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# Music as a (Science as a) Liberal Art at Princeton

Aaron Girard

The influence of 'scientific' methodology and discourse on the design of Princeton University's research programs in music theory and composition has often been asserted, but never adequately defended or contextualized. The literature on this subject has suffered from several flaws: an over-emphasis on Milton Babbitt at the expense of his colleagues; a conflation of distinct paradigms of scientific research; a near-total absence of documentary research; and a disquieting elision of the polemical with the historiographical. This paper, based on archival sources, argues for a decentering of Babbitt and for a new emphasis on the influence of Princeton's institutional history. With the rejection of conventional wisdom, the 'scientific' nature of theory and composition at Princeton becomes clearer: a revisionist history is then required, to facilitate more detailed analysis and to prevent the casual ingress of unsubstantiated opinions.

Der Einfluss naturwissenschaftlicher Methoden und Diskurse auf die Ausrichtung der Forschungsprogramme in Musiktheorie und Komposition in Princeton ist oft behauptet, aber niemals adäquat belegt oder kontextualisiert worden. Die Literatur über dieses Thema weist daher einige Probleme auf: die Überbewertung der Rolle Milton Babbitts im Vergleich mit derjenigen seiner Kollegen, die Vermischung unterschiedlicher Paradigmen wissenschaftlicher Forschung, eine fast vollkommene Abwesenheit quellenbasierter Untersuchungen und eine Überbetonung einer polemischen gegenüber einer historiographischen Herangehensweise. Dieser Beitrag argumentiert auf der Basis der Originalquellen für eine stärkere Einbeziehung des Einflusses von Princetons institutioneller Geschichte und misst Babbitt eine dementsprechend geringere Bedeutung zu. Auf diese Weise tritt die ›wissenschaftliche‹ Ausrichtung von Musiktheorie und Komposition in Princeton deutlicher hervor: Insgesamt ist eine derart veränderte Perspektive notwendig, um ein detaillierteres Verständnis für die Situation zu erreichen und nicht belegte Auffassungen zu relativieren.

## 1. Introduction

Milton Babbitt's call for "'scientific' language and 'scientific' method" in musical discourse, delivered to the International Musicological Society at its 1960 Congress, has come to play an ironic role within the historiography of music theory and composition at Princeton University. The mandate would become a *locus classicus* within that literature, the 'scientific' design of Princeton's research programs a truism. Its uncritical acceptance has given license to dubious figurations: Susan McClary cast the call for academic composition programs as a plea for high modernist music to be "protected in university laboratories"; Matthew Brown and Douglas J. Dempster described Princetonian music theory as a discipline whose practitioners "conspire with the physicist and the

biologist." A related source of confusion is the question of what kind of 'science' is under discussion – formal, natural, physical, or all three? Joseph Kerman notes Babbitt's rejection of natural law as a basis for music theory, then goes on to accuse the composer of "fanatical scientism"; in a less polemical vein, Nicholas Cook makes a similar point about Babbitt's anti-naturalism while assessing the composer's epistemology as "strictly scientific." Further clouding the issue is that Babbitt's philosophy and Princeton's theory and composition programs have been conflated, the latter presumed to have been Babbitt's fiefdom: the seemingly safe attribution of scientism to the composer has been transferred to musical thought *chez* Princeton without much call for justification. A recent and conspicuous example is Richard Taruskin's *Oxford History of Western Music*, which avers without citation that it was Babbitt who "proposed to the Princeton administration that music composition be recognized as a legitimate branch of music research" and goes on to say that the resulting programs "rode the crest of scientific prestige."<sup>1</sup> The ubiquity of these conclusions has seemingly obviated any need for contextual details: instead Babbitt is situated within the broad political context of the Cold War between the United States and the Soviet Union; and his home institution is treated as a fungible example of a nationwide paradigm shift within higher education.<sup>2</sup>

This concept of 'scientific' musical research demands investigation: it is widely attributed to Princeton's theory/composition program despite a dearth of evidence outside of Babbitt's published writings. I called this situation ironic because it exemplifies precisely the sort of scholarship Babbitt was criticizing at the time – that which uses imprecise terminology and cherry-picked documentation to normalize casual acceptance of an ill-defined concept. Our knowledge of musical thought at Princeton, in other words, has been problematized by the same discursive and methodological indiscretions that had concerned Babbitt in the first place; and this has indeed allowed a cavalier intrusion of ideology into scholarship. The word 'scientific' can provoke strong opinions among academic musical researchers, many of whom have long been troubled by the disproportionate advocacy and funding of scientific disciplines within the American academy. The institutionalization of composition and music theory as research disciplines, and those disciplines' allegedly scientific design, have been touchy subjects from the get-go in musicological circles; and if the 'scientism' of those disciplines is accepted as fact, then criticism of them becomes a tempting catharsis for professional insecurity. What's more, Babbitt himself is a political conservative, and this has made him an easy target within liberal academe.<sup>3</sup> Babbitt warned that an absence of discursive and methodological integrity left scholarship vulnerable to compromise; and the historiographical reception of that warning has served to demonstrate its relevance.

This paper will use archival and primary sources to ask, and answer, some of the questions begged within the literature on music theory and composition as research pro-

1 These quotes are drawn from the following sources: McClary 1989 [1997], 58; Brown and Dempster 1989, 65; Kerman 1985, 101; Cook 2002, 97; and Taruskin 2005, 162.

2 For a detailed discussion of Babbitt's Cold War context see Brody 1993.

3 An important assessment of this issue, though it does not discuss Babbitt directly, is van den Toorn 1996. The most detailed exposition in print of Babbitt's political outlook may be found in an interview in the *Music Educators Journal* (of all places): see Babbitt and Grimes 1986.

grams at Princeton. I will begin with a summary of the history of musical study at Princeton to 1961, when the new doctoral programs were formally announced; from there I will move on to examine the university's history of rivalry between the Humanities and the Sciences. Having established a detailed institutional context, I will then revisit the subject of music-theoretical study at Princeton. I argue that musicologist Arthur Mendel, not Babbitt, was the most important advocate of the new composition and theory programs; that Mendel's central argument, as presented to the Princeton administration, was less an inflated promise of scientific musical study than a pragmatic adaptation to institutional changes; that those circumstances created strange bedfellows within the music department, all but one of whose faculty members voted in favor of the new doctoral programs; and that in order to understand the breadth of this support we must differentiate among the various paradigms – scientism, empiricism, and so forth – that have been used to characterize musical study at Cold War-era Princeton. In sum, the documentary record compels a decentering of Milton Babbitt and a redefining of his alleged scientism: where the issue of “scientific” language and “scientific” method” does arise within the sources used here, we will find scant similarity to the monolithic vanity project enduringly portrayed within musical scholarship.

## 2. Music Theory and Music History at Princeton, 1936 to 1961

The position of music theory and composition within the Princeton curriculum must be understood within the university's historically awkward attitude toward musical study in general. Princeton was one of the last universities in the United States to offer a music class for academic credit: its administration argued at several points that this was simply because it lacked appropriate funding sources, but this was surely not the entire story. A 1916 endowment for a chair of music had been used to create a University Organist position; shortly thereafter a bequest earmarked for the establishment of a chair in “music history or aesthetics” was used to fund a modest lecture series, taught by the organist and not given for credit. A 1935 donation at last compelled the administration to offer music classes as a formal part of its curriculum: President Harold W. Dodds commissioned Roy Dickinson Welch, then chair of the music department at Smith College, to investigate the matter. Welch had once told an audience of educators that “the day of pioneering for music's place in the academic sun” was past;<sup>4</sup> but a decade later he found himself at Princeton, having been asked to do precisely that.

The halting incorporation of music into the Princeton curriculum was due in part to a conflict intrinsic to Princeton's institutional philosophy of the liberal arts. Its program of undergraduate study was centered around a twofold ideal: that all academic subjects were to be treated as parts of a unified whole, and that this holism was to be used to cultivate a spirit of individualism within each student. But across the first half of the twentieth century, the institution moved away from an integrated curriculum in favor of individual specialization. Its free elective system, which did not prescribe specific courses, had been abolished in 1902; shortly thereafter a preceptorial system was in-

4 Welch 1927, 47.

stalled to facilitate individual relationships between students and faculty members. Such relationships were further formalized in the 1920s, when the new “Four Course Plan” required upperclassmen to choose a department within which they would take four courses a year, supplemented with individual research projects supervised by an advisor. Thus, inquiry concerning the possibility of a music department was held in a context wherein departmental separation was being cultivated at Princeton; and when a formal musical curriculum was established under Welch’s direction, it was not administered by an independent department but by a “Division of Music” within the Department of Art and Architecture. Music’s place in a liberal course of study had been acknowledged, but at a time when liberal study at Princeton was receding in favor of specialized individual research.

Princeton’s next major curricular change effected a broader sort of separation – one that would also have consequences for its music program. The “New Plan” instituted in 1945 replaced what was left of its underclassman elective system with lecture classes, broad in scope, to be offered by each department (the “Distribution Requirements”). Having enrolled in general education classes from each division – Humanities, Sciences, Social Sciences, and “History, Philosophy, and Religion” – sophomore students chose one of the four and completed a planned course of study across that division’s various disciplines (the “Divisional Requirements”). Then the student was to choose a departmental major, leading to his senior thesis.<sup>5</sup> The New Plan was designed to cultivate specialized knowledge by progressively narrowing a student’s choice of courses (the *Princeton Alumni Weekly* graphically represented it as a pyramid). The ideal of a broad education was nominally retained through a roster of thirty-three new “Basic Courses in the Liberal Arts” designed to appeal to a broad range of students. The same year that the New Plan debuted, the “Division of Music” was promoted to the status of an independent department, and this change may well have been an administrative necessity: it is not clear how a section within an entirely different department would have fit into the university’s new curricular requirements.

The Division/Department of Music, moreover, had been dealing with its own version of the conflict between curricular holism and individual specialization. Upon his formal hire, Roy Dickinson Welch had imported Roger Sessions, his erstwhile colleague at Smith College, to design and administer a sequence of music theory courses. Although they were longtime colleagues and friends, Welch’s and Sessions’s views on theory education were strongly divergent. Welch believed that the study of music history was a vital part of a liberal education, but that music theory was not – except insofar as it suited the historical curriculum. If instead it was designed to train students in the art of composition, Welch would ask in a 1950 paper, “isn’t this professional training, and, then, isn’t the teaching of harmony ‘vocational’ rather than ‘cultural’?”<sup>6</sup> Years earlier he had spelled out similar beliefs in a paper given at the annual Congress of the Music Teachers National Association: “Not technique, not tone-production, not skill in harmony, not personal or

5 I use “his” because during the time period under discussion Princeton did not yet have female students (or faculty).

6 Welch 1950, 22.

specialized attainments of any sort, will engender a conception of the real character of music as a landmark of the race's progress – as a human document."<sup>7</sup>

Debates about "personal or specialized attainments" within musical study were by no means specific to Princeton. As music had grown into a common component of collegiate curricula in the U. S., the central challenge the discipline had faced was the question of whether music theory and musical performance were suitable for the liberal arts.<sup>8</sup> In 1935 – the same year Dodds asked Welch to explain to him the purpose of a music department – composer Randall Thompson had published *College Music*, a study meant to effect an end to the debate. Thompson had been commissioned by the American Association of Colleges to determine whether 'applied music' – that is, performance – was worthy of academic credit from a liberal arts college. Thompson's conclusion was negative; and his parallel assessment of music theory was only slightly more sanguine. Like Welch, Thompson asserted that theory suited the liberal arts only insofar as it could be taught as part of music history – not if it were meant to prepare students for composition. Analysis of works, or composition in a given style, presented students with 'formal problems' that were solvable; testable; gradable; and, therefore, creditable.<sup>9</sup> If directed towards the creative expression associated with composition *per se*, in contrast, then theory was no more appropriate for the liberal arts than was musical performance – it was a vocational discipline.

Roger Sessions, a fervent individualist and a firm believer in music theory as a practical discipline, represented well the opposing position. Theory, he would write in 1938, should be taught "in the spirit of the practical artist." He continues, "What is musical theory and what is its function? For the musician, at all events, it has absolutely no other than a practical purpose – that of helping him more easily to grasp and hence to master his materials."<sup>10</sup> At Princeton, Welch and Sessions agreed to disagree: music history was taught as a humanistic liberal art, music theory and composition as a forum for individual creative accomplishment. And it would have been consistent with this arrangement if the faculty, upon the establishment of an independent music department, had expanded to include a specialized graduate research program in theory and composition. But instead, it would offer a doctorate for students specializing in music history. The faculty went as far as to defend this choice in the university's 1946 course catalog:

Beyond the Master's degree, musical theory and composition is not a field of concentration at Princeton. It is the conviction of the Department that the degree of Doctor of Philosophy, an academic distinction implying an aptitude for scholarship and a capacity for independent research, is neither appropriate nor of any real value to the young composer. Such a man is presumed to have completed his formal studies and to be ready to seek some of the distinctions awarded annually and on a national basis to creative musicians or to enter immediately upon a professional career.<sup>11</sup>

7 Welch 1915, 130.

8 Girard 2007, 66–77.

9 Thompson 1935, 80–81.

10 Sessions 1938, 238.

11 *Princeton University Catalog*, 1946–47.

In a sense, this clarification was unnecessary: the PhD in composition was virtually unheard of in 1945, at which time only a handful of university-affiliated Schools of Music offered such a degree. The inclusion of an unsolicited explanation suggests that the matter had been debated internally, and that was indeed the case. The question of whether Princeton should grant the doctoral degree on the basis of a compositional dissertation had been considered in detail by an Advisory Council in late 1943. Donald Goodchild, its chair, compiled council members' responses along with his own commentary in a concluding letter to Welch.<sup>12</sup> The Council had advised against a composition doctorate, and Goodchild concurred.<sup>13</sup> As for Sessions, he had left the university for the University of California at Berkeley by the time classes resumed. His replacement on the faculty was Randall Thompson – the composer who in *College Music* had argued that music theory only suited a liberal arts curriculum insofar as it contributed to historical understanding. The department's inaugural senior members were Welch, Thompson, and musicologist Oliver Strunk – none of whom supported the idea of composition as a doctoral discipline.

How did the department change, such that in 1961 eleven of twelve faculty members would approve doctoral specializations in composition and music theory? Thompson resigned in the summer of 1948; shortly thereafter Welch unexpectedly fell ill, passing away in January of 1951. Welch was replaced on the faculty by Arthur Mendel, who was named department chair; and Sessions returned in 1953 to retake the position vacated by Thompson. One of Sessions's students, Edward T. Cone, was already a junior member of the faculty; another, Milton Babbitt, had returned to Princeton in 1951 and had been given the rank of Assistant Professor a year later; and by 1956 both had been promoted to Associate Professor. Sessions also brought in Earl Kim, a former student from Berkeley, and by 1957 the composition faculty consisted entirely of Sessions and his erstwhile students. Sessions had made it a condition of his return to Princeton that the composition program he headed should have "a certain autonomy .... I feel that those whose function is to teach theory and composition should have the final word as to courses offered, requirements, and personnel for that branch of the department."<sup>14</sup>

The autonomy Sessions sought, though, was still constricted by the boundaries of the "New Plan." Due to the sudden faculty turnover a full revision of the department's curriculum had not yet been implemented. Eventually the new departmental criteria would be announced as follows:

1. To broaden and make more effective the Distribution and Divisional courses.
2. To place all the courses devoted to the corpus of a single composer's work on a higher level, where a certain minimum technical knowledge can be made prerequisite.

12 Goodchild, who had a PhD in Literature from Princeton, was then the Secretary for Grants-in-Aid for the American Council of Learned Societies.

13 Letter from Donald Goodchild to Roy Dickinson Welch, 22 December 1943, np. Box 6, Music Department. Folder: Advisory Council for Music Prior to 1948. Seeley G. Mudd Manuscript Library, Princeton University. This letter is transcribed in Girard 2007, Appendix A.

14 Letter from Sessions to "Mike" [Whitney J. Oates] dated 8 November 1951; np. Box 9: Music Department Records, Folder: Roger Sessions. Seeley G. Mudd Manuscript Library, Princeton University.

3. To offer in the technique of composition ('musical theory') at the same time more complete training for departmental students and more appropriate training for students who wish only an introduction to the subject.<sup>15</sup>

These changes suited Princeton's contemporary priorities. Music appreciation was reserved for the Distribution courses – the liberal curriculum, or what was left of it. Intensive study for music majors was divided into two specialized tracks – one dealing with specific areas of music history, the other with 'musical theory.' The graduate curriculum did not yet change; but Princeton's growing division between liberal arts and specialization forecast the expansion of the composition program to join the history program as a doctoral discipline. The skepticism that had greeted the establishment of theory and composition courses at Princeton had largely receded because the liberal arts no longer constituted the dominant academic paradigm: 1936's 'vocationalism' had become 1961's 'specialization.' To put it another way, it was time for "The Composer as Specialist."

Arthur Mendel first raised the possibility of an expanded doctoral program in his 1958 departmental report to the university president, citing increasing pressure for academic job applicants to hold the PhD degree. "Until the pressure rises considerably higher," Mendel wrote, "I think we shall be able to resist [adding a composition doctorate]. But I do not altogether exclude the possibility that within a few years we may have to reconsider our position."<sup>16</sup> In the following year's report, Mendel noted that although a new Advisory Committee had voted against a composition PhD, the question was far from resolved:

There is considerable agitation throughout the country in favor of granting a doctoral degree in composition. Almost all students who take degrees in music history here – even if only the MFA, before writing their dissertations – obtain desirable teaching positions promptly. This is less true for those who take the degree in composition, and this fact coupled with the undoubted fact that many, perhaps most universities attach great importance to doctoral degrees in appointing faculty members, and even more in promoting them, causes considerable dissatisfaction among the students and even among the teachers of composition.<sup>17</sup>

Following a year's sabbatical, Mendel resumed his annual reports in 1961 with some news: that winter the music department had voted to award a PhD in composition after all. "This decision was not arrived at lightly," he wrote, "or without considerable hesitation as to the appropriateness of the PhD degree for creative work; but in the end all members of the Department except one felt that composition is not more different from the other fields in which the PhD is already offered than those fields are from one another, and that the arguments in favor of extending the degree to composition greatly outweigh those against it."<sup>18</sup>

15 *Annual Reports to the President*, Princeton University (henceforth *PRP*), vol. 13 (1952–53), 244 C–D.

16 *PRP* 18 (1957–58), 507.

17 *PRP* 19 (1958–59), 476–477.

18 *PRP* 21 (1960–61), 556. The dissenting vote was Oliver Strunk's.



The department's approval was just the first step: because the decision had been reached via vote rather than consensus, something that had not happened "for many years," the faculty proposed to present both sides of the story to the Dean of the Graduate School.<sup>19</sup> Dean Daniel R. Hamilton seems to have responded to the proposal with skepticism, as Mendel wrote a second letter two weeks later further defending the department's position. "What is the degree if it is not a certificate for competence," he asked: "competence for what?"<sup>20</sup> In most academic disciplines, he continued, the PhD denoted "competence for teaching-and-scholarship," and so the question of job placement for graduating students was hardly "unworthy or *infra dig* motivation" for a new degree program. Princeton's own MFA graduates, moreover, were being forced to proceed on to institutions "inferior to" Princeton, only so they could get what ultimately amounted to a "teaching license."

Dean Hamilton put the issue before Princeton's Committee on the Graduate School and its Subcommittee on Policy.<sup>21</sup> The committee ruled unanimously in favor of the degree; the final step, approval by the Faculty of Arts and Sciences as a whole, was perfunctory due to the Committee's endorsement.<sup>22</sup> In announcing this success in his report to the president, Mendel emphasized practical advantages: because only one peer university (Brandeis) had voted to start such a program, Princeton would have an impressive pool of potential doctoral students.<sup>23</sup> Indeed, Mendel continued, the program already had so many qualified candidates that they did not intend to advertise the degree. The process had concluded as Mendel had forecast – the growing status of the PhD as a requisite for academic employment had compelled the university to allow promotion of the only terminal Master's program still on its roster.

But composition was only one part of the proposal, which carried a rider allowing for the election of a doctorate in music theory as well. Or was it the other way around? The relationship between Princeton's composition and music theory programs is difficult to pin down. (As an undergraduate course of study, of course, they were one and the same.) A PhD in composition had been discussed elsewhere, as Mendel's letters indicate; a doctorate in music theory had not.<sup>24</sup> On one hand it seems as though music theory piggybacked on the composition program; but on the other, the *conceptual* argument for composition as a research discipline was predicated on a particular idea of music theory. In that sense, composition followed from a move to promote the academic institutionalization of theory,

19 Arthur Mendel, Interoffice Correspondence to Dean Donald R. Hamilton, 24 January 1961, np. Subject Files AC #109, 1746–present; Series 2, Academics: Music; Box 43. Folder 1: General, 1900–2001. Seeley G. Mudd Manuscript Library, Princeton University.

20 Ibid.

21 Undated Memo to University Faculty from Donald R. Hamilton, Dean of Graduate Studies, Subject: Broadening of the PhD Degree in Music. Subject Files AC #109, 1746–present; Series 2, Academics: Music; Box 43. Folder 4: Concerts and Recitals [sic]. Seeley G. Mudd Manuscript Library, Princeton University.

22 *PRP* 21 (1960–61), 556.

23 Ibid., 557.

24 During the 1960-61 school year Yale University, which would institute a doctoral program in music theory in 1965, was considering the possibility: Allen Forte, who would head that program, had just been hired as an Instructor at the Yale School of Music.

not the other way around. That music theory is not mentioned in Mendel's correspondence with Dean Hamilton could mean that the theory degree was contingent on composition's approval; but it could also mean that its independent approval was not in question, because it involved a written dissertation or because the department had already offered (though never granted) such a degree on an *ad hoc* basis under the music history rubric.

Either way, the argument that the PhD in composition had merit beyond its practical advantages was predicated on a particular concept of music theory. The issue had been broached by Mendel in his 1959 report to the president:

There is an increasing interest among young composers in musical theory, using the word *theory* not in the threadbare sense of the elementary technique of composition, but in that of analytic, descriptive, and synthetic theory of melody, harmony, rhythm, form, etc. We have been repeatedly asked by composer students whether we would give a doctorate in musical theory. ... It is possible to imagine that a good dissertation might be written in this field by a student who did not wish to acquire as extensive a historical knowledge as our general examinations require, but who was well grounded in philosophy and mathematics, and for whom a bridge between music and another department might be the appropriate solution, both for the general examination and for the acceptance of the dissertation.<sup>25</sup>

By the time the Mendel, Cone, and Babbitt submitted a co-authored proposal to the Dean, the interdisciplinary promise of a music theory degree had seemingly grown well beyond philosophy and mathematics to include an impressive suite of programs:

Musical theory is today being transformed from a collection of dubiously derived and inaccurately stated prescriptives and imperatives into a subject that draws, as it must, upon the methods and results of the formal and empirical sciences: logic, the philosophy of science, analytical philosophy, physics, electronics, mathematics, experimental psychology, structural linguistics, and computer methods. Such investigations can be undertaken only in a university, and we wish to encourage them and see them take place at Princeton.<sup>26</sup>

The list of disciplines whose "methods and results" were cited in the prospectus are applicable to the Princeton music program to varying degrees. The 'formal' disciplines – logic, the philosophy of science, and analytical philosophy – certainly warranted inclusion. So too mathematics, electronics, and "computer methods," each of which was relevant to contemporary composition. (The Columbia-Princeton Electronic Music Studio had opened the previous year.) Experimental psychology and structural linguistics do

25 *PRP* 19 (1958–59), 477–78. Italics sic, as underlining. 'Musical theory' and 'music theory' were used interchangeably in the United States into the 1970s – Babbitt himself used the former in the title of a 1972 article. I suspect that the current uniform usage of 'music theory' was effected in part by the founding of the Society for Music Theory in 1977.

26 Milton Babbitt, Edward T. Cone, and Arthur Mendel, "The PhD in Music," undated memo (late 1960 or early 1961), np. Historical Subject Files AC #109: 1746–present. Series 2, Academics: Music, Box 43. Folder 1: General, 1900-2001. Seeley G. Mudd Manuscript Library, Princeton University, np. This prospectus is transcribed in Girard 2007, Appendix B.

not seem to have had much of a presence in the department in the early 1960s, but the later research of David Epstein (PhD 1968) and Fred Lerdaahl (MFA 1967), for example, suggests that their inclusion was not arbitrary.

That leaves physics, a discipline whose inclusion might be easier to account for were it not for the parallel mention of “electronics.” Babbitt did teach an advanced seminar in musical acoustics during the 1960-61 school year, it is true.<sup>27</sup> On the other hand, the rest of the disciplines listed had consequences for music at Princeton *in their contemporary capacities* – Babbitt and his colleagues were interested in what was going on *then*, as would suit petitioners for the right of composers to join the ranks of the research faculty.<sup>28</sup> When the Princeton man of 1961 thought of physics, though, he did not think of acoustics: the physics faculty’s most recent relevant work had been H. Lester Cooke’s design of a new campus theater space decades earlier.<sup>29</sup> At the time of the music department’s proposal, the physics faculty were researching shock waves in gases; nuclear polarizations; gravitation; spectroscopy; low-energy nuclear physics; theoretical topics such as quantum field theory; and high-energy nuclear physics, using the department’s new and improved particle accelerator, the synchrotron.<sup>30</sup> If the prospectus used “physics” in place of “acoustics” to seem more up-to-date, it would not have fooled Dean Hamilton – a member of the Princeton physics department himself.

The reference to physics in the departmental prospectus, although of minor moment in the larger picture, is worthy of our attention because it evokes three issues of historiographical consequence. The first is the financial rivalry between the humanities and the physical sciences – a rivalry which, at Princeton, atypically went back to the turn of the twentieth century. The second issue is the curricular integration compelled by the New Plan, according to which each department was to design a general-education course that could be understood, enjoyed, and internalized by freshmen of any eventual disciplinary specialization. And finally there is the question of whether, how, and why Princeton’s theory/composition program was ‘scientific.’ The rest of this paper will examine these issues in turn.

### 3. The Sciences and the Humanities at Princeton

Princeton was the rare university at which the relationship between the sciences and the humanities had elements of rivalry long before the Second World War. It began when Princeton, transformed from a college to a university in 1896, expanded its faculty in 1905 in parallel to its adoption of its preceptorial system. The Dean of Faculty at that time was mathematician Henry Burchard Fine, who advocated the growth and improvement of science departments at a time when humanistic study still dominated American higher education. During the tenure of Woodrow Wilson as University President, Fine oversaw

27 *Princeton University Catalog*, 1960–61.

28 See for example Babbitt’s recollection of his and David Lewin’s discussions with faculty members from the Princeton math department: Babbitt 1987, 104–6.

29 Cooke 1939.

30 *PRP* 1960–61, 603ff.

the remodeling of Princeton into a national leader in scientific training; upon resigning his position in 1912 he was named Dean of Scientific Departments, a post invented for him and eliminated upon his retirement.<sup>31</sup> In this capacity Fine – now working under President John G. Hibben – aimed to make Princeton a center of scientific research beyond its general capacity as an educational stronghold. In the years following World War I, Fine and Hibben pursued funding for a vast expansion of the university's professorships and research resources in mathematics and the sciences. This culminated in the Scientific Research Fund, spurred by a million-dollar grant from the Rockefeller Foundation's General Education Board. That grant was contingent upon Princeton's raising two million dollars on its own, and the school's Fund Campaign Committee, headed by Fine, was successful.<sup>32</sup>

In the same year of the Scientific Research Fund's consummation an editorial in the *Alumni Weekly* noted that the "chief practical objection" to a credited course in music history or theory "[was] naturally the financial one .... Princeton is already faced by many important demands on her resources, and so the extension of her curriculum into a completely new field is probably at the moment not feasible."<sup>33</sup> By the time the Division of Music was founded in 1936, the Scientific Research Fund had already achieved its goal of giving Princeton an international presence in the sciences. By that point professors in the Humanities were "on the defensive," in the words of a participant in a 1938 forum held at the university.<sup>34</sup> The conclusion of that forum, another reported, was that "the Humanities are not academic luxuries but vital forces upon which we must rely for the defense and cultivation of human freedom, dignity, and worth."<sup>35</sup> Be that as it may, however, humanistic disciplines were increasingly and disproportionately underfunded at Princeton. The Division of Music, still lacking departmental status, held a particularly tenuous position. In March of 1941 President Dodds took the time to acknowledge publicly "certain questions as to the necessity" of relying on outside funding to support the music program. "New undertakings must be carried out with due consideration to the continued strength of existing elements of the Princeton scheme of things," he explained; and furthermore, "the University is not as free in the use of its income and in the diversion of funds from one purpose to another as many suppose."<sup>36</sup> Ultimately the section would rely on a fund-raising group – the Friends of Music at Princeton – to underwrite its 1945 expansion.

The already considerable imbalance in private funding between the sciences and the humanities would soon be superseded by an influx of military and other federal funding.<sup>37</sup> Upon U.S. entry into the Second World War, Princeton's facilities were given over entirely to military training. Some 20,000 men in uniform received instruction on

31 Veblen 1929.

32 Chaplin 1959.

33 Anonymous 1928, 776.

34 Greene 1938, 600.

35 *Ibid.*, 599.

36 Dodds 1941, 7.

37 Brown 1945.

campus as part of the Army Specialized Training Program, the School of Military Government, and the Officers Indoctrination Program (Strunk taught them German; Babbitt taught math). For this use of its facilities the university was paid about five million dollars. The science departments got their share as well: the physics department received around \$500,000 per year from 1940 through 1946, more than triple its annual peacetime budget.<sup>38</sup> Princeton scientists engaged in a wide variety of sponsored research for the U. S. military; most famously, faculty from the physics and chemistry departments were key contributors to the Manhattan Project. Scientific research, provision of facilities, and employment of faculty combined to bring Princeton about ten million dollars of taxpayer money during this span. And the government continued to fund science research after the War's conclusion, spurred by the subsequent Cold War with the Soviet Union. President Dodds summarized the institutional position when he stated that "government must aid science, if only as a means of self-preservation ... the raw truth is that America must pioneer in science more than ever before or be destroyed."<sup>39</sup>

This put Humanities departments in a worse position than they had been in prior to American involvement in the War. On the one hand, just as administrators and faculty had stressed the anti-totalitarian power of the Humanities during the late 1930s, they now took pains to emphasize the importance of humanistic study in a world threatened by nuclear annihilation. Dodds himself insisted that "more, rather than less, attention to the social sciences and humanities" must be paid "if the destructive power of the new energy is to be stopped from running amok in the world." At the same time, he argued, the marginalization of the Humanities effected by federal funding of the sciences could not be addressed "by extending governmental aid to the social sciences and the arts and letters, in which opinions and values are a part."<sup>40</sup> Such disciplines had their work cut out for them: by the early 1960s over half of Princeton's budget came from government sources, and nearly all of that was earmarked for scientific research.<sup>41</sup> A further problem was that burgeoning technological industries promised lucrative futures for those students who made the right disciplinary choices: in those early years of the Cold War the *Alumni Weekly* consistently ran full-page advertisements from companies offering jobs or fellowships to graduates of Princeton's science departments.

Roy Dickinson Welch spoke for many of his colleagues, then, when he rued the undergraduate "flight from the Humanities" in his 1947 Report to the President. Two decades later Arthur Mendel was singing the same tune: the arts and humanities, he complained, "are considered of marginal interest by today's undergraduates."<sup>42</sup> Even before World War II, the music faculty couldn't claim to constitute anything more than a niche major for undergraduates. As it happens, though, the same had been true of the physics department – an instructive point of comparison. During the Division of Music's first three years of existence, eleven sophomore students elected music as their major; during

38 *PRP* 6 (1945–46), 175–6.

39 Dodds 1945, 5.

40 *Ibid.*

41 Bundy 1963.

42 The Welch quote comes from *PRP* 9 (1948–49), 216; Mendel's comes from *PRP* 32 (1966–67), 948.

the same span physics was elected by twelve. Had it needed to, however, the physics faculty would have been able to reassure the administration that its “small number of Departmental undergraduates” was not “a cause for concern” because of its “flourishing graduate division” based upon “a hard core of more specialized work.”

Those particular words, however, were written by Arthur Mendel, twelve years after the end of the War.<sup>43</sup> By then the music department could say what the physics faculty had been able to claim for decades – that a strong research program mooted any reservations the administration may have had about a lack of undergraduate commitment. The difference was that the graduate program in music, although prestigious, could not claim to rival Princeton’s enormous, federally funded, and internationally regarded scientific programs. There was only so much Mendel and his colleagues could do – but the easiest way to address the issue was to expand their research program. The easiest way to do that was to offer doctorates in composition and music theory in addition to music history; and the easiest way to do *that* was to invoke those disciplines’ new-found emphasis on scientific language and scientific method.

Importantly, such claims carried an implication that the music department, like the postwar physics department, might become self-funding via government support. Its prospectus noted pointedly that it had already been receiving applications from prospective graduate students who offered “considerable training in the sciences” alongside their musical backgrounds.<sup>44</sup> Princeton’s first doctoral student in music theory, Michael Kassler, was singled out for just that reason in the departmental report of 1963: Kassler’s work at Princeton that year had been undertaken in the capacity of “a Research Assistant under the NSF Institutional Grant C-248.” Kassler was planning a project “involving the use of computer techniques in the solution of musicological problems,” and the department hoped that the project would “be able to lay the foundations for a long-range project to design a computer specifically capable of reading musical notation” – presumably warranting further funding from the National Science Foundation or some other federal source.<sup>45</sup> What’s more, the Rockefeller Foundation had underwritten the creation of the Columbia-Princeton Electronic Music Studio, via a five-year, \$175,000 grant announced in 1959. Milton Babbitt, writing in the *Alumni Weekly* in 1960, invoked the physics department’s Project Matterhorn, sponsored by the Atomic Energy Commission and comprising confidential research into controlled thermonuclear reactions. The Electronic Music Studio, Babbitt wrote, was “in the scope of its implications and its strategic nature – if not in its budget – the ‘Matterhorn’ of contemporary music.”<sup>46</sup>

If the proposed programs’ scientific aspects did impress some administrators to whom budgetary concerns were less important compared to a president or dean, it

43 *PRP* 17 (1956–57), 424–5.

44 *Ibid.*, 425.

45 *PRP* 24/2 (1962–63), 735. Compare the concurrent activity at Yale University, which in 1964 received a \$41,000 grant from the NSF that brought composer James C. Tenney from Bell Telephone Laboratories to the university’s IBM computer center on a project to analyze musical sounds. See Girard 2007, 289–91.

46 Babbitt 1960, 11. Project Matterhorn’s initial budget was approximately \$450,000.

may not have been for the reason commonly assumed. Their appreciation may have been based not on scientism but rather on the need for curricular integration within the Distribution Requirements. To understand this we must return to Princeton's dialectical principles: "unity of knowledge" and "diversity of human beings." There was a time when the notion of scientific paradigms within humanistic disciplines was derided at Princeton – the late 1930s, to be exact. Another emergent consensus of the "Forum on the Meaning of the Humanities" cited earlier was that such disciplines "provide an invaluable corrective for modern over-specialization, faulty educational programs, and the misapplication of scientific method to the study of human life and human values."<sup>47</sup> A year earlier a lengthy essay in the *Alumni Weekly* had demanded an end to "'scientific' literary scholarship."<sup>48</sup> Such examples resonated with the Princeton curriculum in the era between implementation of the "Four Course Plan" and the "New Plan." To wit: liberal education in the former case referred to the courses taken by a student prior to election of a major and writing of a thesis; in the latter case it referred to the Distribution courses, which served as generalized introductions to departmental subjects meant to appeal to students destined for study in any of the four Divisions. The idea of applying scientific methods to humanistic subjects was incongruous at interwar Princeton, but within the postwar Plan the juxtaposition would have been appreciated as a useful way to appeal to students of all interests.

This requirement also led to a lot of talk at Princeton about the humanistic aspects of science. Such discussions seem to have become more urgent in the early 1960s, perhaps because of the controversy following the publication of Charles Percy Snow's *The Two Cultures*.<sup>49</sup> The idea of *rapprochement* between the humanities and the sciences was popular at Princeton in the early 1960s, in contradistinction to Snow's thesis: namely, that scientists and humanists working in higher education comprised separate cultures all but incapable of even casual communication. In the *Alumni Weekly*, a 1961 article on "Science as a Liberal Art" used *The Two Cultures* to frame a discussion of faculty member Eric Rogers's newly published *Physics for the Inquiring Mind*, "an introductory textbook on modern physics that is also a liberal education."<sup>50</sup>

Rogers had been brought to the Department of Physics during the years of teaching shortages caused by the faculty's wartime commitments. His popularity as a lecturer led to his eventual retention on the faculty and to his being commissioned to teach the department's Distribution Course: "The Methods, Nature, and Philosophy of Physical Science." His textbook, based on that course, was deliberately humanistic – not only was it sprinkled with literary epigraphs and whimsical illustrations, but it was also built around critical inquiry into scientific concepts and methods. Rogers asks students to consider the meanings and implications of words like "experiment," "theory," "scientifically," "logical," and "data." The textbook's introduction makes an intriguing comparison to musical education:

47 Greene 1938, 599.

48 Moment 1937.

49 Snow 1959.

50 Piper 1961, 8.

Historian, philosopher, and scientist: each feels that the others are rich in vision but lack some knowledge of his field. To the historian, the scientist lacks perspective and accurate knowledge of history; to the philosopher, the scientist lacks critical skill and accurate knowledge of philosophy. To the scientist, the works of philosophers and historians are a great delight: but he finds that they pre-suppose (rather than lack) a full knowledge of scientific material and a first-hand understanding of the nature of scientific work. To convey the latter to non-scientists seems to me the essential first move in giving them an understanding of science for use in later life and work – an understanding comparable with the knowledge of music that a good music course conveys to non-musician.<sup>51</sup>

Did such a music course exist at Princeton? More to the point, did the music department's Distribution Courses invoke scientific principles to the same extent that Rogers attempted to invoke humanistic critical inquiry – and if so, in what way?<sup>52</sup> I believe that the manner in which the Distribution Courses were aimed to appeal to scientifically inclined students was, at least by the late 1950s, that they designed to portray music as “a way of thinking” analogous to mathematics or language. In his 1957 report Mendel claimed the difficulty novices faced when studying music was that they needed to “gain mastery over a new way of thinking;” the same year he published “Music is a Way of Thinking,” an essay in which he compared statements of music-historical facts to the statement of a physics equation.<sup>53</sup> And when music professor J. Merrill Knapp, who was teaching the Distribution Course at the time, wrote an essay on musical education for the *Weekly* in 1959 – titled “Music as a Liberal Art,” analogous to the article on Rogers's book a year later – he cited Mendel's phrase as being particularly germane to the challenge of liberal study in music:

One cannot express musical thinking except in music itself. The units of musical thinking are relations between events in sound, tones of different pitch, of different duration, of different volume, of different character, simultaneous or successive. By the same sort of conventions or laws that govern relations between the words in language, between mathematical concepts, between colors and shapes in the visual arts, between gestures and movements in acting and the dance, there grows up in each culture a constantly changing ‘logic’ of these relations between tones. The principles of musical ‘logic,’ and how to use them to write music, to understand it, to analyze it – these, then, are the objects of the study of thinking in music.<sup>54</sup>

51 Rogers 1961, viii.

52 The best analogue to Rogers's book to come out of Princeton's music department would be published a decade and a half later: Peter Westergaard's *Introduction to Tonal Theory* (W.W. Norton, 1975). Although Westergaard had received his MFA from Princeton and was a faculty member when the book came out, *Introduction to Tonal Theory* was rooted in courses he had taught elsewhere; regardless, the book's diagrams of the inner ear, graphs illustrating Fourier analysis, and Appendix concerning the “physiology of pitch perception,” as well as its metalinguistic inquiry into what we mean by ‘music’ and ‘theory,’ constitute vivid analogues to *Physics for the Inquiring Mind*'s literary quotations, analysis of the meaning of ‘experiment’ and ‘data,’ etc.

53 *PRP* 17 (1956–57), 425; Mendel 1957, 9.

54 Knapp 1959, 10.



Knapp's summary refers to undergraduate education in general, not only that aimed at non-musicians; but it is applicable to the latter, and it suggests how the departmental beliefs about music and music theory were applied outside of the realms of research and advanced study. The implied connections to learning mathematics as preparatory work for scientific study are foregrounded in the conclusion to Knapp's essay:

[T]oday there are special reasons for maintaining and strengthening the relations between music and other fields of thinking. In the last thirty years, the domain of music has been undergoing a revolution in thought – a revolution which, in its nature and consequences, can be compared only to the mid-nineteenth century revolution in mathematics and the early twentieth century revolution in physical thought. A tonal system of some three hundred and fifty years' standing, which has given most music a tonal center, is now being supplanted in contemporary music by twelve-tone and electronic techniques. As in mathematics and physics, the most profound result of this revolution has been that it compels us to re-examine the very foundations of our thinking. The musician, like the physicist, must recognize the possibility and reality of alternatives to what he once regarded as absolutes. He lives no longer in a unitary musical universe, but in a variety of universes.<sup>55</sup>

#### 4. Conclusion

I have tried to demonstrate that the nature and philosophy of Princeton's composition and music theory programs cannot be understood fully unless we take into account not only Babbitt's views but those of his colleagues as well. After all, it was not Babbitt who "proposed to the Princeton administration that music composition be recognized as a legitimate branch of music research" but rather Arthur Mendel, representing as department chair the majority view of the faculty. Accordingly, although the record confirms that the new branch of study was designed to be in some way 'scientific,' the nature of that design must not be analyzed with exclusive recourse to Babbitt's writings. In a 1948 paper on the role of the "creative artist" in higher education, for example, Edward T. Cone expressed his own admiration of scientific disciplines: "[O]ne reason for the present-day advance of technology," he wrote, "[is] the fact that mathematics and the natural sciences have, almost alone among the branches of learning, remained healthy [and] retained their proper characters."<sup>56</sup> In Cone's view, those disciplines' vitality had been made possible through the absence of "the virus of the historical method": whereas humanistic subjects were mired in the study of the past, the sciences recognized "the primary role of creative thinking" and the importance of "first-hand experience ... making, doing." To Cone, then, it was the structure of scientific training that music should emulate – not scientific disciplines *per se* but their participatory pedagogy and their lack of historicism.

Cone's essay is reminiscent of some longtime concerns of his teacher, Roger Sessions – another faculty member who voted for the new program. Sessions's philosophy of

<sup>55</sup> Knapp 1959, 10

<sup>56</sup> Cone 1948, 177.

musical study and learning was avowedly empiricist; but his empiricism was not the sort casually identifiable with experimental science but rather a perceptual and experiential individualism. Like Cone, Sessions thought that the devaluation of personal experience inevitably compromised individual artistic integrity:

Nothing interests me less than dogmatism in questions of musical theory – it is the most arid form of dogmatism that I can well conceive, and the least in accord with the realities of the situation which it pretends to interpret. The ear of the musician, as used both in creating and in apprehending, must remain the court of last appeal; and musical theory thus remains, at the very best, a more or less adequate descriptive account of the ear's experiences.<sup>57</sup>

Just as Cone assailed the “historical virus,” Sessions considered historicism to be a particularly pernicious version of such dogmatism.<sup>58</sup> Sessions may have supported the new doctoral programs for practical reasons – in a 1949 paper he had argued against the PhD as “a condition of the admission of composers to academic status” – but the influence of his empirical philosophy on music and musical education at Princeton must be taken into account.<sup>59</sup>

Arthur Mendel's own empiricism was not a prescribed antidote to historicism – he himself was himself a professional music historian. But he did invoke scientific discourse as an analogue to the historiographical positivism he advocated. As he explained at length in a 1960 paper, Mendel believed that musicologists should dedicate themselves to discrete, solvable, and testable problems – in short, to empirical research. The alternative was historiography too broad in scope to lay claim to the status of scholarship. Mendel's positivism, rooted in the work of philosopher Carl Hempel and historian R. G. Collingwood, required scholarship to be testable in accordance with scientific methodology. “What are the practical lessons to be drawn,” he asked rhetorically, “from the claim that the nature of historical inquiry is scientific?” Citing Hempel's criteria for “scientific character,” Mendel claimed that although all music-historical scholarship is empirically testable in theory, “the higher we go in the scale of generality, the harder it is to make the empirical tests Hempel specifies.”<sup>60</sup> Claims of attribution or dating of works, for example, were testable and provable; claims of stylistic periodization or aesthetic value were not. Mendel's interest in science, then, primarily concerned the historiographical implications of its methodology. Despite disciplinary divisions, Mendel's empiricism – if not his positivism – was akin to that expressed by his colleagues Cone and Sessions. And of course Mendel's belief that “music is a way of thinking,” and that this constituted an important interdisciplinary link, was matched by his fellow musicologist J. Merrill Knapp; and also like Mendel, Knapp argued that the decline of harmonic tonality in musical composition was analogous to the supplantation of Newtonian paradigms within the discipline of physics.

57 Sessions 1951, xix.

58 See for example Sessions 1938a, 123–4, and Sessions 1938b, 263–4.

59 Sessions 1949, 202.

60 Mendel 1961, 13.

As for Milton Babbitt himself, his most explicit discussion of scientific paradigms for musical thought was “Past and Present Concepts of the Nature and Limits of Music,” a paper delivered to the same Congress of the International Musicological Society as Mendel’s “Evidence and Explanation.” It was in this essay that Babbitt advocated “‘scientific’ language and ‘scientific’ method” as general criteria for academic research, and the search for ‘scientific’ thought at Princeton compels a closer look at what Babbitt thought those criteria required. If we are to discuss music in a scholarly environment, Babbitt argued, then we must agree upon a particular concept of music first of all. In doing so we must hold ourselves to the same discursive standards as scholars of other types; if anything, we need higher standards for music because we face a daunting legacy of sloppy scholarship. When we do apply the most stringent process of “concept formation” available – here Babbitt, like Mendel, cites Hempel – then we run into the question of “theory formation.” Now, there have always been ‘music theorists;’ but, Babbitt continues, not one among them has ever bothered to define the relevant terms or to delineate the observed phenomena those terms were alleged to represent.

Another problem, Babbitt continues, is that much of this canon has been predicated on a series of *a priori* metaphysical justifications for what are really, and in fact only can be, the individual theorists’ own empirical inductions. Theorists have justified their claims by citing numerical proportions, say, or the overtone series. That kind of theory formation permits a range of *a posteriori* concepts, some of them insidious (‘consonance and dissonance,’ for example) and all of them fallacious. And as for those theorists who resisted metaphysics and tried instead to systematize empirical experience, they had failed to explain concepts as fundamental as what makes one sonority ‘similar’ to another. This lack of precision pre-empted any possibility of explanatory power on these authors’ parts, making it impossible for scholars of later eras to follow up on their theories with discursive integrity. Contemporary music theorists, in Babbitt’s view, were compelled to avoid the methodological and discursive blunders that characterized the work of their predecessors in the field. This is not all that different from Sessions’s wariness of *a priori* justifications of aesthetic judgments, Cone’s condemnation of historicist constraints on creativity, Mendel’s historiographical positivism, or Knapp’s belief that musical thought could no longer countenance assumptions of universalism. Babbitt’s argument may have been more conspicuous, but in substance it was not wildly different from other views found among his colleagues in the Princeton music department.

With that understood, let us move towards a conclusion by revisiting the ways that those authors invoked scientific method and discourse during the years leading up to the creation of a doctoral program in music theory and composition. Consistently, scientific disciplines were presented as exemplars: of empiricism untainted by historicism; of study privileging hands-on learning; of scholarship resistant to generalization and dogma; of fields being reconstructed following a paradigm shift; of departments qualified for federal and private funding. The Princeton music faculty cited the sciences during this time, not to advocate that musicians working in higher education “conspire with the physicist and the biologist” but rather to convince their home institution that music – a field that had long been subjected to skepticism and scrutiny there, as we have seen – had academic relevance in a scientific age. So when we say Princeton theory and composition were ‘sci-

entific,' what do we really mean? The term should be avoided, as although it is accurate in a general sense, it is imprecise and therefore open to inappropriate or misleading interpretations. 'Positivistic,' although more specific and easily demonstrated, would apply to Babbitt and Mendel (and some of their respective students) but exclude the majority of their colleagues. The best option is 'empiricistic,' a term covering not only Babbitt's epistemology and Mendel's methodology but also the experiential creative philosophy of their colleagues Cone and Sessions. This does the department justice by describing its most common epistemological paradigm without facilitating the overheated metaphors invited by use of the term 'scientific.'

And finally, the use of the term 'scientism' to describe Babbitt and his academic program is simply inappropriate. Properly speaking, scientism is a philosophy according to which the results of scientific experiment are taken to be *a priori*, as trump cards controverting any other line of reasoning.<sup>61</sup> A useful example may be found, apropos Babbitt in fact, within Nicholas Cook's contribution to the *Cambridge History of Western Music Theory*. Within his survey of musical epistemologies past and present, Cook makes note of Babbitt's rejection of the overtone series as the basis of harmonic tonality.<sup>62</sup> The claim that the overtone series is the basis of harmonic tonality, Babbitt has argued, requires arbitrary restriction to those partials that mutually form diatonic (and not even-tempered) intervals; even then, among the definitive constituent parts of the tonal system only the stability of the major triad may thus be explained; and even *then*, we must account for the fact that major-key triadic music is not a cultural universal by any definition. To say that the major and minor third and the perfect fifth are consonances because of the overtone series, in other words, is no less tautological than saying that the perfect fourth is a consonance because it has a superparticular ratio.

In Cook's view, all of this is "just plain wrong": his counterargument is that a scientific experiment conducted in the 1980s, organized by a professional psychoacoustician working with volunteer research subjects, had demonstrated that contextual consonance and dissonance "do not obtain" for listeners if the tones in question are synthesized so that they lack harmonic spectra. Cook, in other words, grants authority to experimental findings over any other line of reasoning – an excellent example of scientism proper. And Cook is correct that scientism is inimical to Babbitt's own epistemology, despite his advocacy of a 'scientific method' for musical research.<sup>63</sup> The composition/theory program at Princeton was designed to be experiential, not experimental, and its empiricism was modeled after that of the 'formal sciences' more than the natural or physical sciences. Comparisons between the methodology and discourse of that program and those employed by academic scientists were timely and defensive analogies, indicative of a depart-

61 Note that 'scientism' usually refers to the physical and natural sciences, and not to formal sciences such as analytical philosophy: the latter, secondary definition lies behind Kerman's seemingly inconsistent portrayal of Babbitt's musical philosophy as scientific but not naturalistic.

62 Cook also cites a 1946 article on the subject by Norman Cazden; another interesting point of comparison is Allen Forte's *Contemporary Tone Structures* (New York: Columbia Teachers College, 1955), 10–11.

63 Cook's attribution of Babbitt's "anti-naturalist stance" to anti-fascist ideology should be noted, but that complex issue lies outside the scope of the current paper.

ment's longstanding institutional insecurity rather than some sort of defection from the Humanities. The scientific nature of Princeton's doctoral program in music theory and composition was a product of that university's philosophy of liberal study, its emergent focus on specialized research, its unrivaled disparity in funding, and the affinities between its different music faculty members' positivism, individualism, modernism, and/or anti-historicism. The complexity of the issue demands that future investigations of music theory and composition at Princeton must be discursively precise and methodologically rigorous. That this responsibility corresponds to Babbitt's own disciplinary philosophy is incidental, though the soundness of the prescription should be noted by his discontents.

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