GREEK REFLECTIONS ON THE NATURE OF MUSIC

In this book, Flora R. Levin explores how and why music was so important to the ancient Greeks. She examines the distinctions that they drew between the theory of music as an art ruled by number and the theory wherein number is held to be ruled by the art of music. These perspectives generated more expansive theories, particularly the idea that the cosmos is a mirror-image of music's structural elements and, conversely, that music by virtue of its cosmic elements – time, motion, and the continuum – is itself a mirror-image of the cosmos. These opposing perspectives gave rise to two opposing schools of thought, the Pythagorean and the Aristoxenian. Levin argues that the clash between these two schools could never be reconciled because the inherent conflict arises from two different worlds of mathematics. Her book shows how the Greeks' appreciation of the profundity of music's interconnections with philosophy, mathematics, and logic led to groundbreaking intellectual achievements that no civilization has ever matched.

Flora R. Levin is an independent scholar of the classical world. She is the author of two monographs on Nicomachus of Gerasa and has contributed to *TAPA*, *Hermes*, and *The New Grove Dictionary of Music*.

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To Sam

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Preface

This book owes its inception to the teachings of Dr. Seymour Bernstein: distinguished pianist, composer, author, lecturer, and master teacher. Dr. Bernstein is known and appreciated for the masterclasses in the art of the piano, which he conducts throughout the United States, Canada, Europe, and Asia. I count myself fortunate to have been granted admission to a number of these classes in New York City.

I was impressed early on in these classes by the way in which Dr. Bernstein approached the practical knowledge that must be acquired and implemented in the performance of music on the piano. Even more impressive to me was Dr. Bernstein's ability to demonstrate the transformation that must be worked on musical sound by the art of musicians. For his treatment of this transformation was, as I understood it, philosophy in action. It was to resurrect the dream of Socrates that urged the practice and composition of music as an imperative of philosophy. And since Socrates regarded philosophy as "the greatest music," he felt that by spending his life working on all aspects of music, he was also practicing philosophy in the highest degrees (Plato *Phaedo* 61A3–8).

The philosophical component of Dr. Bernstein's teachings made me think of music even as the ancient Greeks did: as something that tends to unity, like the course of human reason, while reaching for diversity, like the manifold forces of nature. The unity of reason organizes and sets limits to things musical, while the forces of human nature create things musical and set them free. These are the two principles that Dr. Bernstein emphasized in his teachings. According to him, they interpenetrate all musical thought, all musical creation, and all musical performances. Given these principles, I was prompted to think of music

as something manifold but unified, as something whose foundations are in the human soul, not in matter; they are, rather, as something next to which all particulars and partialities are dwarfed by the moving forces of melody. This is to think of music in the way of nature. This is to think of music in the way of Aristoxenus of Tarentum, a student of Aristotle, and the greatest musician of antiquity.

Aristotle's famous dictum has it that musical sound is a living sound that originates in the human voice, and that all instruments, being inanimate objects, are built to imitate the sound of the singing voice (*De anima* 420b5–6). This finds strong confirmation in the teaching of Dr. Bernstein. But, as he demonstrated, the piano, owing to its physical construction, presents a paradox of philosophical dimensions: How can the discrete pitches produced by the piano be made to imitate the living continuity of the singing voice? The sustaining pedal goes far in overcoming this discontinuity of pitch. But something more basic is needed if true artistry is to be achieved. To this end, Dr. Bernstein guided us to concepts of musical function and musical space, of melodic tension and resolution, of melodic motion and stasis – concepts that revolve around the primary axis of Aristoxenian thought. Dr. Bernstein managed to lift such concepts as these out of the textbooks and off the musical scores by demonstrating them in living sound on the piano. He did this, much as Aristoxenus must have done some twenty-five hundred years ago, by using music as a symbol of itself. And, in the process, he revealed, as complete musicians always succeed in doing, the composite nature of music in all its flowing forms and multiforms.

In Dr. Bernstein's classes, the truth of Aristoxenus' teachings was first revealed to me, namely, that the ultimate factor in making music is the intellectual process; it is this intellectual process that presides over the activity of the hands on the keyboard and is their determining principle. When, therefore, I would hear Dr. Bernstein speak of the logic of a resolution, or the function of a particular note, or the tension between two notes in a melodic phrase, I knew that he was releasing Aristoxenus' own concepts from out of the past and disposing them anew. My gratitude to Dr. Bernstein is best expressed by the content of this book.

Many years have passed since I first began to think about the woman scholar, Ptolemaïs of Cyrene, who appears in various contexts

throughout this work. I wondered first of all who she was and when she might have lived. Most important, she impressed me, even though her words as quoted by Porphyry are all too few, as being exceptionally astute where Aristoxenian theory is concerned. And since Aristoxenus had few enough partisans in antiquity to champion his views on music with any depth of understanding, whatever she had to say in his behalf invited my closest study. I was encouraged in this inquiry by the late, great, and good scholar, Professor Gilbert Highet, Anthon Professor of Latin (Columbia University), who observed in what was to be his last letter to me, "Her name alone intrigues for its history." Coming as it did from one whose instinctive recognition of a workable hypothesis I had long since learned to trust, this observation sparked my imagination and led me to speculate on the kind of woman Ptolemaïs might have been. I hope that the results of my inquiry are compatible with all that Professor Highet had intuited from her name. I was also encouraged in this pursuit by the late Professor of Latin and Ancient History, William C. McDermott (University of Pennsylvania). I regret that my expression of gratitude to him for guiding me through the intricacies of Hellenistic history must come too late for him to receive it.

I wish to express my deep appreciation of the late Professor Emeritus of English, Comparative Literature, and Classical Studies, Albert Cook (Brown University). His many contributions to the world of scholarship in such diverse fields as Biblical Studies, History, Poetics, and Philosophy have inspired and sustained me over the course of many years. Professor Cook's writings on Plato are especially compelling to me, not least for being full of dialectical arguments; but above all, for their acute appraisal of the poetic and musical aspects of Plato's style. For Professor Cook, Plato was the Beethoven of Philosophy. He demonstrated this most vividly in his analysis of Plato's use of the Greek particles – "the riot of particles," as he so aptly called them (in *The Stance of Plato)* – which make for the powerfully polyphonic texture of the Platonic dialogues. Professor Cook's scholarly originality and versatility, coupled with his extraordinary breadth of knowledge, have earned my everlasting respect, admiration, and, most of all, my gratitude for his help.

I am particularly indebted to my musically eloquent friend, Norma Hurlburt, who placed at my disposal her comprehensive knowledge of

the piano literature, especially that of Beethoven and Schubert. I owe her thanks for spending many an hour with me speaking of music – the art – and music – the epitome of logic. To this, she added many more hours playing for me things that are more definite to musicians than the meaning of words. Her ideas, both practical and theoretical, helped to set this work in motion.

My sincere thanks are extended to Dr. Baylis Thomas, whose stimulating observations, drawn from his well-appointed knowledge of song, convinced me that music, by its nature, has an inbuilt resistance to theory. It is this that protects music from being demystified.

My obligations to others for their generous help are many: to Dr. Alison Thomas for her contributions to this project through her computer skills, which she so generously placed at my disposal. Her expertise in this critical area is matched only by her pianistic gifts; to the Near-Eastern Archaeologist and Historian, Dr. Oscar White Muscarella, who supplied me with articles and special studies on the history of, and excavations at, Cyrene; to Professor Emeritus of English and Comparative Literature, William Sylvester (State University of New York at Buffalo), with whom I enjoyed many lively discussions on the acerbic views of the philosopher-poet, Philodemus of Gadara, for whom the art of music was on a par with the art of cooking; to Professor Emeritus of Indian History, Stanley Wolpert (University of California, Los Angeles), who, with his wife, Dorothy, read various sections of this work and offered valuable insights; to Professor of Classics, Jacob Stern (Graduate Center, CUNY), for his help in checking the Greek text. From the methods and experience of these erudite friends and scholars, I have learned much.

I must also thank for their many kindnesses Sheran Maitland and Diane Allen. My deep gratitude goes also to Beatrice Rehl, Publication Director of Humanities at Cambridge University Press, and to Laura Lawrie, Production Editor for Cambridge University Press.

One final debt, the greatest of all, is acknowledged in the dedication.

Introduction

The peoples of ancient Greece surrounded themselves with music; they immersed themselves in music; they were in fact imbued with music. Scarcely any social or human function, whether public or private, urban or rural, took place without its musical accompaniment. Marriages, banquets, harvestings, funerals – all had their distinctive cadences. Boatmen rowed to the song of the aulos (the double-reed oboe-like wind instrument), gymnasts exercised to music's pulse, the spirits of soldiers were sustained by its rhythmic lilt as they marched off to battle. Instrumental music accompanied libations, sacrifices, supplications, religious processions, and ceremonial rites of all sort. Musical contests drew throngs of knowing listeners. Singer-composers, who set great numbers of poetic texts to song, which they then performed from memory to the accompaniment of wind and stringed instruments, were esteemed as repositories of knowledge. Solo instrumentalists could stand as high in the public's estimation as any athlete returning victorious from the Pan-hellenic games. In Attic tragedy, the recurring motifs of the choral song not only unified the action on stage, but served also the same virtuoso function as the divisions in a modern aria da capo. In Attic comedy, the joy of life was celebrated in the ecstatic outpourings of licentious song, the chorus encircled by dancers whirling in the drunken revelry of the lascivious *kordax* (a deliberately vulgar and at times indecent dance). In sum, music was for the Greeks more, indeed, much more than a pleasant preoccupation or source of amusement. It was a significant part of life itself. That this was so is because the ancient Greek language was itself a form of melodious expression.

The melodious patterns of the ancient tongue were the products of the pitch-accents that were integral to the meanings of the words. These accents and melodious patterns were learned by the Greeks from infancy on, undoubtedly leading to their heightened perception and retention of pitch-differences in song and speech. As we learn from the fourth-century B.C. musician and theorist Aristoxenus of Tarentum, there was a kind of songful melody in everyday speech (λογῶδές τι μέλος).[1] To distort this pitch-accent was tantamount to committing an egregious grammatical error. A common example of this kinship between pitch-accent and meaning is one that students meet early on in their study of the ancient tongue, involving the difference in meaning between the two otherwise identical words, βίος, βιός (respectively, "life" and "bow"). As W. B. Stanford has pointed out in his ground-breaking study, *The Sound of Greek*,[2] "There were thousands of such words in ancient Greek if we count the verbal inflexions which had different accentuations as well as the nouns, pronouns, verbs, and adverbs."

All classical Greek authors were thus composing for the ear as well as for the mind; the meanings of their words depended in the fullest sense on the semantic nature of their accompanying pitch-accents. This was true no matter what the content or subject matter of their writings, be it poetry, history, or even science and mathematics.[3] Most important, the Greek ear was trained to recognize the most subtle intonations in song and speech. Their ability in this respect was apparently as remarkable as that of people today who are possessed of absolute pitch.[4] Sound was in fact everything in antiquity and, not surprisingly, reciting aloud – more often than not from memory – was the norm rather than the exception. When it came to sound, therefore, the resources of the Greeks were incalculable and superb. This bespeaks an acutely sensitive and highly developed auditory sense on the part of performers as well as auditors. Evidence that this was in fact so is unambiguous and voluminous.

[1] *Harm. El.* 1. 18 (Da Rios 23. 14).
[2] W. B. Stanford, *The Sound of Greek*, pp. 30–31.
[3] See Stanford (note 2), pp. 8–9.
[4] Absolute pitch is the miraculous ability to identify any pitch out of a melodic context, to name it, and even to reproduce it without mechanical aid of any sort. The most famous example of this truly mysterious faculty is, of course, W. A. Mozart.

This evidence, in addition to being massive and diverse, suggests the intriguing possibility that the Greeks may indeed have had absolute pitch. For research in this area has shown quite convincingly that the acquisition of a tonal language may be one of the unusual conditions leading to the retention of and heightened sensitivity to pitch distinctions.[5] To be sure, nothing can be proven on this point, as the ancient tonal systems were different from our own standards of pitch. But, given the possibility, this would account for the Greeks' ability to discriminate between the most subtle colorations of pitch imaginable: differences such as quarter-tones, thirds of tones, even the lowering of a note by three-quarters of a tone (*eklysis*), or the raising of a note by five quarter-tones (*ekbolē*). As their writings on music show, every pitch range of the keys of transposition (*tonoi*), every mode (*tropos*), every genus (*genos*) possessed its own meaningful character (*ethos*). Some sequences of notes were even defined by their "colors" or nuances (*chroai*). Individual notes as the *lichanos* (finger-note) were recognized for their distinctive quality, their "*lichanos*-ness" (*lichanoid*), while other notes were felt to have masculine or feminine characteristics.[6] In short, this type of acute sensitivity to sound bespeaks a whole other realm of perception.

So deep a penetration of music into almost every aspect of life presupposes a musically gifted public and a long tradition of musical education. The evidence appears in fact to depict a society concerned with music more than anything else. The truth is, of course, that music was only one of the myriad products of the Greek genius. What they achieved in all else – poetry, drama, history, architecture, sculpture – scaling heights that later civilizations have never surpassed – is familiar to everyone. What is more, almost everything, music included, seems to have begun with them.[7] Mathematics and science were their inventions,

[5] See Oliver Sacks, *Musicophilia: Tales of Music and the Brain*, pp. 113–14.

[6] This is discussed by Aristides Quintilianus *De mus*, III, 21 (Winnington-Ingram 122.22 123. 4), in which Aristides assigns male or female notes to the planets according to their associative qualities.

[7] Thus, Bertrand Russell, *A History of Western Philosophy*, p. 3: "What they [the Greeks] achieved in art and literature is familiar to everybody, but what they did in the purely intellectual realm is even more exceptional. They invented

and philosophy, that most eloquent witness to the mind of man, was their creation. When it came to music, the Greeks showed the same organic point of view, the same instinct for formulating laws governing reality that appears in every phase of their culture and art. As we learn from the evidence presented to us, the Greeks were the first to intuit music's essence, and the first to discover the universal laws governing its structure. They were the first to perceive the elements of music not as isolated entities detached from one another but as integral parts of an organic whole from which each part derived its meaning and position.

This book is an inquiry into the diverse ways in which the ancient Greeks contemplated and dealt with the nature of music. My purpose is to exhibit music as an integral part of their philosophical, mathematical, and cosmological pursuits. As their writings show, music was not an isolated art whose sole purpose was to amuse and accompany secular and religious activities. On the contrary, music was considered by them to be as necessary as language and as rational as thought itself. As such, it was regarded as powerfully paideutic, and productive of knowledge for its own sake. Moreover, it was seen to be a genuine molder of human character. What they achieved in music and musicology, although comparable to their accomplishments in literature, art and science, philosophy, history, mathematics, and cosmology, has gained them far less attention.

Acoustical theory is universally accepted to have begun with Pythagoras of Samos (6th century B.C.). Deductive reasoning from general principles as applied to music was, as I argue, an innovation of Aristoxenus of Tarentum (4th century B.C.), the leading figure in this study. This method, together with Aristoxenus' original and creative use of mathematics, founded a centuries-long tradition, the main tenets of which persist to this day.

Pythagorean harmonics was geometrical, not dynamic, whereas Aristoxenus' theory was not geometrical, but dynamic, by being rooted in the continuity of infinite number. It was this dynamic that made Aristoxenus' theory a true Science (*Epistēmē*) of Melody. By contrasting

> mathematics and science and philosophy; they first wrote history as opposed to mere annals. . . . What occurred was so astonishing that, until very recent times, men were content to gape and talk about the Greek Genius."

Aristoxenus' unified theory with that of other specialists in the field, it is possible to account for its peculiar meaning in regard to the nature of music itself. To this end, translations from Ptolemy's *Harmonica*, from Porphyry's *Commentary on Ptolemy's Harmonics*, and from the fragments of *The Pythagorean Doctrine of the Elements of Music* by the little-known Ptolemaïs of Cyrene have been cast into the form of a dialogue. This results in an interesting discussion among three experts on the virtues and limitations of the various theories under examination. Of the three, it is Ptolemaïs who seems to me to have grasped the uniqueness of Aristoxenus' Aristotelian type of theoretical logistic. To her credit, Ptolemaïs demonstrated that the geometrical method of the Pythagoreans appealed solely to the eyes but that Aristoxenus' system was designed solely for the ears.

As I argue, Aristoxenus' method is in essence a profoundly dialectic one from which he obtained a fixed constant of measurement.[8] This enabled him to deal with problems of attunement that could not be solved by traditional methods of arithmetic and elementary geometry. Through this technique, Aristoxenus arrived at the concept of continuity by observing the surrounding dense (*pykna*) melodic media. The deep-lying power of Aristoxenus' method is that it enriches the study of interrelations among discrete integers. In so doing, he summoned to the aid of theorists new relations among continuous magnitudes. In short, Aristoxenus, I believe, was practicing analytic number theory centuries before its foundations were laid by such luminaries as Peter Gustav Lejeune Dirichler, Bernhard Riemann, Georg Cantor, Leopold Kronecker, and Karl Weierstrass.

[8] Cf. F. R. Levin, "*Apeiria* in Aristoxenian Theory," *Hermes* 135 (2007), 406–28.

Abbreviations

AJAH	*American Journal of Ancient History*
AJPh	*American Journal of Philology*
Barker, I	Barker, A., *Greek Musical Writing: I. The Musician and His Art*. Cambridge University Press 1984.
Barker, II	Barker, A., *Greek Musical Writings: II Harmonic and Acoustic Theory*. Cambridge University Press 1989.
Barker, *Ptolemy*	Barker, A., *Scientific Method in Ptolemy: "Harmonics."* Cambridge University Press 2000.
Bélis, *Aristoxène*	Bélis, A., *Aristoxène et Aristote: Le Traite d'harmonique*. Paris 1986.
BSA	*Annual of the British School at Athens*
CPh	*Classical Philology*
CQ	*Classical Quarterly*
JHS	*Journal of Hellenic Studies*
Laloy, *Aristoxène*	Laloy, L., *Aristoxène de Tarente. Disciple d'Aristote et la Musique de l'Antiquité*. Paris 1904.
Macran	Macran, H. S., *The Harmonics of Aristoxenus*. Oxford: Clarendon 1902.
Mathiesen, *Apollo's Lyre*	Mathiesen, Th. J., *Apollo's Lyre. Greek Music and Music Theory in Antiquity and the Middle Ages*. University of Nebraska Press 1999.

Michaelides	Michaelides, S., *The Music of Ancient Greece: An Encyclopedia*. London 1978.
PCPS	*Proceedings of the Cambridge Philological Society*
REG	*Revue des Études grecques*
Solomon, Ptolemy	Solomon, J., *Ptolemy: Harmonics Translation and Commentary*. Leiden 2000.
White, *The Continuous and the Discrete*	White, M. J., *The Continuous and the Discrete. Ancient Physical Theories from a Contemporary Perspective*. Oxford: Clarendon 1992.

Texts

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Cousin	Cousin, V., *Opera Petri Abaelardi*. 2 vols. Paris 1849–59.
Da Rios	Da Rios, R., *Aristoxeni Elementa Harmonica*. Rome 1954.
Deubner	Deubner, L., *Iamblichi De Vita Pythagorica Liber*. Leipzig 1937.
Düring	Düring, I., *Die Harmonielehre des Klaudios Ptolemaios*. Göteborg 1930 (Högskolas Årsskrift, 36/1); rep. 1982.
Düring	Düring, I., *Porphyrios Kommentar zur Harmonielehre des Ptolemaios*. Göteborg 1932 (Göteborg 1932, Göteborgs Högskolas Årsskrift); rep. 1978.
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Friedlein	Friedlein, G., *Anicii Manlii Torquatii Severini Boetii De Institutione Musica Libri Quinque*. Leipzig 1867; rep. 1966
Heath	Heath, Sir Th. L. *The Thirteen Books of Euclid's Elements*. 3 vols. Cambridge 1925; rep. 1956.
Heiberg	Heiberg, J. L., *Claudii Ptolemii Syntaxis Mathematica*. 2 vols. Leipzig 1898–1903.

Hiller	Hiller, E., *Theonis Smyrnaei Philosophi Platonici Expositio Rerum Mathematicarum ad Legendum Platonem Utiliam.* Leipzig 1878.
Hoche	Hoche, R., *Nicomachi Geraseni Pythagorei Introdoctionis Arithmeticae Libri II*. Leipzig 1866.
Jan	Jan, K. von, *Musici Scriptores Graeci*. Leipzig 1895; rep. 1962.
Jonker	Jonker, G. H., *The Harmonics of Manuel Bryennius*. Groningen 1970.
Kemke	Kemke, I., *Philodemus De Musica Librorum Quae Exstant*. Leipzig 1884.
Meibom	Meibom, M., *Antiquae Musicae Auctores Septem*. 2 vols. Amsterdam 1652; rep. 1977.
Najock	Najock, D., *Drei anonyme griechische Traktate Über die Musik. Eine kommentierte Neuausgabe des Bellermannschen Anonymus*. Göttinger Musikwissenschaftliche Arbeiten, vol. 2. Göttingen 1972.
Pearson	Pearson, L., *Aristoxenus Elementa. The Fragment of Book II and the Additional Evidence of Aristoxenean Rhythmic Theory*. Oxford: Clarendon 1990.
Pistelli	Pistelli, H., *Iamblichus In Nicomachi Arithmeticam Introductionem Liber*. Stuttgart 1894; rep. addendis et corrigendis U. Klein 1975.
Ross	Ross, Sir D., *Aristotle's Physics*. Oxford: Clarendon 1955.
Vincent	Vincent, A. J. H., "Notice sur divers manuscrits grecs relatifs à la musique, comprenant une traduction francaise et des commentaires," *Notices ex extraits des manuscrits de la bibliotheque du Roi et autres bibliotheques*, vol. 16/2. Paris 1847.
Vors.	Diels, H., and Kranz W., *Die Fragmenta der Vorsokratiker*. Dublin/Zürich 1966.
Wachsmuth	Wachsmuth, T. C., and Hense, O., *Stobaei Eclogae,* vols. I–III. Leipzig 1884.

Wehrli	Wehrli, F., "Aristoxenus," *Die Schule des Aristoles*. Basle 1945.
Willis	Willis, J., *Martianus Capella*. Leipzig 1983.
Winnington-Ingram	Winnington-Ingram, R. P., *Aristidis Quintiliani De Musica Libri Tres*. Leipzig 1963.
Ziegler-Pohlenz	Ziegler, K., and Pohlenz, M., *Plutarchi Moralis*, vol. VI, Fasc. 3. Leipzig 1953.