Leonardo da Vinci as a Musician by Emmanuel Winternitz
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REVIEWS

Emmanuel Winternitz. *Leonardo da Vinci as a Musician*. New Haven: Yale University Press, 1982. xxvi, 241 pp.

LEONARDO SCHOLARSHIP passes through phases when it looks uncommonly like a gold rush. Claims to have unearthed splendid new nuggets are filed with a frequency that can be alarming to anyone who wishes to keep abreast of the latest developments. Not surprisingly, few scholars have succeeded in staking a claim to exclusive rights in any one area of Leonardo research without being elbowed aside by other prospectors. Emmanuel Winternitz, however, has made Leonardo's musical activities his own. In a series of highly perceptive articles he has established the nature of Leonardo's involvement with the invention of new instruments and given signs of a fine understanding of the central core of Leonardo's thought. It is in the light of the high expectations aroused by these articles that this reviewer has experienced some sense of disappointment that the present book does not add up to a comprehensive statement of Leonardo's involvement with musical theory and practice.

The central problem of Leonardo's music is essentially the same as that posed by all extemporized performance in the Renaissance: The vital evidence of the music itself simply has not been recorded. Giorgio Vasari, whose *Lives of the Artists* provides the central source for historians of Renaissance art, made reference to a number of musician-artists, including Giorgione, but the greater part of his claims cannot be independently verified, even when plausible. For Leonardo we do at least possess the precious notebooks to support the contemporary accounts of his accomplishments as a master of the *lira da braccio*. The written and drawn evidence is more slippery than we might ideally like, but at least it is there.

Winternitz's great strength lies in his interpretations of Leonardo's sketches for musical instruments, which range from cursory scribbles to detailed diagrams of mechanical components. He demonstrates that Leonardo's extraordinary inventiveness was no less vividly apparent in music than in other areas of his *scienza*. The author's analyses of the drawings are highly persuasive and permit him to credit Leonardo with a number of notably ingenious conceptions. Most remarkable of these is the *viola organista*.

A series of sketches from the early 1490s show Leonardo experimenting with various systems for mechanizing the sounding of strings. The traditional hurdy-gurdy suffered from the disadvantage that the wheel rubbed simultaneously against all the strings in such a way as to prevent single strings or any particular combination of strings from being sounded in sequence as required. Leonardo's new instrument, by comparison, was intended to provide the musician with an entirely free choice of which notes or combination of notes he wished to play at any moment. He seems to have begun by considering a method of drawing

strings against a friction wheel, as a refinement of the hurdy-gurdy or *ghironda* system, but in a series of more resolved designs he posited a different solution. This involved a continuously circulating bow, or *archetto*, against which the strings were drawn by a series of levers attached to a keyboard. This not only gave more flexibility than the hurdy-gurdy, it also possessed an advantage over contemporary keyboard instruments, in that "the player would be able to graduate the intensity of the friction and thus the volume of tone by varying the pressure of his fingers against the keys" (p. 155).

Leonardo's inventiveness also extended into the realm of percussion and wind instruments. He devised a number of alternative forms of melody- and chord-producing drums. Varied pitch was obtained either by combining skins of different tension within a compound instrument, or by ingenious mechanisms for adjusting the tension of a single membrane during performance. He also conceived two types of glissando recorders with slits in place of the customary finger holes. He prophetically considered using a system of remote-control keys for wind instruments. He hoped to be able to produce tunable bells using dampers to alter their pitch. And he endeavored to design bellows for portable organs that would provide "continuous wind." It should also be added that the author makes a convincing case for the existence of the "skull lyre," the bizarre instrument that Leonardo supposedly took to Milan in 1482 or 1483.

Were any of the new instrument mechanisms realized, and did they have any impact upon the history of instrument design? The answer, as in other fields of Leonardo's engineering design, must be a qualified negative, or at best a confession that the surviving evidence does not provide a clear answer either way. The simplest of the instruments to manufacture, the glissando recorders, typify the problems. There is no question that they accomplish an effect not available in the conventional instrument, and Winternitz has himself constructed versions that do indeed function. It is difficult, however, to see the glissando recorder playing any substantial role in contemporary performance, although David Munrow has shown that glissando effects coaxed from a conventional recorder could be incorporated into his style of early music performance. I am inclined to think that Leonardo's instrumental design is for the greater part a case of an amazingly inventive mind, well founded in contemporary practice, indulging in a series of free-ranging "thought experiments" that take him into imaginative realms around and outside the fringes of practical music-making in the Renaissance. Where his inventions resemble an instrument later manufactured, there seems to be no direct influence, but rather parallel solutions to similarly perceived problems.

When it comes to setting these inventions in their intellectual context, Winternitz's touch is less sure, although he does draw some nice parallels with Leonardo's work in other fields. The introductory sections on "Musical Life in Florence and Milan" and on Gafori, Pacioli, Gusnasco, and Migliorotti sketch in the local context, but make no sustained attempt to define the intellectual bases of contemporary theory and practice. The discussion of the neglected instrument maker Lorenzo Gusnasco (Lorenzo da Pavia) is the best of these sections, reflecting

Winternitz's strength in this field.

There is one quotation from Franchino Gafori's *Practica musicae* but few other signs of a direct confrontation with the substantial body of his theoretical writing. This reviewer would wish to know more about the basis of Gafori's musical thought, and, most relevant in this context, its relationship to those matters of visual harmony that were Leonardo's chief concern. Gafori's does, for example, suggest a correlation between color and music, taking up an Aristotelean idea. How far are his notions of harmonic proportion implicitly or explicitly related to visual matters, and do his later writings reveal the impact of Leonardo's ideas?

The same kind of questions occur when studying Leonardo's friendship with the great mathematician Luca Pacioli, whose *De divina proportione* is illustrated with geometrical bodies designed by Leonardo. How do Pacioli's ideas of harmonic proportion, particularly in the architectural addendum to the 1509 edition of the treatise, reflect the Pythagorean system? And in what ways did Pacioli, Leonardo, and the musical theorists characterize the association between harmonic systems and the science of nature? When Winternitz briefly suggests an answer to this latter question, he unduly polarizes the attitudes of Pacioli and Leonardo by separating Pacioli's ideas from natural design and by misrepresenting Leonardo's attitude to mathematical proof, above all in his late science.[1]

There is a considerable body of Leonardo material bearing on such questions. His notebooks from shortly before and after 1500 are replete with sets of harmonic numbers, and he made sustained attempts to learn about arithmetical and geometrical proportions from Pacioli's *Summa* and Euclid's *Elements*. And his major painting of this period, *The Last Supper*, has been shown by Thomas Brachert to have been designed around a skeleton of musical proportions—although Brachert pushes his analyses further than the evidence warrants.[2]

A full study of Leonardo's sources would throw much light on the kind of questions I am asking. Winternitz rightly produces a Vitruvius source for the analogy between the motion of sound and water. But what of Leonardo's use of other architectural sources for musical harmonies? Alberti is mentioned on a number of occasions, but a detailed scrutiny of the Renaissance theory and practice of architecture would show the extent to which architectural aesthetics were being penetrated by Pythagorean ideas. In the same way, Leonardo's geometrical analogies between sound and light require analysis in relation to his knowledge of earlier texts, particularly the treatises on *perspectiva* by Bacon and Peckham. And his comments on percussion can only be properly understood in the context of medieval impetus dynamics. I do not think I am making impossible demands here, since the researches of Clagett, Lindberg, and others have given us excellent access to the medieval sources.[3]

[1] See Martin Kemp, *Leonardo da Vinci: The Marvellous Works of Nature and Man* (London, 1981), pp. 293–314 for a discussion of mathematics in Leonardo's later investigations.

[2] Thomas Brachert, "A Musical Canon of Proportions in Leonardo's *Last Supper*," *Art Bulletin*, LIII (1971), 461–66.

[3] Marshall Clagett, *The Science of Mechanics in the Middle Ages* (Madison, 1959); and David C. Lindberg, *Theories of Vision from Al-Kindi to Kepler* (Chicago, 1976).

Such an understanding would also give us a better idea of how to interpret Leonardo's technical language. It would help us to avoid the pitfalls of attributing to him anachronistic notions like that of the behavior of "individual water molecules" (p. 102). It would allow us to make sense of the *imprensiva* as the ventricle of the brain that collects sensory impressions rather than as "the perceptive sense" (p. 207); of *invenzione* as the first act in the creative process, as characterized in humanist poetics (p. 207); of *circondare* as "to circumscribe" in the Albertian sense (p. 210); of *simulacro* as the medieval term for an image emitted by an object (p. 115); and of *concento* as "concord," equivalent to Alberti's proportional *concinnitas*. It is a pity that Winternitz does not analyze Leonardo's use of *fantasia* in relation to musical usage. I also suspect that the literature on dance would help to clarify Leonardo's vocabulary.

Translating Leonardo's language into modern equivalents is a minefield. Winternitz lays great stress upon Leonardo's estimation of music as "the imitation of the invisible," implying a metaphysical dimension that may not be justified by Leonardo's actual phrase, the *imitazione delle cose invisibili*. What Leonardo is saying about music, it seems to me, is simply that it deals with the composition of harmony from one of the non-visual phenomena of nature. Nothing he says should be taken to mean that he regarded music "as a discipline that is not bound to copy nature but with an unparalleled degree of freedom creates forms [*figure*] out of a material neither tangible nor visible" (p. 223). Rather, he regarded music as a particular kind of manifestation of the universal harmonies of *natural* design, and, as such, a more incomplete reflection of natural beauty than painting—which "embraces all those forms which exist and those which do not exist in nature."

Wisely, Winternitz provides the Italian texts for most of his translations, although the *Codice Atlantico* sections in the appendix perplexingly retain Leonardo's notarial-style contractions. Unfortunately, the scholarly apparatus does not provide full references to primary and secondary sources to allow the reader to investigate the subject comprehensively on his own account. Besides the article by Brachert already mentioned, no reference is given to Motta's old but valuable articles on music at the Sforza court, or Angiolillo's book on Leonardo's involvement with *feste*.[4] Pedretti's encyclopedic researches into the notebooks should have been acknowledged and utilized more fully. And, most surprisingly for a book of this quality from an academic press, there is no consolidated bibliography.

Too often Winternitz refers to out-of-date authorities, such as Ludwig for the *Trattato*, or the Quaderni volumes for the Windsor anatomical folios, when later editions by McMahon, Clark, Pedretti, and Keele are more accessible and reliable.[5] Research by Clark and Pedretti, in particular, has established a fairly secure chronology for most of the drawings and much of his written

[4] E. Motta, "Musici alla corte degli Sforza," *Archivio storico lombardo*, II/14 (1887), 29–64 and 514; and Maria Luisa Angiolillo, *Leonardo: Feste e teatri* (Naples, 1979).

[5] *Treatise on Painting by Leonardo da Vinci (Codex Urbinas 1270)*, ed. A. Philip McMahon, 2 vols. (Princeton, 1956); and Kenneth D. Keele and Carlo Pedretti, *Leonardo da Vinci: Corpus of Anatomical Studies in the Collection of Her Majesty the Queen*, 3 vols. (London, 1979).

output.[6] Winternitz tends to dodge questions of dating, which is particularly serious when he associates the "Pluto's Paradise" design with the 1496 performance of Taccone's *Danaë*. The drawings bear no direct relation to the text and, as Pedretti has shown, should almost certainly be dated more than ten years later.[7] Winternitz reflects the common but unwarranted assumption that all of Leonardo's theatrical activities should be grouped within the Sforza period. His analysis of the text on the "Pluto" drawing does, however, produce a useful clarification: The devils are not "in twelve pitchers acting as the mouths of hell," as we had previously believed, but instead are seen to "play on pots [*Rommelpots* in the Dutch sense] to make an infernal noise" (p. 79).

The reader should be warned of a number of errors in the published text. Paolo Giovio was born in 1483, not 1543 (p. 75); Leonardo's "XX in XX" does not mean "220 yards," but "intervals of 20 braccia" (p. 214); "roti" is not a feasible alternative reading for the "rote" in Leonardo's script (p. 176); "conoscimento" is a misreading for "comō sēso" (i.e., *sensus communis*, p. 132); captions 5.33 and 5.34 belong to plates 5.36 and 5.37, and vice versa; plates 6.16–21 are all printed in reverse; on p. 181, for "illus. 7.9" read "illus. 9.8." I am also concerned by two unsupported statements about Leonardo and Gafori lending each other books (p. 6), and Leonardo staying with Gusnasco in Venice (p. 18), both of which would be nice to have verified since they do not correspond to any evidence available to this reviewer and the author does not indicate his sources. Unfortunately, the pleasing design of the book and its comprehensively adequate illustrations have not been matched by the editorial precision we have come to expect of the Yale imprint.

This book is important for what it says about Leonardo's design of instruments. It properly recognizes the necessity of relating Leonardo's musical activities to his thought as a whole, and draws some excellent analogies between music and other areas of his intellectual and practical pursuits. But the theoretical context is not fully investigated, with the result that some of Leonardo's statements tend to assume a misleading appearance. There is still much to do in this area, but any future investigator will be grateful that Winternitz has succeeded so splendidly in illuminating Leonardo's brilliant if eccentric place in the history of instrumental design. If we may doubt the practicability of Leonardo's ideas in the context of Renaissance music-making, there is now no reason to deny the radical quality of his inventiveness in this field.

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[6] Kenneth Clark, *The Drawings of Leonardo da Vinci in the Collection of Her Majesty the Queen at Windsor*, 2nd ed., with Carlo Pedretti, 3 vols. (London, 1968); and *The Literary Works of Leonardo da Vinci*, ed. Jean Paul Richter, Commentary by Carlo Pedretti, 2 vols. (Oxford, 1977).

[7] Carlo Pedretti, "Dessins d'une scène, exécutés par Léonard de Vinci pour Charles d'Amboise (1506–7)," *Le Lieu théâtral à la renaissance* (Paris, 1964), pp. 27–34.

Robert Donington. *The Rise of Opera*. New York: Charles Scribner's Sons, 1981. 399 pp.; 19 plates.

ROBERT DONINGTON's admirable desire for comprehensiveness in treating the emergence of the most