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DESIGNING MUSIC FOR HUMAN BEINGS

We are musicians and our model is sound not literature, sound not mathematics, sound not theatre, visual arts, quantum physics, geology, astrology or acupuncture.

— **Gérard Grisey**

We ought not to forget that we still must account for the tones actually sounding, again and again, and shall have no rest from them nor from ourselves — especially from ourselves, for we are the searchers, the restless, who will not tire before we have found out — we shall have no rest, as long as we have not solved the problems that are contained in tones. We may indeed always be barred from actual attainment of this goal. But more certainly, we shall have no rest before we do; the searching spirit will not stop pursuing these problems until it has solved them, solved them in a way that comes as close as anyone can to actual solution. I think, then, contrary to the point of view of those who take indolent pride in the attainments of others and hold our system to be the ultimate, the definitive

musical system — contrary to that point of view, I think we stand only at the beginning. We must go ahead!

— Arnold Schoenberg

In this chapter, I will offer my more specific, personal views about how I and a particular group of composers attempt to write music that corresponds to the limits on musical languages and musical meaning discussed in the last two chapters. This is the "how" question of the dialogue I imagined in the prelude: How can a modern composer hope to make a meaningful addition to an impossibly exalted corpus? Up until this point I've tried to argue in a somewhat general and abstract way about art and music, but this chapter will deal more specifically with contemporary composers, compositions, and techniques to serve as a case study of a possible application in artistic works of the ideas I have been discussing theoretically.

The focus in this chapter will shift somewhat, from the audience's perspective to the composer's to illustrate how artists explore the sort of aesthetic design space that I discussed earlier. This viewpoint is perhaps more familiar in the world of visual arts, where curators have long oriented their expositions around design space explorations whether tacitly or explicitly (e.g., placing late Medieval and early Renaissance works in a way that highlights the emergence of perspective in the representations; placing Expressionist, then Fauvist, then abstract landscapes in a way that highlights a deepening preoccupation with light and color at the expense of "realistic" depiction). It is, of course, equally possible to construct concert programs around the gradual evolution of some aspect of musical practice; however, this is much less frequently done, therefore discussing music in this way may seem less familiar. Yet if I am to have any chance at convincing you to support the kind of art we have been discussing, it is essential that you get a feel for how this art might continue to develop without simply transforming into something entirely abstract and unperceivable. I need to give you a very small peek inside the workings of a living composer's mind, and because I only have access to my own head, that will have to do. Some parts of this chapter may be a bit difficult for those with little or no experience in this domain, and some readers may want to skim the parts that are

too difficult to follow. I would, however, recommend to everyone that they try to listen to some of the works and composers I discuss in this chapter, in concert or at least on recordings.

Let's ask it again: How can a composer hope to make a meaningful addition to an impossibly exalted corpus? The first step in finding a solution is to acknowledge that there is a fundamental dilemma at the center of new art music: Even if you believe that basic cognitive principles allow novel musical languages to be created, when is a listener supposed to learn these new languages? Even the most adventurous or committed among us will have relatively few occasions to hear new composers' works. The pieces we do hear will often not be available in recorded format and will not be played again anywhere near us for years to come. This indisputable reality makes many wonder whether it is necessary to deviate so greatly from our existing musical models, because many listeners have already learned those languages. I suspect that some of these doubters are unsure of even the theoretical possibility of creating something meaningful that is not essentially similar — in not just deep ways, but also more evident ways — to our tonal models (most music critics fall into this category).

I have suggested in earlier chapters that I think this *is* possible: A composer can use the first principles deciphered through studying the music and sound humans generate and process to create something very different from what we have known before, but possessing equal potential as a musical language. The bulk of this book has been my attempt to answer why, if possible, this might be worthwhile, or even important. Now what remains to be attempted is offering an answer to how a composer might try to do this.

In the final analysis, general theoretical observations will not be worth much unless artists are able to figure out a concrete way of using them to make real works of art. We must discuss the hard, specific and personal "Here's how I …" at this point and not the general "How might one… ." Although I could try to analyze certain works I find successful (and will do so to a small degree), I fear that would be too specific. So, instead, I would like to try putting forward the way that I, and some of the contemporary composers I most admire, attempt to answer this question when we sit down to work each day. Because I have been part

of a small movement, I will try to focus on the movement as a whole so that I do not descend too far into personal specificity and self-justification. For the purpose of our discussion, the utility of the compositional approach I will present does not depend on whether I'm right; what really counts is the quality of music these attitudes allow me, or others, to produce. And in the context of this book, what is really important is to show one possible framework for responses to the dilemmas facing the creation of the sort of new, difficult art (the reception of which) we have been discussing up to this point: one possible "how." Although you may reject my conclusions, I think that looking at one way a group of composers might try to solve these problems in artistic works can perhaps convert a somewhat bleak assessment of the current situation for art into the groundwork for attempts to "go ahead." At the very least, it ought to show that the very difficult set of constraints that face a composer today are not completely irreconcilable.

I need to offer one major caveat before we begin in earnest. When I move away from my work table and start to look at music as an observer, it seems obvious that a whole range of solutions to the problems inherent in composing a piece are possible. This is the detached reasoning of an outside observer, however. When I'm in the heat of the moment making the actual decisions that let me create a piece of music, I am incapable of taking this broad perspective. Intellectually, I may be sure that there are many potentially successful responses to a given set of compositional problems, and that my own is just one possibility; however, on a gut level, I can't really believe in those other solutions (at least not while I'm still writing the piece). To create effectively, I think you need to be certain, not just pretty sure. Artists may be wracked with doubt about whether they have achieved their aims, but I don't believe they can be effective if they doubt those aims.

All this is my way of saying that you will get the sense in this chapter that I'm awfully sure I'm right and everyone else is wrong, because this is the way I need to think when writing my music. I want you to get a glimpse of the way a set of composers see the world and how that shapes their work. In a certain sense I could probably have chosen a different set of composers with a somewhat different outlook to demonstrate something very similar, but it would be a view from outside.

Therefore I decided to risk the danger of this seeming too much like self-justification in order to offer give a more direct and personal view of how at least a few composers try to make their music.

So, we return to our question once again: How can someone set off, without a map, on a quest for the compositional "grail" of really new music that possesses the same potential for aesthetic richness as the greatest tonal music? Every day when I sit down to compose I think about this question, and every day I have to feel sure that I have found some kind of answer in order to continue. You might think of the way I, and several others, try to create musical structures that are both novel and "comprehensible" to human listeners as the "spectral approach." This approach is built around the idea that writing music is not just pushing around tunes, intervals, numbers, or harmonies; it is designing evolutions of sound in time to be processed by human beings listening attentively.

The Spectral Approach

The spectral approach looks beyond the specifics of tonal music for the more general rules that allowed tonality to function so well. The idea behind this approach can perhaps be most clearly explained through an analogy: Engineers who have built fantastically complex devices through successive refinements of existing apparatuses sometimes hit a roadblock. In this case, the scientific method tells them to go back to the basic theories that allowed the initial device to function and reconsider them. It is often the case that a new consideration of these same "first-principles" can lead to a very different perspective. Continued progress may depend upon the use of an entirely different apparatus to accomplish the same underlying function. This was the approach adopted by the spectralists starting in the early 1970s with the French composers Gérard Grisey and Tristan Murail.

Spectral composers felt that much new music was not producing satisfactory results: The theoretical constructions that were being discussed at great length by the composers of the time did not seem to correspond to anything audible in the actual works. In their reflections about a basis for musical construction that would function, be audible, and not return to tonality, they saw only one realm in which to explore: sound. Even the earliest Western treatises about music have used sound

as the underpinning for their theoretical constructions — long before any deep understanding of acoustical or psychoacoustical principles existed. This recognizes the indisputable reality that human hearing is not primarily *for* music and therefore music must be designed *for* hearing. Theorists have always regarded musical hearing as a secondary, nonindependent effect of our general capacity for hearing. Nonetheless, phenomena affecting our general hearing (such as the combination of multiple partials into a unified sense of pitch) have clear implications both for musical and for environmental sounds. This is not to suggest that hearing can dictate a musical style, but rather that a study of sound and hearing can elucidate the borders within which a valid (from the perceptual point of view) style might be created (the contours of some region in the design space we discussed earlier).

Clearly, the extended relations of tonality were not "natural" in any meaningful sense, but they were developed from models that, just as surely, were (the opposition of consonance and dissonance, the hierarchy of tension between intervallic relations played by instruments with complex timbres, etc.). Twentieth-century composers who speculated that consonance and dissonance were purely cultural, and that one could create a music where the fifths were dissonant and the minor seconds consonant, were simply wrong. While many aspects of most musical traditions are learned (through context and exposure), we can only learn to hear things that do not too directly contradict our natural intuitions.[1] Like the king in *The Little Prince*, composers who wish to command the stars must be careful only to order the sun to rise in the morning and set at night, because we are severely lacking in the means to alter that arrangement significantly.

Spectral composers have sought to create a music that was built to function (by function, I mean to create specific, *compositionally controlled* auditory impressions in the listener's subjective awareness), instead of a music that functions in spite of how it was built. For example, some of the classic pieces from the Darmstadt era of serialism in the 1950s and 1960s — such as Luigi Nono's *Il Canto Sospeso* or Pierre Boulez's *Le Marteau sans maitre* — whose effectiveness derives from a sense of orchestration, motion, and contrast, not through a study of the voluminous analyses of permutations and calculations that went into their

composition. The pieces work *in spite* of this intellectual baggage not *because* of it. Therefore, the spectralists turned to the developing fields of acoustics, psychoacoustics, electronic and computer music, and cognitive sciences to find directly things that *could* be heard and impressions that *could* be created. This information did not tell them how to compose, but merely where to look.

I will try in this chapter to give a general guide and orientation to spectral music. However, just as a study of overtones, temperaments, and formal models (while useful) do not clearly define Mozart's style, I cannot really "explain" spectral music, but can offer background and perspective for further study and listening. Real musical understanding is sensory. Ultimately the real "meaning" of the music lies in the feeling of rightness, surprise, beauty, tension, or whatever else the music produces. The real ideas of the music are musical in nature and no amount of conceptual description should be accepted as a substitute for "the tones actually sounding." But nonetheless, we must address the question I'm sure you are all ready to ask: What is spectral music?

What Is Spectral Music?

As I've said, formulating a clear definition of a broad musical category like spectral music is nearly impossible. Only through extended familiarity not just with a type of music, but also with its milieu, can one hope to develop meaningful categories that are more than mere simplified labels. Thus, I will try to describe a mixture of historical and musical developments that together have helped define the spectral school. I'll also include a few very targeted "analytical" examples interspersed within the discussion.[2] These examples will be very broad in nature and are really intended for those readers who have little or no experience with this music. All the examples are drawn from works that are available on commercial CDs, and hopefully some of them will incite you to hear the pieces themselves. While my definition of spectral music is a personal one, its broad outlines are largely undisputed. As with any definition, however, many of its specific details are controversial and many of those to whom this label would be appropriate do not like being classified. In any case, for the present discussion what really matters is the general outline.

Spectral music developed as a school of composition in the early seventies inspired by the works of two composers, Tristan Murail and Gérard Grisey. Its composers now cover three compositional generations and a large variety of styles. They write for all types of instrumental groupings and often take advantage of new technological possibilities for enriching their musical palettes. The musical approach is profoundly different from both structuralist (postserial) approaches and hybrid (neoromantic or postmodern) aesthetics; however, the pieces remain intimately linked to the interpretive tradition of Western instrumental music. While tape pieces have been written by some spectral composers, their goal is not electro-acoustic music, but rather a new type of instrumental music with different sounds, textures, and evolutions.

The term spectral music was coined by Hugues Dufourt[3] but the most pertinent remark for understanding its meaning was made by Tristan Murail during his lectures at the 1980 Darmstadt summer course. He referred to spectral composition as an attitude toward music and composition, rather than a set of techniques. While that remark was made without elaboration, it offers a useful starting point for our investigation of what spectral music is.

Spectral music addresses broad aesthetic consequences instead of specific stylistic ones. Thus, spectral composers can have vastly different styles and some even prefer to reject the label. However, all of these composers share a central belief that music is ultimately sound evolving in time. Viewing music in this way, as a special case of the general phenomenon of sound, facilitates these composers' use of the available knowledge in the fields of acoustics and psychoacoustics within their music. They can refine their understanding of what sound is, how it may be controlled, and what, ultimately, a listener will be able to perceive. That knowledge, when applied musically, provides powerful new compositional tools. Musical works may be conceived much more closely to the manner in which they will ultimately be perceived than would otherwise be possible. Sounds and musical colors (timbres) can be sculpted in time to produce musical effects. The panoply of methods and techniques needed to create these effects and to manipulate sound in this way are secondary. They are simply the means of achieving a sonic end and not a discourse with intellectual pretensions in its own right.

Combining and manipulating spectral materials in the same abstract ways in which intervallic materials are treated (without taking into account the precise nature of these materials and a listener's perceptual capacities) does not yield music that I would classify as "spectral." Spectral composers have often, in fact, chosen points of departure or made use of materials that are not directly related to sonic phenomena. The manner in which a spectral composer treats and develops his or her material, however, constantly takes into consideration the sonic entity that is being generated. This is what Grisey really meant when he wrote that our model is sound. It is not that a composer cannot take inspiration from "visual arts, quantum physics, geology, astrology or acupuncture"; in fact, Grisey wrote one piece inspired by the painter Piero della Francesca and another inspired by a Pulsar, but I don't think he was just a hypocrite. Sound is the model for spectral composers in the same way that light the model for Impressionist painters, yet Monet did not simply paint luminous washes of color. In Monet's series of paintings of the Rouen cathedral at different times of day, it is clear that the proximate subject (the cathedral) is just a vehicle for communicating the real content: light, shadow, and color. This is what Grisey means: The real content of music is not mathematics, quantum physic, or even aesthetic philosophy, but sound, the way sound changes in time and the affects it produces in the human mind.

This may seem like an obvious idea to anyone who was not a composer in the twentieth century, but to those of us who were, this was a major breakthrough. The prevailing schools of composition either regarded music as the structured combination of musical symbols (notes, rhythms, dynamics, etc.), with an emphasis on the interest or complexity of these structures; or as a vehicle for conceptual ideas (in parallel with the conceptual movements in visual arts we discussed earlier). In more recent years, new trends have also emerged that refer back to a more romantic notion that regards music as being essentially a vehicle for emotional content — usually produced through references (literal or evocative) to past works already possessing cultural associations. Yet in any of these cases the piece at its most essential level is something other than sounds heard in time by human listeners, and this is the fundamental belief of spectral composers. Any other ideas

(brilliant or insipid) will be useful or not only in how they affect those sounds and the mental representations they create in listeners, they have no independent justification.

A score created by a composer with this spectral attitude serves simply as a means of communicating the composer's sonic intentions to the musicians. The score is not the actual musical work and any notational or other innovations that may be present in spectral scores are attempts to express the composer's intent more clearly with regard to final realizations; the actual piece of music *is* what the sonic realization becomes in the mind of a human listener.

Because neither the technical manipulations used to generate and manipulate the musical material, nor the procedural means of notating the score are central or indispensable to spectral composition (these aspects are in fact in constant mutation), we must instead return to Murail's observation that, in fact, spectral music is neither about techniques nor styles but, at its core, is simply a question of attitude. This doesn't mean that a spectral composer does not need to have technique. In fact, writing this sort of music is often very technically demanding, and a lack of technique may well cause the piece to fail. Spectral composers do not believe, however, that the success or interest of the piece on technical terms is a justification or validation of the musical work. In whatever manner it was made, the work must ultimately succeed "independently."

A great advantage of viewing the problems of musical organization from the perspective of the broader category of sonic organization is that very successful models already exist. One of the best sets of models for sound organization are the instruments that have evolved over time into sound generators that composers want to use and listeners want to hear. Thus, it is not surprising that some of the first important spectral pieces made use of instrumental models in creating their orchestral sonorities. You may not think of an individual instrumental note as a particularly complex or rich model for music; it might seem like some tiny indifferent musical atom. However, each and every instrumental note, in fact, contains a very complex interior structure that constantly changes in time — as complex in its own way as a piece of composed music. This is why so many synthetic sounds have an "artificial" sheen

to them — they lack this interior mobility and are thus perceived as too simple or static by our ears. It is extraordinarily difficult to generate an artificial sound with the richness of internal structure that most natural sounds already possess.[4] For acoustic instruments, builders have sought to use the physical properties of vibrating materials to create sounds that are at once extremely appealing in their richness and sufficiently coherent in their structure to be usable as elements within larger structures like chords (multiple notes played simultaneously by one or more instruments).

Of course, to listeners much of this richness exists at a level too microscopic to hear. We perceive the sound globally as brassy, reedy, bright, or somber; we perceive its pitch, its loudness, and so on. We would certainly notice the lack of complex internal structure, but we are not consciously aware of the details of that structure and the way they influence our global perceptions (any more than we perceive the atomic motion that gives rise to temperature in the air around us). With the advent of electronic devices that decompose sounds into their constituent elements, however, we could begin to see the workings of these structures. This internal organization offered a new model for how a large number of elements might evolve together in ways that offer both juxtaposition and collaboration within a larger structure.

In Gérard Grisey's first pieces, he used a close-up view of this structure as the model for much larger orchestral structures, sometimes even complete sections. Grisey liked to describe the process as "putting a microscope on the sound."[5] His idea was not to re-create the original sound (which he could have just played, after all), but to make something new that preserves the overall coherence that comes from being part of a unified acoustical structure at a larger level. This may sound a bit puzzling, but there is a very good parallel in the visual arts. The painter Chuck Close has made a career of painting realistic representative paintings where the picture is pixilated into individually visible shapes and colors. Each spot in the picture has a definite size and shape while still giving its overall color and shading characteristics to the larger image, which becomes clear once you step back from the canvas to view it. The total is definitely something more or at least different from a photographic reproduction. The difference between Close's

paintings and these first works of Grisey is that the end result in the musical use need not remain photorealistic to even a moderate degree; it has to preserve just enough of the structure of the model to maintain its dual nature: as part a global sound and as the sum of individual sounds. The musically inclined may notice that this model is used in a parallel manner to the use of tonal harmony within late-Baroque counterpoint; this is an example of convergent musical evolution. This musical technique of using the interior structure of a sound as a model for rich new orchestral object, transforming its micro fluctuations into macro-forms, is called "orchestral synthesis."

Let's look briefly at an example of this orchestral synthesis from one of Grisey's pieces, *Partiels* (1975) for eighteenth instruments. I'm going to include some music notation in this example, because it is fairly simple and it should be easy to follow the shapes, even for those who do not read music. For the later examples, I'll try to do as much as possible with descriptions. *Partiels* is one of the best-known and earliest examples of a composer using an instrumental analysis to create a harmonic and gestural model that is then realized by an instrumental ensemble. Personal computers were, of course, not an option for Grisey at the time that he wrote the piece, so he used an electronic sonogram device to analyze the attack of a low E2 (an octave and a sixth below middle-C) played loudly on the trombone. The analysis of this attack became the model for the opening gesture of the piece (this gesture is then repeated with increasing degrees of alteration throughout the first section of the piece).

While the specific analyses and devices he used are no longer available, we can very easily approximate the steps he took with current tools. The first step is the generation of a sonogram showing the attack of the low E on a trombone played forte.

\Notice that the sound is made of component bands (called partials) that are equidistant on the frequency axis. This is because the sound is "harmonic" like most pitched sounds (the partials are located at integer multiples of the fundamental frequency that determines the pitch of the sound). If we look at the way the loudness of the partials changes in time, we can use the darkness of each band to see that the partials enter one after the other with lower partials generally entering earlier and higher
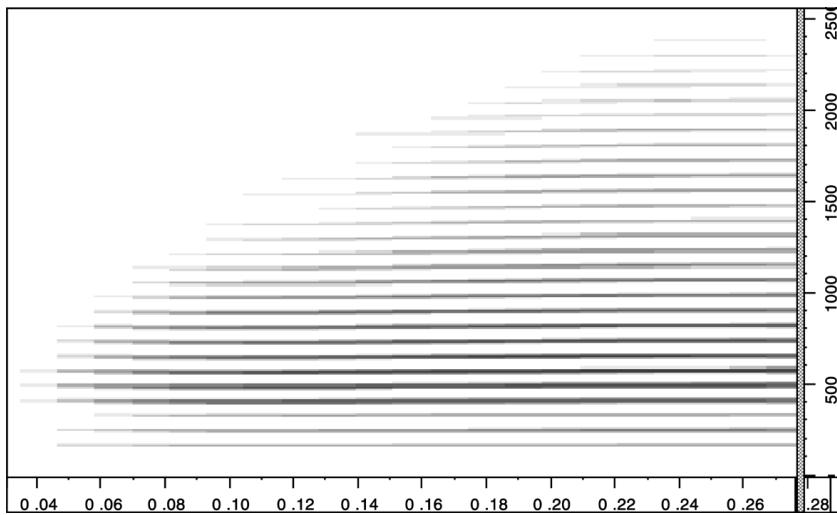
Figure 8.1 A sonogram showing the low E on a trombone played forte. The x-axis shows the time, the y-axis shows frequency in Hz and the darkness shows amplitude.

partials appearing later. We should also notice that the lowest partials — including the fundamental — are not the darkest (loudest) ones; the fifth and ninth partials are louder. This is especially interesting because both of these partials form "dissonant" high-tension intervals with the fundamental. These loud dissonant partials give the aggressive, "brassy" quality to the trombone sound. Finally, we can observe that the partials above this louder region gradually trail off in amplitude.

If we want to use this information in an instrumental score, we will have to translate it from the domains of time, frequency, and amplitude to more musical dimensions like pitch dynamic and rhythm. This will often require approximations to the nearest available values that we call "quantification." By quantifying this sonogram, we can generate a
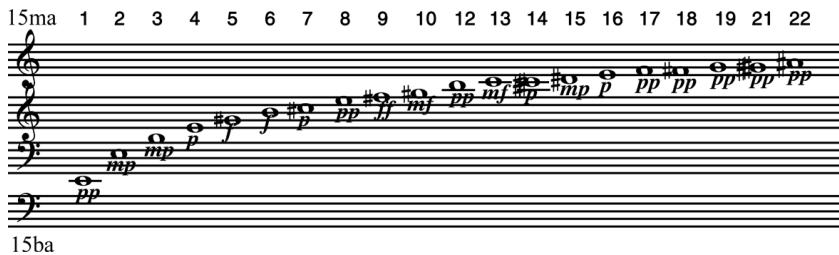

Figure 8.2 A musical model that corresponds to the partials of the harmonic series (approximated to the nearest quarter-tone). The numbers above the top staff represent the partial rankings within the harmonic series.

musical model that corresponds to the partials of the harmonic series. When this is transcribed into musical notation of pitches (approximated to the nearest quarter-tone) and dynamics, the following series is produced. This series, coupled with a rhythmic modeling of the successive entrance of the partials, can then be used to produce the instrumental score.[6]

In the following excerpt from the final score, Grisey wrote the partial ranking next to each note. While it is generally not very helpful to write a textual commentary on the effect of a musical passage, I think it is important to note how striking this moment is. At the very start of the piece one hears the trombone attack forte, with the double bass repeating the attacking gesture with less and less determination. This allows the sound of the sustained trombone to gradually emerge. Just as this happens, the sustained note that has been performing a decrescendo begins to give way — through a cross-fade — to an instrumentally synthesized imitation of itself. This instrumental timbre does not seek to present an indistinguishable copy of the original, but rather to generate an amplification and transfiguration of the trombone note. The listener can still sense the underlying trombone color of the sound, while at the same time a doorway is opened up to a vast new domain of sound found within the original sound. Deploying these notes in a vastly stretched out imitation of a trombone, does not really sound like a trombone; it sounds like something entirely new, while preserving a distinct trombone-color in its overall presentation. It also creates an orchestral entrance that sounds neither like a "chord," nor like a single sound, but that manages to simultaneously possess many elements of both.

This particular musical moment, especially at the time it happened, was to have an enormous impact. Many of the second- and third-generation spectral composers have cited their first hearing of *Partiels* as having caused their initial interest in the musical potential of sonic phenomena.

Another defining pieces of the spectral movement is Tristan Murail's *Gondwana*. The brief opening section of this piece for large orchestra is a series of enormous orchestrally synthesized bell sounds that are gradually transformed into an orchestrally synthesized brass sound. Again, the idea is not to offer a realistic simulation; after all, Murail could have just included bells with his orchestra. The idea is to go inside of

Figure 8.3 Excerpt from the opening of Grisy's *Partiels* with the composer's annotations of the partial ranking of each note. © 1976 by CASA RICORDI — BMG RICORDI SpA. Used with permission.

a bell sound and render audible the normally microscopic structures that make it beautiful. Moreover, by re-creating a hybrid with bell-like properties, it is possible to gradually manipulate these structures and make musical objects less and les bell-like in gradual increments (doing this with real bells would at least require a foundry).

One way to create this effect would have been to analyze acoustic bells and then analyze a brass instrument, but by looking at distinct objects like that it is quite difficult to create a convincing intermediate space between the bell and brass sounds. So Murail turned to the developing world of electronic synthesis. A few years earlier a researcher and composer at Stanford, John Chowning, had published the description of a versatile and simple technique for sound synthesis based on frequency modulation. (This is like the vibrato of a string instrument, but instead of vibrating seven or eight times a second the vibrato might

cycle hundreds of times per second.) This technique became the basis of the Yamaha DX-7, one of the first really successful digital synthesizers. For Murail, however, this technique offered a single method, which when used as a model could generate both convincing bells and brass spectra.

Murail used a simplified form of this FM-synthesis model (one that did not take the relative loudness of the partials into account) and constructed a bell sound and a brass sound using the same carrier frequency but different modulators. He then chose three other modulators that produced sonorities with intermediate sonic properties. In all this series of five carriers affected by a single modulator produces five different modulation-based harmonies that are played by the orchestra. In the piece, these chords are completed by other chords that were generated by calculating intermediate steps (interpolations) between some of these FM chords. [7]

There is more to a bell sound than a set of pitches, however. There is also the way those pitches function in time. Unlike brass instruments, bell sounds have a very sharp attack, meaning that all the partials sound immediately. In fact, these partials are completed by a brief spurt of noise called the "attack transient." What then happens is the gradual disappearance of the partials moving from high to low, until only the fundamental of the bell (called the "drone") remains. In the opening passage of *Gondwana*, Murail wants to move from a bell-like orchestral sound toward a brasslike one, so the overall shape of the orchestral gesture is gradually transformed as can be seen below:

I have given quite simplistic descriptions of the Grisey and Murail passages; the music in question is in fact much more complex. By focusing on one very prominent aspect, however, I hope to give a clear handle on some of the basic ways spectral composers have tried to integrate sonic models into musical processes. These sort of literal models never represented the totality of a piece or even a part of a piece, but they
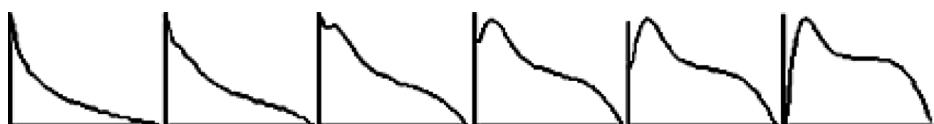
Figure 8.4 The overall shape of the orchestral gesture as it transforms from a "bell-like sound" to a "brasslike" sound in the opening section of Tristan Murail's *Gondwana.*

were very important to the early spectral works and can still be found in new pieces; however, a more complex and sometimes less direct sort of model is now more common.

Examples of this more subtle type of model can be in any of Grisey's or Murail's pieces after the mid-seventies. However, I'd like to illustrate this more complex use of models with one of my own pieces, «*Receuil de pierres et de sable…*». In this piece, I had many different categories of models ranging from the purely poetical, through statistical behaviors, all the way to fully concrete. This work is scored for two harps tuned a quarter-tone apart and an ensemble of six instruments. Together, the two harps create a sort of microtonal super harp that can play parts one harp is not capable of performing. The other six instruments create something like a sounding board for the two harps. The sonic/instrumental analogy at the heart of the piece is drawn from the piano.

Sounds produced by the piano have two distinct characteristics: the percussive attack produced by the hammers and the long sustain produced by the cast-iron sounding board and facilitated by a sustain pedal that allows the dampers to be lifted and the strings left free to vibrate. Of course, because I'm only using the piano's hammers and soundboard metaphorically, the nondirect nature of the analogy opens up many possibilities. The sustaining instruments of the ensemble can draw out the notes attacked by the harps, but they can also change and color them. This is a malleable sort of resonant body.

This technical or logistical analogy is inspired by a more poetic analogy: the raking of the sand in Zen gardens. I was drawn to the idea of the successive passages of the rakes being like successive percussive attacks that leave an ever-richer pattern on the sand or in the ensemble. All of this leads to the point where the raking, or playing of new attacks, becomes less important and interesting than the design that has been created.

Other types of models appear in the piece that are more specific, closer to the Grisey and Murail examples that we've already discussed. At three pivotal points, the ensemble re-creates through orchestral synthesis the sound of a Japanese mouth organ called a *sho*. The specificity of these three moments could be thought of as somewhat akin to the boulders encrusted in the sand/ocean of a Zen garden. The piece also

uses what I would describe as statistical models in the central solo for two flutes (accompanied by the harps). For this solo, I analyzed a Japanese flute called a *Ryuteki*. This flute is basically a tube (like all flutes) made of smoked bamboo, but it has a small lead tube with a different diameter between its head joint and its body. The story is that a flutist broke his flute on the way to the concert and had to repair the flute quickly, producing this instrument. Anecdotes aside, this flute has a very strange doubleness to its sound because the oscillating air (called "standing waves") in the two tubes with different diameters and lengths interfere and interact with each other. The way this doubleness occurs is very specific, yielding certain intervals in its spectrum and producing certain melodic configurations when a flutist changes pitch by increasing the force and speed of his or her breath. In the central solo for the two flutes, I mimicked this behavior with two Western flutes. Though many of the gestures and sounds these two flutes communally produce come straight from Ryuteki analyses, I could take this "instrument" into speeds, registers, and harmonic areas a real Ryuteki, with its more limited key system, could never go.

One has to take these very limited examples with a grain of salt; in each case I have dealt with only one or two aspects of a much richer musical situation. Moreover, even if I were to give many more examples and spend much more time describing them, they would remain an incomplete way of understanding the attitude. Any summary affirmations that I might make about a spectral style are all both true and false. I might assert that the music has made color into a central element of the musical discourse, often elevating it to the level of the principal narrative thread; or that orchestral fusion is often a main feature of its surface texture, so that individual voices are subsumed in the richness of the overall texture and color; or that the basic sonic image is often sonorous and resonant, giving the music a sort of acoustic glow that comes from the coherence — in the domain of frequencies — of the different constituent pitches; or even that this music simply sounds profoundly different from other musics. While examples could be found to support all of these attributes, counterexamples could certainly be found. Spectral composers have produced music that is too diverse for any kind of blanket assertion to be true. The only true constant for

composers like me is that we consider music ultimately to *be* sound, not symbols or concepts, and see composition as the sculpting in time[8] of those sounds that a listener will hear. If we can only go so far in a book like this with technical/musical examples, however, perhaps we ought to enrich the ideas with a little more general and historical context.

Where Did Spectral Music Come From?

Spectral music has always cast itself in the role of a revolutionary movement, fighting against the academicism (in the French sense)[8] and dogma they perceived in the French New Music scene of the seventies. And while this revolutionary stance does reflect the reality of the movement's emergence as a counterweight to the postserialists surrounding Pierre Boulez, it does not mean that the movement was purely reactive.

Spectral music does have its compositional forebears. One can certainly cite Edgard Varèse's sensitivity to sound or even the Italian Futurists' obsessions with making a new sonic vocabulary for music.[9] Or, more specifically, one might point to André Jolivet's experiments with harmonic spectra (inspired by an attempt to imitate the mixture stops on an organ), or the early microtonal experiments of Ivan Wishnegradsky or Julián Carrillo, not to mention some of Karlheinz Stockhausen's works.[10] In a certain sense, *Stimmung*, a vocal piece by Stockhausen built around singing different vowels in a fixed harmonic spectrum, is a spectral piece already. And Stockhausen's experiments both there and in his large piece for multiple ensembles, *Gruppen*, were very influential on Grisey, albeit less so on Murail. Per Nørgård's *Voyage into the Golden Screen* (1968) is another example of what might be called a protospectral work, but don't worry if these references don't mean much to you. The point is that many of these ideas were in the air in the 1960s and I wanted to list some names and works for those who might want to listen to some very strange, but quite wonderful, musical experiments.

Although all these influences on the development of the spectral movement were important, in a general way, my focus will be on the three figures who had the most direct impact on the origins of spectral music: Olivier Messiaen, György Ligeti, and Giacinto Scelsi. These three figures played pivotal and very different roles in Grisey and Murail's

compositional and aesthetic development. It is difficult to imagine their music of the early seventies — the pieces that have become the defining classics of early spectral music — without the profound influence exerted by all three figures on the young and still searching Grisey and Murail of the late sixties. Don't worry if you've never heard of these composers — I'll try to briefly explain the aspects of their musical thinking that were important to the Spectralists.

Le Maître des Maîtres

Olivier Messiaen was the composer who assisted most directly in the birth of the spectral movement. While his music was probably less influential for spectral composers than that of Ligeti or Scelsi, it was Messiaen who was the professor of both Grisey and Murail. This influence affected not just Grisey and Murail, but a whole group of French composers who formed the Group L'Itinéraire with Murail. (L'Intinéraire in its original incarnation was, a composers' collective and performing ensemble that tried to elevate sound and timbre from a decorative role to the center of musical discourse.) These composers (Michaël Levinas, Roger Tessier, Hugues Dufourt, etc.) shared many of the attitudes that would come to be associated with spectral music. Messiaen influenced all of these composers, and through them the spectral movement in several different but very important ways.

Messiaen's most direct influence was the weight that spectralists place on the harmonic dimension of musical composition, as opposed to the emphasis on melodies and the linear (lines) dimensions of music, which had become preeminent in the mid-twentieth century. This aspect of spectral music is often attributed to the traditional French preoccupation with color (think of Fauré or Ravel), but I think that it goes deeper. In the late sixties most European composers, even in France, were still under the thrall of Darmstadtian postserialism, which sought mightily to limit the importance of the vertical dimension of composition (harmony) at all costs.[11] Yet Messiaen, while encouraging his students to adopt this postserial approach (at the time he saw no other "progressive" option, and Messiaen was not one to suggest returning to the past), was also talking to them about the "vraie harmonie" of a piece.

The idea was that really successful music needed to be more than logically coherent, and that some note choices were not just more interesting or complex than others; they were more "right." This idea, which might seem naive to many composers, struck a real chord with the spectralists. As Tristan Murail has said, "I verify the truth of this idea in my work each day, as do all composers who attempt to write a music based on sound."[12]

Messiaen's use of all different sorts of music in his teaching (Greek and Hindu metric systems, Gregorian neumes, well-known and obscure pieces from the repertoire, naturalistic reproductions of birdsong, etc.) and his unconventional analytical methods have been widely documented, but I don't think the effect of this on the early spectral composers has been sufficiently emphasized. Messiaen's highly personal overview of musical ideas, for Grisey, Murail, and others, became an impetus to look for the common links between vastly different manifestations of musical phenomena. The common links they discovered were sonic, not structural, in nature. The use of a wide range of primary sources for sonic inspiration (i.e., gagaku, Höömi singing, bell sounds, speech, etc.) remains an important aspect of much spectral music.

Perhaps the greatest influence that Messiaen exerted on Murail and Grisey was in his role as mentor. Murail has said that in many ways he was not really teaching his students composition, but he was helping them to look into themselves to find what was really authentic. He was ingraining in them the deep sense of integrity to a personal vision that is required to create original art. And more than this, he was there at the perfect moment to say, "the way you've found, that is your path."[13] This may seem a bit mystical or over the top, but this was exactly the sort of encouragement that allowed composers in their early twenties to feel confident enough to forge a path far outside of the mainstream.

External Appearances

The works of Gyorgi Ligeti from the 1960s played a pivotal role in many spectral composers' efforts to find a means of realizing their vision of a music that sounded and worked differently. In the late '50s, Ligeti spent a few years in the electronic music studio of the German radio. During this time he partially realized three tape pieces. Working with the

electronic medium, albeit in a primitive form, he came to think about music in a very different way. He started to think of musical situations and objects as global colors and textures and of counterpoint as the superposition of these layers. He saw new formal possibilities emerge from the techniques of splicing and cross-fades. And most important, he realized that this new approach to sound — which could not have been achieved without his exposure to studio techniques — need not apply only to the electronic medium. The sketches he had made for his second and third electronic pieces were thus transformed into the sketches for his first micro-polyphonic orchestral works (*Apparitions 1958–59* and *Atmosphères 1961*).

This may seem like a contradiction: Earlier, I spoke above about how much richer and more complex acoustic sounds are when compared to artificial sounds. Studio techniques are not just a questions of the sounds made, however. A host of techniques were developed to manipulate sounds in time. Because these techniques used an electronic and not a physical support, they suggested a range of novel musical processes, from slow cross-fades or fade-outs to infinitely long loops of sound to sudden cuts that let sounds appear or disappear instantly, and so on, which are easy to do with a volume knob or a pair of scissors but much less so with breath or bows.

Ligeti never returned to the electronic medium. He decided that he possessed a greater mastery of the sonic tools offered by traditional instruments and that even his "electronic" ideas might be better realized through these means (in large part because of the greater richness of internal structure I discussed earlier). The resulting works remain some of the most sonically striking works that exist, the entire orchestra becomes a wailing or shining mass that can change its color or density suddenly and produce truly dramatic effects. The basic sound of these works, in a distorted form, should be familiar from Stanley Kubrick's use of tiny out-of-context excerpts from Ligeti's music in his films (most notably in *The Shining* and *2001: A Space Odyssey*). Bowdlerized versions of this music have shown up ever since in horror films, because it is so charged with tension.

Ligeti saw a violin, flute, or clarinet as a tremendously sophisticated sound generator and saw no reason not to use them in the same ways he

had tried to use the very rudimentary radio oscillators and other sound-generators of the electronic music world of the 1950s. This crosspollination of ideas let him create instrumental passages that would have been nearly impossible to conceive without the metaphor of electronic music processes. Therefore one can properly speak of Ligeti as a "post-electronic" composer. Ligeti had arrived at a music that, while no longer directly electronic, would have been impossible to create had he not passed through an electronic phase. More broadly, any nonelectronic music whose composition depends on ideas, concepts, or techniques borrowed from the electronic domain can be thought of in this way.

This idea of a postelectronic music that uses "instrumental synthesis" to simulate "electronic" sounds with orchestral instruments is clearly central to spectral music. Ligeti's influence, however, goes beyond these conceptual realms. His techniques for achieving orchestral fusion used perceptual saturation. The sheer mass of sound (with its vast number of independently moving lines) forces listeners into a global sort of hearing rather than attempting to follow individual lines. This technique became central to spectral music as did Ligeti's juxtapositions of extreme dissonances and shockingly open consonances as a means of producing contrast. Moreover, his treatment of individual instruments as tone generators within a larger whole (not as real melodic lines) has also all been very influential for spectral composers. In many ways, pieces like *Atmosphères* and *Lontano* are almost trying to be spectral: They present the same high degree of instrumental fusion, the unusual colors, and the slow almost event-free unfolding as the early spectral pieces.

Were it not for the severe limitations that Ligeti's dependence on "cluster"-based harmonies (harmonies built out of adjacent semitones) created and the limited scope of the formal processes he employed, it would be easy to imagine him having become a spectral composer.[14] However, Ligeti's harmonic language forced him into constantly choosing between extremes of hyper-dissonance or hyper-consonance. His language did not allow for much fertile terrain between these poles. Moreover, his formal analogies with tape-splicing and panel sections also kept him from having much room for a sense of directionality in the musical discourse, which is so important to large-scale musical form. Ligeti seemed keenly aware of these limitations, and I

suspect they are the reason that his works from this period are mostly quite short.

Instead of searching for a richer, more powerful harmonic language and more gripping, multifaceted processes of formal development, Ligeti decided to move on. He began by focusing more intensely on motivic gestures (in pieces like *San Francisco Polyphony*) and a few years later had moved so far as to write the unabashedly referential horn trio (*Homage à Brahms*). By this time, his interest for spectral composers had long been lapsed, but the influence of his seminal works of the sixties remains. Even some younger spectral composers (including myself) began their march toward spectral music by following the path that Ligeti had marked during that decade.

Penetrating to the Interior

While many of the surface features of spectral music come from Ligeti (the fused mass movements of sound, the micropolyphonic thickening of textures, the global formal movements, etc.), the sonic content took its inspiration from another source. As we've noted, Ligeti worked with a very constrained harmonic toolkit; this was insufficient for the young Grisey and Murail, who were looking for a way to give harmony back the essential and structural (read: directional) role it had enjoyed in the past. During their "Rome Prize"[15] stays in Italy, both Grisey and Murail came to know the Italian composer Giacinto Scelsi[16] who is much less well known to the musical public.

Scelsi began his career as a serialist. He studied with Walter Klein, a pupil of Schoenberg, in Vienna and was among the first Italian twelve-tone composers. In the years leading up to the Second World War, he started moving away from serialism. He studied with Egon Koehler, a protégé of Scriabin, and was drawn to Eastern philosophy and mysticism. Scelsi then suffered a breakdown, which led to years of hospitalization (at this time, he had already composed approximately thirty pieces). The story, surely apocryphal but with a grain of truth, is that during his recovery he would spend hours each day banging on single notes of the piano and attempting to listen inside the sound. This was said to have brought him back to the purely sensual relationship with sound he had enjoyed as a child. This approach seemed to liberate him,

and in the early fifties he began composing again, but in a very different style. He sought to write a music that penetrated the interior of the sound. As he said, "He who does not penetrate to the interior, to the heart of the sound, even though a perfect craftsman, a great technician, will never be a true artist, a true musician."[17]

During this period, Scelsi composed prolifically, writing nearly a hundred pieces of somewhat varying quality but all focused on this idea of voyaging to the heart of the sound. Perhaps the most extreme and influential piece in this style is his *Quattro Pezzi per Orchestra (Ciascuno su una nota sola)* (Four Pieces for Orchestra [Each one on a single note]). This piece, which is a sort of a prespectral answer to Schoenberg's famous orchestral study in tone-color "Farben," uses microtonal and orchestrational fluctuations to color the single note (often including its triadlike expansion) that dominates each movement. In this way, music that should seem static opens up a new universe of microlistening[18] and microevents. His concerto for violin, *Anahit,* uses a similar technique; the central note being colored, however, is in constant progression. This imparts a sense of formal progress, or at least formal *process*. It's nearly impossible to describe with words the truly strange and haunting sound of this work, which is somehow both radically new sounding and oddly nostalgic. The sound of the violin is cracked open and we slither our way inside of it, becoming subsumed in its incredibly richness. It is almost as if we could take a single lush moment of Mahler or Bruckner and open it up into a whole micro-universe.

Scelsi's idea of looking for a new harmonic dimension inside of the sounds — combined with the microlistening and slowly evolving formal processes — was to become central features of spectral music. There are many parallels between Scelsi's work and the work of American minimalists, especially Steve Reich, except that the domain of focus was the timbre of a sound for Scelsi and not the rhythmic alignments of the minimalists. Moreover, while Scelsi's music is very process-driven; the processes are not mechanical or automatic but are controlled in a freer, more intuitive manner than is true for the early minimalists.

Scelsi's music, when studied on its own, is often dismissed as fatally limited. Very few of the elements we have come to expect in pieces can be found: almost no melodies, little even in the way of specifically

memorable events. The music when listened to inattentively or poorly performed can sometimes sound like little more than a slowly changing drone. When Grisey and Murail combined Scelsi's sometimes naive intuitions with a more in-depth study of acoustics, however, the postelectronic attitude of Ligeti, the artistic integrity and dedication to harmony taught by Messiaen, and their own high levels of compositional "métier,"[19] spectral music was born.

What Shaped the Development of Spectral Music?

Defining a musical movement requires at least some attempt at describing the milieu in which it was shaped. The formation by Tristan Murail of the group L'Itinéraire (especially the performing ensemble that was the public face of the collective) in the early seventies along with the bipolar opposition that existed between the serialist establishment (led by Boulez and his Domaine Musical ensemble) and the Spectral young Turks (who, in L'Itinéraire, had their own ensemble) were the cornerstones in the evolution of spectral music.[20]

Trial and Error

A key aspect of early spectral music was its empirical nature. The term "experimental music" generally refers to pieces based directly on untested intellectual speculations,[21] whereas spectral music draws on the concrete results of musical experiments. Especially in the earliest days, the collective L'Itinéraire was a place where a fairly close-knit group of composers and performers (most of the composers were also performing) could try out new ideas, retaining the successes and eliminating the failures. Hugues Dufourt's piece *Saturne,*[22] for example, was created in the aftermath of an enormous phase of experimentation. Dufourt had made reel-to-reel recordings of a vast array of percussion effects. He then used several tape decks to simulate different superpositions from this repertoire. The most striking and successful results of these experiments (read improvisations) could then be used in the final composition. This sort of experimentation was central to the working method of L'Itinéraire.

Another manifestation of their empiricism was their extensive use of analog electronic instruments. The state of computer technology at the time meant that digital synthesis was an unavoidably slow and cumbersome endeavor. Analog electronic instruments — from the ondes Martenot (a single-line electronic instrument which became popular in the mid-twentieth century) to electric organs to ring modulators — on the other hand, offered a wealth of new resources that could be tested and evaluated. L'Itinéraire had an ensemble of electronic instruments whose members would meet for informal experimental sessions and, in contrast to the traditions of American experimentation and improvisatory performance, these sessions were not the goal, but only a step toward achieving a goal. Just as great improvisers like Bach saw the need to go back to the table and perfect what could be satisfactorily improvised, the composers of L'Itinéraire saw these sessions not as concerts or happenings (they were not public), but as a laboratory in which to test and discover new ideas. These ideas could later be incorporated in the context of fully mastered compositions. This enabled these composers to avoid both the paralysis that can affect a composer who is not constantly searching for new ideas and techniques, and the self-absorption of a composer who realizes his concepts in a pure and untempered form without regard to the musicality or interest of the resulting work.

The early spectral composers, in a curious parallel with some of the early American minimalist composers, were reaping the benefits of being practical music makers in a field full of unheard and sometimes unhearable experiments that were being presented as finished products. This is not to say that the members of L'Itinéraire ceded the intellectual high ground to the serialists who represented the mainstream of new concert music (what the French call "musique savant"). In fact, one of the reasons that L'Intinéraire received government funding in such a relatively short time was that certain other anti-Boulez factions (who favored something more like a return to tonality) saw spectral music, which they did not particularly like, as a valuable intellectual counterweight to serialism. At that time, French intellectuals were not disposed to granting force to the populist arguments of the neo-tonal composers. Of course, those same "conservative" composers who then saw spectral music as an expedient strategic ally now feel free to attack

all stripes of "intellectual" music equally. The publications by and about L'Itinéraire are the first forums where the ideas of spectral music were presented to a larger audience.[23] While the importance of this group became less clear in the — very late seventies and early eighties — when Grisey moved to America and the ensemble began to function in a more routine manner — its impact on Grisey, Murail, and developing younger composers in the early and mid-'70s was enormous.

The Evil Empire

All revolutions need an enemy, and for spectral musicians the target was clear: serialism. I've been throwing this word around a bit and it's high time I explained it as best I can for nonspecialists.

"Serialism" was originally used to talk about the music written by Arnold Schoenberg and his followers beginning in the early part of the twentieth century. They organized the twelve notes of the chromatic scale into an ordered series. All twelve notes had to be used before any one could be re-used; in principle, it was hoped that this would guarantee a sort of equality among the tones, ensuring that the kinds of hierarchy that are so important to tonal music did not creep in. The composer would write a new series — ordering — for each piece and the characteristics of a given order would help determine the character of the work; any order of notes was possible. Using this first version of a given series as a point of departure, the composer could perform permutations of various sorts to generate new variants that they believed would share some structural underpinnings. As serialism developed after World War II in Europe, the use of complete twelve-note series began to disappear and serialism or postserialism came to mean music that used combinatorial procedures for organizing musical parameters (these variants of a given series are called combinatorial permutations by theorists). The idea was that some abstract germ (a set of intervals, or notes, or even just a list of random numbers) could take on myriad musical manifestations, which might seem very different but which — at least metaphysically — ought to have some coherence.

The entrenched position of the well-known serialists was formidable indeed. For most of the public, their music and ideas simply *were* contemporary music. A strong need to rebel against the perceived tyranny

of this situation is evident in both the music and articles of the first-generation spectral composers. Where serial pieces of the day were made up of an endless number of pointillistic micro-events, spectral pieces contained long stretches of slow evolutions with events occurring only on a large temporal scale. A structural or functional use of harmonic relationships was disdained by twelve-tone composers, but was elevated to a central role in the musical discourse of spectral composers. The advocates of serialism espoused (though rarely actually used) fragmented, nondirectional "panel" and "moment" forms that attempted to create a sequence of "separate" moments or panels that were not intended to "add up" to some larger-scale structure, while the spectralists tried to createprocess-based evolutionary forms where each event grew out of the previous event. And perhaps most profoundly, the capacities of the music's listeners were no longer something to be mocked (at worst) or elevated through a program of auditory indoctrination in some future, better society (at best). The spectral attitude led these composers to attempt to compose music that could be perceived by any attentive human listener, rather than hoping for some improvement in the society or species whose likelihood is doubtful. They saw the phenomena of auditory perception as a set of fruitful constraints that show what is relevant and what is mere utopian dreaming.[24]

However, as with any bipolar opposition, the differences and the rhetoric were both exaggerated. Even in the earliest spectral pieces, like Grisey's *Partiels*, there are some elements that are organized in a combinatorial manner. Moreover, this opposition that was so central in the 1970s began to weaken in the '80s, when a new generation of less revolutionary spectral composers began to appear. In the '90s (under the common threat of a less intellectual, more "democratic" approach that attacks equally all music that attempts something new — "the people like this so we should give it to them!"), this opposition has all but evaporated. The change in attitude can be clearly seen in the contrast between a composer like Murail who was never involved with serialism and one like Philippe Hurel,[25] who has always used some combinatorial procedures and who admires that repertoire greatly.

The change from enemy to ally (although this term is perhaps too strong) has not been purely rhetorical or social in nature, but has also

manifested itself in the music. Both spectral and postserial music have evolved greatly over the last twenty-five years. Spectral composers no longer disdain all types of contrast or rupture and few postserialist are now willing to write off the possibilities of human audition as irrelevant to musical composition. Furthermore, a sensitivity to sound seems to have become a ubiquitous requirement for music of any style to be deemed well crafted. As with political movements, both the spectral and serial composers have matured to the point that they can openly acknowledge and influence each other without fear of losing their identity or "polluting" their ideology.

Where Has Spectral Music Gone and Where Is It Going ?

Although it may seem strange in a movement that is less than thirty years old, three very distinct groups of composers have emerged that could properly be called "spectral." Most clear is the first generation: Gérard Grisey and Tristan Murail. Together and separately, they helped define the goals and ideals of the movement and have created a legacy of masterpieces that have influenced a broad spectrum of composers. While both have had many students, few of those students have become spectral composers. Both Grisey and Murail adopted Messiaen's approach of encouraging their students to find a personal form of expression (although they certainly have pushed them to give harmony a higher priority than many other composers do).

The second generation of spectral composers (for those who follow new music more closely, I am thinking of composers such as Saariaho, Hurel, Durville, early works by Dalbavie, etc.) all studied with other teachers and initially wrote in more postserial styles. Yet each of these composers was drawn, over time, toward spectral music, and all of them completed brief periods of study (late in their development) with Grisey or Murail. They were drawn to spectral music as an alternative choice, one that would allow them to exploit their particular sensibilities. They are not polemicists by nature and most hold strong sympathies for some other styles of music as well. Although their styles are personal, they do not exhibit the same degree of extreme stylistic rigor that so mark Grisey and Murail, and they often show signs of eclecticism in their works.

In the last ten to twelve years a third generation of spectral composers, of which I am a part, has begun to emerge (including Jean-Luc Hervé, François Paris, etc.). This group of composers turned to spectral music for diverse reasons, but did so much earlier in their development. All of these composers have studied extensively with Grisey, Murail, or both. While the languages and aims of these composers are very different (for example, Paris composes frequently for the voice and is interested in the lyric possibilities of the spectral language, while my music is almost exclusively instrumental), they share a greater degree of ideological fervor than the second generation. This group has delved deeply into spectral techniques and sought to continue its evolution in new directions.

Besides individual temperaments, social conditions may explain some of the difference between the second and third generations. Whereas the second generation was still in many ways forced to declare allegiance to a movement, becoming either spectral or remaining post-serial, in the still-polarized atmosphere of the time, the composers of the third generation were free to mix eclectically whatever elements from whatever styles they chose. Most of Grisey's and Murail's students have, in fact, proceeded in this manner, incorporating elements of spectral music but not fully embracing the movement. (I do not count these spectrally influenced composers as belonging to this third generation.) Those with sympathies for other styles have been free to pursue these styles, while at the same time integrating some aspects of spectralism. The real composers of this third generation, however, have forged deeper links with the spectral school. Furthermore, they have done so without constraint, out of a deep commitment to the spectral approach. In this way, they more closely resemble the first generation of spectralists.

So What?

If this attitude I'm describing and this musical lineage I've put forward really is a possible answer to the "how" question, am I predicting it will somehow "save" new music? While my view is certainly biased, certain tendencies clearly seem to be forming. The spectral attitude has already had a major effect on all styles of contemporary European music. In

a historical progression that began in the Baroque period, timbre has moved from an accessory, decorative role to an essential place within the musical discourse. Spectral music has been both the product of this trend and an agent in its recent progress. I think that a musical style that totally ignores "the tones actually sounding" has become an extremely unlikely venture in the twenty-first century. Even the most bloodlessly cerebral of contemporary composers now pay at least lip service to the sonic reality of their music. This achievement is extremely significant and much of the credit belongs to the spectral movement. Composers like Jonathan Harvey and Magnus Lindberg have integrated many elements of spectral music within a decidedly nonspectral language, and this phenomenon seems to be spreading.

During my third year at conservatory, I suddenly felt lost as a composer. I was not sure what to write or why I was writing. I asked myself what had drawn me to music as a child. The answer I finally discovered in myself was the same one Scelsi had found: the sounds. There were sounds I wanted to make and sounds I wanted to hear. No structural principles or intellectual frameworks had motivated my initial love of music, only a sensual fascination with sound. I wanted to compose because there were things I wanted to hear — things that didn't yet exist. We have taken the first steps and made some of the crucial insights; I can't imagine that there will not be future composers who will feel the same need and who will profit from our efforts. They will either build on our work or move in other directions in their search for a personal means of sculpting sound into music.

Moreover, I think that the spectral approach offers the potential for creating really novel musics that are nonetheless perceivable and viscerally satisfying to a wide range of listeners. We should not be surprised that the Impressionists' understanding of light and color led to works that can be appreciated without a great knowledge of iconography and chiaroscuro and ultimately reached a significant and appreciative public. Nor should we be surprised if an approach like that of spectral music turned out to give many new listeners, who possessed an openness to new music and were willing to listen carefully, a way to begin a meaningful relationship with demanding, innovative, even difficult music. In the first part of this book, I pointed out that the decline in

the acceptance of new art is due to many aspects of modern society that are essentially independent of considerations of the art itself. But any solution or even improvement of the situation will require both a changed context and fertile ideas ready to bloom in that new context. I don't know if the group of spectral composers have found those ideas, but I know we're out there looking.

Ultimately what counts is that both sides of the art creator–perceiver contract are fulfilled. You must believe that if you make the effort and sacrifice the time, that there will be a reward. Music must not be of interest only to the specialists who make it; it must at least sometimes offer something remarkable and rare to all those who are ready to find it. Music cannot be an affair for the learned specialist; it must be at least potentially accessible to any human being ready to invest the requisite time and effort. Music must be designed not in the abstract as a piece of sonic speculation, but as a work of sound designed to be heard by human beings.