

Articles

Applications of Science The Age of Standardization and Efficiency in Music Education

JERE T. HUMPHREYS¹

From the ancient Greek period to the present, the word "science" has been used to describe various aspects of music, musical learning, and musical performance. For example, in both Ancient Greece and in European medieval universities, the "science of music" meant music theory, or possibly the study of music theory. In early America, Puritan preachers urged people to learn the "science" of music, which to them meant reading music at sight as opposed to singing by rote. Later, during the early nineteenth century, "scientific" music was the music of Handel, Haydn, Mozart, and Beethoven, while other music was thought to be "unscientific."² The term "science,"

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²H. Wiley Hitchcock, "William Billings and the Yankee Tunsmiths," HiFi/Stereo Review, February 1966, p. 62.

as it related to education, has an equally varied history.

Beginning in the last two decades of the nineteenth century, the term took on many new meanings and applications in the American educational world. It came to mean any one or more of the following: (1) systematic approaches to teaching; (2) the efficiency by which a given subject was or could be taught; (3) use of standard curricula and course content; (4) educational research; (5) teaching based upon educational or psychological theories; and (6) school administration based upon business management principles. Regardless of its exact meaning, the term scientific education became the watchword of late nineteenth-century reformist educators.

The first widespread attempts to effect a new scientific education were made by educators and psychologists, who, by studying the physical and intellectual characteristics of individual children, sought to direct the focus of the schools toward specific needs, interests, and growth processes of students. By the 1890s, the widespread, systematic, descriptive study of children came to be known as the child-study movement. From the beginning, the movement relied upon scientific and quasi-scientific methods, spurred on by Charles Darwin's writings on evolution, Herbert Spencer's advocacy of a scientific approach to education, the emergence of the field of empirical psychology, and well-publicized discoveries and applications in the physical and biological sciences.

³Jere T. Humphreys, "The Child-Study Movement and Public School Music Education," Journal of Research in Music Education 33 (Summer 1985): 79-86. For more information about science applied to education see Lawrence A. Cremin, The Transforma-

Scientific research in education began to expand beyond descriptive studies of children in the 1890s. Several influential organizations dedicated to educational research were established around the turn of the century: the National Society for the Scientific Study of Education (the word "Scientific" was eventually dropped), the Educational Research Department and the Educational Research Society of The Forum magazine, and the Society of Educational Research.

Although several child-study researchers and other educators and psychologists of the late nineteenth century engaged in research on musical learning, interests, and aptitude, music teachers were apparently either unaware of or not interested in the research. They were more interested in expanding and solidifying music's place in the school curriculum and in teaching methods, especially methods for the teaching of sight-singing. It is not surprising, then, that some of the earliest attempts by music educators to apply what they considered the methods of science were to the teaching of sight-singing, the principal goal of music teachers of the era.

A music supervisor from Westfield, Connecticut, Sterrie A. Weaver, was one of the first music educators to advocate a scientific approach to music teaching. For several years before his death in 1904, Weaver "tirelessly urged the super-

tion of the School: Progressivism in American Education, 1876-1957 (New York: Alfred A. Knopf, 1961), pp. 90-126.

⁴Humphreys, "The Child-Study Movement," p 84.

⁵Edward Bailey Birge, History of Public School Music in the United States (Washington, D.C.: Music Educators National Conference, 1966), p. 113.

visors . . . , through his summer school, public addresses and written articles to take a scientific attitude toward their work." Weaver's scientific approach was to teach each tone and rhythm by relating them systematically to tones and rhythms previously learned, followed by tests of the results, which consisted of students singing material at sight from basal series books. Although Weaver's concept of science as applied to music teaching was crude when compared to later efforts and even to child-study research of his day, he at least planted the seed from which more sophisticated scientific approaches to music education would grow. Edward Bailey Birge called him the "first exponent of tests and measurements in sight reading," and noted that "this stands out as his main contribution to school-music, and, in the writer's opinion the main contribution of the period [1885-1905]."⁶

Another early attempt to apply the methods of science to music instruction was made by Philip C. Hayden, music supervisor in Keokuk, Iowa and editor of School Music (Monthly), who wrote a series of articles just after the turn of the century citing experimental studies on the psychology of rhythm by psychologist Thaddeus L. Bolton of Clark University. Hayden wrote that the ear's tendency to group rapidly occurring sounds into groups of twos, threes, and fours had been "scientifically demonstrated," set forth in "scientific order," and

⁶ Ibid., pp. 128-31. Other music educators advocated a scientific approach to music teaching during the late nineteenth century. See, for example, George N. Heller, "Frederick Woodman Root (1846-1916): Singing Teacher Extraordinaire," UPDATE: The Applications of Research in Music Education 4 (Summer 1986): 15-16.

"scientifically proved" by Bolton's experiments.⁷ Hayden also demonstrated his ideas about rhythm at the 1905 meeting of the National Educational Association (NEA) and at the first two meetings (1907 and 1909) of what became later the Music Supervisors' National Conference (MSNC).⁸ Hayden may have been the first music educator to attempt to apply results of psychological experiments to his own teaching.

⁷Philip C. Hayden, "The Place of Rhythm in Classifying and Teaching the Elements of Music," School Music Monthly 7 (January 1906): 23.

⁸"Secretary's Minutes: Department of Music Education," Journal of Proceedings and Addresses of the National Educational Association (Winona, Minnesota: National Educational Association, 1905), p. 628; Birge, History of Public School Music, pp. 246-47; and Philip C. Hayden, "Rhythm and Beating Time," School Music 10 (May-June 1909): 27, 30-35.

⁹Hayden and certain other music educators of the period were influenced by psychologist G. Stanley Hall's writings on the "recapitulation theory," but Hall, unlike Bolton, was not primarily an experimentalist. For information on Hayden's interest in recapitulation see Philip C. Hayden, [no title], School Music Monthly 6 (November 1905): 28-30. For information on the recapitulation theory and Hall's influence on music educators see Roger Rideout, "Granville Stanley Hall and Music Education: 1880-1924" (Ed.D. dissertation, University of Illinois, 1978), and "On Early Applications of Psychology in Music Education," Journal of Research in Music Education 30 (Fall 1982): 141-50.

EFFICIENCY

Hayden, Weaver, and others were influenced by what by then amounted to a scientific craze in American education. One of the principal goals of the new scientific education was efficiency, "the word which best expresses the inner spirit of this period."¹⁰ Educators were quick to seize upon efficient management techniques used so successfully by industrialists to increase output and reduce waste in the production of manufactured goods. As they watched industry's phenomenal growth, educators came to believe that these new techniques, when coupled with scientific methods advocated by child-study leaders, could form a truly scientific basis for education.

The term efficiency seems to have meant different things to different people, so much so that its exact meaning was somewhat vague. For example, William H. Maxwell, Superintendent of the New York City public schools, defined it as the "development of each citizen, first as an individual, and second as a member of society," while psychologist Edward L. Thorndike thought of it as the improvement or deterioration of mental functions. The word was overused for so long by music educators that a precise definition is elusive, but for most of them it seems to have meant, simply, "the ratio of useful work to the energy expended."¹¹

¹⁰ Birge, History of Public School Music, p. 114. Birge (p. 131) characterized Sterrie Weaver as the "embodiment" of the spirit of efficiency.

¹¹ William H. Maxwell, "Education for Efficiency," Journal of Proceedings and Addresses of the National Educational Association (Winona, Minnesota: National Educational Association, 1905),