

Notes Inégales  
and rhythmic alterations  
of the  
18<sup>th</sup> and 19<sup>th</sup> centuries

By Steve O'Connor

November, 2005

## Foreword

Among the many problems that besets the pursuit of historic performance, especially in music of the baroque period, few are as complex as the uncertainties surrounding the rendition of performance convention of dotted rhythms, also known as “uneven notes,” or in French repertoire, “*Notes Inégales*.”

In the following research project I have attempted explain the primary rules which surrounded this practice.

Steve O’Connor  
Los Angeles

Composition of music for the organ and harpsichord reached a pinnacle in the music of the 17th and 18th centuries. Much of the body of literature that serious organists perform today is from this period. In order for a modern performer to reproduce an “authentic” performance of this repertoire, a working knowledge of the improvisatory playing style of the period must be understood. Anna Linde, in her preface to François Couperin’s *The Art of Playing the Harpsichord* states,

“The modern player will have to readjust himself, and the listener learn to understand that only by a really faithful rendering of the old music, adapted to the instrument, can the latter reveal all the charm and freshness of quality which is its own.”<sup>1</sup>

The manner in which music was to be performed in this period was primarily understood by convention, that is, was not written down, was passed on from student to teacher, and assumed to be a part of the skill base of a performer. Turner tells us;

“There are a number of reasons why at that particular time in the development of music such conventions should appear. The transition from the Renaissance to the Baroque period was a time when there still existed a close connection between composition and performance. For centuries, much of the organ music in the church was [at least in part] improvised. Some of this music was then written down but often it was not. For centuries it had been assumed that the performer would introduce into the written text such additional material as seemed to him appropriate and in good taste. Improvisation, both in pre-composed and extemporaneous performance was a part of the equipment of every musician whether he was a vocalist or an instrumentalist. Not only did composers expect that performers would provide the appropriate and necessary adornments to the basic material given them, but they also assumed that in many instances these additions would conform to well known and accepted patterns. Many of the improvised additions were matters of common practice and might in some instances be labeled stereotypes.”<sup>2</sup>

---

<sup>1</sup> Couperin, François, *The Art of Playing the Harpsichord*, Breitkopf & Härtel, Wiesbaden Gr.1933 Preface.

The Baroque period emerged from a time when musical notation was in a state of non-uniformity and change. Conventions arose because the notation of the times was not adequate to express what the composer intended. We note that earlier music was essentially monophonic, thus writing down what was intended was not complex. As the polyphonic style grew, a more efficient way of helping singers and players to stay together and play or sing the proper notes was needed. Another reason for the use of rhythmic and other conventions is the difficulty encountered in printing. To set down on the manuscript all of the notes called for by the elaborate ornamentation of the period would have used up a tremendous amount of time and energy, not to mention ink, resources that were not necessarily readily available.

Rhythmic alteration was an important part of Baroque performance convention and practice, especially in French music. This is evidenced by the fact that nearly every French theoretical treatise written between the years 1550 and 1750 dealt with various types of rhythmic alteration. In addition to treatises, we often find information in the prefaces to printed music written by the composer, himself, giving specific instructions to aid the performer. Collins gives us an insight to the complexity and variety of these rhythmic alterations;

“The “Scotch snap” or “Lombardian” rhythm which requires a short-long interpretation of notes written equally is one kind of rhythmic alteration. The Baroque custom of double dotting, familiar in the slow sections of the French Overture would be another example. Still another typical rhythm of the period is the one in which a triplet figure in one part is opposed to a duple figure in another. Increasingly research tends to indicate that these opposing rhythms were

---

<sup>2</sup> Turner, Jet, *Treatises by Bacilly, Loulié, and Démoz: Their application to the “Mass for the Convents” by F. Couperin*. Thesis. 1974 Univ. of Wisconsin. P. 23.

smoothed out in actual performance to either a duple or a triple rhythm rather than the strict performance according to the written text.”<sup>3</sup>

One of the most important conventions of rhythmic ornamentation in the period, was the use of dotted rhythms, also known as “uneven notes,” or in French repertoire, “Notes Inégales.” This practice, “assumed” by performers of the time, was rarely written as it was to be performed. The practice of “uneven notes” was prevalent throughout Europe, especially in France and in “French style” music throughout the continent, and was a controversial issue even among the theorists of the 17th and 18th centuries – hence it need not surprise us that the controversy persists to the present day.

In this short research effort, I would like to explore rhythmic alterations and the use of the specific conventions known as *Notes inégales*, in the music of the baroque period, hoping to “sort out” some of the mystery in performing in an historically “informed” manner.

Three types of rhythmic alteration were prevalent in the “French style” of the 17<sup>th</sup> and 18<sup>th</sup> centuries, *overdotting*, *synchronization*, and *uneven notes* (Notés Inégales). Overdotting means that the dot after a note is to be lengthened by a second or even a third dot, or a corresponding silence, and that the short note that follows the dot is to be played as late as possible. Synchronization means that if, for example, there are dotted quarters in one voice and dotted eighths in the other, the short notes following the dot must be played simultaneously and as quickly as possible, in other words, the two voices “synchronize” and play together, no matter how the notes on the page are written.

---

<sup>3</sup> Collins, Michael, *The Performance of Triplets in the 17<sup>th</sup> and 18<sup>th</sup> Centuries*. JAMS, Vol. XIX, Fall, 1966.

This manner of performance supposedly originated in France, where it permeated the overtures and dance music of the Lullian era. Thanks to the continental attraction of “all things French” of the time, this style spread across Europe. The result was an almost international convention that lasted through the 18<sup>th</sup> century. Couperin, Rameau, Bach and Handel all felt its influence.

Neumann states that the term *Inégales* should be applied specifically as a convention of French music. He defines the term as “the uneven (long-short or short-long) playing of evenly written pairs of notes that are subdivisions of a beat. The first documentation regarding uneven playing begins to appear around the middle of the 16<sup>th</sup> century.

“Át that time in Spain , Santa Maria reports patterns of long-short and short-long; and Bourgeois in France mentions long short inequalities. In 1602 Caccini in the *Nuove Musiche* demonstrates the long-short dotted pattern as one of many different ways in which rubato-style rhythmic manipulations can be applied to a vocal melody. Cerone, in 1613, describes long-short inequality for contiguous melodies and Frescobaldi in 1614 suggests, in the Preface to his Toccatas, short-long patterns in some specific cases of 16<sup>th</sup> notes (when they are combined with 8<sup>th</sup> notes).”<sup>4</sup>

These rhythmic alterations were a form of simple ornamentation without adding notes. The purpose was simply to give more grace and elegance to a melody by changing a plain and square rhythmic pattern into a lilting and more varied one.

Early in the period, specific principles were established regarding the relationship between the meter and type of note subject to inequality. The first of the two notes is a consonance, the second is a dissonance (this is the basis for the frequently encountered description “good note /bad note” description of notes in rhythmically altered passages of

---

<sup>4</sup> Neumann, Frederick, *Essays in Performance Practice*. UMI Research Press, Ann Arbor, Michigan. 1982. p.20.

music). In short, inequality applied to pairs of notes that move in stepwise progression and are subdivisions of the basic metrical unit.

These conventions remained virtually unchanged until the late 18<sup>th</sup> century. From early French Musicological treatises we have a clear, fairly uniform picture of how this convention was applied in music. These treatises discuss the manner of performing inequality, the rules that determine which notes are to be even and which are eligible for unevenness, the nature of the inequality, and the exceptions to the rules.

One of the earliest references to the practice of *Notés Inegales* appears in a treatise *Droit chemin de musique* written by Louis Bourgeoise, a music teacher, and published in Paris in 1550. Bourgeoise is credited as one of the composers of the Genevan Psalter. In his treatise, Bourgeoise actually describes how *Notés Inegales* were to be performed.

“The way of singing well the quarter notes in these signs of diminution is to sing them as by two and two, dwelling for a somewhat longer time on the first than on the second: as if the first had a dot and the second one a tail. The first is a consonance and the second more often a dissonance, or as some say a “bad” note (chord). For musicians have such liberty in singing them in this way rather than all equal. One must do the same with eighth-notes in the regular meters.<sup>5</sup>

It is interesting that not only is this treatise valuable to musicological research on the performance of altered rhythms, but it tells us that these convention were well established by the late Renaissance period.

Bourgeoise goes on to explain that *Notés Inegales* are to be applied only to notes which move in conjunct (step-wise) motion and never to those which move in disjunct motion. He tells us that the alteration of values which takes place does so within the beat.

---

<sup>5</sup> Powell, Newman, *Rhythmic Freedom in the Performance of French Music from 1650-1735*. Stanford University, 1959, p. 50-51.

These two points are reiterated in many later treatises. Finally Bourgeoise discusses the length of time that the notes are to be held; “dwelling a little longer on the first.” The non-specific nature of this description of length reminds us of the difficulty in accurately describing matters of time in music during this early period. It also reminds us that the execution of ornamentation, in general, was a decision left to the performer. “The matter is one of ‘good taste’ and thus not susceptible to scientific measurement of analysis.”<sup>6</sup>

In 1717 Couperin (Le Grand) published *L’Art de toucher le Clavecin*. In it, he gives specific instructions regarding Notés Inegales.

“There are, it seems to me, some faults in our way of writing music which correspond to the manner of writing our language. We write differently than we play: this is the reason that foreigners play our music less well than we play theirs. On the contrary, the Italians write their music in the true values in which they think of it. For example, we dot successive eighth notes which follow in step-wise motion. However, we write them equally. Our usage has served us well and we continue in it.”<sup>7</sup>

Donnington defines Notés Inegales as: “a prominent convention of Baroque notation whereby, in a number of different contexts notes are to be performed in a rhythm other than that shown in the written text.”<sup>8</sup> He also says; “among the expressive liberties taken for granted by early performers was the right to modify a four-square rhythm by performing unequally certain notes which are written equal.”<sup>9</sup>

---

<sup>6</sup> Mellers, Wilfred, *François Couperin and French Classical Tradition*, Dover ed., 1968, p. 39.

<sup>7</sup> Couperin, François (Le Grand), *L’Art de toucher le Clavecin*, Paris, 1717, p. 39.

<sup>8</sup> Robert Donington *Inégales*, in *Groves, dictionary of Music and Musicians*, 5<sup>th</sup> ed. Eric Blom. London, 1954, Vol. IV, p. 477.

<sup>9</sup> Donington, Robert. *The Interpretation of Early Music*, Faber and Faber, London, 1963, p. 386.

Simply stated, it is specifically the changing of a rhythmic pattern from a series of notes written evenly into one which uses a long-short rhythm.

Neumann gives us an excellent summary:

“1). Inequality applies to pairs of certain notes that move in stepwise progression and are subdivisions of the basic metrical unit. 2) Inequality is long-short, practically never short-long. 3). Notes not subject to inequality must be played very evenly. 4). The convention applies to French music only. 5). Inequality is subject to many exceptions.<sup>10</sup>

Let us discuss each of these points in more detail.

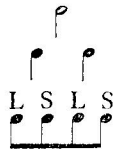
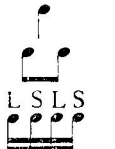
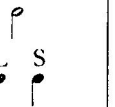
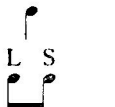
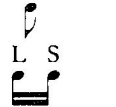
1). *Notes eligible for inequality.* The meter of a piece determines which notes are eligible for inequality and which must be played evenly. Only notes that move in stepwise progressions, and are subdivisions of the beat are subject to inequality.

Inequality May never be applied to note the values representing the metrical unit itself such as the quarter note in 4/4 time or the eighth note in 3/8 time. Thus the time signature determines which notes may be played with inequality and which notes must be played evenly. In duple meters the metrical units must be divided into four parts before inequality applies. In triple meters inequality applies to two part subdivisions. Table 1 below represents these metrical and notational relationships.

---

<sup>10</sup> Neumann, Frederick, *Essays in Performance Practice.* UMI Research Press, Ann Arbor, Michigan. 1982. p.21.

Table 1  
The Two Categories of Inequality\*

FIRST CATEGORY		$2, \text{C}$ (two beats)		$\frac{2}{4}, \text{C}, \text{C}$ (four beats) $\frac{3}{4}$			
Meter							
Metrical unit	equal						
Subdivision in two	equal						
Subdivision in four	unequal						
SECOND CATEGORY		$\frac{3}{2}$	$3, \frac{3}{4}$	$\frac{3, 4, 6, 9, 12}{8}$			
Meter							
Metrical unit	equal						
Subdivision in two	unequal						

11

As has been mentioned the prerequisite of stepwise progression in use of inequality is well documented. Flexibility of applying inequality to stepwise melodies may occur when the entire melody is predominantly stepwise and linear, that is to say, the performer may, with careful discretion, choose to not use inequality if the entire melodic line of a section or piece is stepwise and linear. He may then opt to perform parts of it equally based on “good musical” decision making.

On the other hand, a melody moving by skips clearly implies equality of the notes which (per the meter) are eligible for inequality in stepwise progressions. In addition, skip motion also implies *detached* playing interpretation, unless specifically countermanded by a slur marking.

<sup>11</sup> Neumann, Frederick, *Essays in Performance Practice*. UMI Research Press, Ann Arbor, Michigan. 1982. p.22.

“A definite bond existed between inequality and legato; between equality and detached articulation. This explains why the terms *Détaché* or *Marqué*, or dots over the notes, indicate not only staccato playing, but also imply cancellation of inequality.”<sup>12</sup>

2). *Inequality is to be performed Long-Short*. The long note of the unequal pair falls on the beat (inequality is almost never short-long). Time and time again, the treatise writers specifically describe notes played in a long-short manner. Many went to great lengths with exhaustive written out musical examples to ensure that long-short was not to be mistaken for short-long. However, there are some, though rare, occasions where a short-long pattern is described. After exhaustively explaining the various types of long-short patterns, for example, Lully writes, almost as an after-thought;

“In the second part I have forgotten to mention, when I spoke of the triple meters, that the first half of each beat can also be played in [another] manner, to wit: by playing the first note shorter than the second.”<sup>13</sup>

The degree of inequality varies from treatise to treatise. We can safely assume that a great deal of flexibility existed in this matter. The extent to which the first note of an unequal pair was lengthened was from almost negligible to the equivalent of a full dot. However, its length never exceeded a full dot in value.

3). *The evenness of the Notes Égales*. As we have described, notes that were not eligible for inequality were expected to be played very evenly. It is interesting to note that treatise writers so specifically demand absolute precision in the execution of even notes that they describe manners in which to ensure it. These may seem almost amusing to we modern musicians who grew up using the metronome (which did not exist until the

---

<sup>12</sup> Neumann, Frederick, *Essays in Performance Practice*. UMI Research Press, Ann Arbor, Michigan. 1982. p.23.

<sup>13</sup> Ibid. p.23

19<sup>th</sup> century). The following is an example of the lengths writers went to describe the rhythmic precision they expected.

“French musicologist, David, pointedly declares that notes representing the beats, and those representing the first subdivision that are not subject to inequality, have to be played with the precision of the pendulum of a well-adjusted clock.”<sup>14</sup>

4).The convention of *inequality applies to French music only*. In 1698, Lully states (in italics for emphasis) that inequality does not apply to any non-French music. He further states that non-French musicians write out the rhythmic patterns that they intend, that is, if they want uneven notes, they write them that way, unlike the French convention where unevenness is not written, but expected in its playing. Other writers including Couperin, Rousseau, and Corrette all indicate the same thing.

5).*Inequality is subject to many exceptions*. The primary exceptions have already been stated, that is, inequality does not apply to foreign music or to French music that is patterned after foreign (non-French) models. It does not apply to melodies that move by skip.

The other big exception simply is that of the performer’s artistic license, that is, don’t do it if you think it is better not to. We are well served at this point to recall that Renaissance and Baroque performers were expected to make decisions regarding ornaments and improvisation far more than modern musicians. In fact, much historical documentation has come to us indicating that performers were judged heavily on the manner in which they ornamented and improvised music. We can assume that complex polyphony (rare in 18<sup>th</sup> century French music) was not conducive to the use of inequality. It more naturally resides in homophonic music with a prominent melodic line. Orchestral

---

<sup>14</sup> Neumann, Frederick, *Essays in Performance Practice*. UMI Research Press, Ann Arbor, Michigan. 1982. p.28.

works and chamber works tend not to lend themselves to use of inequality as much as works for solo instrument or voice, as the very nature of the inequality is a free, rubato-like rhythmic manipulation of a melodic line. The degrees of inequality were arbitrary as well, thus if used in orchestral or chamber works, would tend to result in more confusion than precise ensemble playing. Therefore, the greatest use of inequality occurs in works for organ, harpsichord, vocal arias and songs, and instrumental solos.

Finally, composers themselves expressly called for exceptions to convention of inequality by writing directives in the score. Indications such as *Notes Égales* and *Croches égales* were often placed in the work to ensure the passage was played evenly. Markings calling for detached or staccato playing, such as the words *Detaché*, *Marqué*, and *Martelé*, as well as dots or dashes over the notes were also understood to countermand inequality, as we have stated above.

The question arises as to what to do with notes whose values are smaller than the *Inégales*, such as 32<sup>nd</sup> notes in 4/4 meter. Most period authorities suggest that the inequality applies to the fastest note, with the 32<sup>nd</sup> notes becoming unequal and the 16<sup>th</sup> equal. It should be noted that a very few writers call for both the 32<sup>nd</sup> and the 16<sup>th</sup> both to become unequal. In light of the fact that these decisions are rare and that performers maintain ultimate artistic license in these matters, the discussion seems insignificant.

In conclusion, a quick summarization describing the convention of the French inequality is difficult, in that its use was strictly prescribed by a rather complicated set of rules. However, if we consider its general purpose, there is logic to its principles. The true function of the *Inégales* is to grace passages that are melismatic in character. In other words, the convention served to embellish passages that are primarily step-wise,

predominantly legato, and usually consist of the fastest notes in a piece. Inequality was not meant to tamper with the essence of the melody. This can be said for all Baroque ornamentation. Its purpose was to emphasize and embellish, not overpower and obscure. It is for that reason that notes of the primary metric value (quarter notes in 4/4 time, for example) are never rhythmically altered, as they considered structural. In addition, both staccato articulation as well as disjunct progressions tend to confer structural meaning on single notes, however fast. Neumann sums it up well;

“What mattered was not the dogmatic application of rules but an intelligent performer’s judgment as to the nature and function of the notes involved, whether they were more nearly structural and ornamental; musical pillars reveal a true organic unity. In a way it was the gilding of the lily by further gracing ornamental figuration, thereby adding another sophistication to an already highly refined musical style.”<sup>15</sup>

It is interesting to note that the convention of the French *Inégales* was **not** purely Baroque. Their beginnings reach back to the mid 16<sup>th</sup> century and began to fall from popularity as late as the turn of the 19<sup>th</sup> century. The considerable survival span of the convention becomes more striking when one considers that Couperin and Rameau were identified as Rococo composers and the terminal date of the baroque period in France was approximately coincidental to the death of Louis XIV (1715), far earlier than we think of when considering the termination of the German baroque was marked by the death of J.S.Bach (1650), of whose life nobody in France had taken much notice at the time.

---

<sup>15</sup> Neumann, Frederick, *Essays in Performance Practice*. UMI Research Press, Ann Arbor, Michigan. 1982. p.31.

Meter-Inequality Relationships as Formulated by 30 Contemporary Authors

	$\frac{3}{2}$	2	$\frac{C}{\text{in two}}$	$\frac{C}{\text{in four}}$	C	$\frac{2}{4}$	$\frac{3}{4}$	3	$\frac{6, 9, 12}{4}$	$\frac{3, 4, 6, 9, 12}{8}$
Rousseau (Jean) a) 1687	↓	↓			♯			↓		
Loulié b) c) 1696	↓	↓	↓	♯	♯	↓	↓	↓		
L'Affilard 1697, 1705		↓	↓		♯	♯				
Muffat 1698	↓ d)	↓	↓		♯		↓ d)	↓ e)	↓ d)	↓ d)
Saint-Lambert f) 1702	↓	↓	↓		♯			↓		
Montéclair g) 1709, 1736		↓	↓	♯	♯	♯ b)		↓	↓	↓ i)
Dupont c) 1718		↓	↓		♯			↓		↓
Saurin 1722	↓	↓	↓		♯	↓	↓	↓	↓	↓
Démotz j) k) 1728	↓	↓	↓	♯	♯	♯ b)	♯ b)	↓	↓	↓
Vague b) 1733	↓	↓	↓	♯	♯	↓	↓	↓	↓	↓
David b) 1737	↓	↓	↓		♯	♯	↓	↓	↓	↓ i)
Dupuit l) 1741	↓ m)	↓			♯	♯	♯		↓	♯
Corrette l) n) 1741, 1770	↓ m)	↓		♯	♯	♯	♯	↓	↓	↓
Duval j) 1741					♯	♯ b)	♯ b)	↓	↓	♯
Vion j) 1742	↓	↓	↓		♯			↓		♯
Denis 1747					♯			↓ m)	↓	♯
Roller g) 17—		↓	↓	♯	♯	♯ b)	♯ b)	↓		♯ b)
QUANTZ l) 1752	↓	↓	↓		♯		↓			♯ i)
St. Philbert 17—	↓ m)	↓	↓		♯	♯		↓	↓	♯ b)
Bordet l) 1755	↓	↓	↓		♯	♯	↓	↓	↓	♯ b)
Villeneuve 1756	↓	↓	↓	♯	♯	♯		↓	↓	♯
Bordier l) 1760	↓ m)	↓		♯	♯			↓	↓	♯
Choquel 1762						↓ o)	♯ b)	↓		
Brijon 1763		↓			♯			↓		
Duval (abbé) j) 1764	↓	↓	↓		♯	♯	♯	↓	↓	♯
Macassagne l) 1766	↓			♯	♯	♯	↓	↓	↓	♯
Dard j) 1769	↓	↓	↓		♯	♯	♯	↓		♯
Métoyen 17—	↓	↓			♯ b)	♯ b)	↓ p)	↓ p)	↓	♯ b)
Rajon l) 1772	↓ q)	↓			♯		↓		↓	♯
Laparlier 1772	↓	↓	↓		♯	♯	♯		↓	♯

o) Rousseau uses the term *marquer* which might imply a combination of dynamic and agogic accent. b) First category in duple meters, second category in triple meters. c) Equates equality with detached articulation. d) Derived from Muffat's examples. e) If "fairly fast" (*un peu gai*). f) St. Lambert's listings implied by: 8th unequal except in 4/4 where 16ths unequal; quarter-notes unequal in "slow triple meter". g) Any four-old subdivision of the beat is unequal. h) Implied by: 8th equal. i) Specified for 3/8. j) Inequality is *cumulative*: when shorter notes occur than those eligible for inequality, both the shorter and the longer notes are unequal. k) Démotz spells out cumulative inequality in every single instance. l) Inequality *descends*: when many notes occur that are shorter than those eligible for inequality, the shorter ones become unequal and the longer ones become equal. m) 'Sometimes equal' implying unequal 8ths. n) No inequality in Sonatas or Concertos. o) With the unusual comment that only quarter and 8th notes occur in 2/4 meter, meaning probably: if only quarter and 8th notes occur. p) Equal if 16ths occur. q) If no 8ths occur, quarter notes are unequal.

## Bibliography

- Brown, Thomas K.  
*The French Baroque Organ Tradition: A Critical Analysis of Works by Representative Composers.*  
Ph.D., Theory, Florida State University, 1967.
- Collins, Michael,  
*The Performance of Triplets in the 17<sup>th</sup> and 18<sup>th</sup> Centuries.* JAMS, Vol. XIX, Fall, 1966.
- Couperin, François,  
*The Art of Playing the Harpsichord,* Breitkopf & Härtel, Wiesbaden Gr.1933.
- Robert Donington  
*Inégales,* in *Groves, dictionary of Music and Musicians,* 5<sup>th</sup> ed. Eric Blom. London, 1954, Vol. IV.
- Donington, Robert.  
*The Interpretation of Early Music,* Faber and Faber, London, 1963.
- Fuller, David Randall.  
*Eighteenth-Century French Harpsichord Music.*  
Ph.D., Music, Harvard University, 1965. 2 vols., 349.
- Gustafson, Bruce.  
*Sources of Seventeenth-Century French Harpsichord Music.*  
Ph.D., Musicology, University of Michigan, 1977. 5 vols., 1347.
- Mellers, Wilfred,  
*François Couperin and French Classical Tradition,* Dover ed., 1968.
- Neumann, Frederick, *Essays in Performance Practice.* UMI Research Press, Ann Arbor, Michigan. 1982.
- Powell, Newman, *Rhythmic Freedom in the Performance of French Music from 1650-1735.* Stanford University, 1959.

Turner, Jet,  
*Treatises by Bacilly, Loulié, and Démoz: Their application  
to the "Mass for the Convents" by F. Couperin.* Thesis. 1974 Univ. of  
Wisconsin.

Vogan, Charles E.  
*The French Organ School of the Seventeenth and Eighteenth Centuries.*  
Ph.D., Musicology, University of Michigan, 1949.