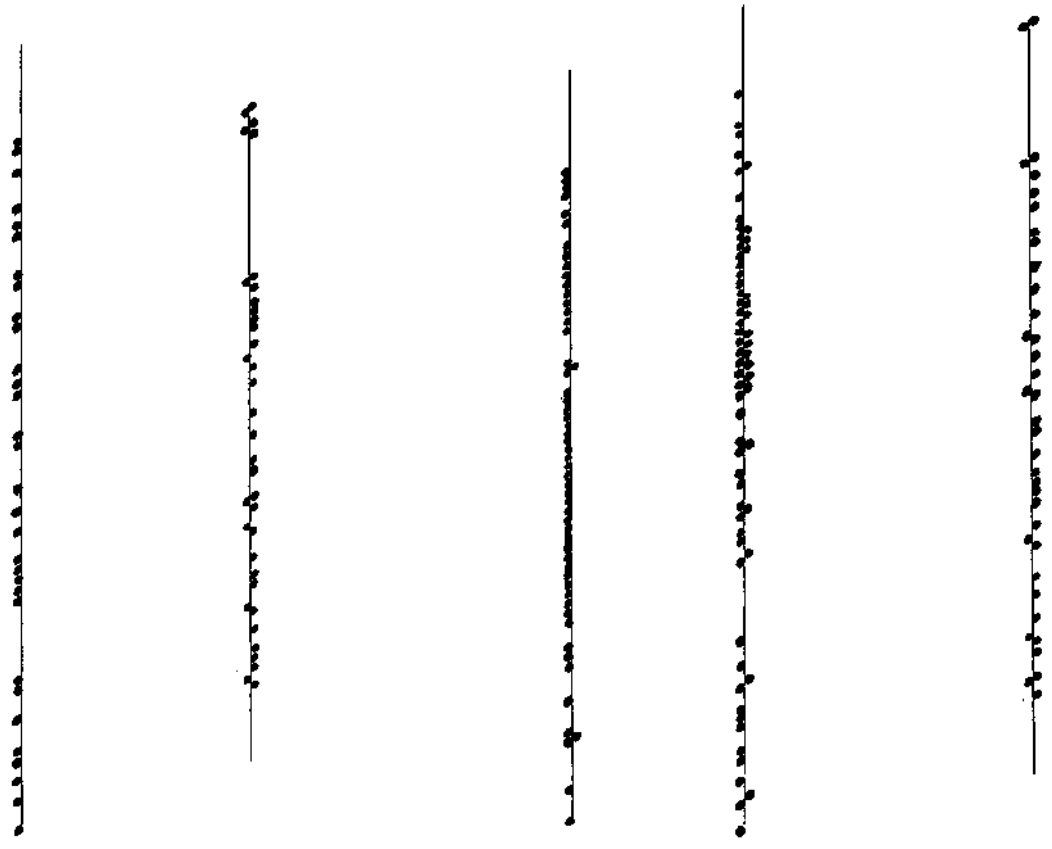
CHAPTER THREE

Multiphonic Techniques

The sound of a multiphonic is familiar to all oboists who have taught beginners or can remember their own early faltering attempts to play high notes. It's easy to produce multiphonics on the oboe. All one needs is to play certain high notes with a relaxed embouchure and low air pressure, and multiple sounds result. With the right combination of fingering, lip position, air pressure, and embouchure, the oboe is capable of producing a huge variety of multiphonics.



Dense Harmonics (courtesy T.J.)

The fundamental acoustics of the instrument determine the nature of oboe multiphonics and provide a challenge in finding reliable fingerings that work for a range of oboe and reed types. The oboe is basically cone-shaped (similar to a saxophone or bassoon), while the flute and clarinet are basically cylindrical. The mathematical representation of the resonances of a cylindrical system is fairly simple and one-dimensional. Diagrams of this sort of vibrational mode look like sine tones, overlapping at regular and even intervals, comparable to the vibrational mode of a string. In contrast, diagrams of vibrations within a conical system are complex and irregular. It is not surprising, therefore, that oboe multiphonics tend to be dissonant and oddly tuned.

Acoustician Cornelius Nederveen explains, "Frequency, initial transient, stability, ease of blowing and timbre of a note are solely determined by the inner geometry of the entire instrument (including the player's mouth)."[1] Note that the cavity of the reed is included in the overall geometry of the entire instrument. Another acoustician, Arthur Benade, pointed out that even the angle of the cut of a tone hole could affect the sound produced.[2] Hence, the oboe is a complex acoustical system with variables that range from the exact dimensions of inner bores, placement and cut of tone holes, reed types, and even the inner cavity of the individual player's mouth! All of these variables present a challenge in the standardization of reliable fingerings that will work across the range of oboe types, reed types, and players.

The list of multiphonic fingerings below is by no means complete—it does not include the hundreds of fingerings that produce a multiphonic under certain conditions. Instead, I sought to include fingerings that were dependable across a range of oboes and players. These multiphonics are reliable, relatively easy to produce, and stable; they can be played with a broad range of dynamics, can be attacked and tongued easily, and can be played on a variety of instruments and reeds in a variety of climates. Very awkward fingerings were omitted even if they met all of the criteria above. All fingerings were tested by five different oboists who had different oboe types, reed styles, and training.[3] To be included in the list, each fingering needed to work reliably for four out of five of the oboists.[4]

The term "multiphonic" is quite appropriate; the phenomenon is more aptly described as "many sounds" than as a chord. Pitches vary in degrees of intensity, from the very prominent to the barely audible and to difference tones. Timbre varies from raucous conglomerates with lots of beating to delicate wisps; some are highly complex and some are much simpler. Many, if not all, of the pitches tend to deviate from standard tuning. With all these considerations, a notational system that implies a chord is misleading. In the several decades during which multiphonics have been studied, various authors have tried to devise appropriate notational systems, including Singer's proposal of color-coding[5] to Veale's amazingly precise and detailed approach[6] to Holliger's use of a quasi-tablature in which only the oboist's gestures are specified.[7] The system employed here is simpler than Singer's or Veale's; my hope is that it gives enough information while being concise. Conventional notation is used because it is clear and practical, even though it does not always specify exact intonation, dynamic balance, timbre, or complexity. To address this issue, the sound of every multiphonic can be heard on the accompanying CD. Composers and oboists are urged to listen to the CD in order to know more specifically the qualities of each multiphonic.

My system usually lists only the three most prominent pitches. More subtle pitches are almost always present, but they have not been included in the interest of clarity. Many variables affect exact microtonal intonation: each individual's embouchure and lip position on

the reed, differences between instruments, and the variable heights of keys. The oboists who tested the fingerings frequently reported slight differences, particularly in the lowest pitch. Because of these variables, I have simply included arrows indicating the general direction of pitches. Graphic symbols indicating lip position on the reed, amount of air pressure, and amount of lip pressure are given only for fingerings that deviate from standard technique. The key at the back of the book explains all symbols. Multiphonics are listed chromatically from the lowest prominent pitch to the highest. Remember that the lowest pitch might not be the most prominent within any specific multiphonic and that difference tones are often present, producing tones even lower than the bottom prominent pitch indicated.

Chenna and Salmi's book, *The Contemporary Oboe*, mentions a fascinating study on perception that was conducted by IRCAM.[8] Six professional musicians were given a multiphonic dictation, and the results varied widely (see figure 3-1). This is an illustration of how highly

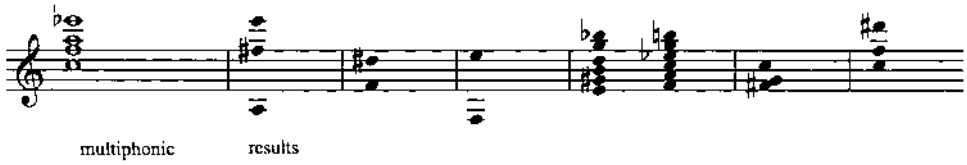


Figure 3-1 Multiphonic dictation

trained professionals can perceive the same combination of tones in strikingly different ways. I have tested hundreds of fingerings, some of which have been analyzed using sophisticated digital techniques, and very often the resulting pitches seemed different from ones indicated on the fingering chart. Thus, even the most highly refined notational system is open to interpretation.

Four categories of multiphonics are included: (1) the standard complex multiphonic; (2) beating multiphonics, which include two prominent adjacent pitches that cause a beating effect; (3) double harmonics; and (4) metamorphic multiphonics, ones that can smoothly transform from a standard tone into a multiphonic or vice versa.

Most reliable multiphonics can be performed with the same level of artistic sensitivity as any other oboe tone (e.g., with a variable dynamic range including crescendos and diminuendos, all speeds of vibrato, relatively easy progression from one sound to the next, and appropriate trills, double trills, and tremolos). It is impossible to alter the pitch of a single tone within the multiphonic, and the possibility of pitch bends of the entire multiphonic should not be assumed. However, it is possible to alter the speed of the beats in some beating multiphonics by adjusting the embouchure: a relaxed embouchure will produce slower beats and a tighter embouchure will produce faster beats. Many multiphonics can be slightly altered by raising or depressing adjacent keys. Oboists are encouraged to use the chart as a point of departure and to experiment on their own with slightly different fingerings, air pressures, and embouchure positions.

I squandered a significant part of my wasted youth searching for the perfect reed to execute multiphonics and other extended techniques. A very hard reed is good for some raucous multiphonics, and a reed with a long and finely graded tip is better for some more delicate ones. Finally, I realized (with apologies to Gertrude Stein) that "a good reed is a good reed is a good

reed." More specifically, it seems that a well-balanced, stable, flexible reed—for example, one that might be used for the performance of Classical-era chamber music—is the type that works best for multiphonics and most extended techniques. I don't think that there's any magic formula for a perfect contemporary music reed—although for extended techniques as well as for standard playing, the reed should correspond to the demands of the piece. If lots of loud beating multiphonics are called for, a robust reed is desirable. If lots of extreme high notes and double harmonics are called for, a lighter reed might be more appropriate. In general, the embouchure used for multiphonics is somewhat more relaxed than the standard embouchure, and the lip position is closer to the string of the reed.

Although multiphonics have been widely used for decades, the notation has not become standardized. The following examples will demonstrate several alternatives for notation in some particularly interesting musical gestures.

Drake Mabry's *Lament for Astralabe* includes a movement, "Chorale," which consists entirely of multiphonics. He notates the entire chord and gives a fingering above every multiphonic, as shown in figure 3-2. This approach is very clear and relatively easy to read. It is

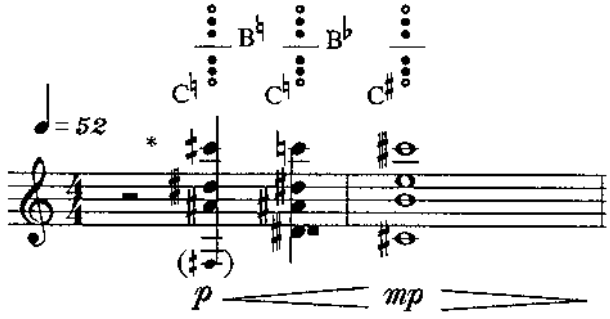


Figure 3-2 Mabry, Lament for Astralabe *(example 1)*

my preferred approach to multiphonic notation for most musical contexts. Mabry's chosen multiphonics sound a lot like the chords he writes, but this is not always the case. One problem with this approach to notation is that the sound of the multiphonic is sometimes so divergent from its appearance that it is confusing for the player. Mabry, an accomplished oboist as well as a composer, wisely notes in the piece's instructions that the work was written for a Lorée oboe and that some modification of fingerings might be necessary for other oboes. As discussed above, multiphonics that work on some makes of oboes do not work on others. For example, I can play Mabry's "Chorale" with the notated fingerings on my Lorée oboe, but not on my Laubin.

The "Chorale" includes ingenious multiphonic writing (see figure 3-3). Mabry juxtaposes dynamics in the grace note figures. The multiphonics he suggests make it easy to execute this passage: the mezzo forte multiphonic is naturally loud, and the piano multiphonic is naturally soft. The last multiphonic is later transformed with a microtonal trill. Mabry indicates that the player should open and close the indicated key (in this case, the "d" key). The gesture concludes with a grand fortissimo on a multiphonic that is naturally loud and raucous.

The excerpt in figure 3-4, from Heinz Holliger's *Studie über Mehrklänge* (chordal study), employs an ingenious approach to notation. This quasi-tablature shows the standard oboe

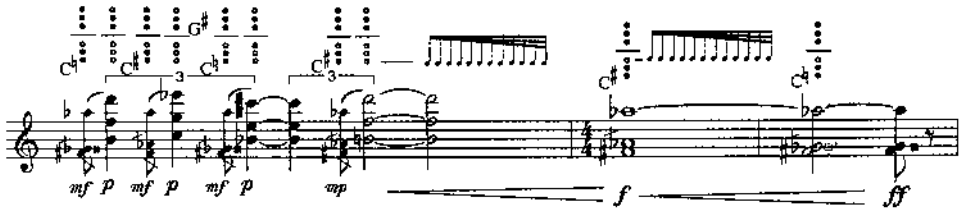


Figure 3-3 Mabry, Lament for Astralabe *(example 2)*

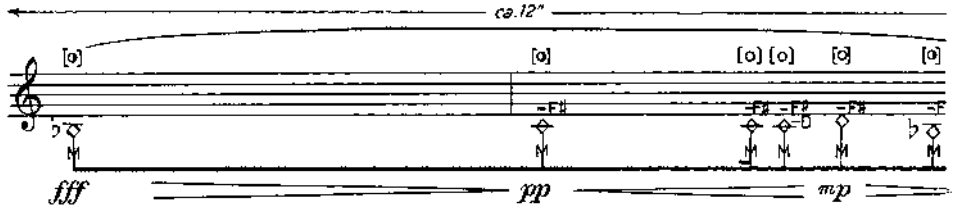


Figure 3-4 Holliger, Studie über Mehrklänge

note (indicated with a diamond notehead) with alterations given above. For example, in the gesture shown, the oboist would finger a low B♭ and open the half hole on the B key. In the next measure, the low C is fingered, and the F♯ is lifted along with the half hole. The next two multiphonics are produced by completely opening the half hole, then lifting the D key as well—and so on. Later in the piece, many techniques are applied to the multiphonics such as tremolo, trill, double trill, glissando, flutter tongue, double tongue, and circular breathing.

An advantage of this type of notation is that most oboists could sight-read it with ease. Chenna and Salmi, in *The Contemporary Oboe*, argue that multiphonics are more accurately thought of as timbral transformations rather than chords, so "it is no longer necessary to notate the presumed multiphonic sounds played."[9] Certainly this notation is clear, easy to read, and practical; however, a disadvantage is that players have no idea what sound is desired if the proposed fingering does not work on their instruments. Given the variables described earlier in this chapter, this is a very real possibility.

Elliott Carter's *Inner Song* includes a multiphonic for which he gives both Holliger's and the more conventional notation (see figure 3-5). It is clear, and there should be no question about what he wants. Another multiphonic (a double harmonic) is shown with only the conventional notation, as shown in figure 3-6.

Vinko Globokar, a remarkably inventive composer who has been at the forefront of the exploration of new instrumental techniques, proposes an entirely different approach to notation in his piece *Discours III*, for five oboes. He indicates the desired prominent pitch and the level of multiphonic complexity with a number above the notehead (see figures 3-7 and 3-8). Globokar has explained to me that he believes players should have the freedom to select the multiphonic that works best for their individual setups, and that by this point, there is enough information on fingerings available so that any resourceful player can come up with the appropriate multiphonics. Globokar's approach is practical, clear, and respectful of the integrity of the individual performer. He leaves a little to chance; however, most performances are proba-

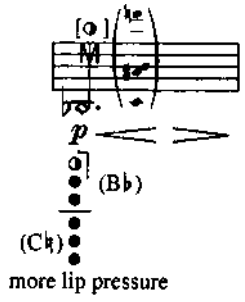


Figure 3-5 Carter, Inner Song

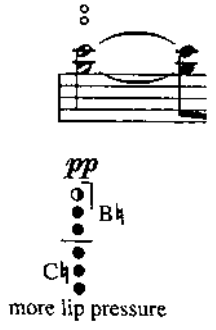


Figure 3-6 Carter, Inner Song

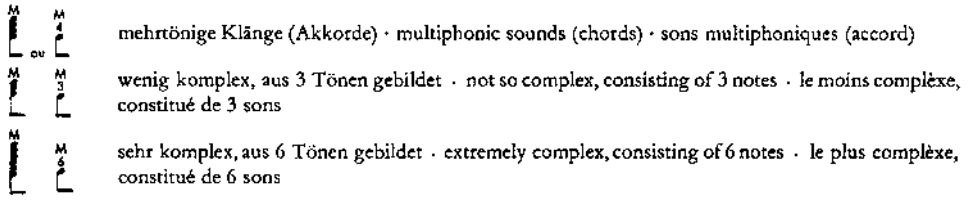


Figure 3-7 Globokar, Discours III

bly closer to his original intention than they would be if he proposed specific fingerings that didn't work for many instrumentalists. Globokar's notation suggests that certain parameters of multiphonics can be indicated (i.e., prominent pitch and level of complexity), but that precise and exact sounds cannot always be relied upon—a very practical approach.

George Brunner's *Teaching No Talking* for oboe and tape, based on a text from the *Tao Te Ching*, includes an expressive gesture in which a single low E♭ transforms into a multiphonic progression and finally dissolves into a high E♭. The composer suggests fingerings in the introduction, and simply uses graphic notation to indicate the two multiphonics (see figure 3-9). This notation is clear, and most players should be able to execute the phrase comfortably.

Another effective use of multiphonics can be found in Ronald Roseman's *Partita for Solo Oboe*. He indicates a multiphonic by using a diamond notehead and writes verbal instructions

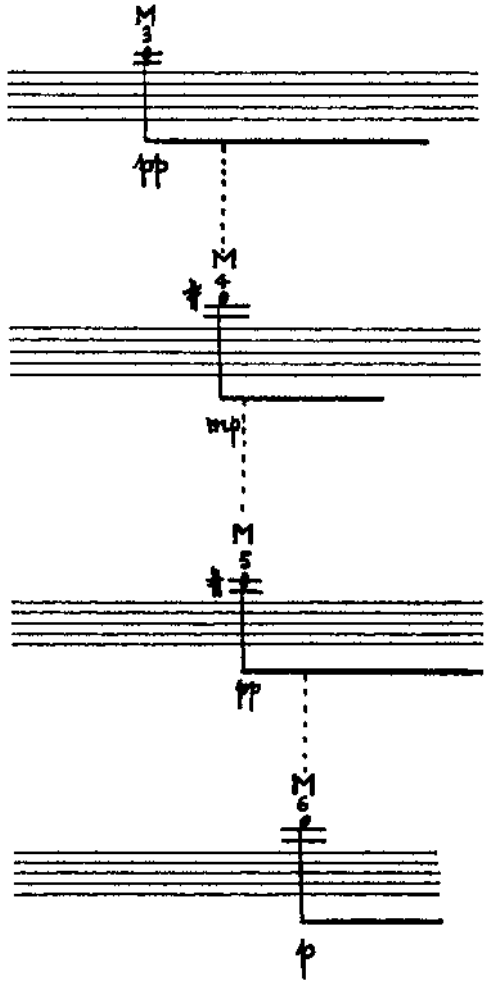


Figure 3-8 *Globokar,* Discours III

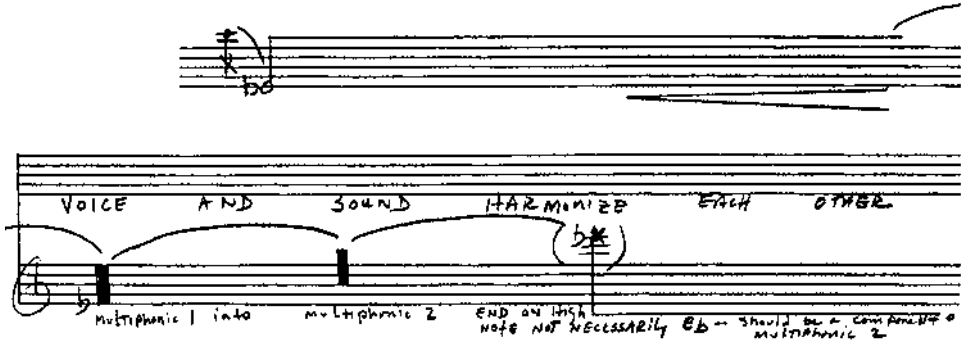


Figure 3-9 *Brunner,* Teaching No Talking

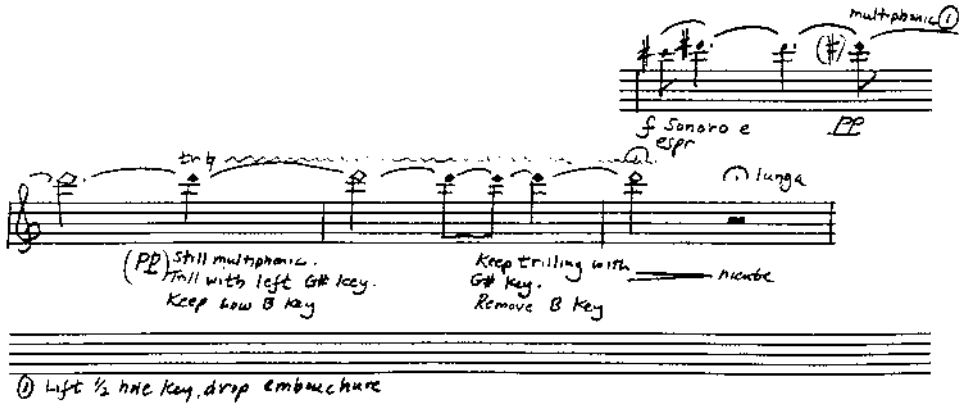


Figure 3-10 Roseman, Partita

regarding performance technique, as shown in figure 3-10. Roseman, a master oboist as well as composer, has chosen a multiphonic that is reliable on every oboe that I know. It's the sound described in the first paragraph of this chapter, the unintentional multiphonic that results (mostly) from using a relaxed embouchure for a high note. This multiphonic is easily trilled, and the pitch of the entire multiphonic is subtly lowered during the trill by lifting the B key. Roseman's notation is clear, effective, and easy to read.

Jack Vees asked me for various combinations of fingerings that could be played with lightning speed for a section of *Tattooed Barbie*. He liked combinations that included occasional

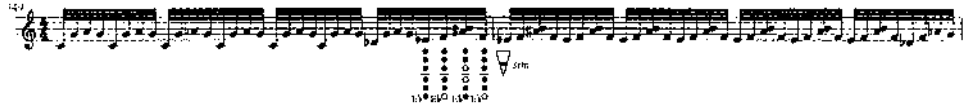


Figure 3-11 Vees, Tattooed Barbie

multiphonics. The passage in figure 3-11 is an excerpt of a section that is performed through a digital delay, accompanied by an extremely distorted 12-string guitar and manic computer-driven drumming. The resulting melange, heard on the accompanying CD track 34, is the chaotic mix the composer desired. This passage is noteworthy (not to mention note-y!) because the multiphonics fly by without delicate embouchure or air-pressure preparation. In this situation, the composer indicates exact fingerings, and there is no other convenient way to execute the passage. If a certain fingering combination doesn't produce a multiphonic or produces a sound different from what is notated, it probably wouldn't significantly alter the desired final effect: a wall of frenetic sound.

Scott Lindroth's *Terza Rima*, for oboe and live interactive electronics, includes a passage in which a multiphonic emerges from a very strong and sweeping electronic gesture (see figure 3-12). The specific multiphonics were chosen for their particularly consonant quality, and they flow almost like a chord progression. (At the recording session, the composer was amazed when I added vibrato to this passage. Why not? Multiphonics are music!) As stated in the

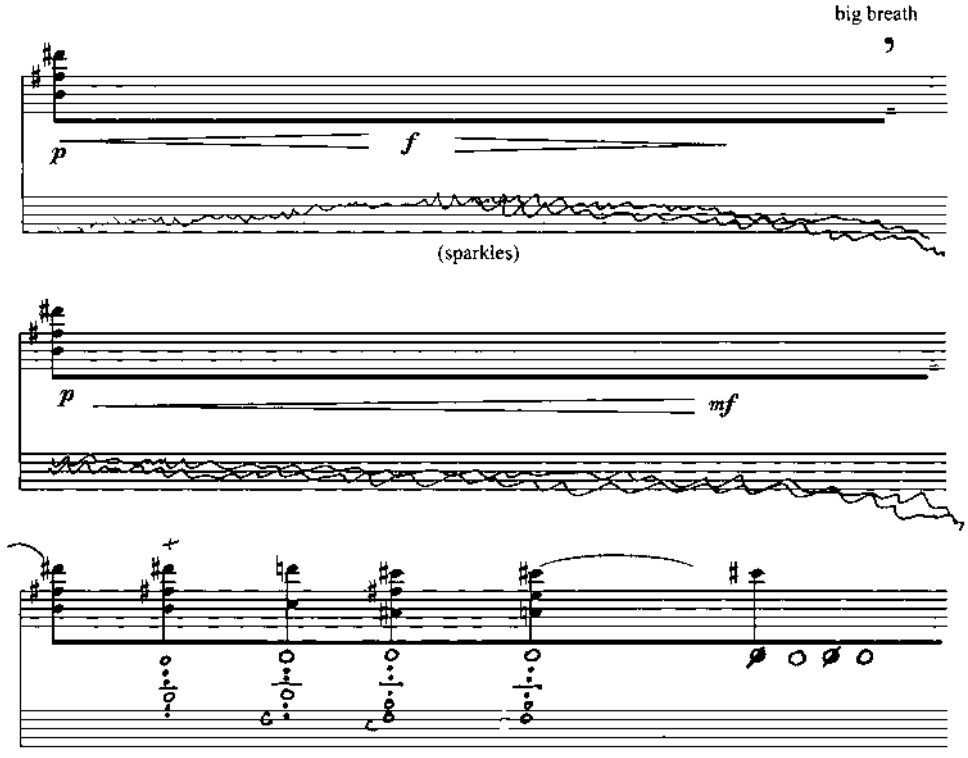


Figure 3-12 Lindroth, Terza Rima

paragraphs above, most stable multiphonics can be treated as any other musical gesture. Vibrato can subtly color a multiphonic just like any other long tone. The last fingering of the example needs only a slight addition of lip pressure to transform into the high C♯, which is then altered with a timbral trill. This excerpt is on CD track 33.

Roger Reynolds includes a number of multiphonic trills in his *Summer Island*, as shown in figure 3-13. His instructions note that *trir* indicates an irregular trill. He uses the conventional notation along with suggested fingerings for these stable and reliable multiphonics. With a sensible combination of fingerings, trills are easily executed on most stable multiphonics.

John Corigliano's *Concerto for Oboe and Orchestra* includes an excellent example of a beating multiphonic. The piece begins with a humorous quasi-tuning of the entire orchestra. The soloist enters with quarter-tone bends and eventually emerges playing a somewhat demented tune that highlights the beating multiphonic centered around A and B♭ (see figure 3-14). I have been seated next to oboists in my local orchestras who quoted this passage during tuning. It was the big inside joke for years after Corigliano's concerto was written.

Luciano Berio's *Sequenza VII* includes a poignant moment when a multiphonic emerges from a single tone, as shown in figure 3-15. Similar to the example Ronald Roseman used, this metamorphic multiphonic is derived from relaxing the lip pressure on a high note and is fairly reliable for most oboists and most oboes. The piece concludes with another gesture in which a single tone and a multiphonic are linked; however, this one does not have the seamless

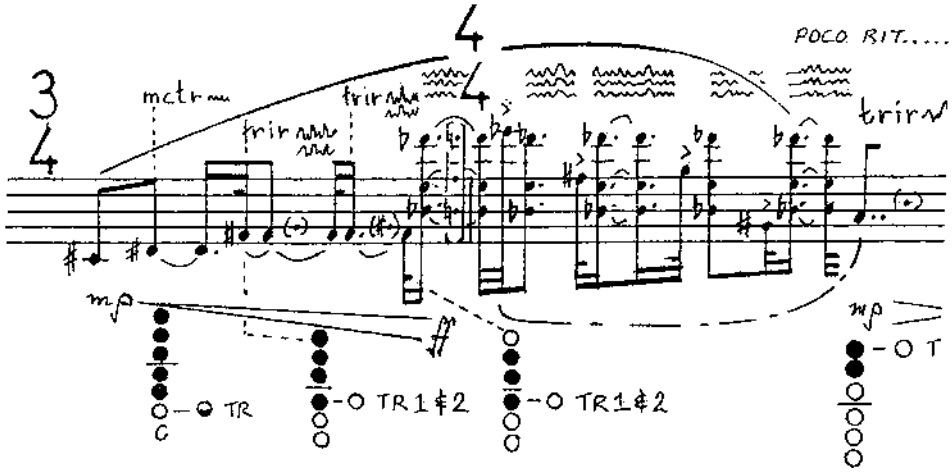


Figure 3-13 Reynolds, Summer Island

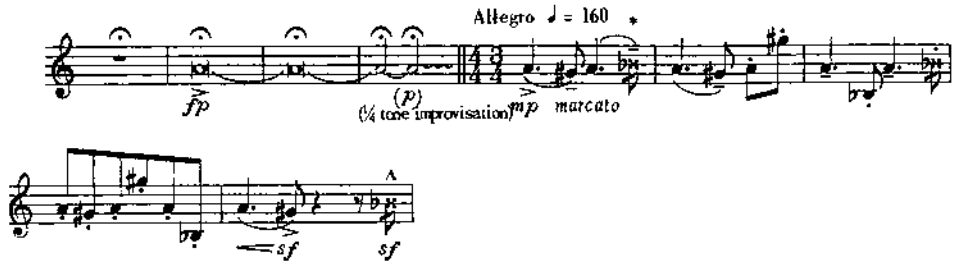


Figure 3-14 Corigliano, Oboe Concerto

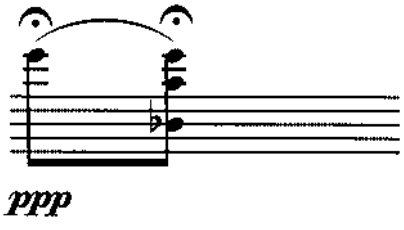
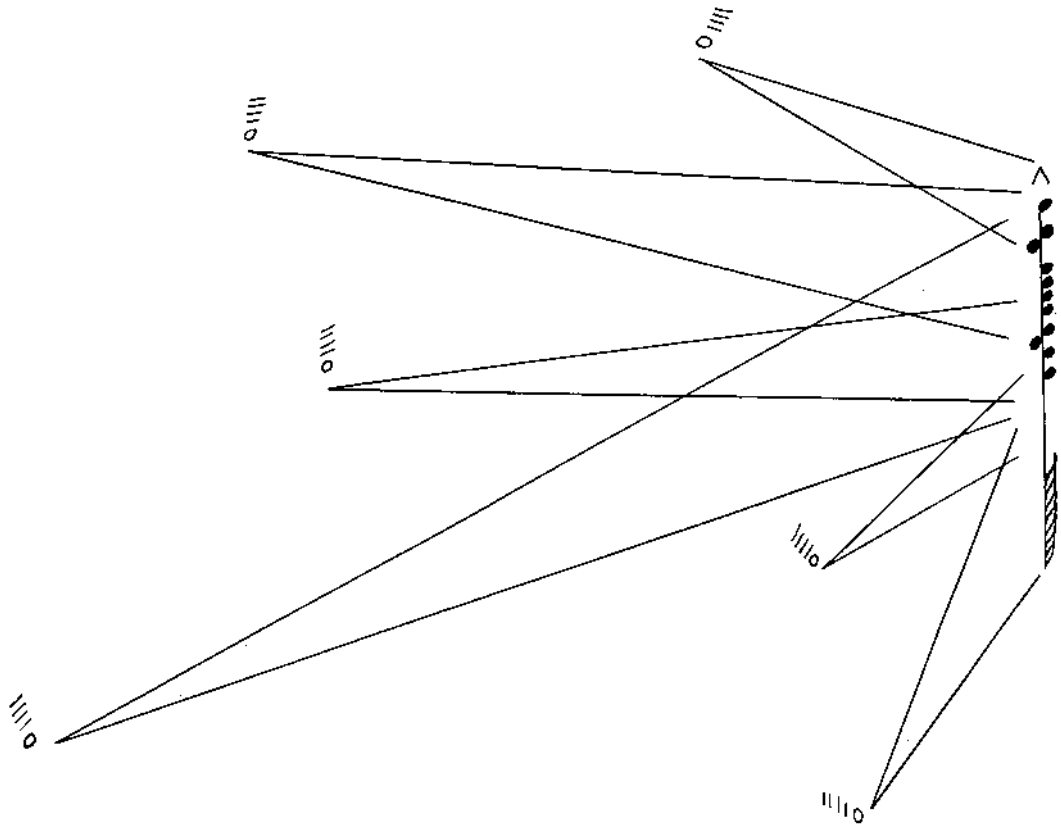


Figure 3-15 Berio, Sequenza VII

quality that occurs when the fingering stays the same and only embouchure or air pressure changes. Nevertheless, this example shows the flexibility of multiphonics: it is approached by the C harmonic, the same C is prominent in the multiphonic, and the alternative fingering that Berio suggests for the last C helps to produce the ethereal *ppp* tone required (see figure 3-16).

Berio's piece makes wide use of a particular kind of multiphonic, the double harmonic. This delicate sound is produced by slightly adjusting the fingering, air pressure, and embouchure for a standard harmonic. The interval of a fifth results. Many double harmonics are very difficult to produce and can only be played at a pianissimo dynamic. The *Sequenza* and many



Dramatic Moment (courtesy T.J.)

of the other early pieces that used double harmonics were written for Heinz Holliger who plays a Rigoutat oboe. The Rigoutat oboe differs from many others in the design of the hole under the B key. This key is always half open for double harmonic fingerings; and, accordingly, the double harmonics are easier to produce on a Rigoutat. Double harmonics can be produced with other types of oboe, but they are less flexible and more difficult to play. Berio sometimes lets a double harmonic stand alone (figure 3-17), sometimes adds a trill or double trill (figure 3-18), and sometimes approaches it from one of the component notes (figure 3-19).

Notation of double harmonics is standardized and is demonstrated by the Berio excerpt above. The two small circles are placed above the pitches that are to be heard.

All of the previous musical examples were written either by accomplished composer-oboists or by composers who collaborated closely with oboists. As mentioned in chapter 1, it is highly recommended that composers work directly with a living, breathing, squawking oboist when writing extended technique passages, especially multiphonics. Even the most reliable fingerings will sometimes produce surprising results or unexpected challenges for the performer.

Figures 3-20 and 3-21 provide fingering charts for both standard and beating multiphonics. As indicated earlier, double harmonics are sometimes rather difficult to produce. Figure 3-22 gives the standard fingerings and alternatives that have been proposed by James Ostryniec. I include some fingerings that, while not reliable for every instrument, do work well in some cases.

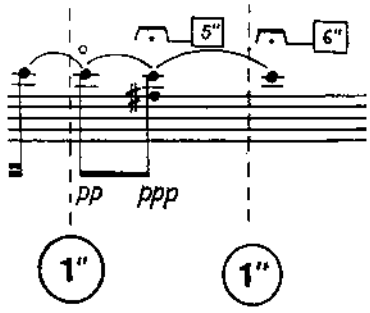


Figure 3-16 Berio, Sequenza VII

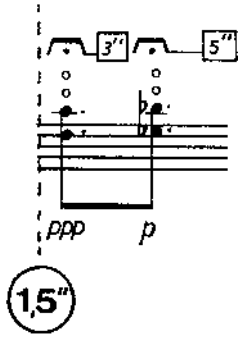


Figure 3-17 Berio, Sequenza VII

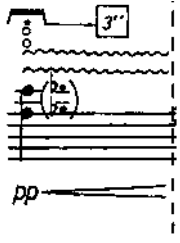


Figure 3-18 Berio, Sequenza VII

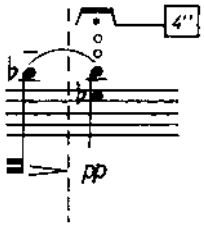


Figure 3-19 Berio, Sequenza VII

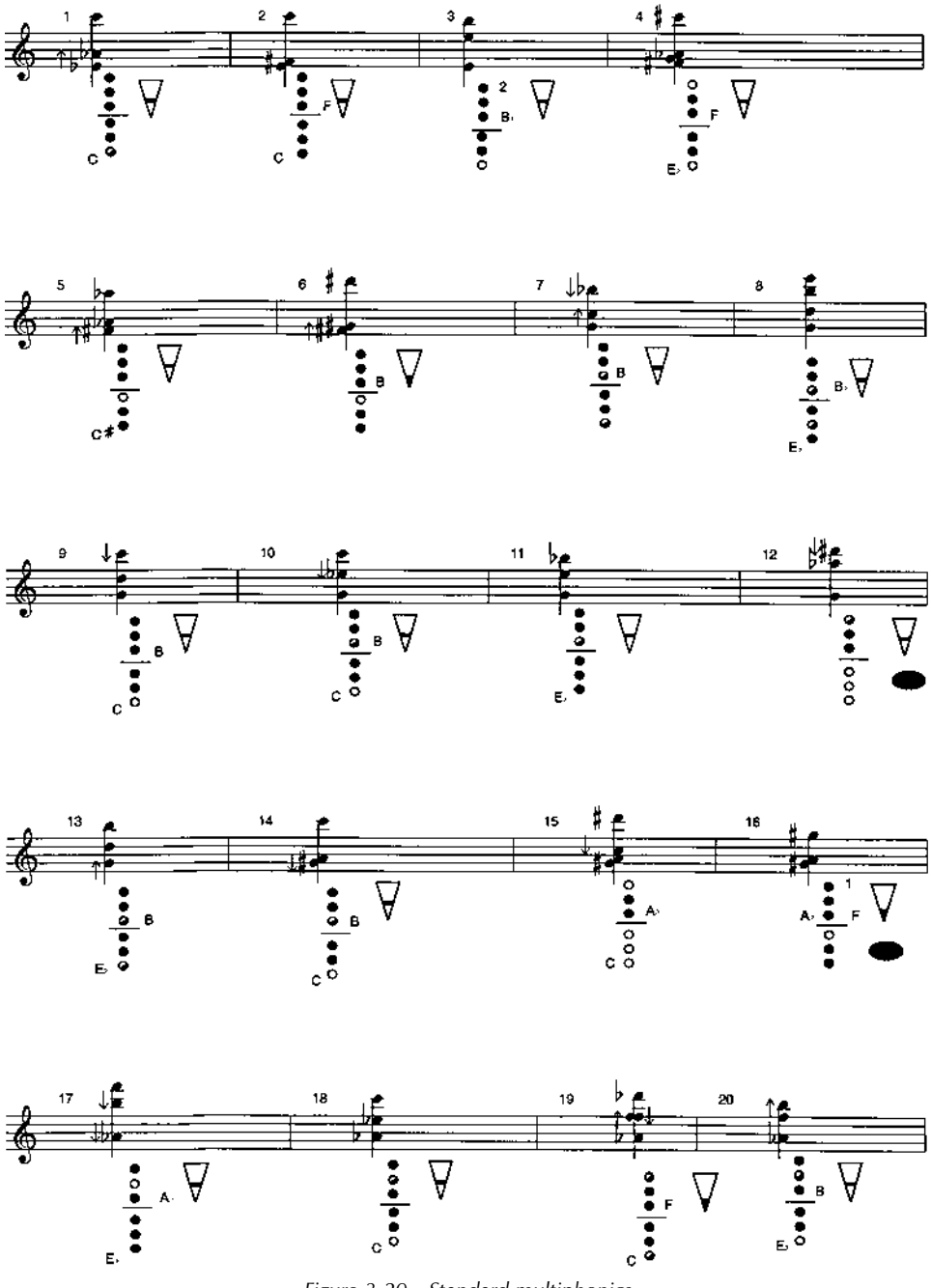
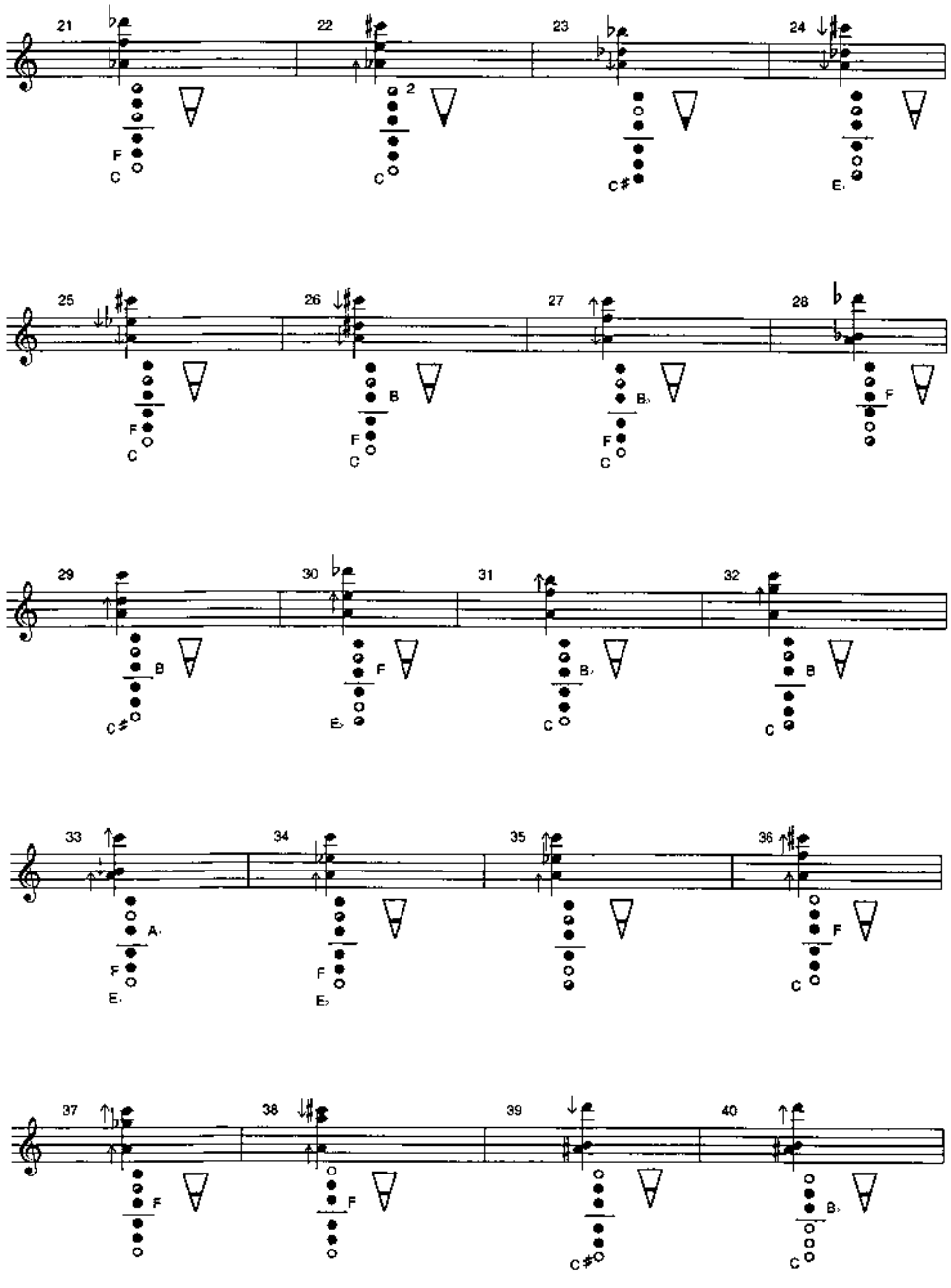


Figure 3-20 Standard multiphonics



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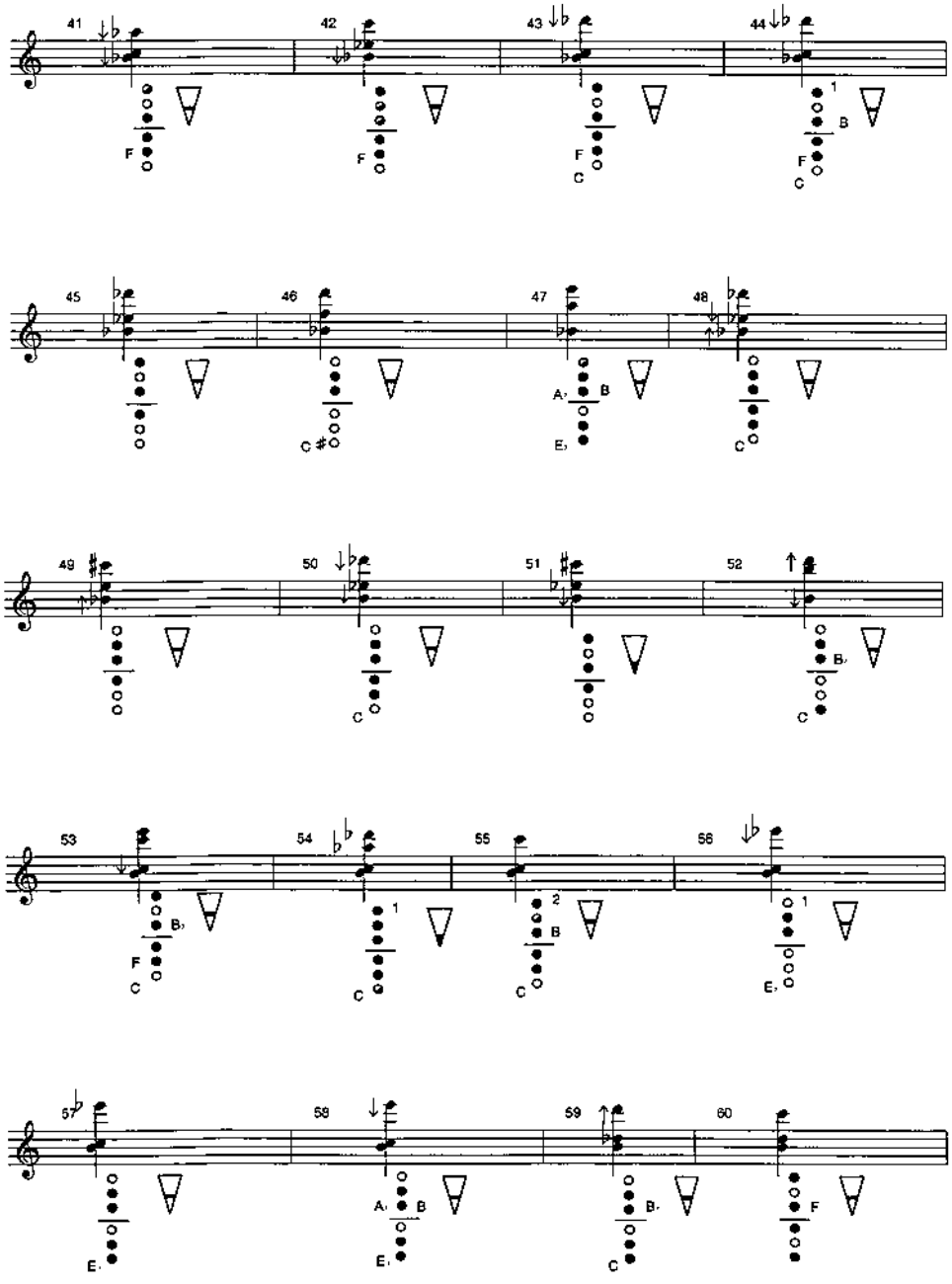

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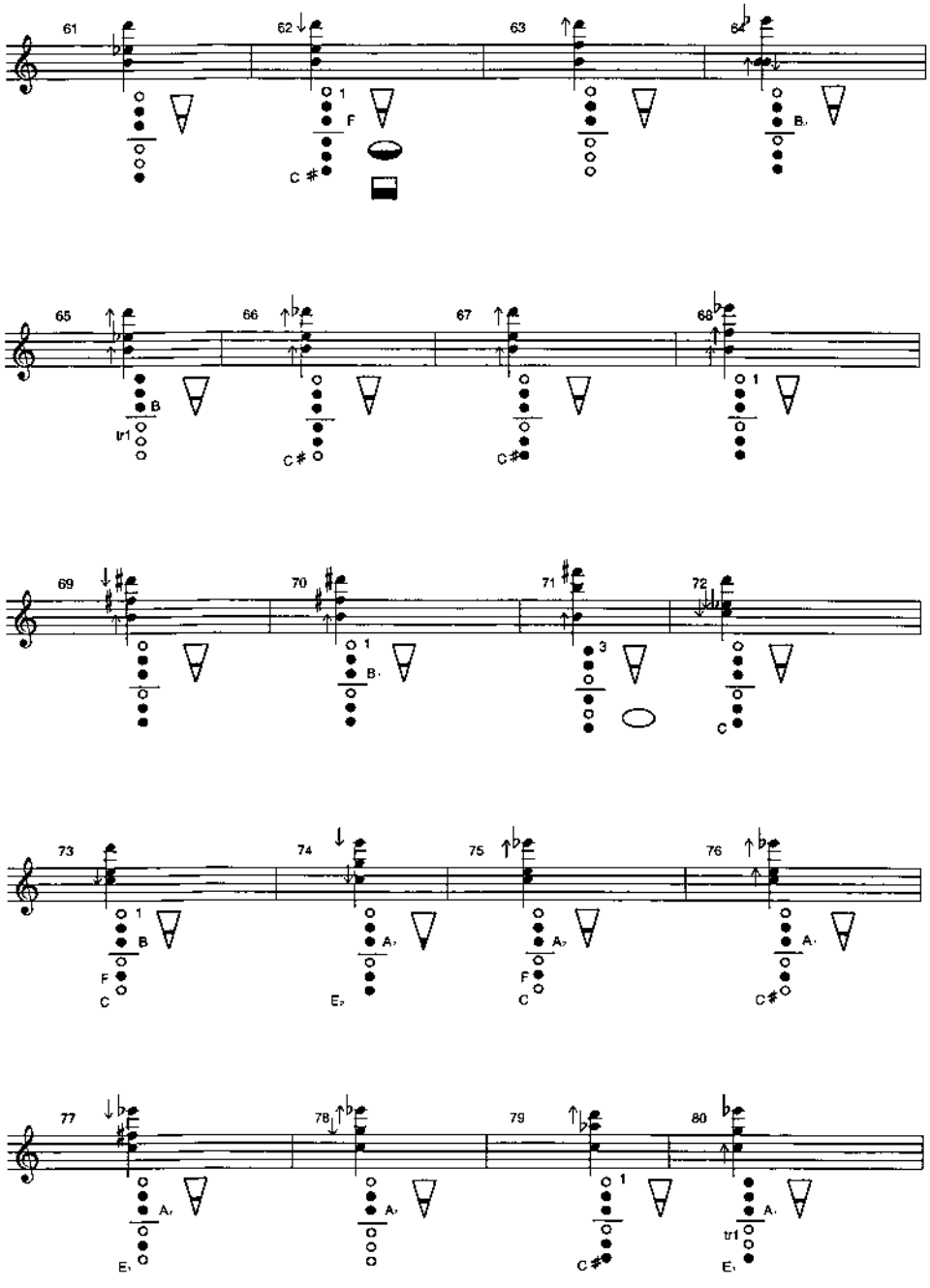

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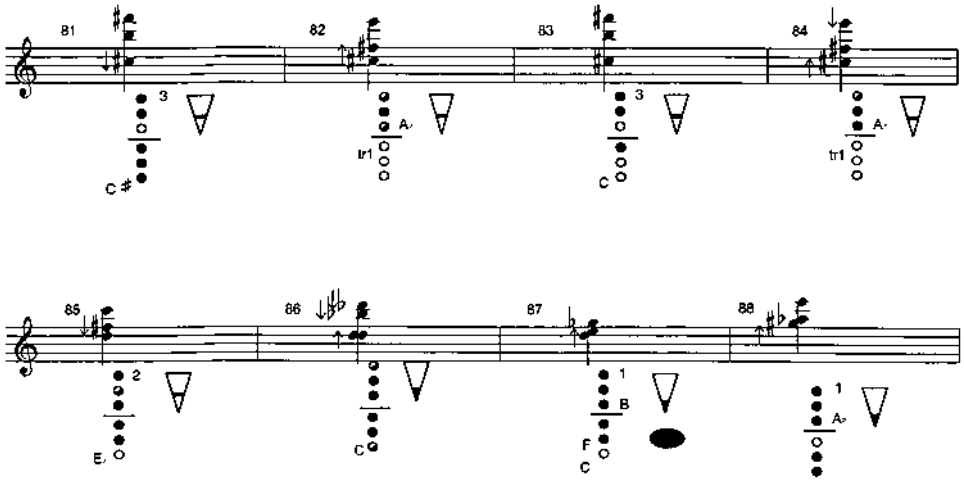

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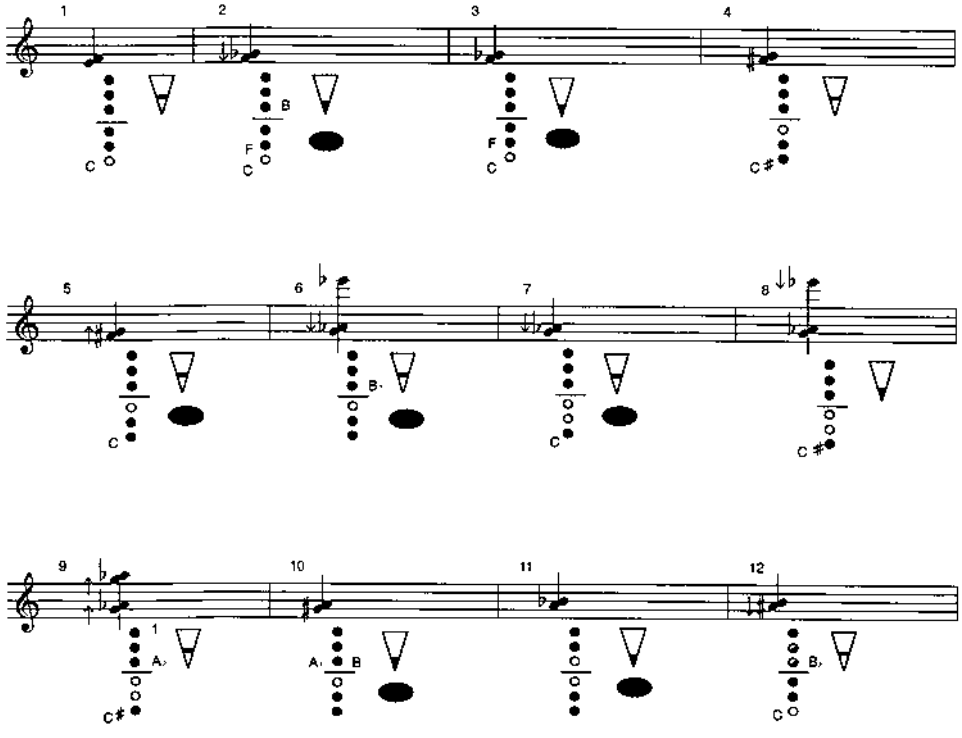


Figure 3-21 Beating multiphonics

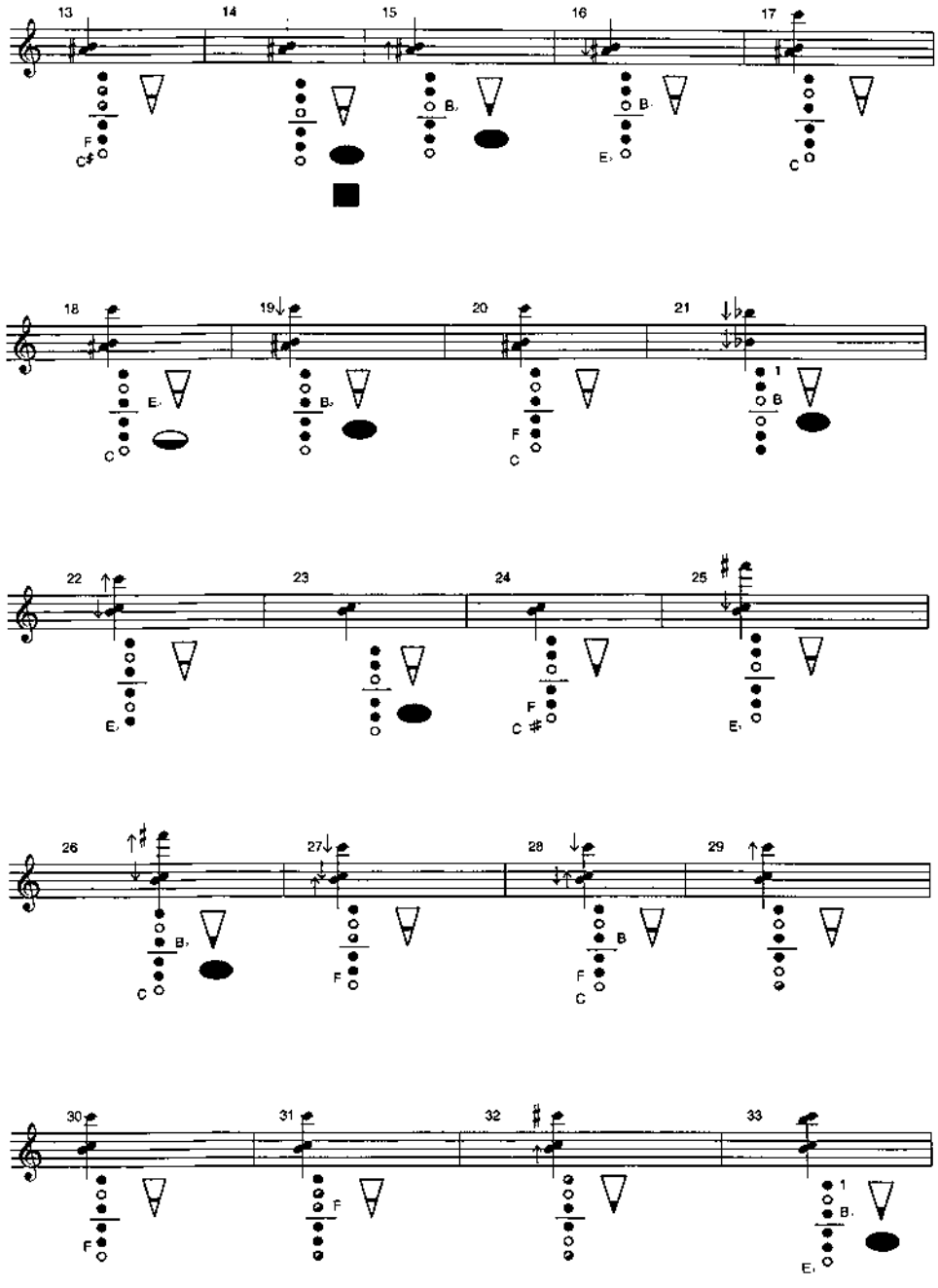


Figure 3-21 continued

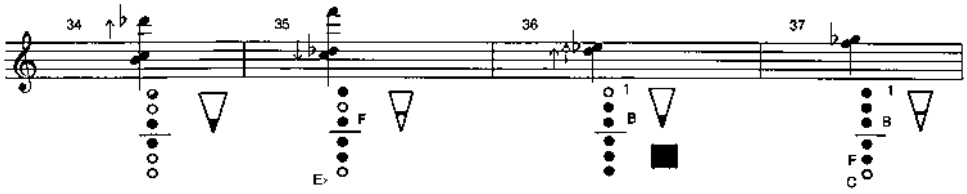
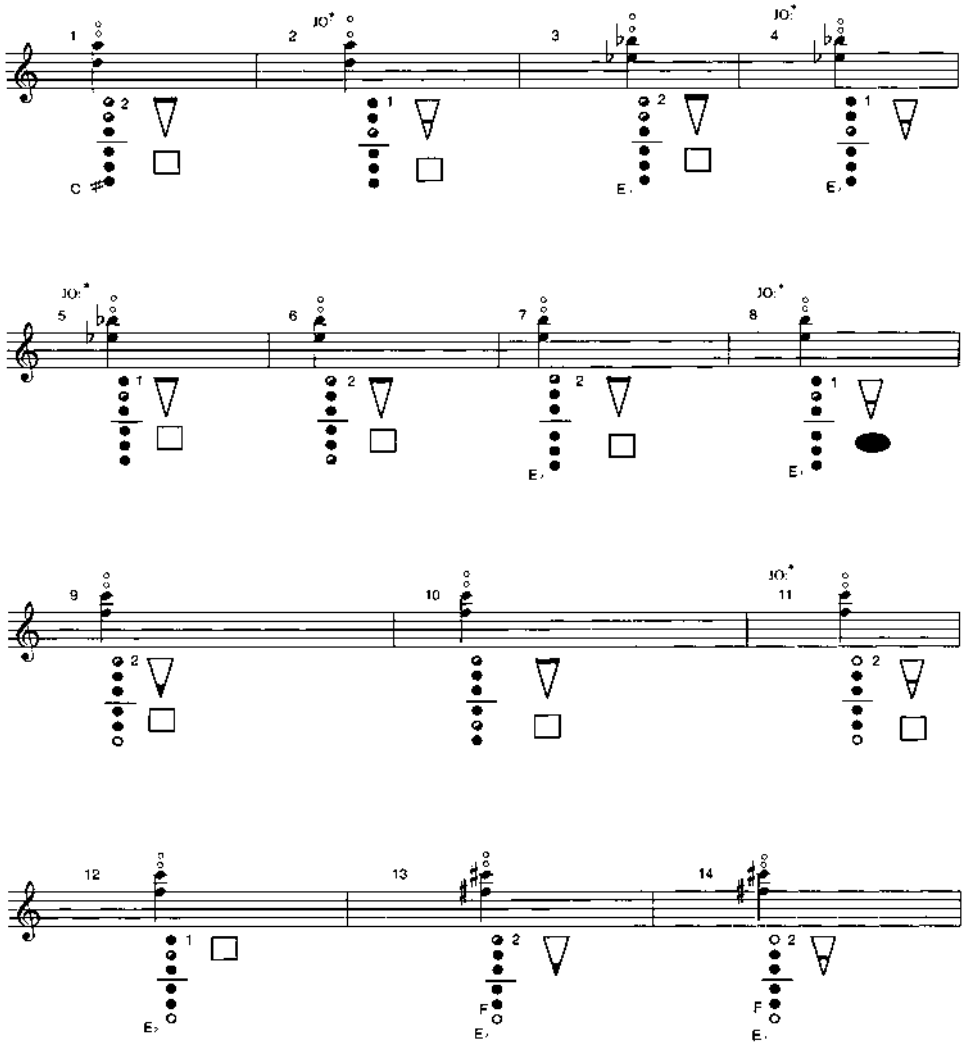


Figure 3-21 continued



*alternate fingerings suggested by James Ostryniec

Figure 3-22 Double harmonics

Many multiphonics can metamorphose into and out of a single tone with subtle changes of embouchure or air pressure. Here are a few of my most reliable favorites:

Category 1. Most notes above the C_6 can easily transform into a multiphonic with a simple change in lip pressure or reed position.

Category 2. Many beating multiphonics can emerge from the lowest pitch if the oboist plays on the extreme tip of the reed with light air pressure. Note that as the multiphonic emerges, the player can control the speed of the beating.

Category 3. This is just a sample of many possibilities. Included are fingerings that flexibly transform from a low pitch to the multiphonic and then into a high pitch. One could also play from the higher pitch to the lower pitch. Players are encouraged to experiment with lip pressures and reed positions to find other fingerings that work for their setup.

Figure 3-23 provides fingering charts for metamorphic multiphonics.

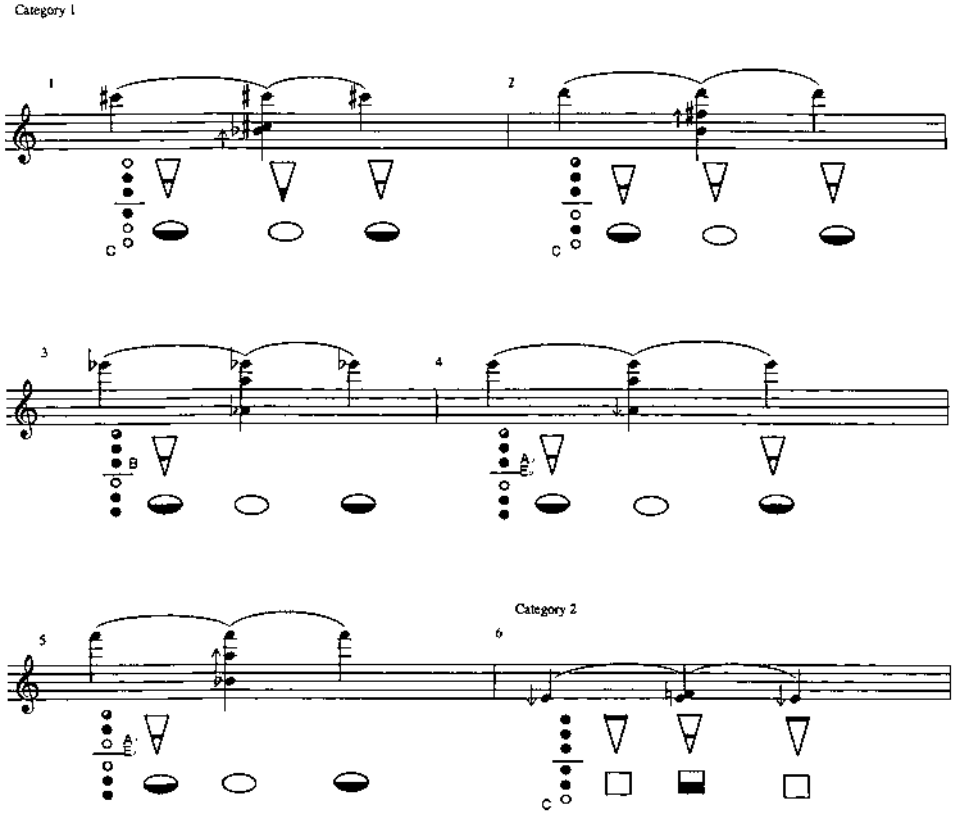


Figure 3-23 Metamorphic multiphonics

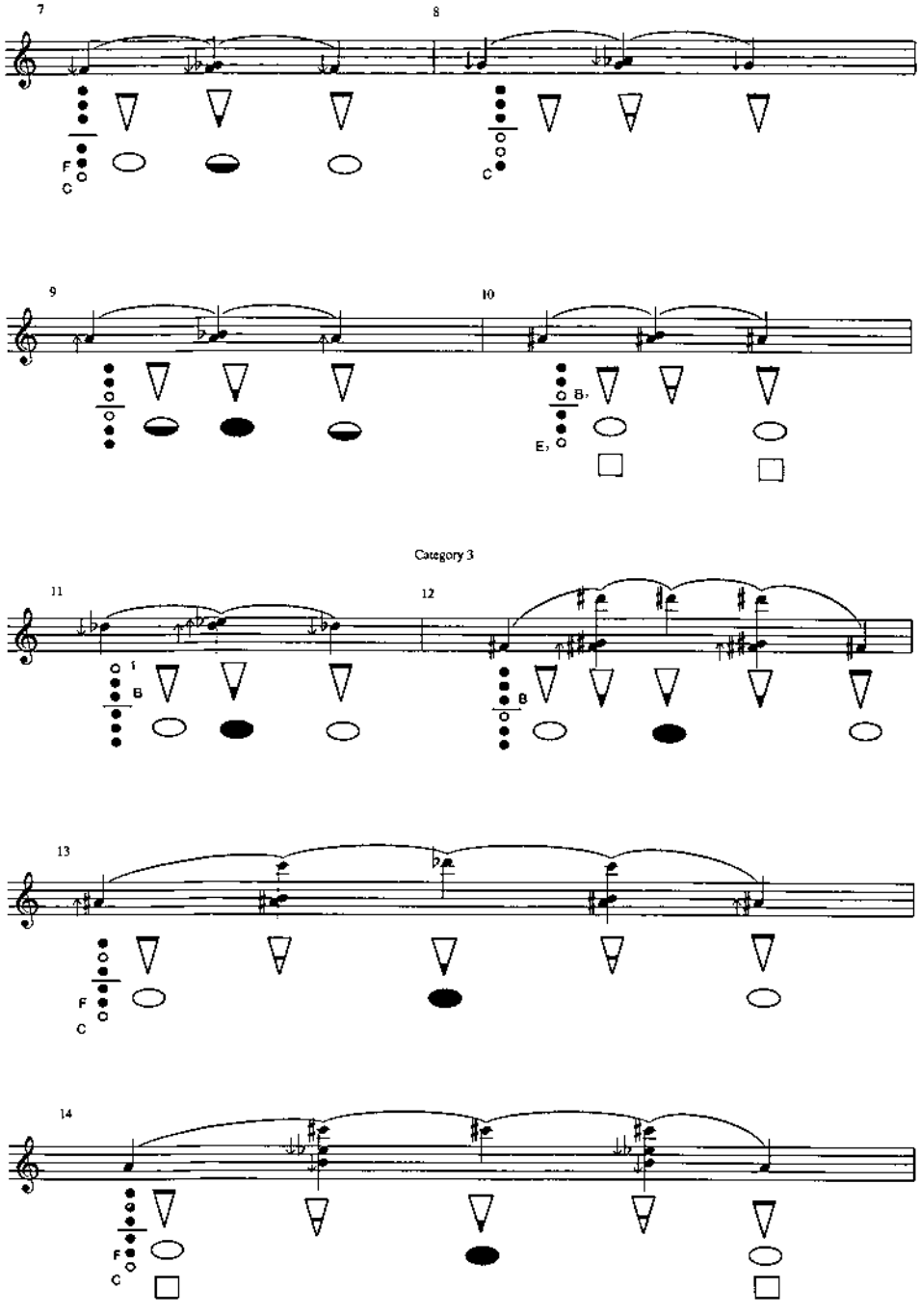


Figure 3-23 continued

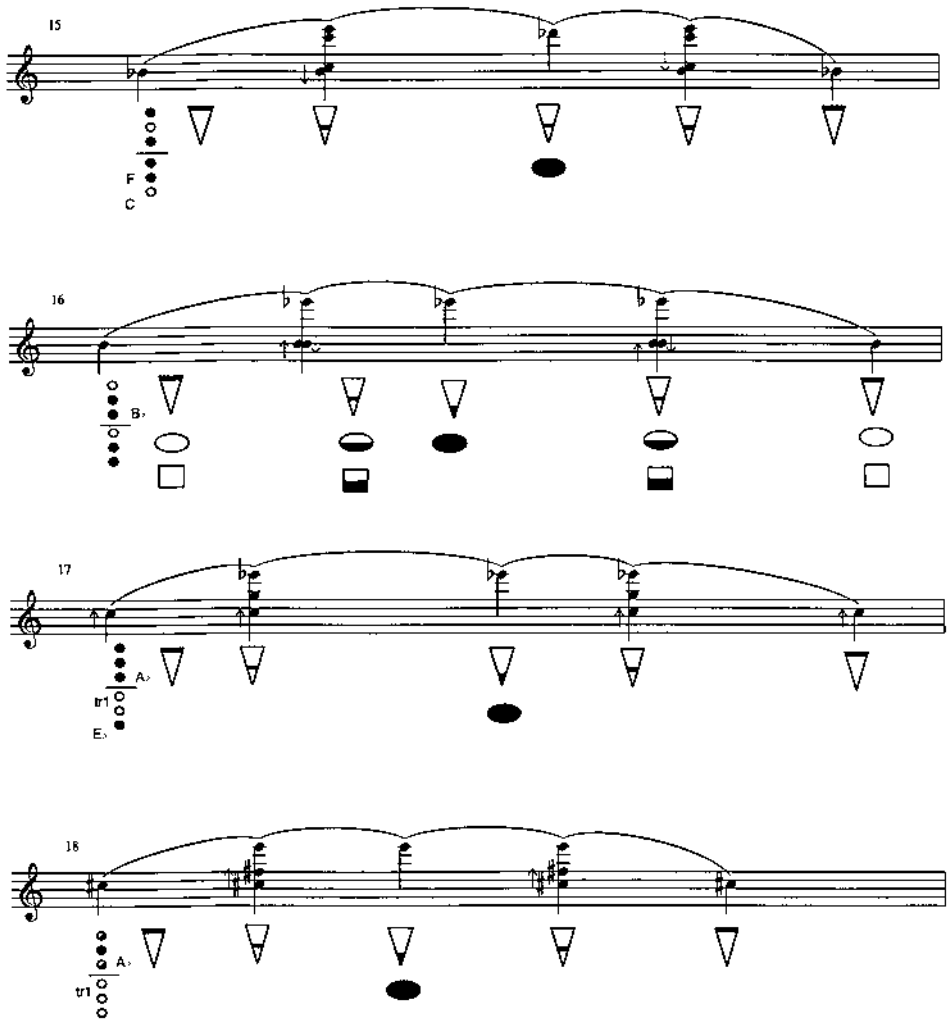


Figure 3-23 continued

Notes

1. Cornelius Nederveen, *Acoustical Aspects of Woodwind Instruments* (Amsterdam: Frits Knur, 1969), 97.
2. Arthur Benade, *Fundamentals of Musical Acoustics* (New York: Oxford University Press, 1976), 7501.
3. The testers were myself on Laubin and Lorée, Jacqueline LeClaire and Jenny Raymond on Lorée, Electra Reed O'Mara on Marigaux, and Judi Scramlin on Rigoutat.
4. For those intrepid souls who want a larger list of multiphonics, refer to Andrea Chenna with Massimiliano Salmi and Omar Zoboli, *Manuale Dell'Oboe Contemporaneo* [The Contemporary Oboe] (Milan: Ruggineni Editore, 1994); Lawrence Singer and Bruno Bartolozzi, *Metodo per Oboe* (Milan: Edizioni Suvini Zerboni, 1969); or Peter Veale and Claus-Steffen Mahnkopf, *The Techniques of Oboe Playing* (Basel, Switzerland: Barenreiter Kassel, 1994).
5. Lawrence Singer, "Woodwind Development; A Monophonic and Multiphonic Point of View," *Woodwind World* 14 (June 1975): 14.
6. Veale and Mahnkopf. *The Techniques of Oboe Playing*, 75–123.
7. Heinz Holliger, ed., *Pro Musica Nova, Studies for Playing Avant-garde Music for the Oboe* (Wiesbaden, Germany: Breitkopf & Hartel, 1972), 42–45.
8. Chenna, Salmi, and Zoboli, *Manuale Dell'Oboe Contemporaneo*, 25.
9. Chenna, Salmi, and Zoboli, *Manuale Dell'Oboe Contemporaneo*.