rules. The analysis for this has been done so fully that we do not need to go over it again. We should, however, note that it was not really done in depth, being more a working model than an explanation.

Above all, we should note that this marks not only a gradual break with the rules of counterpoint and harmony taught in the conservatories but a reappraisal of musical structures. Speaking of dissonance and polytonality in relation to that well-defined structure that is the Western scale is one thing. It is quite another to attack the structure itself, be it—as Debussy had already done—by using a six-tone scale, or—as Schoenberg has done—a scale of twelve semitones, in which the canonical arrangements of dodecaphony aim to eliminate all tonality. Finally, from now on, certain concepts, even tentative, like *Klangfarbenmelodie*,[2] indicate an interest in using specific structures other than pitch.

The second phenomenon is the appearance of new *techniques*. For musical ideas are, and more than you would think, the prisoners of the whole baggage of music, just as scientific ideas are of their experimental equipment. Indeed, two unusual modes of sound production, known as *musique concrète* and *electronic music*, came into being at about the same time, about fifteen years ago. These developments were in opposition for more than twelve years, before several complementary aspects were revealed.

Musique concrète claimed to compose works with sounds taken from anywhere—in particular those we call noises—judiciously chosen and then assembled through the electroacoustic techniques of editing and mixing recordings.

2. Literally "timbre melody," consisting of a succession of sounds of the same pitch but different timbres. [The word-for-word translation is, in fact, "Sound-Color-Melody"; it implies splitting a melody among different instruments. Sounds may or may not have the same pitch but are often within a narrow pitch range.—Trans.]

Conversely, electronic music claimed to synthesize any sound at all, without going through the acoustic phase, by electronically combining its analytical components, which, according to physicists, could be reduced to pure frequencies, each one given a measure of intensity and developing through time. This strongly reinforced the idea that every sound could be reduced to three physical parameters[3] and that synthesizing these, which was now possible, could make all other instrumental devices, traditional or "concrete," unnecessary, at least in the long term.

In both cases, the works created using the new means made available by electroacoustic or purely electronic techniques had, in some strange fashion, their own style, an aesthetic peculiar to them, so peculiar, in fact, that they were often refused the name of music. Instead of extending the creative range, as might have been expected, modern equipment seemed to give rise to idiosyncrasies, eccentricities even, at the margins of music properly speaking.

In addition, all aesthetics apart, these two types of music—if we may provisionally call them this—displayed worrying anomalies: the former was not written down; the latter was written in numbers. By going too far or not far enough, they did more than challenge traditional notation: they did without it altogether. The former was to abandon it when faced with a sound material whose variety and complexity eluded all attempts to transcribe it. The latter made it anachronistic through a rigor so absolute that the approximations of traditional scores paled before such precision.

The third phenomenon involves a reality that is very ancient and is also gradually disappearing. It concerns *vestiges of civilizations* and *musical geographies* other than Western. For our contemporaries this phenomenon does not yet seem to have taken on all the importance it deserves.

Traditional musicians, as their name suggests and also as their interests incline them, are very curious about the historical sources of music and a musical ethnology that would not be very different from the ethnology of languages. But, a relative latecomer into this field, ethnology initially concentrated on and referred back to its own object of study rather than the musical phenomenon its discoveries could have explained. And musicologists, with few exceptions, do not really seem ready to decipher these other languages, which, however, should give us the keys to a true musical universalism.

How could they be? Music, for Westerners, is inseparable from a "theory of music," which in turn, if we believe the manuals, rests on a scientific basis: acoustics. University teaching backs up teaching at the conservatories, which starts from a number of definitions: musical note, scale, chord, and so forth, which are seen as principles laid down once and for all, under the discreet guardianship of specialists,

3. Frequency, measured in hertz (Hz); intensity, measured in decibels (dB); and time, measured in seconds (s) or milliseconds (ms).

physicists and musicians who trust each other or, as the case may be, declare themselves incompetent in a field that is not theirs.

Under these conditions it is understandable that musicologists, confident in their own system, should quite naturally strive to reduce primitive or non-Western languages to the concepts and terms of Western music. And it is not surprising that the need to go back to authentic sources should have been argued precisely by the most modernist musicians, of musique concrète in particular, who found themselves obliged, through their own experience, to question seriously the universal value of this system.

THE THREE DEAD ENDS OF MUSICOLOGY

Thus the musical interpretation of sound phenomena as it is generally practiced these days has come up against three main dead ends.

One of these dead ends is *musical concepts*. It is now not only the scale and tonality that have come to be rejected by the most adventurous, as by the most primitive, musics of our time, but the very first of these concepts: the musical note, the archetype of the musical object, the basis of all notation, an element of every structure, melodic or rhythmic. No music theory, no harmony, even atonal, can take into account a certain general type of musical objects, and in particular those used in most African or Asian musics.

The second dead end is *instrumental sources*. Whatever the tendency of musicologists to reduce exotic or archaic instruments to our norms, they suddenly found themselves disarmed when faced with the new sources of electronic or "concrete" sounds, which—surprise, surprise!—sometimes got on famously with African or Asian instruments. More worrying still was the possible disappearance of the concept of the instrument. Universal[4] or synthetic instruments, these were going to be the ornaments of our concert halls, or maybe they were going to be stripped of any instruments at all. Were we going to witness the disappearance of the orchestra and the conductor, apparently threatened by the disappearance of musical scores, and about to be replaced with magnetic tapes played by loudspeakers?

The third dead end is *aesthetic commentary*. Taken as a whole, the copious literature devoted to sonatas, quartets, and symphonies rings hollow. Habit alone can hide from us the poverty and the disparate nature of these analyses. When we put aside the smug comments on the composer's or the performer's state of mind that litter the work, we are left with the most tedious list, in the language of musical technology, of his methods of production or, at the very best, a study of his syntax.

4. The French term is *instruments gigognes*, a reference to the figure from children's stories, Mère Gigogne, who produced hordes of children from beneath her voluminous skirts. Here the expression implies "the instrument that contains all instruments."—Trans.

But there is no real critical appraisal. Should we perhaps not be surprised? Perhaps, as good music is itself a language, and a specific one, it completely eludes any description or explanation in words? Whatever the case, we simply acknowledge that the problem is important enough not to be whitewashed over and that the difficulty has been neither resolutely faced nor clearly addressed.

The analysis is doubtless severe, but we must one day realize that the musicology it criticizes is running out of steam. If no explanation is forthcoming—conceptual, instrumental, or aesthetic—it would be better to admit that, after all, *we do not know very much about music*. And worse still, what we do know is more likely to lead us astray than to guide us.

A PRIORI MUSIC

So unless musicians resign themselves to stagnation, where will they find principles that will enable them to understand and direct their own activity?

In a time of crisis, when we are inclined to doubt both received ideas and ourselves for having previously accepted them, it is a natural reaction to turn to science and, in particular, the most prestigious of our time: mathematics and the physical sciences. This would explain historically the importance of the tendency toward doctrine that for some years now has sought to find a model and a medium in these disciplines.

Starting from serial music, the rules of which were already being formulated like some sort of algebra, "*a priori* musics" have evolved, their main preoccupation seeming to be intellectual rigor and the total ascendancy of abstract intelligence over both the composers' subjectivity and the sound material. The idea of sensitive and intuitive music, which seems unable to free itself from dull repetitiveness, is being challenged by a desire for austerity, indeed aridity: let us rather make musical constructions that are perhaps arbitrary but clearly conceived, obeying precise and precisely formulated rules that will guarantee their coherence at the most objective level. The stricter the rules and the more meticulous the calculations, the more the composer will be shielded from his own whims, his subconscious preferences, which might mask his enslavement to automatic habits of composition.

And besides, the arbitrary itself must be codified. What else does the traditional composer do than simultaneously use and break certain rules? Whoever wants to do this scientifically must do it consciously. The use of calculating machines, by making him formulate the rules that determine what he does, will be a salutary exercise for him. Chance, which has its own laws that can be counted on, will provide the succession of notes and sequences. From the rules of the series, which automatically excluded any tonal allusion, it is a completely logical step to the calculation of probabilities. The paradoxical result of a composition such as this is

that it will prove to be completely conscious, perfectly willed, as soon as the hateful self of the composer is totally eliminated from it.

Moreover, it is science, acoustics as it happens, that guarantees the rigorous correspondence between the sound structure and the intellectual construct. Since—and no one doubts this—musical concepts can be reduced to the definitions of acoustics, we will prefer the latter, more precise and reliable, to the former, contingent and approximate. As we have seen, electronic equipment has allowed the composer to familiarize himself with the concept of parameters and with calculating the variation of every sound phenomenon in relation to these.

There remain these two contingent elements, which are not readily reducible: the human performer, if the orchestra is being used, and the consumer, if we are thinking about the audience. The least that can be said is that the attitude toward these is resolutely authoritarian. The orchestra must follow and mold itself to the austere purposes imposed on it. The audience as well. A new music is not made to please, or move, or be immediately understood. It will be understood little by little, through people learning the language it forges. It will give pleasure to those who have themselves taken the trouble to understand it.

Thus we have witnessed the birth of works that are undeniably new, and doubtless interesting in this respect, but also very disappointing on other levels, and not necessarily assured of survival.

We are scarcely in a position to criticize them for this: if we accept their intention, which has its logic, nothing, as far as our sensibility is concerned, would allow us to say whether they are good or bad. In fact, either our ear will get used to them—and we know about the amazing power of adaptation of the musical ear—or it won't, and all these works, despite their intrinsic qualities, will never amount to an intelligible language.

So must we leave it to posterity to decide for a whole generation what its life and work will be? The risk is worthy of respect, but the stakes are huge. Perhaps we could shed more light on this by analyzing the two premises on which the whole meaning of the undertaking rests.

The first is not the worst: a rigorously constructed music *must* be intelligible. The only things against it are our habits and our determination to reduce it to a traditional language. Deconditioning or education should be enough, once our attention has been steered in the right direction, for us to hear it as it was made.

But to what do all these calculations, intended to guarantee rigorous coherence of construction, apply? As we have seen, to sound, as defined and measured by acousticians. Is this the sound that we really hear?

Clearly the value of the first premise depends on this second one: if our ear functions effectively as an acoustic receptor, there is a possibility that a music devised *a priori* in keeping with these parameters may one day become accessible. But what if this is not the case? If these works, intellectually and acoustically

impeccable, speak in reality only to a theoretical ear, which ours will never be, then surely the wager becomes absurd.

We should state here and now what we intend to demonstrate fully in this work: the wager is lost; the correspondence between music and acoustics is remote; experiments show that it is not an easy task to reduce the facts of human perception to the parameters measured by machines.

But for those experiments to take place, research must take a new and quite different path and define another method.

MUSIQUE CONCRÈTE

First, we should clear up a misunderstanding. It is true that the electronic mode of composition can, more than any other, satisfy a systematic mind and, reciprocally, that the use of electronic equipment has certainly strengthened this tendency. It is true also that the problems of composition in musique concrète have, historically, given rise to a different type of musical research, which lays claim to the experimental method and, reciprocally, that the choice of a living and complex material, resistant to analysis, and a mode of composition that can only be carried out empirically and through a series of approximations may be characteristic of another type of mind. But we must not go any further and fall into two all-too-common misunderstandings: the first is confusing two different ways of tackling the problem of music, by using particular instrumental means; the second is believing that *a priori* and experimental music stand face-to-face, opposing each other like two schools of aesthetics.

A point of terminology, which will necessitate a personal parenthesis, will help to clarify these perhaps-too-abstract comments. When in 1948 I suggested the term *musique concrète*, I intended, by this adjective, to express a *reversal* of the way musical work is done. Instead of notating musical ideas using the symbols of music theory, and leaving it to known instruments to realize them, the aim was to gather concrete sound, wherever it came from, and to abstract the musical values it potentially contained. This "wait and see" attitude justified the choice of the term and opened the door to very varied lines of thought and action. I first had to pay the price of the discovery. It was still the age of gramophones, and only by means of the closed groove[5] could we make cuts in sounds that would lead to collages. So we thought about precedents in painting, and the parallel with a nonfigurative type of painting called "abstract" led immediately to the antipodes of the *concrete:* in any case we were not going to give the name *abstract* to a music that did without the symbols of music theory and was carved out of living sound! From here to imagining a reciprocity between painting and music was only a short step, quickly

5. This is a groove closed in on itself, thereby isolating a fragment of recording, which can be listened to indefinitely.

taken by people in love with symmetry: they said figurative painting takes its models from the *external world*, from what can be seen, whereas nonfigurative painting relies on necessarily abstract pictorial *values;*[6] conversely, music at first grew up without an external model, having reference only to abstract musical "values," and it becomes "concrete," one might say "figurative," when it uses "sound objects"[7] taken directly from the "external world" of natural sounds and given noises.

This way of seeing things, however, failed to take into account the potential of our discovery. This book contains a critique of a too naive faith in the so-called external world and in the distinction, no less so, between a concrete and an abstract, dissociated in this way. For us, who have long been convinced that these two aspects are "isotopes" of the real, the choice of one of these adjectives aims only to mark a new starting point in music and, it must also be said, a tendency to oppose the bias toward abstraction that had invaded contemporary music. As for shutting ourselves up in a music whose objects referred to the "external world" (or, more precisely, whose objects had a double meaning, relating to sound, by reminding us of the source they came from, and musical, through being organized), there were either wrong interpretations or the choice of lines of approach other than ours. Works like this are possible and interesting (the *Symphonie pour un homme seul* was a good illustration of this), but they do more than choose a so-called expressionist or surrealist aesthetic; they explore a particular type of art, halfway between music and poetry. I would not reject this particular type of art, scarcely explored and so often parodied, but I think I have also quite clearly indicated another option, which is to carry out musical research starting from the concrete, certainly, but wholly dedicated to reclaiming the indispensable musical abstract.

I therefore abandoned the name *musique concrète* in 1958, not without congratulating myself on this initial stage, to which I still owe everything I have done. But it was necessary to avoid misunderstandings, tenacious as are all misunderstandings when they are both aesthetic and technical. If these first experiments had any consequences beyond particular procedures and the inspiration of a few, it is because it became possible to conceive of an experimental music that made every experimental process its own and preceded all aesthetics.

EXPERIMENTAL MUSIC

The two opposing musics of 1950 to 1955, concrete and electronic, had ended their match in a draw, both of them too ambitious—one to conquer sound in one fell

6. In contrast with the *natural* external world, values are norms established within a determined *cultural* group.

7. By "sound object" we mean sound itself, considered as *sound*, and not the material object (instrument or some sort of device) that produces it.

swoop, the other to try and produce the whole of the musical by synthesis. The traces of both, which reveal the joint temptation of the possible and the impossible, mark out what is now a historical fact: that it was possible, in two ways, to make music without performers, or instruments, or music theory. It was the first of these that was remembered by public opinion, always very keen on these performances, fascinated by music machines and thinking of them rather as the cinema was thought of in the age of the Lumière brothers. In effect, the tape recorder had practically replaced the closed grooves of the former and mingled the concrete with the electronic sounds of the latter. The most remarkable so-called electronic works—Luciano Berio's *Omaggio a Joyce* and Karlheinz Stockhausen's *Gesang der Jünglinge*—use every sound source and allow two types of freedom: one of procedure and the other of the aesthetic that flows from it. No matter that the term *electronic* is still attached to such musics, which are in reality electroacoustic. I should, for my part, have preferred the term *experimental*, inasmuch as no one putting together on the tape recorder instrumental and vocal sounds, and those that come from acoustic sound bodies as well as electronic generators, can deny that he is in full experimental mode. Besides, this term had triggered the first serious international debate on this subject, in Venice in 1961. In fact, the best-known contemporary experimental composers have by and large gone back to the orchestra, fortified by the instruction received from the studio.

Is this return to the orchestra a sign that so-called experimental music procedures have failed? How is it that most of the composers who first took up arms for this cause turned away from it more or less of their own accord, just when they were being crowned with success? Moreover, how can we explain the worldwide increase in studios that mix the concrete and the electronic (and now also aim to use the "computer"),[8] with several dozens at least per continent?

It seems quite easy to unravel this knot, provided we hold some of the threads. If the talented composer turns to the orchestra as soon as he can, it is out of an all-too-natural impulse, and maybe also, talent for talent, it is the composer trained in the disciplines of the experimental studio who is best placed to do this, through the advantage he has gained in musical knowledge of a type that is neither practiced nor taught anywhere else. His desires urge him to develop what he has acquired and to apply it to the living reality of the orchestra and the concert hall, infinitely more pleasing than the austere solitude of the studio.

The fact that new studios are opening, however, is due to an automatic reflex of our time, which strives to occupy all available spaces for what is possible or doable, even if we don't know what is possible or what to do. In any case electronic music, in the strict sense of the term, cannot but tempt the young composer emerging

8. A very powerful calculating machine. [In the early 1960s, when the *Treatise* was written, computers were quite unknown devices.—Trans.]

from a classical, then serial, training: he finds reassurance in notation in numbers, and to him this seems like progress itself—that is, a far better continuation of what he has been taught. Others, captivated by a different scientific mode, are fascinated by the aleatoric, the combinatorial, either machines for "making music," as formerly, or for "inventing music," as never before. Only a minority follows the advice that we have always given to many foreign correspondents: that a good broadcasting studio, even a small facility with no sound or recording equipment, is enough to provide years of fruitful experimental work. The lack of appetite with regard to technical tools arouses suspicion. And when we add that the revolution is still to take place in the field of musical ideas, and that we must agree to some years of *aural retraining*, which can be done without complicated equipment and which no device can do for us, there is disappointment among the proselytes.

The fact is that, ultimately, experimental music for most of its followers has meant only a number of technical procedures and specific musics composed outside the norms of score and orchestra.

If, indeed, there are many devotees among musicians, they are convinced that, ultimately, it is all to do with a new instrument or instruments. While there are also many talented technicians among them, inventive and motivated by music, there are scarcely any who feel inspired to take it as their subject. Between musicians who are still primarily composers and researchers who are primarily technicians, there are no candidates, practically speaking, for *fundamental musical research*.

NO-MAN'S-LAND

So we are obliged to acknowledge an almost total deficiency in this field, which is all the more surprising as this deficiency is felt daily. Those musicians captivated by science are more empirical than ever: their borrowings from formulae or devices are almost like pilfering, rapidly transformed into trade secrets, and sometimes decked out with a few romantic theories, except that their dreams are put into equations. As for serious scientists, they are busy elsewhere, music not yet being considered a major objective for the cosmos or the bomb. Those among them who are interested in music seek in it, as in art in general, a just compensation for other more austere disciplines. They expect perceptible pleasures, and they respect all the more the heritage that provides this. In the arts, scholars are not progressives.

So it seems that in no other of the innumerable areas where so many new questions are raised, where ideas have to be rethought in the light of recent events, where specialists (who until now had no reason to collaborate) are obliged to come together is there such neglect of the essential, such a conspiracy of silence. Can it really be that we have just discovered all manner of ways to create and assemble previously unheard sounds, and nothing in music has changed, that we merely work on what we already know, what we already do? For fifteen years we have had

a sound film that allows us to slow down, speed up, expand, contract, and, above all, fix sound, which until then was ephemeral, and there is nothing to be drawn from this except a few strange works of secondary importance? These same recordings, coming from all points of the compass, give rise to extraordinary comparisons among different human ways of perceiving, and there is not one new thought to be had about the problem of musical languages?

We often think we can find answers to this sort of research by using two types of approximations: the philosophical and the scientific. A physicist accustomed to dealing with and measuring facts, who transfers his habits of mind and his experience to music, is doubly threatened by the trap of words and things. Musical words have a double meaning: they designate magnitudes as well as phenomena. It is possible to measure parameters but rarely perceptions. And we can always go and look for the phenomenon in the "external world," without necessarily encountering, in the slightest, the phenomenon of music, which is within human consciousness, even though, paradoxically, it is materialized by the instruments and notations of the past, as well as by the tools and calculations of the present.

This is the justification for the double unlinking that we have attempted to bring about in both the meaning and the name of this activity, which has gone from concrete to experimental and is now focusing unreservedly on musical research. The word *concrete* had attached itself spontaneously to the result, the aesthetic form of the products; the word *experimental* had come to designate only devices, procedures, and methods; the word *research* assumed reflection that would bring everything into question, and this everything dared to speak its name, without any particular qualifier: *music*.

DIVERGENCE OF DISCIPLINES

What ultimately seems to us so essential and so linked to the conclusion of a particular process still appears incomplete and incidental to specialists of our time. If scarcely anyone can deny the importance of an in-depth reflection on music and a fundamental research approach with regard to the phenomenon of music, it is difficult to see the means, the circumstances, or who is competent to do this. It could also be objected that those who feel responsible for music are already engaged in it: musicians have rethought their traditional activities over the last decades; acoustic physicists have accumulated works on hearing that bring them very close to experimental psychology; electronic and cybernetic engineers are continually making technological contributions and developing not only a new *instrumentarium* but *composing machines* in unforeseen and radical ways. So our criticisms seem unfounded and unfair in the face of so many researchers who are preoccupied in various capacities with the musical.

Far from denying this fact and refusing the contributions of all these people, we point out that they all only labor so well because implicitly they accept that

several arguments are won and that there is a common basis, indeed, even a language precise enough for people to be able to understand each other when music is discussed. But quite a few eminent people are working like this in good faith on principles that, to our mind, are only assumptions and words with double meanings.

The purpose of the whole beginning of this work is to identify these assumptions and expose these terms that are not the common fund but a common misunderstanding. This brings us to a second intention: to explore relationships among various disciplines as far as music is concerned. Indeed, it cannot be denied that the musical—and this is at one and the same time its interest and its difficulty—is a frontier land where the Arts, like the Sciences, have to be involved. As happens among neighbors in a disputed territory, relations are not particularly easy: too much courtesy, consisting of stepping out of each other's way and in effect leaving the territory underdeveloped, can be followed by a will to annexation pure and simple. Besides, the real has too many disparate aspects not to let everyone seize something that properly belongs to his specialty, but what specialist will come forward to link these particular disciplines together?

In truth, instead of parallels, serious examination is far from revealing any clear correlations, a preestablished harmony between music and mathematics, or an easy one between psychology and acoustics; we are obliged to acknowledge the disparate and the dispersed: music is a mountain with everyone tunneling into it, and the tunnels cross each other without ever meeting.

Rather than being upset, or underplaying the difficulty, it is better to take it on board and, as a strategist said, make this difficulty into "a springboard" for action. If the disciplines fail to meet in music, which nevertheless is a favored place for them to come together, it is not because they have something wrong with them or because their coming together is badly organized; it is because they are each pursuing their own goal, without the essential objective being addressed by any of them. In effect, the musical enigma contains its converse. It offers to any mind, from the layman to the professional, from the ordinary to the superior, the strangeness of being both the most material manifestation of mechanical vibrations (and their physiological deciphering) and the most spiritual (indeed the most esoteric) means of communication between one person and another. This well-known fact does not stop people applying to music, with scholarly stubbornness, the iron rule of our Culture, which carefully separates the Arts from the Sciences. Perhaps this separation of powers does not suit it?

MUSIC AS INTERDISCIPLINE

It would be as unwise to reject this division of work wholesale as to adopt it respectfully by virtue of established rights. Music, in particular, brings a discord-

ant note into the concert of knowledge.[9] It jars with one of our favorite scruples: to separate as clearly as possible facts from ideas, the sensory from the intellect, or, in other words, objects and language. So music must be treated as scholars have learned to treat a fact that refuses to fit in with the system of explanations intended for it: it is not the fact that is wrong or that they deny; rather, they review the system.

First, we notice that the most common terms—pitch and duration, sensation and perception, objects and structures—which are used daily by everyone, do not have the same content, or they designate different circuits of experience or use. As can be seen, this is not yet about questions of principle: distinguishing pure sound from the sound called noise; basing a musical system on tonality or series (on a calibration of six, seven, twelve, or thirty sounds) or even on pitch rather than timbre. Over and above terminology it is a question of concepts themselves and, over and above concepts, of attitudes toward the musical. Thus, as soon as we move beyond the first premises of the two approaches—the musical arts and those sciences that touch on music (acoustics, physiology, experimental psychology, electronics, cybernetics, etc.)—we discover a problem of pure method, of how to define objects of thought or elucidate processes of reflection, which is properly the realm of the philosophical.

Can we find in philosophy the solution, the term or the means for a newly efficient way of thinking? To turn so soon to philosophy to find a way out of our uncertainties would doubtless be to prejudge it as well as to run it down. What we can ask of it is to contextualize them, and in particular, to spring the trap of words.

Once we are better prepared by considerations such as these, and, above all, better situated among the body of approaches that have put the same sort of question to philosophy, it would seem possible to define a type of research directed, this time in essence, toward the musical. Does this mean putting forward a new discipline, which would take over from or supplement the earlier ones? It is doubtless too early to say or to choose between two equally presumptuous options. Let us at the very least point out that there is a void between musical acoustics and music properly speaking, and that it must be filled by a science that would describe sounds, together with an art of hearing them, and that such a hybrid discipline is clearly at the basis of the music of musical works. A more ambitious approach is to put forward music, above all others, as a "universalizing" activity, a true *interdiscipline*, an activity that, taking from many specific disciplines, validates their partial contributions through synthesis, as much on the level of facts as ideas, and presents

9. The same remark can be found in Saussure with reference to language; see Ferdinand de Saussure, *Cours de linguistique générale* (Paris: Payot, 1916). [Translated by Roy Harris into English as *Course in General Linguistics*, ed. Charles Bally and Albert Sechehaye (La Salle, IL: Open Court, 1983).—Trans.]

itself on an equal footing with them, as an activity of discovery, aiming just as much, if not more, to establish a branch of knowledge as to create works.

RESOURCES FOR MUSICAL EXPERIMENTATION

Such high ambitions may seem desirable but lack their most elementary means. After all, they were there before, in musical literature, and are in keeping with the noblest, yet also the emptiest, of themes since time began. What new element would open up the harmony of the spheres to us?

Without aspiring so soon to that harmony, let us say that this figure of speech makes a mockery of it. We only speak so well, in such pompous terms, about a dream that we do not believe in. The way music is spoken about, vapid and prosaic by turns, going straight from the sublime meditations of the inspired to the laborious vaticinations of the inspirers, scarcely gives us confidence in a genuine approach to music.

We think new facts could bring about a radical rethinking of musical attitudes—facts that allow us, for the first time in history, to put together *musical facts* and *musical experimentation* worthy of that name.

These new facts are, after all, very modest in comparison to those to which they are added. Even if, by and large, there is already wide musical experimentation in the music of all times and all places, it does not obey the norms of the *experimental*. It is the discovery of *recording* (over the last twenty years since the preliminary problem of *fidelity* was resolved) that creates new conditions for traditional musical experimentation. These have not been clearly recognized. Once again, we have not seen the wood for the trees. The experimental music of these last years, in accumulating devices and increasing the number of sources, has inadvertently hidden from us the main means of experimentation in music: the ability to preserve, repeat, and examine at leisure sounds that until now were fleeting, tied to the playing of instrumentalists and the actual presence of the audience.

Does this amount to saying that the same thing is happening in music as probably happened in biology, when the photograph, aided by the microscope, prolonged by the camera, allowed the observer to hold between two slides what had been hidden from him and to fix this spectacle in time and space? The idea is fair enough but would not reveal the extent of the observable phenomenon and the construction we can put on it. Putting slivers of sound between slides, "observing" it through the microphone, or fixing it with the tape recorder would be yet again to consider sound as an object that is inert, essentially physical, physiological at a pinch. Fixing a sound on film is consistent with the first goal, to subject it to detailed and completely new observation. But to limit the field of inquiry in this way would be to forget both the listener altogether and music altogether. Sound cuttings are made in two worlds: they are a slice of the listener's time, and they are an extract from the message of the person expressing himself.

It could then be pointed out, as far as these two worlds of listening and musical creation are concerned, that the fact of recording adds nothing. It fixes sounds in its own way, repeating earlier, different, and differently developed fixations of the musical: precisely, the musical scores of works and the symbols of music theory, which enabled them to be translated. That the fact of recording only gives one particular packaging of the sound, only allows one phase of examination, without touching on the essence of the problem, does not lessen the significance of the means of observation. It is by noting the apparently slight differences between notated and recorded sound, between sound as *live listening* and sound as *acousmatic listening*,[10] that a whole process of revision and discovery seems to us to have taken off.

THE AIMS OF MUSICAL EXPERIMENTATION: OBJECTS, STRUCTURES, LANGUAGES

Initially we were, we admit, fascinated by this particular phenomenon. One needs to have gone through these moments, which any interested person can experience personally, when sound, the captive of the tape recorder, repeats itself indefinitely the same, cuts itself off from contexts, reveals itself in other perceptual perspectives, to rediscover that fervor of listening, that fever of discovering. It is very much like the feeling that takes hold of cinematographers when through the camera, its slow motion and close-ups, they discover faces, objects, movements that their eyes could see only rarely and indistinctly. So, for several years, the discovery of *sound objects* grabbed our attention, mobilized our research.

Limiting musical investigation like this would be to forget that "objects are made to serve" and the basic paradox about using them: that, once they are grouped in *structures*, they are forgotten as *objects*, and each simply brings a value to the group.[11] In any case this is a naive thought, which is expressed in ordinary language thus: objects, in our normal experience, seem to us to be "given." In reality we do not perceive the objects but the structures that allow us to identify them. These structures do not themselves take us by surprise in an original listening experience. We have never stopped hearing sounds since the awakening of our sense of hearing, and it did not awaken in just any period or just any civilization.

So from objects to structures and from structures to language there is an unbroken chain, all the more indiscernible as it is absolutely familiar to us, spontaneous, and we are completely conditioned to it. And here we have the second aspect of the tape recorder, which initially we had taken to be a machine for making sounds,

10. These terms will be clarified later in the work, in particular in chapter 4.

11. The problem of the relationship between objects and structures will be discussed at a deeper level in the philosophical book (book 4).

putting them together, creating new objects, indeed, new musics. It is also, first and foremost (for research purposes), a machine for observing sounds, for "decontextualizing" them, for rediscovering traditional objects, listening again to traditional music with a different ear, an ear that, if not new, is at least as deconditioned as possible.

Here we must understand the dissymmetry of its use. In the sense of *making* or even analyzing sound, the tape recorder is a laboratory or instrument-making tool. It works at the basic level, let us say the level of objects. In the sense of *hearing*, the tape recorder becomes a tool to prepare the ear, to provide a screen for it, to shock it, to remove masks from it. The tape recorder, but no more than any other acoustic device, cannot exempt us from a thorough study of listening, but it prepares the way for this through new contexts. Because of it, we can ask why, and how, and with reference to what context (ancestral, traditional, conventional, natural, etc.) we hear.

People may find these thoughts surprising, and wonder about the meaning of this sybilline suggestion that the tape recorder can place the ear outside its usual contexts. Surely it faithfully gives back what has been recorded on it? This phenomenon, astonishing in its simplicity, has nothing properly technical about it; to understand it, we have to look elsewhere for a precedent in the use of phonetics for the study of language.

The tape recorder allows us to focus our attention on sound itself, its matter and form, through cuts and comparisons that, apart from the technique, are very much like work done on the materials of language. Taking language only in context, it is difficult, if not impossible, to arrive at this kind of knowledge. The flow of meaning and the functions of the various elements are far too determinant for the infrastructure to be revealed. Patient reconstitution of the objects of phonation was needed to arrive at this surprising discovery: that some phonetically different sounds are heard as the same in one language system, whereas they are heard as very different—or, as they say, significant—in another. It has even been said that at a pinch phonology could do without phonetics. We would agree with Robert Francès that "musical perception has little in common with hearing" (physicists' hearing).[12] We cannot be content with such a dichotomy, even while using it to justify the necessary separation of sound and the musical, just like the distinction between phonetics and phonology.

General linguistics has been reflecting on language systems in this way for several decades. It was no longer content to explain language systems through one or several reference languages, as traditional linguists had done. From phonetic material to phonological functional units there are correlations that explain each other. Of course, doubt can be cast on any close parallelism between language

12. Robert Francès, *La perception de la musique* (Paris: Vrin, 1958). [Published in English as *The Perception of Music* (Mahwah, NJ: Lawrence Erlbaum, 1988).—Trans.]

systems and music because of the arbitrariness attached to the choice of meaning and the free relationship between signifier and signified, which makes the word into a sign, whereas the musical note has always appeared to impose itself independently of any arbitrariness, like a given from the physical world to which we seem to respond. This statement contradicts the previous one: that the musical is deduced from sound. This debate will have repercussions throughout this work and lead to the conclusion that there is a fundamental dualism in music, which gives it all its interest and also conjures up its mystery. We do indeed find in musical objects an objective basis related to the physical world, but we have also chosen a meaning for it within a far broader framework than people seem to realize at present. Hence, the symbols of music theory do not simply represent physical sounds but are relatively arbitrary signs, musical "ideas."

MUSICAL RESEARCH

Suggesting a new approach to music in this way means daring to envisage generations of researchers working over a very long time. Sketching out the program and the method for this, making a start on it, is already highly ambitious. This means, as well, that our first concern will be to limit it, to outline a program of approaches rather than a list of results.

We could say, in the most everyday language, that we could tackle the investigation of the musical from both ends—material and works—and *that we have exclusively chosen material*. But to put forward such a clear separation would be to forget the essential connectedness that articulates structures from the simple to the composite and that does not necessarily start with the simple: we enter into such relationships at any level, so we gain access as much to the higher as to the lower levels. In other words we perpetually keep in our minds and ears the part played in every work by *objects* (sound building blocks) that we can isolate and compare with each other independently of the context from which they come. Therefore, the reader will not be surprised to see throughout this work references to traditional, primitive, non-Western, and contemporary musics. There will be, however, no reference to any of these at the level of language, as this is beyond our remit.

There should be no misunderstanding about this attitude. Not only does it presuppose what is constantly present and accompanies the most general musical experience (i.e., works, civilizations, composers, audiences), but it allows, of course, for further or simultaneous stages of investigation into objects still more decisive than what we have attempted here.

Now it remains for us to say in what ways such a limited stage is possible and indispensable. We can see several reasons.

(a) One of them comes from the fact that, in linguistics, where the objects are much more involved at the higher levels, it seems possible to arrange the subdivision

of disciplines into hierarchies, each of which has a different "degree of freedom." And so, Jakobson writes:

> There is a rising scale of freedom in the combinations of linguistic units. When distinctive characteristics are combined into phonemes, the individual speaker has no freedom at all; the code has already fixed all the possibilities that can be used in the language system in question. The freedom to combine phonemes is circumscribed; it is limited to the fringe situation of creating words. When sentences are formed from words, the speaker is less constrained. Finally, when sentences are combined into utterances, the action of the constricting rules of syntax ceases and the freedom of each particular speaker is substantially increased, although the number of clichéd utterances should not be underestimated.[13]

It is quite easy to draw a parallel with traditional music. There is no more freedom to combine phonemes than the composer has using an instrumental "language": the orchestral sounds are given in the same way as the sounds of the vocal apparatus. The "words" of the orchestra are the notes, and the only new ones that can be expected are in a zone of "neologisms": those gongs, those cinceros, even those *ondes martenot* that are coming into the orchestra with the boldness and toughness typical of innovations. Musical "sentences" are clearly the dependence on scales, modes, rules of harmony, and so forth, with the same situation of semifreedom as the linguistic sentence in relation to syntax. Finally, musical "utterances" come under the final remark: there are many clichés: cadences, responses, accompaniment, resolutions, while contemporary music puts forward new stereotypes.

An initial comment must be made here: every new music, whether concrete or electronic, or quite simply contemporary, that tries to destroy all or part of such a robustly constituted system cannot claim either to be particularly logically based or to be easy to hear or immediately understood. Everything has to go right back to basics, and it is better to acknowledge its discontinuities than to plead development, or progress.

(b) If the argument for such a parallel were to be repudiated, we could point out that practical music teaching has also traditionally made a distinction between the theory of music and composition. In putting aside any preoccupations that may justify traditional rules of composition, or contradict or replace them, we are doing no more than returning to a time-honored musical custom. Besides, our theory of music will be less theoretical than the theory taught in musicianship classes, which rapidly turns to the uses of the scale, intervals, tonalities, and so forth. Our standpoint still falls short of this mark, and we are much closer to whatever concerns the instrument, determined never to separate *hearing* from *making*.

13. Roman Jakobson, *Essais de linguistique générale*, vol. 1, *Les fondations du langage* (Paris: Minuit, 1963). [The *Essais* are a collection of lectures by Jakobson; a second volume appeared in 1973.—Trans.]

(c) And this brings us to a third reason for a preliminary examination such as this. Inasmuch as the musical appears so bound up with physical sound, it is important to look at this first of all. Just as it would be difficult to imagine the linguist not being interested in the speech organs and the various "phonic objects" it is capable of delivering, it would be hard to see a fundamental investigation of music fail to reexamine sound such as we are able to make it. Now, unlike speech organs, which have not changed since Neanderthal times, the means of making musical sound have not ceased to vary from one age, one civilization, to another. We must make the prosaic, but often forgotten, remark that the musical thus singularly depends on the means of making music. This does not at all detract from the importance of hearing it, or from the fact that, in music as in phonetics, civilizations have made an instinctive and everyday choice of what they have retained as *significant*.

Even within these limits, our investigation should not be presented as the first stage of a journey that is concerned first and foremost with the instrumental and the ear in the context of the laboratory, and which would keep complementary matters until later, in particular the impact of this research on composition, its relationship with audiences, and its interaction with the material of other civilizations. In the same way as limiting it to elementary objects and structures involves constant reference to higher levels and the implicit presence of the end results they suggest, reflecting on making and hearing is inseparable from group research and the social and cultural context of which it is part. We are not talking here of castles in the air and good intentions. It will be seen how much the research we are suggesting is directed toward not an object *in itself* but an object *for an act of communication* and of group communication.