

Physiologists, Physicians, and Physical Educators: Nineteenth Century Biology and Exercise, *Hygienic* and *Educative*

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In 1893, Francis Amasa Walker (Harvard, LL.D., 1883 and signatory to the call for the 1889 Boston Conference on Physical Training), President of the Massachusetts Institute on Technology, delivered Harvard's Phi Beta Kappa address. The subject was "College Athletics." Three months later the full text of Walker's remarks appeared in *The Harvard Graduates Magazine*.¹ The decision to open volume II of the new publication with a discussion devoted to athletics-and gymnastics-might have been the idiosyncratic choice of the editor. More likely, however, it was prompted by the intense interest which arose after the Civil War in matters pertaining to health (both personal and public), calisthenics, gymnastics, physical training, out-of-door pursuits, and competitive athletics.

As several sport and social historians have shown,² Americans of a wide variety of persuasions expressed a remarkable interest in athletics and "physical education" in the four decades between 1865 and 1906. By 1890, this had found expression in the emergence of "varsity" sports, athletic clubs, country clubs, and the formation of the Amateur Athletic Union. It was also reflected in a spate of books, pamphlets, essays, and articles of a general and a specialized nature on athletics, gymnastics, and physical

1. Frances A. Walker, "College Athletics." *Harvard Graduates Magazine*, 2 (1893), 1-18. Walker's speech was published in abstract form, and with high endorsements, in the "Clippings" section of *Physical Education*, 3 (1894), 14-16. "Addendum," *Report of the Commissioner of Education for the Year 1889-90*, Vol. II (Washington, D.C.: U.S. Government Printing Office, 1893), 1103. Also Edward M. Hartwell, *Report of the Director of Physical Training*, School Document Nov. 22-1891 (Boston: Rockwell and Churchill, 1891), 65-66.

2. The literature on this subject is now quite extensive. One useful source is the Special Issue of the *Journal of Sport History*, 10 (1983). Athletics, and sport, have been the subjects of by far the largest percentage of historical studies, although several of these have also touched upon "physical culture," "physical training," and "physical education." The terms are not quite synonymous, but were often used somewhat indiscriminately. In general, but with many exceptions, "physical culture" was the broader term and the term used more by non-professionals. "Physical training" tended to be the preferred term among those who were interested in its educational dimensions and by members of the A.A.A.P.E. "Physical education," a term which has a long history, increasingly replaced "physical training" in the late 1890s and early 1900s.

training. The interest was further expressed in the formation of college and high school physical education programs and various organizations (e.g. American Social Science Association and the Playground Association of America) which devoted at least a portion of their attention to promoting health and development through exercise regimens, gymnastics, play, athletics, and physical education. A professional organization specifically devoted to such matters—the present American Alliance for Health, Physical Education, Recreation and Dance—held its inaugural meeting on November 27, 1885. The goals of the American Association for the Advancement of Physical Education, as stated in its revised constitution of 1895, were: “. . . to awaken a wider and more intelligent interest in Physical Education; to acquire and disseminate knowledge concerning it; and to labor for the improvement and extension of gymnastics, games, and athletic pastimes in the education of children and youth.”³

In the minds of many who were associated with the newly emerging field of physical education through their work in schools and colleges, summer courses, Chautauquas, and the like—as well as those who sought to influence and educate their contemporaries by means of the printed word—the goals of physical training, and athletics, as well were: *hygienic* and *educative*.

Speaking before the Boston Society for Medical Improvement in 1894, W. M. Conant, M.D. Instructor in Anatomy at the Harvard Medical School and Out-Patient Surgeon at Massachusetts General Hospital, declared: “Exercise . . . has for its aims the promotion of health and the acquisition of correct habits of action. The first is hygienic; the second is educational. . . . The principles of all forms of physical training, however various, are based upon the power of the nervous system to receive impressions and to note them or their effects.” Drawing upon the writings of the English physiologist Michael Foster, from Herbert Spencer’s “Law of Evolution,” and from Edward M. Hartwell, M.D. (President of the A.A.A.P.E., 1891—92 and 1895—99), Conant upheld the worth of gymnastics, as well as baseball, football, rowing, tennis, track, cricket and other sports—provided these were not carried to excess.⁴

The first goal—hygienic—was especially concerned with bodily health, hygiene, and “fitness” of the muscular, circulatory, digestive, and excretory functions. It was strongly influenced by antebellum health reform movements but drew also from newer discoveries in the biological sciences—especially the physiology of the circulatory, respiratory, and digestive systems. The second—educative—emphasized “development,”—a vaguely and variously used term which meant, among other things, the ways in which the organism grew, how “character” was formed, and the way in which the human species had evolved.

3. American Association for the Advancement of Physical Education. General Constitution, Article II. In *Report of the Tenth Annual Meeting of the American Association for the Advancement of Physical Education. April 25, 26, and 27, 1895* (Concord, N.H.: Republican Press Assoc., 1896). Appendix, p. 7.

4. W. M. Conant, “The Educational Aspects of College Athletics,” *Boston Medical and Surgical Journal*, 18 October 1894. Published and distributed as part of a separate pamphlet by Damrell and Upham, Boston, 1894.

Here discussions drew heavily upon pre-Civil War Millenarian ideologies and older notions of the nature of “the Will” as well as selected aspects of nineteenth century biological science, especially the physiology of the nervous system. Newer concepts of the nervous system and the brain, derived from laboratory experiments of researchers like Helmholtz, DuBois-Reymond, Bain, and Ferrier were frequently merged with older conceptions of “mind” and “will,” resulting in differing, and at times contradictory, notions of man’s essential nature. After the 1859 publications of Darwin’s *On the Origin of Species*, they also drew increasingly from evolutionary theories—both biological and social.⁵

A belief that exercise can effect mental and moral development, as well as physical health, has a long, if uneven, history. Hippocrates held that without health wisdom could not be fully achieved. For the “. . . Socratics, health of the body [was] an aid to, and condition for, the right life of the soul.”⁶ In the nineteenth century, health of the body in relation to proper moral development of the individual—and by extension to the improvement of society—received intense and sustained attention, especially in English-speaking countries. One of the reasons for this was improved technology which made possible a number of advances in medicine, sanitation, and science. Another was the renewed attention given to the body by discoveries in the biological sciences. The prominence of beliefs about man’s unique place in Nature, divine providence, and “Will” in English-speaking cultures, L. S. Jacyna has suggested, fostered a particular interest in the “nervous system.”⁷ As the century progressed, a belief that muscular action undertaken in physical education or athletics could contribute to strengthening man’s *moral* qualities received increasing attention in both Britain and the United States.

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Shortly after *The Harvard Graduates Magazine* published Walker’s commentary on college athletics, it also printed Charles William Eliot’s 1892-1893 annual Harvard President’s Report. By 1893, Eliot had become convinced that American intercollegiate athletics were inimical to both the physical health and the moral development of young men. An inordinate desire to win and the attendant evils of commercialism, “coarse publicity,” and “hysterical excitement,” he insisted, had turned potentially healthy and beneficial activities into

5. In *The Descent of Man and Selection in Relation to Sex*. Darwin had included a chapter in which he discussed “the moral sense” at some length. It was “the moral sense” that distinguished man from the lower animals, and it was the social instincts that were “. . . the prime principle of man’s moral constitution.” “[T]he state of the body by affecting the brain. . .,” Darwin held, “ha[d] a great influence on moral tendencies. . .” Right actions could be reinforced by “habit,” and it was expected that “. . . virtuous habits will grow stronger, becoming perhaps fixed by inheritance.” Revised Edition (Chicago: Rand, McNally and Co., n.d.), 94—123, especially 120-121.

6. Ludwig Edelstein, *The Dietetics of Antiquity*, in Owsei Temkin and C. Lilina Tempkin, *Ancient Medicine: Selected Papers of Ludwig Edelstein* (Baltimore: The Johns Hopkins University Press, 1967), 315. See also Michel Foucault, *The History of Sexuality* (New York: Random House, Inc., 1895), Part II.

7. L. S. Jacyna, “Principles of General Physiology: The Comparative Dimension to British Neuroscience in the 1830s and 1840s.” in William Coleman and Camille Limoges (eds.), *Studies in the History of Biology* (Baltimore: The Johns Hopkins University Press, 1984), 47-92; idem, “The Physiology of Mind, the Unity of Nature, and Moral Order in Victorian Thought,” *British Journal for the History of Science*, 14 (1981), 109-132.

an aberration—a blight on the colleges. The intense excitement drained the “nervous energy” of athletes and the brutality of the contests (football was the chief culprit) blunted the sensibilities of players and spectators alike. For the remainder of his career, Harvard’s President would remain an implacable foe of what he considered to be corrupted forms of athletics.⁸

As the twentieth century approached, American views regarding athletics ranged along a continuum from those of Eliot to those of men like Paul Dashiell, former multi-sport athlete at The Johns Hopkins University, football coach at the U.S. Naval Academy, and referee at the 1905 Harvard-Yale game. It was Dashiell’s *alleged* unwillingness-or inability-to prevent repeated slugging and other transgressions that prompted an inquiry from U. S. President Theodore Roosevelt, and a lengthy response from Dashiell which attempted to explain the action in the 1905 contest, that added fuel to an already smoldering debate over college athletics. Even further removed from the views of Eliot were those of men like J. W. Spalding (of A. G. Spalding and Co.), who wrote to Walter Camp in 1895 urging the Yale coach to publicly suggest changes in the football rules. Anything which would stem the current criticisms which threatened football, Spalding stated: “. . . would be hailed with delight by every lover of the game as well as those interested in its success financially.”⁹

Walker shared the views of Harvard’s President regarding commercialism and excess, finding “evil” any form of “. . . athletic competition and contest which injuriously affect[ed] the constitution and permanently impair[ed] the vital force. . . .” However, he rejected Eliot’s extreme position holding that the benefits of athletics usually were far greater than the defects. Athletics developed strength, swiftness, “. . . courage, steadiness of nerve . . . resourcefulness, self-knowledge, self-reliance . . . the ability to work with others . . . [and] readiness to subordinate selfish impulses, personal desires, and individual credit to a common end.”¹⁰ These and comparable words were used so frequently in connection with male athletics that they became a veritable litany.

Norman Bingham’s *Book of Athletics and Out-of-Door Sports* (1895), for example, discussed: “sand”—the “. . . steady pegging away in the face of all discouragements. . . .” Significantly, Bingham placed the effects of athletics on the *disposition* ahead of the “. . . physical good which comes from regular exercise.” The 1893 history of *Dartmouth Athletics* noted “. . . the increased attention given of late to the physical side of man’s development,” and cited the positive effects of “stronger physiques” on the nerves of the present and future

8. [Charles William Eliot], “President Eliot’s Report of 1892-93,” *Harvard Graduates Magazine*, 2 (1893), 374-383. In 1906 Eliot responded to a letter from the President of the University of California Benjamin Ide Wheeler stating irascibly that Americans were “morally inferior” to the English in competitive sports. Harvard students, he held, “. . . in any keen competition would make it a rough and cheating game in fifteen minutes.” Eliot, letters to Wheeler, 8 February 1906 and 19 September 1906. (Bancroft Library, University of California; by permission.)

9. Paul Dashiell, letter to President [Theodore Roosevelt], 7 December 1905. (Harvard University Archives; by permission.); J. W. Spalding, letter to Walter Camp, 20 November 1895. (Walter Camp Papers, Yale University Library; by permission.)

10. Walker, “College Athletics.” 11-13.

generations. Readers of Walter Camp and Lorin Deland's *Football* (1896) were assured: "Great as are the physical benefits to the football player, there are advantages of a mental or ethical nature which outweigh them." Football developed physical and moral courage, vigorous manhood, self-control, discipline, and "power of the will." These were the qualities needed by both the *soldier* and ". . . the successful man in any of the affairs of life."¹¹

Such ideal attributes appear remarkably similar to those which such British public school masters as Almond, Weldon, Cotton, and Warre sought to inculcate in boys who would become both proper "Christian gentlemen" and future custodians of an Empire.¹² While Americans did not have an Empire to defend and extend, they did have a nation to build. The Western frontier of the continental United States may have "closed" in 1890, as the Bureau of the Census and Frederick Jackson Turner claimed, but for those of expansionist persuasions there were ". . . new frontiers in the Indies and in the Far Pacific ." These impulses would become more evident after "the Splendid Little" Spanish American War of 1898. For men like Theodore Roosevelt, self-reliance, strength, courage, and "sand," were precisely the qualities needed by those men who were to ensure the fulfillment of the nation's quest for greatness and world leadership. Roosevelt repeatedly upheld the merits of out-of-door pursuits and athletics in the formation of bodily strength and manly virtue, holding that the character of a man and "national greatness" both owed much to vigorous physical activity.¹³

Americans had originally derived both the forms of their games and at least the broad outlines of the values to be associated with them from English sources. By the 1890s, however, few Americans looked back across the Atlantic for their inspiration in sports or in anything else. Proud of their own heritage and increasingly certain of the power of their young nation-Americans shaped athletics with their own values and to their own purposes. Their ascendancy over British athletes was evident at the 1895 Penn Relays when Americans were victorious over the London Athletic Club. The *Quarterly Review* in 1904 expressed alarm that Rhodes scholars were bringing "professionalism" to British university sport; and in 1905, the stewards at Henley decided to instruct American crews to leave their "salaried" coaches at home. Walker's 1893 statement had included a hint of the changes to more "pragmatic" Yankee values

11. Norman Bingham (ed.), *The Book of Athletics and Out-of-Door Sports*. . . (Boston: Lothrop Publishing Co., 1895), 9-14; Walter Camp and Lorin F. Deland, *Football* (Boston: Houghton, Mifflin and Co., 1896), 42-52. Other authors repeatedly set forth the same slogans. Fielding H. Yost, *Football for Player and Spectator* (Ann Arbor: University Publishing Co., 1905), talked about "self-reliance, moral courage, energy, discipline, and 'sand.'" pp. 10-11. John Henry Bartlett and John Pearl Gifford, *Dartmouth Athletics: A Complete History of All Kinds of Sports at the College* (Concord, N.H.: Republican Press Association, 1893).

12. See, for example, James A. Mangan, *The Games Ethic and Imperialism* (Harmondsworth: Penguin Books, Ltd., 1985); idem, *Athleticism in the Victorian and Edwardian Public School: The Emergence of Consolidation of an Educational Ideology* (Cambridge: Cambridge University Press, 1981).

13. Quoted in Walter La Feber, *The New Empire: An Interpretation of American Expansion, 1860-1898* (Ithaca: Cornell University Press, 1963). 71. See for example, Theodore Roosevelt, *The Strenuous Life: Essays and Addresses* (Philadelphia: Gebbie and Co., 1903), especially chapters 1, 5, 6, 10, 15, and 17.

when he declared that, among other things, athletic participation developed qualities which were “. . . useful in any profession.”¹⁴

As Anthony Rotundo, Peter Stearns, and others have shown, American middle-class attitudes regarding what defined ideal male qualities and behavior changed during the nineteenth century. By the 1870s, the earlier concept of “inner-strength”-which usually meant self-possession and a balance not “. . . easily disturbed by outward events”-had given way to that of the “self-made” man. *Action* was the watchword of the new ideal.¹⁵ The “self-made” man had shaped himself by acting upon the material world and tested himself in the crucible of competition. Perhaps nowhere were the changes more graphically conveyed than in athletic games where the body in *action* was (and is) spectacularly displayed. (A similar vigorous ideal was also embodied in the icon of the frontiersman, cowboy, and the cavalryman, also popular and powerful expressions of mid- to late-nineteenth century American ideals of maleness.)

Summarizing “The Status of Athletics in American Colleges” for the *Atlantic Monthly* in 1890, Albert Bushnell Hart proclaimed that the sporting element was fast disappearing: “The participants find both practice and match hard, unremitting work.”¹⁶ This transformation of “play” into work in the last decades of the century has been noted by Daniel T. Rodgers and others: “There was no missing the gospel of play, reiterated as it was in a thousand sandlot baseball games and in the frenzied enthusiasms of college football.”¹⁷ The gospel of strenuous activity which transformed “. . . colleges into theaters of organized physical combat . . .,” John Higham contends, reflected “. . . the dynamism that characterized the whole political and social scene from the turn of the century through World War I. . . .”¹⁸

For those who stressed *hygienic* and *educative* goals, the new gospel of strenuous activity meant something rather special which partook of, but also

14. See, Roberta J. Park, “Sport, Gender and Society in a Transatlantic Victorian Perspective.” *British Journal of Sports History*. 2 (1985), 1—28; Ralph D. Paine, “The Spirit of School and College Sport: American and English Rowing,” *The Century Magazine*. 70 (1905), 483-503; idem, “The Spirit of School and College Sport: English and American Football,” *The Century Magazine*. 71(1905), 99-116; “The Cricket Mania,” *The Nation*, 9 (2 September 1859), 658; “Some Tendencies in Modern Sport,” *Quarterly Review*, 199 (1904), 127-152; Walker, “College Athletics,” 13.

15. Anthony Rotundo, “Body and Soul: Changing Ideals of American Middle Class Manhood, 1770- 1920,” *Journal of Social History*, 16 (1983), 23-38; Peter Stearns, *Be a Man!: Males in Modern Society* (New York: Helms and Meier, 1979); Elizabeth H. Pleck and Joseph H. Pleck, (eds.) *The American Man* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1980); John G. Cawelti, *Apostles of the Self-Made Man: Changing Concepts of Success in America* (Chicago: University of Chicago Press, 1965). The whole notion of *action*, with regard to the body and to the rise of athletics and new “scientific” attempts to understand and control both, needs further attention. I attempted to grapple with this in my 1979 Seward Staley Address before the North American Society for Sport History--“Action As Moral Necessity; Reflections on Healthful Exercise and ‘Wholesome’ Sport, 1815-1915.” Donald J. Mrozek, *Sport and American Mentality, 1880-1910* (Knoxville: University of Tennessee Press, 1983) adds important new dimensions to this fascinating and still too little analyzed concept. Hopefully, the present paper will also add to our knowledge; much remains to be studied, however.

16. Albert Bushnell Hart, “The Status of Athletics in American Colleges,” *Atlantic Monthly*. 66 (1890), 63-71.

17. Daniel T. Rodgers, *The Work Ethic in Industrial America. 1850—1920* (Chicago: University of Chicago Press, 1974), 108.

18. John Higham, “The Reorientation of American Culture in the 1890s,” in John Higham (ed.), *Writing American History: Essays on Modern Scholarship* (Bloomington: Indiana University Press, 1970), 79.

differed from, the glorified accounts of athletics which appeared in the popular press and sporting journals. They, too, stressed vigor and activity, but usually within certain well-defined limits and directed toward specific goals. A large corps of "experts" would be needed to achieve the desired ends, to plan and direct exercise and athletic programs which placed health and physical and moral development above contest victory. A "new profession" devoted to the study and care of the body-and aimed at perfection of both the individual and the race-was to be intrusted with this important goal. That profession, as Luther Halsey Gulick told the A.A.A.P.E. in 1890, was physical education.¹⁹

The precipitous rise of athletic sports after the Civil War, as Walker asserted, had ". . . carried all before it: Honors in football, in baseball, and in rowing have come to be esteemed of equal value with honors in the classics, in philosophy, or in mathematics." The earlier ideal of the pale, religious, intellectual young man with ". . . towering forehead, from which the hair was carefully brushed backwards and upwards to give the full effect to his remarkable phrenological development" had been replaced by one of vigor and vitality. Now "mass" and "power" in a nation-and in a man-were the things to be admired. The Civil War had provided a new awareness of America's strength and the physical and moral courage of her young men. It was the role of athletics to perpetuate in peace what had been forged in battle. Camp and Deland agreed. The "best fighters" in the War had displayed the precise qualities which were needed by a football player, and vice versa. Yet Walker was slightly anxious about the new cult of strenuous physical prowess, holding that when ". . . the severer forms of athletic competition and contest . . . impair[ed] the vital force . . ." their influence was evil.²⁰

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Although much of his Phi Beta Kappa address was substantially a paean to men who had endured the sectional strife, and to those who would become the nation's leaders, Walker included in his remarks another topic: modern biology and its relationship to athletics and physical culture. Whereas a ". . . bad physiology, or the absence of anything that could be called physiology . . ." before the War had resulted in devaluation of ". . . physical force, dexterity, and endurance, capacity for action, nerve, and will power . . .," recent developments had cast athletics and physical training in a new light. Modern biology, Walker maintained, had fostered the introduction of gymnastics and physical training into the colleges, courses in hygiene and human physiology, and the appointment of medical doctors to direct gymnasia and organize

19. Luther Halsey Gulick, "Physical Education: A New Profession," in *Proceedings of the American Association for the Advancement of Physical Education, Cambridge and Boston, 1890* (Ithaca, N.Y.: Andrus and Church, 1890), 65; Walker, "College Athletics," 1-2; Camp and Deland, *Football*, 48. See also George M. Frederickson, *The Inner Civil War: Northern Intellectuals and the Crisis of the Union* (New York: Harper Brothers, 1965), Chapter 9.

20. Walker, "College Athletics," 11. Anxieties over the loss of "vital force" or energy, though they took somewhat different forms before and after the Civil War, existed throughout the nineteenth century. See Harvey Green, *Fit for America: Health, Fitness, Sport and American Society* (New York: Pantheon Books, 1986), 68-76; 167-179; passim.

departments of physical education. It had also helped to legitimize athletics as an appropriate educational investment.²¹

Although it was not usual for late nineteenth century commentators to make such a direct connection between *biology* and *athletics*, this conjunction was frequently made by those who sought to advance the cause of “physical education” and what they considered to be “educational” forms of play and games.²² What was implied in more general discussions was usually more directly enunciated in pedagogical statements. The *New England Journal of Education*, founded in 1875 by a merger of *Massachusetts Teacher*, *Rhode Island Schoolmaster*, *Connecticut School Journal*, *College Courant* and *Maine Journal of Education*, devoted substantial attention to physical education, exercise, athletics, physiology, hygiene, and play. G. B. Emerson urged teachers in 1875 to pay more attention to the training “. . . of all the senses and faculties of the body” and recommended they read Dr. J. C. Dalton’s *Physiology and Hygiene*. The author of an accompanying article on “Exercise” urged two hours of activity a day to maintain “. . . the natural force of the muscular system. . . .” The following week readers were told of the moral and physical benefits which the English derived from school sports. In October a lengthy article linked physically active games with the development of “. . . intellectual and moral motives. . . .”²³

Two decades later, T. M. Balliet, superintendent of the Springfield, Massachusetts schools and member of the A.A.A.P.E., used words which conveyed the sense that a scientific understanding of the ways in which muscular exercise affected moral development could be achieved, even though direct *experimental* evidence for such a statement was lacking:

Brain cells grow, like other parts of the body, by exercise. The sensory cells can be exercised only by the use of the senses. In like manner the motor cells can be exercised and developed only by making them contract the muscles. Muscular exercise, either in the form of play, gymnastics, or manual training, is therefore absolutely essential for the healthy growth of the brain as a physical organ.

Motor education, by developing the motor parts of the brain, develops energy and force of character. It develops pluck and courage. Competitive games are particu-

21. Walker, “College Athletics,” 3-5; 9-10.

22. To the extent that just about every commentator contended that the participant “learned” something from engaging in athletics, one could say that they were all educational. For the majority of those who had some official capacity in an educational institution, or in an organization which took seriously its responsibilities for the body, mind, and spirit of a young man, educational athletics meant something rather special. In chapter 25 of the Young Men’s Christian Association Handbook, as revised in 1891, Luther Halsey Gulick wrote that outdoor work and athletics added to the value of work done in the gymnasium, and that athletics could have greater *educotional* value provided they were carefully supervised and controlled, 32-38. A Society for the Study of Athletics (Athletic Research Society) was organized on December 30, 1907 to seek a “. . . solution of the problems and difficulties in competitive athletics and study the educational, moral, and social forces involved.” “News Notes,” *American Physical Education Review*, 8 (1908), 65.

23. G. B. Emerson, “Physical Education,” *New England Journal of Education*, 1 (February 13, 1875), 76; “Exercise,” *ibid.*, 76—77; “Physical Culture Among English Students: Competitive Tests,” *New England Journal of Education* 1 (February 20, 1875), 91; “The Nature of Play, and Its Importance as a Means of Education,” *New England Journal of Education*, 2 (October 2, 1875), 147-148.

larly valuable in this respect. It would be difficult to estimate how much cricket has done for the Englishman.²⁴

Arguments which linked muscular contractions with functional development of the nervous system, "growth of the brain," and strength of mind, "will," and character rested largely upon reasoning by analogy and were embraced by many contemporary social reformers, educators, physicians, theologians, and even physiologists. The power and perseverance of these assumptions needs to be seen against the broader background of biology, and especially physiology, in the nineteenth century.

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In 1897 a series of articles in *Harper's New Monthly Magazine* outlined recent discoveries which had altered traditional beliefs regarding the human body. Ether and chloroform had made surgery bearable; Pasteur had discovered anaerobic bacteria; the nature of "contagion" had been exposed; Lister's "antiseptic principle" had opened the way to safer surgery. By the 1840s, the improved microscope had given physiologists a powerful instrument for opening new lines of investigation. Schwann, Virchow, and other members of the German scientific community had fixed the nucleated cell as the fundamental organization of organic matter. The function of the red corpuscles in carrying oxygen to the cells had been established, and it had been determined that the muscles burned fuel and transformed energy. The glycogenic (carbohydrate) function of the liver had been experimentally demonstrated by Claude Bernard, and by the end of the century the general role of the glands in metabolic change was known. The third article of the series, entitled "The Century's Progress in Experimental Psychology," gave particular attention to the work of the "nerve physiologists" (e.g. Magendie, Helmholtz, DuBois-Reymond, Wundt).²⁵

Historians of science have suggested that the nervous system dominated nineteenth century thought in much the same way that the heart and circulation had dominated the seventeenth. Early in the century Sir Charles Bell discovered that the anterior roots of the spinal nerves conveyed "motor impulses" while the posterior roots conveyed "sensory impulses." Further investigations found the same divisions in the cranial nerves. Marshall Hall observed the "reflex action" in 1832. By mid-century the essentials of the "nerve tract," with one terminal in a cell of the brain or spinal cord and the other in the muscle or skin, had been determined. Work on the nervous system had an important bearing on questions dealing with the mind-and "will"-and with attitudes toward physical training and athletics.²⁶

Arguments based upon a belief that the works of an all-wise God were manifest in the indissoluble joining of form and function had occupied a

24. T. M. Balliet, "Value of Motor Education," *New England Journal of Education*, 48 (November 17, 1898), 317.

25. Henry Smith Williams "The Century's Progress in Anatomy and Physiology," *Harper's New Monthly Magazine*, 96 (1898), 621-632; idem, "The Century's Progress in Scientific Medicine," *Harper's New Monthly Magazine*, 99 (1899), 38-52; idem, "The Century's Progress in Experimental Psychology," *ibid.*, 513-527.

26. Smith, "Experimental Psychology," 515-517; Karl E. Rothschuh, *History of Physiology* (Huntington, N.Y.: Robert E. Kreiger Co., 1973). 181-187.

dominant role in eighteenth century thought. The power of this belief persisted well into the following century, even in the face of continuing discoveries of science and medicine. As Karl Figlio has maintained, nineteenth century physiological investigation initially “. . . focused on the nervous system as the bridge between philosophical/psychological inquiry into the soul and nature of man . . . and the anatomical/physiological study of . . . structure and function. . . .” The requirement that bodily structure and organic action receive equal consideration flowed from the assumption that such harmony was set down by divine Design.²⁷ In *Animal Mechanics: or Proofs of Design in the Animal Frame*, a small work prepared in 1823 for the Society for the Diffusion of Useful Knowledge, Sir Charles Bell had stated that the *structure* of the bones, joints, and muscles confirmed that man was intended to “. . . walk, run, leap, and swim . . . ;” and that “. . . this apparatus is preserved perfect by exercise.” While he spoke approvingly of these types of exercises, Bell had little use for calisthenics and gymnastics as these placed unnatural demands on the body.²⁸

In 1834, Andrew Combe, an Edinburgh physician trained in both his native city and at Paris, referred to Bell’s recent work (as well as that of Cuvier, Bichat, and Gall) in *Principles of Physiology Applied to the Preservation of Health and to the Improvement of Physical and Mental Education*. Written for the benefit of the intelligent layman, this useful little work had gone to a sixteenth American printing by 1854. Combe was too well-schooled in anatomy and physiology to contend that brain and “mind” were the same thing; however, because they were closely associated in life, he held, whatever would strengthen one would strengthen the other. Combe made numerous recommendations in support of exercise, and deemed “active sports” superior to “. . . mere measured movements . . .” such as walking or routine calisthenics—the reason being that the more active and social nature of sports brought the “nervous impulse” into fuller and more harmonious operation.²⁹

Combe’s *Principles of Physiology* was brought to the attention of American readers in the November 1834 issue of the *American Annals of Education*. In introducing his review, editor William Woodbridge declared: “It is more than four years since we began . . . to press the subject of Physical Education upon the community; to urge them to consider the mutual connection and dependence of mind and body. . . .” The subject of “physical education” had been introduced in the first issue in 1826 by the original editor William Russell, who urged schools to institute programs of “. . . healthful exercise and innocent recreation . . . [to meliorate] the condition of our race.” The development of the

27. Karl Figlio, “Theories of Perception and Physiology of Mind in the Late Eighteenth Century.” *History of Science*, 12 (1975), 177. See also Thomas L. Hankins. *Science and the Enlightenment* (Cambridge: Cambridge University Press, 1985), chaoter 5.

28. Charles Bell, *Animal Mechanics or the Proofs of Design in the Bones of the Head, Spine and Chest, Shown by Comparison with Architectral and Mechanical Conrriances* (Cambridge: The Riverside Press, 1902). 1-2: 87-89.

29. Andrew Combe, *The Principles of Physiology Applied to the Preservation of Health, and to the Improvement of Physical and Mental Education*. (New York: Harpers and Brothers, 1836), 1, 109—120; 208-209; passim.

corporeal system and the improvement of health, Russell and his successors repeatedly insisted, were fundamental to achieving mental and moral power.³⁰ *The Journal of Health*, established in 1829 by a group of Philadelphia physicians, likewise specified that the topics which were to receive attention were: "Air, food, exercise, the reciprocal operation of mind and body . . . [and] the physical education of children. . . ."³¹

The "Argument from Design" had postulated intimate connections and harmony between the body and the "mind" or "will"; however, just what the nature of these were remained obscure. John Jeffries, a Boston physician, wrote for the 1833 *American Quarterly Review*: "The powers of the body should be cultivated, because of its connection with the mind." Although the Creator had not seen fit to reveal to man the mechanisms by which this connection was made, Jeffries held, the ". . . union of the body and the soul . . . [was] clearly seen in the mutual action of mind and matter. . . ." The strength of the blacksmith's arm confirmed this fact, as did ". . . the strength and swiftness of the athlete and the prodigious feats of the gymnasium."³² The example of the "blacksmith's arm" would be repeatedly set forth throughout the century to uphold the assumption that strengthening the muscular system would strengthen the "will." Likewise, a belief that the strength and swiftness of the athlete and the "feats of the gymnasium" were instrumental in developing proper *moral* character underscored the majority of arguments which were advanced in support of *educational* athletics and *physical education* in the second half of the century.

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As Harvey Green and James Whorton have shown in their studies of American health and fitness movements—and Bruce Haley has shown for Victorian Britain³³—exercise, "physical education," and sports were often advocated as alternatives to the standard ministrations and pharmacopeia of "heroic" physicians. Americans certainly suffered from a host of illnesses and disabilities for which there were few medical cures before the end of the nineteenth century; there was, in fact, often little that could be done about many conditions. Technologies were not advanced and most doctors were poorly prepared in comparison to those standards which would apply after the Flexner Report of 1910. Until the turn of the century, many of the best American physicians had studied abroad at Edinburgh, London, Paris, or Vienna. It was this backward and uncontrolled state of medical education which led to the reorganization of the A.M.A. and to the licensing reforms of the early twentieth century.³⁴

30. "Review of Combe's *Physiology*," *American Annals of Education*, 1 (1834), 485-491; "Physical Education," *American Journal of Education*, 1 (1826), 19-23.

31. *Journal of Health. Conducted by an Association of Physicians*, 1 (1830), announcement inside book cover.

32. John Jeffries, "Physical Culture, the Result of Moral Obligation," *American Quarterly Review*, 1 (1833), 253; 259-260.

33. Green, *Fit for America*; James C. Whorton, *Crusaders for Fitness: The History of American Health Reformers* (Princeton, N.J.: Princeton University Press, 1982); Bruce Haley, *The Healthy Body and Victorian Culture* (Cambridge: Cambridge University Press, 1978).

34. See for example, William G. Rothstein, *American Physicians in the 19th Century: From Sects to Science*

Physical activity offered one way in which digestive, respiratory, circulatory, and even reproductive complaints might be alleviated-or so many believed. At the very least, calisthenics, games, and outdoor exercises were not likely to induce the same violent results that might ensue from bloodletting or the ingestion of mercury compounds, laudanum (tincture of opium), or other widely used chemical preparations. Calisthenics, simple games, and out-of-door pursuits, therefore, *could* have positive hygienic value. The potential value attributed to such activities was not solely *hygienic*, however; they could also be *educative*. The possibility existed that calisthenics, gymnastics, simple exercise, and even athletic games could strengthen the “will,” or so it was believed. In their advocacy of bodily exercise for developmental reasons, supporters continued to uphold and extend those assumptions which saw personal hygiene as the necessary foundation for human progress.³⁵

According to the physiology of the first six decades of the century, the brain-the *common sensorium*-was the organ by which the immaterial mind received sensations and issued the volitions that resulted in bodily movements.³⁶ In 1839, William B. Carpenter, M.D., F.R.S., and Examiner in Physiology and Comparative Anatomy in the University of London, had published *Principles of Physiology, General and Comparative*. The 1854 fourth edition appeared as two massive volumes. In the first, *Principles of Comparative Physiology*, Carpenter addressed the subject of the nervous system and the Will in members of the Animal Kingdom, adhering to the notion of the hierarchy of functions. “The successively more complex nervous actions of animals . . .,” he held, “were developments from a primitive functional type.” In the case of humans, however, a *discontinuity* in the development of the nervous system had occurred. In man, the cerebrum was “. . . the instrument of the ‘will’ and not an organ of reflex action.” For Carpenter, the cerebral hemispheres were not only ganglia-they were “. . . also agents by which an immaterial principle exerted its Will in the world.” The diagram on page 707 of the 1854 edition aptly conveys this conception. Over and controlling the operations of the spinal cord, sensory ganglia, and cerebrum is the “will,” which operates “. . . in producing or checking muscular movement, or in controlling or directing the current of thought.” Operationally and hierarchically the “will” governed all actions. Carpenter retained this separation of mind and motor-function throughout all the editions of *Principles of Physiology*-the standard English text-and other writings “. . . up to and including his review of the experiments of David Ferrier which decisively disproved it.”³⁷

(Baltimore: The Johns Hopkins University Press, 1972); Martin Kaufman, “American Medical Education,” in Ronald L. Numbers (ed.), *The Education of American Physicians: Historical Essays* (Berkeley: University of California Press, 1980), 7-28; Richard H. Shyrock, *Medical Licensing in America. 1650-1965* (Baltimore: The Johns Hopkins University Press, 1967).

35. See, William Coleman, *Biology in the Nineteenth Century: Problems of Form, Function, and Transformation* (Cambridge: Cambridge University Press, 1977).

36. Jacyna, “Principles of General Physiology”; idem, “Physiology of Mind.”

37. William B. Carpenter, *Principles of Comparative Physiology*. 4th edition. (London: John Churchill, 1854), 690-709. See also, Jacyna, “British Neuroscience”; Roger Smith, “The Background of Physiological

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The living body, however, is a complex mechanism which cannot be fully, or perhaps even adequately, explained by the direct application of the findings of experimental laboratory science. As numerous scholars have shown, conceptions of the body are always grounded in broader social and cultural contexts and often are expressed metaphorically. The anthropologist Mary Douglas maintains that there are deep and persistent pressures to create consonance between the social and physiological levels of experience, and that because consonance can be so satisfying, it is to be found “. . . in layer after layer of experience, and in context after context.”³⁸

In a study of eighteenth century conceptions of health, disease, and medical care, W. F. Bynum has stated: “models of physiological function may embody attitudes to children and the aged, to men and women, class and race, refinement and civilization, and to existing and desired social systems.” Sally Shuttleworth has shown how Victorian psychological and physiological theory influenced the British authoress George Eliot’s understanding and depiction of contemporary society, and Bruce Haley’s excellent study of Victorian health illustrates the pervasiveness of the body metaphor in British thought and institutions. Sharon Cameron analyzed symbolic representations of the body in the novels of Herman Melville and Nathaniel Hawthorne, concluding that these nineteenth century American works are preoccupied with identity in corporeal terms.³⁹ Laymen, professionals, physicians, and also scientists use body metaphors in an attempt to understand, explain and communicate not only physiological functions, but customs, roles, status, fears, aspirations, perceived relationships to nature and to the cosmos, and much more.

Metaphorical thought has influenced the thinking of biologists, in spite of the tendency of scientists to reject analogy and metaphor as “. . . smack[ing] of rhetoric rather than of sober and factual description of things.”⁴⁰ The noted physiologist Rudolph Virchow, for example, drew upon social theories of the German state in the mid-1800s to explain the nature and function of the “cell.” L. S. Jacyna has examined how a “natural” dimension in social and political discourse in Victorian Britain influenced physiological psychology, finding

Psychology in Natural Philosophy,” *History of Science*, 11 (1973), 75—123; Robert M. Young, “The Functions of the Brain: Gall to Ferrier (1808&1886).” *Isis*, 59 (1968), 251-268.

38. Mary Douglas, *Natural Symbols: Explorations in Cosmology* (New York: Pantheon Books, 1982), 65-71.

39. W. R. Bynum, “Health, Disease and Medical Care.” in G. S. Rousseau and R. Porter (eds.), *The Ferment of Knowledge: Studies in the Historiography of Eighteenth Century Science* (Cambridge: Cambridge University Press, 1984), 224; Sally Shuttleworth, *George Eliot and Nineteenth Century Science: The Make-Believe of a Beginning* (Cambridge: Cambridge University Press, 1984); Haley, *Healthy Body*; Sharon Cameron, *The Corporeal Self: Allegories of the Body in Melville and Hawthorne* (Baltimore: The Johns Hopkins University Press, 1981). See also, Roberta J. Park, “Henneneutics, Semiotics, and the 19th-Century Quest for a Corporeal Self,” *Quest*, 38 (1986), 33-49.

40. Owsei Temkin, “Metaphors in Human Biology,” in Owsei Temkin (ed.), *The Double Face of Janus and Of her Essays in the History of Medicine* (Baltimore: The Johns Hopkins University Press, 1977), 271. See also, Karl M. Figlio, “The Metaphor of Organization: An Historiographical Perspective on the Bio-Medical Sciences in the Early Nineteenth Century,” *History of Science*, 14 (1976), 17—53.

that as the century progressed the “laws of nature” increasingly supplied the type of social restraints that “. . . the will of God had once provided.”⁴¹

In novels, health guides, and a host of other sources, Americans at mid-century were repeatedly reminded by words and pictures that they had innumerable bodily deficiencies and that they constantly teetered on the brink of physical disaster. Dr. W. W. Hall’s *Guide-Board to Health, Peace, and Competence* proclaimed: “It is hard enough to get along in this world when a man is well; but to have to make a living under the depressing influence of sickness, and pain, and suffering, is worse than having to climb a steep clay bank in wet weather.” In 1867, what was purported to be the Hundredth Edition of Gunn’s *New Family Physician or Home Book of Health . . .* (to which an entire section on calisthenics had been added) informed readers: “The faculties with which our Creator has endowed us, both physical and intellectual, are so dependent upon exercise for their proper development, that action and industry must be regarded as among the primary duties of accountable man.” Exercise, Gunn proclaimed, was the source of bodily health, vigor, moral evolution, and all happiness. In his opus of some 12,000 pages, the eclectic physician referred to Carpenters’s *Physiology*, Well’s *Principles of Chemistry*, the English physician Southward Smith’s *Philosophy of Health*, Dio Lewis’ *Light Gymnastics*, and other sources to discuss “chylification,” animal heat, the sponge bath, early rising, horseback riding, and an enormous number of items which influenced the body, mind, and morals of men and women. Although Gunn’s recommendations were more comprehensive than those offered in the health manuals and “guide-books” of most of his contemporaries, the coverage was simple, superficial, and often contradictory.⁴²

The same year that Gunn’s Hundredth Edition appeared, William Jay Youmans, M.D. dedicated the first American edition of *The Elements of Physiology and Hygiene: A Text-Book for Educational Institutions* to, “My friend and teacher, professor [Thomas] Huxley. . . .” The famous English biologist had recently published an elementary work on physiology intended for “. . . any person who desires to become acquainted with the principles of Human Physiology . . . ,” and gave his former student permission to modify it for “. . . the circumstances and requirements of American education.” Youmans added seven of his own chapters on Practical Hygiene “. . . in response to a growing demand that the subject . . . in both its bodily and mental aspects, shall receive increasing attention in general education.”⁴³

The two goals of applied physiology, Youmans declared, were *Hygiene*, or

41. Paul Weindling, “Theories of the Cell State in Imperial Germany,” in Charles Webster (ed.), *Biology. Medicine, Society: 1840-1940* (Cambridge: Cambridge University Press, 1981), 99-155; Jacyna, “Physiology of Mind”; Smith, “Physiological Psychology,” 105.

42. W. W. Hall, *Guide-Board to Health, Peace and Competence, or the Road to Happy OldAge* (Springfield, MA: D. E. Fisk and Co., 1867), preface; John C. Gunn, *Gunn’s New Family Physician: or, HomeBook of Health: Forming a Household Guide With Supplementary Treatises on Domestic and Sanitary Economy, and on Physical Culture and Development* (New York: Moore, Wiltstach and Baldwin, 1867).

43. Thomas H. Huxley and William Jay Youmans, *The Elements of Physiology and Hygiene: A Text-Book for Educational Institutions* (New York: D. Appleton and Co., 1881), preface to the Revised Edition (1872).

“the art of preserving health”; and Medicine, “the art of restoring it.” Proper exercise was one way to minimize such physiological hazards of modern society as overcrowding, impure air, bad water, exhausting labor, and excessive “brain-work.” Continued improvement of the race depended on improved “. . . bodily constitution, and especially the qualities of the brain.” Invoking the “Argument from Design,” Youmans continued: “Anatomy and Physiology alike proclaim that the purpose of the human constitution is activity. The provision for varied and complex movement is seen in the jointed skeleton, the contractile muscles, the controlling nerves, and the power supplying apparatus of digestion and circulation.” Because bodily and mental health depended upon the same conditions, both needed to be “. . . the business of the physiologist.” Although he was familiar with the Swedish Movement Cure which had been introduced into the United States in the 1850s, Youmans preferred exercise taken in the open-air to that performed in the gymnasium.⁴⁴

A decade later a man considered by many contemporaries to be America’s leading physician published *A Textbook of Human Physiology* for the use of students and medical practitioners. Austin Flint (M.D., Harvard 1833) was professor of physiology in the Bellevue Hospital Medical College, a former President of the New York Academy of Medicine, and soon to become President of the A.M.A. Citing experiments on the rate of nervous conduction, Flint questioned the existence of any special “muscular sense” and noted the importance of “. . . habit and education . . .” of the muscular nerves in making judgments about weight and resistance. (The importance of “habit” in training both “motor nerves” and “will” would assume a major role in physical education theory by the early 1900s.) In a brief section on “training,” Flint distinguished between *local* and *general* effects of exercise (i.e., increased muscle girth and endurance) and noted that: “training men . . . have long since demonstrated practically certain facts which physiologists have been rather slow to appreciate.” Trained men, even pugilists, he held, were healthy specimens. It was *after* their contest that they lapsed into practices “. . . in which all physiological laws are violated”; this, not training, was what deteriorated their health. In an extended discussion of the nervous system informed by the findings of Helmholtz, DuBois-Reymond, Marey, and other physiologists, he used the example of playing musical instruments to show “. . . to what extent the power of association and disassociation of movements may be acquired by long practice.”⁴⁵ In eliminating all but the briefest mention of the “will” from his discussions, Flint reflected the more scientific attitude in medicine which was beginning to emerge.

Thomas Wentworth Higginson, who has been called America’s preeminent “muscular Christian,”⁴⁶ a decade earlier had observed that too few physiologists

44. Ibid., 344-345; 420-432.

45. Austin Flint, *A Text-Book of Human Physiology; Designed for the Use of Practitioners and Students of Medicine* (New York: D. Appleton and Co., 1876), 54; 78-79; 150-151; 498-499; 513-514; 586-599; 750-751.

46. John A. Lucas, “Thomas Wentworth Higginson: Early Apostle of Health and Fitness.” *Journal of Health, Physical Education, and Recreation*, 42 (1971). 30-33.

understood the effects of exercise on the human constitution. Not having been “practical gymnasts,” physiologists lacked an understanding and appreciation of vigorous physical activity. Writing for the *Atlantic Monthly* in 1861, he suggested that technical innovations like the Fairbank’s scale and stopwatch should be brought to bear on improving physical education and asserted that more attention should be paid to the study of the relation between mental culture and physical power. Although the best physical condition-and the highest standard of civilization-were to be found in the Anglo-Saxon race, in America progress was being purchased by a neglect of the body and “physical decay.” To arrest this, the burnt-out man of business needed to frequent the gymnasium for calisthenics, vaulting, and similar exercises and engage in vigorous outdoor activities. Higginson wanted his countrymen to develop a system of physical education that conformed to distinct “American needs”—one which would be scientifically informed and superior to German and Swedish gymnastics and English sport.⁴⁷

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Higginson anticipated by slightly more than two decades the first *formal* efforts to develop an “American” system of physical education. The Association for the Advancement of Physical Education held its organizational meeting at Adelphi Academy on November 27, 1885. Among those present were: ministers; directors of college gymnasia (women as well as men); and representatives from the Y.M.C.A., the U.S. Military Academy, private athletic clubs, academic institutions, and commercial enterprises. Those assembled included eleven men who had earned (in some fashion) the M.D. degree. In calling the meeting together Adelphi’s principal Albert C. Perkins “. . . welcomed his guests as co-laborers in a department of service of the highest importance” proclaiming physical education to be the basis for “. . . the intellectual and moral well-being of society,” and commented upon the “progress” which had been made in the last thirty years.⁴⁸

Although those who sought to organize a *profession* of physical education in the last decades of the nineteenth century endorsed “progress”—and often sought to express their goals in modern term—there was frequently little to separate their aspirations from those who had been a part of the Millenarian health reform endeavors of the 1830s and 1840s. The founding of the A.A.A.P.E. needs to be seen within the broader context of such continuing attitudes toward health, exercise, and physical activity. It also needs to be examined as a part of those tendencies toward professionalization that occurred in several fields in the late nineteenth century.

Between 1880 and 1900, the American Historical Association (1884) Ameri-

47. Thomas Wentworth Higginson, “Barbarism and Civilization,” *Atlantic Monthly*, 7 (1861), 51-61; idem. “Gymnastics,” *ibid.*, 283-302.

48. *Proceedings of the Association for the Advancement of Physical Education, at its Organizational Meeting at Brooklyn, N.Y., November 27, 1885* (Brooklyn, N.Y.: Rome Brothers, 1885), 3. For a discussion of the first twenty years of the A.A.A.P.E. see. Roberta J. Park, “Science, Service, and the Professionalization of Physical Education: 1885-1905,” *Research Quarterly for Exercise and Sport*, Special Centennial issue (April 1985), 7-20.

can Physiological Society (1887), American Association of Anatomists (1888), and American Psychological Association (1892) were among the many organizations which sought to break with an amateur tradition and establish authority based upon specialized knowledge and intensive preparation.⁴⁹ The A.A.A.P.E. had similar aspirations, but its ties to the ideologies of social reform frequently stood in the way of professional as well as scientific advancement.

For most pre-Civil War reformers, individual redemption and regeneration had been seen as fundamental to the reform of society. After the War, reformers increasingly focused their activities through a variety of agencies that aimed at redressing a host of problems which was seen to afflict the nation. The American Social Science Association (A.S.S.A.), often referred to as "the mother of associations," was founded in 1865. Its major goal, Thomas Haskell has asserted, ". . . was not only to understand society, but improve it as well." Addressing the 1883 A.S.S.A. meetings, Dr. Ezra Hunt, Chairman of the Department of Health, equated "health" with wealth, patriotism, and national strength. Social science, Hunt continued, must begin with the family; but the schools could also contribute by teaching hygiene and physical education, for it was on "physical vigor" that mental and moral culture and ". . . social and civic existence . . ." depended.⁵⁰

Among the founders of A.S.S.A. was Thomas Amasa Walker's father; the younger Walker was an active member of the 1880s and 1890s. Charles William Eliot, Daniel Coit Gilman, President of Johns Hopkins University, John Eaton, U.S. Commissioner of Education, William Torrey Harris, then Superintendent of the St. Louis Public Schools, and Thomas Wentworth Higginson were also early members. Dudley Allen Sargent, M.D., Edward M. Hartwell, M.D., and D.F. Lincoln, M.D., all future members of the still to be formed A.A.A.P.E., presented papers at the A.S.S.A. meetings in the 1870s and 1880s.

As the Director of Harvard's Hemenway Gymnasium, Sargent held a position of considerable stature. In his 1883 A.S.S.A. address he stated that American attempts to institute systematic bodily culture had all been adaptations of German, English, and French practices. What America needed was a ". . . combination of these systems, all regulated and adapted to our particular needs and institutions." At Harvard, Sargent had instituted a program of exercises based upon anthropometric measurements, a physical examination, and the use of "developing appliances" (e.g. chest-weights, leg-weights) that he had designed and manufactured. A program of exercises was devised for each student who worked to shape those parts of the body that had been judged "deficient" on the basis of anthropometric data and functional measurements taken in dynamometer and lung capacity tests. Sargent became the leading

49. See, Thomas Haskell, *The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth Century Crisis of Authority* (Urbana: University of Illinois Press, 1977); Sally G. Kohlstedt, *The Formation of the American Scientific Community: The Association for the Advancement of Science* (Urbana: University of Illinois Press, 1976).

50. Haskell, *Professional Social Science*, 100; Ezra M. Hunt, "Health and Social Science," *Journal of Social Science*, 18 (1883), 28-43

proponent of “anthropometry” in the decades between 1880 and 1900, published charts and directions for taking measurements, and actively sought to sell his “developing appliances.” The “Sargent System” was one of the three that were extensively discussed at the 1889 Boston Conference on Physical Training.⁵¹

Modeled upon the British National Association for the Promotion of Social Science, the A.S.S.A. adopted the same four departments: Education; Public Health; Jurisprudence; Economy, Trade and Finance. As Secretary of the Department of Public Health, D.F. Lincoln proposed a plan for studying school hygiene in 1874, specifying that particular attention should be paid to “School Gymnastics” and “The Effects of Schools on the Nervous System.” Lengthy papers on both subjects were given the following year. J. J. Putnam, M.D. spoke on “Gymnastics for Schools.” Introducing his own paper on the nervous system, Lincoln observed: “Muscular functions are in a sense nervous functions . . . nervous force is consumed in the performance of muscular acts, and is reciprocally strengthened by such performance. . . .” The blood, by means of the heart and vessels, supplies the “nervous organs” with nutrition. Therefore, “a strong pulse is needed by a strong brain; and if we want a strong pulse we must strengthen the heart. And in no way can this be done except by muscular exercise.” It was the responsibility of educators, Lincoln maintained, to provide such exercise by means of singing, dancing, running, gymnastics, and childish athletic sports.⁵²

An infinitely more detailed and precise portrayal of the functional relationships of the body’s systems was set forth in Michael Foster’s *Text Book of Physiology* (1877), the most authoritative English language treatise on the subject in the last quarter of the century. In his Introduction, Foster declared all the various tissues to be but parts of one body bound together by the vascular mechanism and the nervous coordinating mechanism. The latter was connected to the muscles, which in higher animal forms were arranged with the greatest precision to achieve the chief end of animal life- *muscular movement*. Foster’s influential text included much detailed information about such things as DuBois-Reymond’s muscle-nerve and electrode-holder, the theory of the realignment of molecules during nerve-impulse, the pendulum myograph, the muscle curve, and tetanus produced by means of the magnetic interrupter. Even the noted British physiologist, however, found it necessary to resort to making “will” the stimulus which puts the machinery of the cerebral hemispheres into action.⁵³

51 Haskell, *Professional Social Science*. 91-110; Dudley A. Sargent, “Physical Training in Homes and Training Schools,” *Journal of Social Science*, 18 (1883). 44-52; Edward M. Hartwell, “The Study of Anatomy, Historically and Legally Considered,” *Journal of Social Science*, 9 (1880). 54-88; D. F. Lincoln, “The Nervous System as Affected by School-Life,” *Journal of Social Science*. 7 (1876), 87-110.

52. J. J. Putnam, “Gymnastics for Schools,” *Journal of Social Science*. 7 (1876), 110-124; Lincoln, “Nervous System,” 89-92.

53. Michael Foster. *A Text-Book of Physiology* (London: Macmillan and Co.. 1878). 1-8; 490. For a discussion of DuBois-Reymond’s work on the electromagnetic theory of the action of nerves and muscles see: Timothy Lenoir. “Models and Instruments in the Development of Electrophysiology. 1845-1912,” *Historical Studies in the Physical and Biological Sciences*. 17 (1986), 1-54.

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In 1862, Emil DuBois-Reymond, whose theory of muscle and nerve current (derived from analog models expressed in terms of Faraday's theories of electricity and magnetism) had been cited by Foster, had written a short and acerbic article in which he linked muscular activity and development of the nervous system with gymnastics and physical activities. The renowned German physiologist's stature as an experimental scientist provided additional legitimacy for those who argued that strengthening muscle would strengthen nerves and "mind."

Swedish gymnastics had been introduced at Berlin's Royal Central Gymnasium by Major Hugo Rothstein, who had studied Ling's work at Stockholm. The installation of a foreign system at the Prussian national school for training gymnastic teachers for schools and the military infuriated many Germans. Issues embedded in a discussion of "physiology" soon aroused an acrimonious debate which focused on: (1) whether exercises on the parallel bars were dangerous; and (2) whether it was possible to exercise "single muscles."⁵⁴ The Prussian Minister of Education appointed several members of the Royal Medical Department of the University of Berlin (including Virchow and DuBois-Reymond) to look into the matter. In "Swedish Gymnastics and German Gymnastics From a Physiological Point of View," DuBois-Reymond attacked the so-called "physiological theories" upon which the Swedish system was based. Even the simplest body movements, he pointed out, were not ". . . performed by the action of a single muscle, but by several muscles which are similar in their action." This was confirmed by both his research experiments and his experience in the Gymnasium of Eiselin. Invoking Helmholtz's work on the production of heat, and his own on the velocity of nerve impulse and sequence of action, DuBois-Reymond declared: "All forms of bodily skill, such as dancing, skiing, riding, swimming, fencing, etc., depend in the end on a complicated activity and on the suitable interaction of impressions obtained through the senses of which we are only partially conscious. All these accomplishments, therefore, pertain equally as much to the nervous system as to the muscles. . . ."⁵⁵

This statement, which was subsequently cited by numerous commentators, was brought to the attention of members of the newly created A.A.A.P.E. in 1886 by Edward M. Hartwell, Associate in Physical Training at Baltimore's Johns Hopkins University. A recent recipient of the Ph.D. in biology from Hopkins and the M.D. from Cincinnati's Miami Medical College, Hartwell was one of the most scientifically prepared of the early leaders of American physical education. In an address entitled "On the Physiology of Exercise" (subsequently published in the *Boston Medical and Surgical Journal*) Hartwell

54. Emil DuBois-Reymond, "Swedish Gymnastics and German Gymnastics from a Physiological Point of View," A.B.C. Biewind, trans., in *Essays Concerning the German System of Gymnastics* (Milwaukee: Freuekner Publishing Co., n.d.); Lehnert et al. "Exercises on the Parallel Bars from a Medical Point of View," *ibid.* Virchow was a signator to the latter report. These were published as a small pamphlet by the Executive Committee of the North American Turnerbund.

55. DuBois-Reymond, "German Gymnastics," 5-10.

declared DuBois-Reymond's definition of exercise to be the most comprehensive he had encountered, stating ". . . such bodily exercises as gymnastics, fencing, swimming, riding, dancing, and skating are much more exercises of the central nervous system, of the brain and spinal marrow." He also invoked the example of the "blacksmith's arm," observing that the analogy had been repeatedly used as the standard proof that ". . . muscles grow larger, harder and stronger when duly exercised. . ." Moreover, Hartwell continued, exercise produced similar effects on sensory and motor cells, even if this was less easily observed.⁵⁶

Hartwell brought his training in both medicine and biological science to bear on many of the issues regarding exercise and physical education which were being debated at the end of the nineteenth century. One was the problem of the many, mixed, and imprecise meanings which were attached to the term "exercise." While he readily acknowledged that in actual life they were intimately related, Hartwell distinguished between: (1) exercise which was aimed at perfecting the ". . . more familiar systems of organs" (commenting here on smooth and striated muscle, the circulatory system, production of "carbonic acid," etc.); and (2) exercise which ". . . exerts a potent influence upon the important growth of the body (commenting here upon the effects of exercise on nerves and the brain, and emerging theories of evolution.)⁵⁷

In the "On the Physiology of Exercise" paper, "The Nature of Physical Training and the Best Means of Securing its Ends" (which he presented at the 1889 Boston Conference on Physical Training), and elsewhere, Hartwell's familiarity with contemporary scientific and medical work was evident: (Ferrier's research on the brain; the medical writings of J. Crichton-Brown and S. Weir Mitchell; studies of height, weight, and growth being conducted by Henry Pickering Bowditch, M.D., Professor Physiology in the Harvard Medical School; the anthropometric studies of Charles Roberts, M.D., F.R.S.) The importance of physical education, he maintained, was increasingly confirmed by discoveries in the biological sciences, notably work on the central nervous system. Although the nature of the mechanisms was still not well understood.

there is a settled conviction among those who know most about healthy and diseased nerves, that the frequent or habitual passage of stimuli from a given group of cells through definite fibres to the muscles concerned in a given movement, leads to some kind of rearrangement of the molecules composing the irritable protoplasm of fibres and cells so that less and less resistance is required to the passage of subsequent impulses from the same source.⁵⁸

This depiction of the effects of muscular movement on nervous tissue, drawn

56. Edward M. Hartwell. "On the Physiology of Exercise," *Boston Medical and Surgical Journal*, 31 March 1887. 297-302; *ibid.*, 7 April 1887, 321-324. Published separately as *On the Physiology of Exercise* (Boston: Cupples, Upham and Co., 1887), 32 pp.

57. See Roberta J. Park, "Edward M. Hartwell and Physical Training at The Johns Hopkins University, 1879-1890," in this issue; Edward M. Hartwell. "The Nature of Physical Training, and the Best Means of Securing its Ends," in Isabel C. Barrows (ed.), *Physical Training: A Full Report of the Papers and Discussions of the Conference Held in Boston in November 1889* (Boston: George H. Ellis, 1899), 5-20.

58. Hartwell. "Physiology of Exercise." 26-29.

from the work of DuBois-Reymond, provides the basis for Hartwell's claim that ". . . the centres of motor ideation . . ." need to be exercised so that proper development will occur, and for substantiating the important role that "muscular training" must perform ". . . in our educational systems of the future. . ." It was these important ends, and not the mere outward form of gymnastics and athletics, which legitimized physical education.⁵⁹

Hartwell repeatedly upheld the distinction between gymnastics and athletics that was shared by most of his contemporaries—the essential difference being the end results: "The aim of athletics, unless of the illegitimate professional sort, is pleasurable activity for the sake of recreation; that of gymnastics is discipline or training for pleasure, health, and skill. . . Gymnastics . . . are more comprehensive in their aims, more formal, elaborate, and systematic in their methods, and are productive of more solid and considerable results." This did not mean that Hartwell deprecated athletics. Indeed, as the head of Hopkins' Department of Physical Training, he had already spent considerable time providing athletic opportunities for students. While he had ". . . no disposition to disparage athletic sports," he wished they could be better regulated and accessible to more students. Because athletics called for ". . . self-subordination, public spirit, and co-operative effort . . ." they were of particular value for their *moral* effects,⁶⁰ but this could only be achieved when they were directed to *educational* ends.

In his 1889 address Hartwell had also touched upon a subject which would receive increased attention from physical educators, social reformers, psychologists, and professional educators: the *healthful play instinct*. Indeed, the athletics of young men—properly conceived and responsibly directed—offered the ". . . highest and fullest expression of the play instinct." That same year Harvard's N. S. Shaler authored an article for the *Atlantic Monthly* entitled "The Athletic Problem in Education" in which he observed that the child's natural disposition to play served important physiological purposes. By actively reliving the experiences of the race, the child learned ". . . habits of command, of cooperation, and of laboring under defeat, qualities of the utmost value in maturer life, on which the very success of the race may depend. . . ." While calisthenics and gymnastics could benefit the body, Shaler held, because they lacked "the cooperative element" they could not provide for *moral* education to the same extent as games and sports.⁶¹

Shaler's article sketched arguments that were presented in much greater detail by G. Stanley Hall, Professor of Psychology and Pedagogy and President of Clark University, especially in his influential *Adolescence, Its Psychology and Its Relations to Physiology, Anthropology, Sociology, Sex, Crime, Religion, and Education* (1904). America's leading proponent of the *recapitulation* theory of development, Hall was extremely interested in physical education, play, and athletic games. In his epochal work on adolescence (and in

59. Hartwell, "Nature of Physical Training," 19-20.

60. *Ibid.*

61. N. S. Shaler, "The Athletic Problem in Education," *Atlantic Monthly*, 63 (1889), 79-88

scores of other writings) he declared play to be of inestimable value to the child: "I regard play as the motor habits and spirit of the past of the race, persisting in the present, as rudimentary functions sometimes of and always akin to rudimentary organs. . . ." To act vigorously gave the ". . . organism a sense of superiority, dignity, endurance, courage, confidence, enterprise, power, personal vitality, and virtue [manliness] in the entomological sense of that noble word." Hall, too, considered play superior to gymnastics because it called forth the social instincts of the child. Using terms which gave his statement a scientific patina, Hall declared that in vigorous activity ". . . the products of decomposition are washed out by oxygenation and elimination, the best of the deganglionic and sympathetic activities is aroused. . . ." Athletics, the more mature form of play, provided a defense against weakening of the will, loss of honor, and degeneration of both the individual and the race.⁶²

* * * * *

The full incorporation of play-and the recapitulation theory-into physical education was, however, still in the future when U.S. Commissioner of Education William T. Harris opened the 1889 Boston Conference on Physical Training. Although Harris acknowledged the hygienic (e.g. dietary, digestive, circulatory, respiratory) benefits of physical training, it was "the exercise of the muscles by voluntary effort [that] calls into action the higher nervous motor-centers of the body and brain," that the Commissioner stressed: ". . . physical training such as is advocated by us relates especially to the will. . . ." In closing his introduction, the Commissioner optimistically proclaimed the emergence of a *new physical education*.⁶³

Harris, Hartwell, and participants at the Boston Conference were not alone among those who spoke enthusiastically of a "new physical education." It was not always clear, however, what "new" meant. In a lengthy article for *Lippincott's Magazine* in 1887 entitled "A Physician's View of Exercise and Athletics," J. William White, M.D., cited Hartwell's 1885 Report "Physical Training in American Colleges and Universities" and DuBois-Reymond's statement about the influence of exercise on the nervous system. In rambling praise of both gymnastics and athletics which touched upon sources as diverse as Homeric Greece, Martin Luther, Dudley Allen Sargeant, Archibald Maclaren (Director of the Oxford Gymnasium), Dr. John Morgan's study of Oxford and Cambridge crew members between 1849 and 1869, the Harvard-Yale boat race, Wilkie Collins *Man and Wife*, Eugene L. Richard's comments on "body brain-work," and recent meetings at which problems of college sport had been discussed, White concluded that competitive athletics were ". . . far less dangerous and much more beneficial than is generally supposed. . . ." The manly games of the Anglo-Saxon race-expunged of all excess-needed to be extended to all schools and colleges, the dyspeptic, the nervous, the over-worked professional, and the businessman. Exercise was, White concluded,

62. G. Stanley Hall, *Adolescence, Its Psychology and its Relations to Physiology. Anthropology. Sociology. Sex, Crime, Religion and Education* (New York: D. Appleton and Co., 1908), 1:202-205: 217-230.

63. William T. Harris, "Physical Training," in Barrows, *Physical Training. 1889*, 1-4.

“ . . . the most important therapeutic and hygienic agency at the command of the physician of to-day.”⁶⁴

In 1884, *Popular Science Monthly* had published two articles on “College Athletics” by Eugene L. Richards, Professor of Mathematics and Director of the Gymnasium at Yale. Although “disadvantages” existed, he was convinced that the “advantages” of college athletics far outweighed them. Referring to Dr. Edward Clarke’s book *Building of a Bruin* (1874), Richards pointed out that the development of the brain and the development of the muscles were intimately related. Young men, he asserted, were in particular need of maintaining the right “. . . reciprocal action between body and brain . . .” if they were to withstand the intellectual and emotional strains of college life. By providing a goal to strive for, “. . . an ideal of strength or skill . . .,” athletics encouraged men to engage in “*body brain-work*”: that is, the type of physical activity which benefited the mind, not the type which drained away “vital energy.” Invoking an argument which would be repeated ad nauseam for the next hundred years, Richards insisted that the men on University crews, “nines” and “elevens” served as models which encouraged others to emulate their efforts; hence, varsity athletics served a good that was far greater than solely for those who were on the teams.⁶⁵

Not everyone, however, was convinced that varsity teams provided any such stimulus. A series of editorials in the *Medical News* in late 1892 (published separately as a small pamphlet entitled “Some of the Moral and Physical Effects of the Game of Foot-Ball”) decried the current state of affairs: “Wise educators are today frightened at the influence of the foot-ball problem. . . . Ninety-nine let one do their exercising . . . for them, and we have the noteworthy result—vicarious athletics, or gymnastics by proxy.” The growing number of injuries and deaths incurred in the game was noted apprehensively, as was the game’s “. . . pernicious influence upon the morals of the players and of the community. . . .”⁶⁶

While college presidents and others grappled with the problem of what to do with the burgeoning and immensely popular sports of the student extracurriculum, departments of physical training were being organized at colleges and universities. Influenced by local circumstances, type of the institution, and the training and predilections of those who served as directors and faculty, these took several forms. Some embraced athletics as well as physical training; others did not. Many were headed by men who possessed a medical degree. The nature of this training might have been anything from a short course at a proprietary

64. Ibid.: J. William White, “A Physician’s View of Exercise and Athletics.” *Lippincott’s Magazine*, 39 (1887), 1008-1033.

65. Eugene L. Richards, “College Athletics: Advantages,” *Popular Science Monthly*, 24 (1884), 446-453; idem, “College Athletics: Evils and their Remedies.” *Popular Science Monthly*, 24 (1884), 587-597. In an encomium to football the following year, Richards compared the sport to the feelings a lover has for his mistress and the *patriot* for his country! Idem, “Foot-Ball in America.” *Outing*, 6 (1885), 62-66.

66. “Some of the Moral and Physical Effects of the Game of Football. Selections from Editorials in the *Medical News* of November 18, November 25, December 2 and December 9, 1893” 8 pp. (Published as separate pamphlet). Compare, for example, Joseph Hamblen Sears, “Foot-Ball: Sport and Training,” *North American Review*, 153 (1891), 750-753.

institution, where whatever physiology had been learned was gained from textbooks and lectures (and perhaps a few demonstrations), to the type of scientifically based medical education which Henry Pickering Bowditch had begun to institute at Harvard in the 1870s. Few American-trained physicians before 1910, however, had much experience with experimental science.⁶⁷ The consequences of this soon became apparent in the types of programs which were developed and the debates which appeared in the professional physical education literature.

Collegiate departments of physical training that were organized in the 1890s and early 1900s, for the most part, endeavored to devote attention to the goals which Harris, Hartwell, and others had set forth at the Boston Conference. In 1892, for example, the Division of Physical Culture and Athletics at the University of Chicago was opened, with Amos Alonzo Stagg as its Director. This arrangement placed athletics under university rather than student control, while physical training was made a requirement for graduation. The aims of the Division, as set forth in the 1892-93 *Annual Register*, were specified as *hygienic* and *educative*. Under *hygienic* were included: activities to aid circulation, respiration, and digestion; exercises to develop posture and the symmetry of the body; and "recreational" activities which would draw blood from the nerve centers, congested by mental work, out to the skeletal muscles. The *educative* goals included perfection of the nervous system; production of mental and moral self-control (e.g. action, courage, the ability to subordinate personal will for the good of the whole; and the development of muscular strength).⁶⁸

* * * * *

Although there was considerable agreement that a "modern ideal" must define and inform the new physical education, the achievement of this goal was not easily accomplished. It was a tall order to attribute to any field *all* of the potential which so many commentators assigned to physical education. By setting goals which came close to embracing total human perfection—a kind of professionalized Millenarianism—physical education extended its boundaries so broadly that almost anything might be—and frequently was—included. Even the more scientifically-inclined often found it easy to slip into this mode of thought. Addressing fellow members of the A.A.A.P.E. in 1890 on the topic "Physical Education: A New Profession," Luther Halsey Gulick declared:

There are a few scientific fields to-day which offer opportunities for the study of the problems of greater value to the human race. . . [It] is in line with the most thorough modern physiological psychology . . . [and] with our modern conception of evolution, as it works to develop a superior race. This profession offers to its students a large and broad field for intellectual activity, involving for its

67. John Harley Warner, "Physiology," in Numbers, *Education of American Physicians*, 48-71.

68. "The Division of Physical Culture and Athletics," *University of Chicago Register*, July 1, 1893, 169-170; "Physical Culture and Athletics," *The University of Chicago President's Report, July 1892-July 1902* (Chicago: University of Chicago Press, 1903), 336-339; Hal A. Larson and Alan G. Ingham, "Conflicting Ideologies Concerning the University and Intercollegiate Athletics: Harper and Hutchins at Chicago, 1892-1940," *Journal of Sport History* 7 (1980), 37-67.

fullest appreciation a profound knowledge of man through physiology, anatomy, psychology, history and philosophy. . . .⁶⁹

In a speech before the International Congress on Education at the 1893 Chicago World's Fair, Thomas Dennison Wood, M.D., Director of Physical Training at Stanford University, declared that although "there is today, in an embryonic and crude form, a science of physical education . . .," greater dedication to a *scientific attitude* was needed among its practitioners.⁷⁰ George Fitz, M.D., Instructor in Physiology and Hygiene at Harvard University, was more emphatic!

The same issue of The Harvard Graduates Magazine which opened with Walker's "College Athletics" also contained Fitz's brief article "Problems of Physical Education." Fitz had graduated from Harvard Medical School in 1891 where the influence of Bowditch's new experimental approach had made a considerable impact on the curriculum. As Walter Kroll has suggested, it was surely Fitz who was a guiding force in establishing a laboratory in the Lawrence Scientific School ". . . for the experimental study of the physiology of exercise." Here attention was given to ". . . the hygiene of muscles, conditions under which they act . . . and the effects of various exercises upon muscular growth and general health."⁷¹

Fitz' insistence that physical education could become a respectable field only if it was grounded in a systematic, scientific study of the effects of physical activity on the body was evident early in his career. At the 1891 A.A.A.P.E. meetings, he had criticized the uninformed debate regarding which "system" of gymnastics was best, saying: "Physical training today is an art, not a science . . . What we need is scientific work, not the assumption that certain laws require certain exercises. . ." In the *Harvard Graduates Magazine* article he set forth numerous questions regarding gymnastics and athletics for which no adequate information existed even though practitioners continued to advance extravagant claims for a bewildering assortment of "theories" of exercise. The entire ". . . question of the relative value of games *versus* arbitrary systems of gymnastics . . ." could only be intelligently discussed, he held, when the appropriate research studies had been completed.⁷²

In an attempt to place physical education and athletics on a secure scientific foundation, Fitz set about establishing a four-year B.S. degree program in "Anatomy, Physiology, and Physical Training" for ". . . those who expect to

69. Gulick, "Physical Education: A New Profession," 65. See also: H. W. Bowditch, "Reform in Medical Education," *Science* 8 (1898), 921-927.

70. Thomas D. Wood, "Some Unsolved Problems in Physical Education." *Addresses and Proceedings of the International Congress of Education, Chicago*. 1893, 3 (1893). 621-623, as cited by Walter P. Kroll, *Graduate Study and Research in Physical Education* (Champaign, IL: Human Kinetics Publishers, Inc., 1982), 43. To date, Kroll's is the only attempt to analyze efforts to establish "academic/scientific" degree programs in physical education in the 1890s.

71. George W. Fitz, "Problems of Physical Education," *Harvard Graduates Magazine*, 2 (1893), 26-31; Kroll, *Graduate Study*, 27-60; *Harvard University Catalogue*. 1893-94, 246-247; *Harvard University Catalogue*. 1895-96, 297-299. See also, Ellen W. Gerber, *Innovators and Institutions in Physical Education* (Philadelphia: Lea & Febiger. 1971), 302-307.

72. George W. Fitz, "Discussion." in *Proceedings of the American Association for the Advancement of Physical Education*. Philadelphia. 1892 (Springfield, MA: Springfield Printing and Binding Co., 1893), 203.

take charge of gymnasiums as well as for those who wish to obtain a general education preparatory to the study of medicine.” The only contributions that physical educators could claim, he held, were in anthropometry, the production of “tables of measurements,” and the design of various pieces of exercise equipment. This was not the type of work, however, which was likely to do much to further the *scientific* study of physical training. In making such a statement, Fitz was indicating (even if this was not his intention) the work of his Harvard contemporary, Sargent. Anthropometry had become a preoccupation of many physical educators in the late nineteenth century; however, the compiling of endless height, weight, girth and strength tables could do little to explain the *functional* effects of exercise. *Experimental* research in physiology and psychology was indispensable. As a condition of their work, therefore, every advanced student in the Harvard B.S. program was required to undertake original research and report the results in a thesis.⁷³

The curriculum of Harvard’s four-year degree program (which terminated in 1899) was far more scientific and rigorous than that which was offered by any other contemporary institution that trained physical educators. Fitz taught the first year Physiology and Hygiene course, the senior course in the Physiology of Exercise (which included experimental work), and the course in remedial gymnastics. With Sargent he also taught the senior course in the History of Physical Education. General physiology was taught by Bowditch and William T. Porter, also a professor in the Harvard Medical School. William James taught the psychology course. The curriculum included: experimental physics, zoology, morphology (animal and human), chemistry, medical chemistry, general anatomy, comparative anatomy, English, and foreign languages. Sargent taught the Anthropometry course and the course in Applied Anatomy and Animal Mechanics. With Mr. Lathrop he also instructed the students each year in a course entitled “Gymnastics and Athletics.”⁷⁴

At the nearby Boston Normal School of Gymnastics, young women received instruction in anthropometry from Bowditch; Josiah Royce lectured on psychology and pedagogy; Dr. W. M. Conant, Harvard’s Assistant Demonstrator of Anatomy, taught “Emergencies”; M.I.T.’s Thomas Drown, M.D. taught chemistry; and William T. Sedgwick, Ph.D. and Theodore Hough, Ph.D. (both of M.I.T.) were in charge of general biology, comparative anatomy, histology, physiology, and sanitary science. Applied anatomy, physiology, and Swedish pedagogical and medical gymnastics were taught by Claes Enebuske, Ph.D., a graduate of the Royal University at Lund, Sweden. Students at the B.N.S.G. were required to undertake laboratory work—dissecting frogs and various mammals. Although examination questions suggest that a high standard of

73. Fitz, “Problems of Physical Education,” 30; *Harvard University Catalogue, 1895-96*, 297.

74. *Harvard University Catalogue, 1895-96, 297-299*. The Department of Physical Training and Hygiene at Stanford University, by contrast, opened with the 1891-92 academic year with Professor Thomas Denison Wood, M.D. as its Director. The course for teachers included Sanitary Science, Personal and General Hygiene, Bodily Mechanics, Physiology of Exercise, Anthropometry, History of Gymnastics, and Medical Gymnastics—all taught by Wood. Miss Lowell and Mr. Black (with Wood) taught a variety of practical courses in Swedish and German gymnastics, health gymnastics and athletics. *Stanford University Register, 1891-92, 72-73*.

performance was expected, it does not appear that they had much experience with original research other than, perhaps, in anthropometry.⁷⁵

The type of curriculum offered at B.N.S.G., impressive by contemporary standards, was much more reflective of the better college, physical education baccalaureate programs which would begin to emerge in the twentieth century. While comparable endeavors were undertaken at several other institutions (e.g., the program which Wood initiated at Stanford in 1891), many of the teachers who were needed to fill posts in the rapidly growing public school physical education programs—and even at institutions of higher learning—were trained in two-year, or shorter, courses. It was the limited and unscientific nature of these which presented a serious threat Fitz told the Physical Education Section of the National Education Association in 1899. This was also a concern of Dr. C. E. Ehinger of the State Normal School at West Chester, who declared at the Seventh Annual Meeting of the A.A.A.P.E. that in spite of all the recent interest in physical education, there was “. . . a lamentable neglect and dense ignorance of this subject. . .” Although educators, physicians, and parents were coming to appreciate the hygienic and educational value of exercise, Fitz maintained, a persistent failure to apply “scientific investigation” to the field impeded its growth while competing and uninformed claims of various groups “. . . threaten[ed] the unity of purpose and heartiness of cooperation upon which our future progress rests.” Accurate physiological and psychological knowledge, he remonstrated, must be sought by physical educators, who must become “. . . students of the problems of physical education, not merely exponents of fixed system.”⁷⁶

Most of the men and women who headed the newly emerging teacher-training programs—either by choice or by necessity—were oriented more toward the practical concerns of curriculum, facilities, and teaching methods than they were toward experimental science. Gerald Geison has observed in “Divided We Stand: Physiologists and Clinicians in the American Context” that medical doctors and research physiologists have persistently held substantially different views of the body.⁷⁷ In general, although there were important excep-

75. *Boston Normal School of Gymnastics. Second Annual Catalogue of the Instructors, Students, and Graduates, with a Statement of the Course of Instruction and Examinations, 1892-1893; Boston Normal School of Gymnastics, idem. Fourth Annual Catalogue of the Instructors, Students, and Graduates, with a Statement of the Courses of Instruction, 1894-95.*

76. George W. Fitz. “Conditions and Needs of Physical Education.” *American Physical Education Review*, 4 (1899), 337-339. Hartwell had criticized colleges and universities for a failure to show any great insight or scientific interest in physical training as early as 1891. He and other discussants objected to a paper delivered at the 1891 A.A.A.P.E. meetings entitled “Is the Teaching of Physical Education a Trade or a Profession?” in which Dudley A. Sargent had complained that manufacturers and entrepreneurs were appropriating the gymnasium equipment which had been invented by “experts”—by which Harvard’s Gymnasium Director almost certainly meant his own “developing appliances.” Gulick and J. Gardiner Smith, Director of the Harlem, New York Y.M.C.A., both medical doctors—as was Sargent—retorted that in medicine it was considered unprofessional for a man to use his name in connection with a patent. In *Proceedings of the American Association for the Advancement of Physical Education, Boston, 1891* (Ithaca, N.Y.: Andrus and Church, 1891), especially 22-24; C. E. Ehinger, “Physical Culture in Normal Schools,” in *Proceedings of American Association for the Advancement of Physical Education, Philadelphia, 1892* (Springfield, MA: Springfield Printing and Binding Co., 1893), 184-204.

77. Gerald Geison, “Divided We Stand: Physiologists and Clinicians in the American Context,” in Morris J. Vogel and Charles E. Rosenberg (eds.) *The Therapeutic Revolution: Essays in the Social History of American*

tions, those medical doctors who were directors of college programs had been trained more in accordance with a “clinical” than an experimental model. This influenced the types of programs that emerged under their direction.

In an effort to foster scientific work, Fitz, Sargent, Springfield’s James H. McCurdy, M.D., Theodore Hough, Professor of Physiology at M.I.T., and others formed an American Society for Research in Physical Education. Thirteen of the group’s initial twenty-two members spoke at the first annual meeting in April 1904; of these, nine held medical degrees and an additional two held the Ph. D. in biological science.⁷⁸

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The nature of the assumptions upon which most Americans based their ideas of physical education, however, mitigated against the type of scientifically-based profession that Fitz and others aspired to attain. Health reform, after all, had been anyone’s prerogative-and often business-throughout the century, and “physical education” was closely, even if loosely, associated with a very substantial number of these health reform activities. The close connection of many of these antebellum reform efforts with notions of total human perfection also continued to influence how many individuals perceived of the field of physical education. (Indeed, it is not difficult to discern a vacillation between objective, scientific goals and subjective, Millenarian aspirations through the hundred years since the profession was founded.) It was difficult for the emerging A.A.A.P.E. and its members to counter this legacy. There were, moreover, continuing opportunities to make money by writing books, giving lectures, and opening proprietary training schools, especially as there were no licensing laws or other mechanisms to control unqualified practitioners.⁷⁹

The inclusion of physical education in the curriculum of public high schools in the 1890s and the enthusiasm for “child study” which had begun in the 1880s, exacerbated the problem. The *1891-92 Report* of the U.S. Commissioner of Education concluded a 100-page article on the history and present status of physical education with tables showing the rapid increase in the number of cities that had instituted public school programs: eighty-four employed “specialists” and an additional eighty-one required regular instruction in some form of gymnastics. The need to provide teachers fostered the expansion of “normal,” Chautauqua, and private-venture courses. Some, like the Sargent Normal School of Physical Training (established in 1881 as a two-year program and expanded to a three-year course in 1902) brought in medically trained faculty to instruct students; others offered much thinner fare. Athletic clubs, the Y.M.C.A., Turner societies, and private individuals like health seeker Bernarr

Medicine (Philadelphia: University of Pennsylvania Press, 1979). 67-90.

78. James A. Babbitt, “Present Condition of Gymnastics and Athletics in American Colleges,” *American Physical Education Review*, 8 (1903), 280-283; “American Society for Research in Physical Education,” *American Physical Education Review*, 9 (1904), 60-61.

79. Ronald G. Walters, *American Health Reformers, 1815-1860* (New York: Hill and Wang, 1978), especially Chapter 7. See, Green, *Fit for America: Wharton Crusaders for Fitness*; and items such as *A Synopsis of the Course of Instruction in the Department of Gymnastics of the Northwestern Normal Institute for Physical Education*. (Chicago: H. A. Newcome and Co., 1864).

Macfadden and strongman Eugen Sandow also vied for a portion of the current enthusiasm for exercise. The American Physical Education Association was sufficiently concerned about the “. . . manifold and confusing systems . . .” that it held a symposium on the problem in 1903. A.P.E.A. member James A. Babbitt, M.D. of Haverford College, one of the discussants, urgently called for more scientific men and women to “. . . add strength and dignity to our profession.”⁸⁰

The same volume of the *American Physical Education Review* that published Babbitt's remarks included Dr. Delphine Hanna's survey of colleges preparing students in public school gymnastics. Of the sixteen institutions listed, only three (University of California, University of Nebraska, and Oberlin College) offered four-year courses. Two years later, James McCurdy reported the results of a survey which found that 128 American cities employed a total of 291 teachers of physical training, the overwhelming majority of whom had been trained at normal or proprietary schools; the largest numbers had studied at the Boston Normal School of Gymnastics and the Turnlehrer Seminar of the North American Turnerbund.⁸¹ Only the best of these schools could provide the time and resources to give students any experience with laboratory work, and it is doubtful that any were able to offer extended experience in experimental science. As a consequence, large numbers of those individuals who trained for the field were left with learning the outward “forms” of exercise and games, gross anatomy, hygiene (personal and school), anthropometry, kinesiology and postural work, and some basic physiology. McCurdy also expressed anxiety over the fact that a man was hurried “. . . into active work before he ha[d] fully prepared himself . . .,” noting that the additional demands of conducting competitive athletics programs further complicated the situation.⁸²

As McCurdy had observed, the burgeoning interscholastic and intercollegiate athletic programs created a dilemma for the embryonic field of physical education. At numerous institutions educators—both male and female—were asked or chose to devote much of their attention and energy to competitive sports. The persistence of values which postulated a “separate sphere” for members of the female sex, made it relatively easy to hold to what was claimed to be an “educational” model for girls and women. Highly visible competitive sports for males, however, had attained such prominence by the 1890s—as

80. “Physical Training in America,” *Report of the Commissioner of Education for the Year 1891-92*. Vol. 1 (Washington: Government Printing Office, 1894), 494-594; Delphine Hanna, “Present Status of Physical Training in Normal Schools,” *American Physical Education Review*. 8 (1903), 293-297; James E. Sullivan “Present Status of Athletic Gymnastics and Gymnasiums,” *ibid.*, 268-272; Henry Hartung, “The Present Condition of Gymnastics and Athletics in the North American Gymnastic Union,” *ibid.*, 273-279; George T. Hepbron, “The Present Status of Physical Training in the Young Men's Christian Associations,” *ibid.*, 284-292; Babbitt, “Present Condition of Gymnastics and Athletics in American Colleges.” See also Donald J. Mrozek, *Sport and American Menrality, 1880-1910* (Knoxville: University of Tennessee Press, 1983), especially chapter 7. Although Macfadden had been publishing books and journals for years, his several volume *Macfadden's Encyclopedia of Physical Culture*, first issued in 1911, may have been the most extensive. The A.A.A.P.E. was renamed the American Physical Education Association in 1903.

81. Hanna, “Physical Training in Normal Schools”; reprinted in Kroll, *Graduate Study in Physical Education*. Chapter 2. James H. McCurdy, “A Study of the Characteristics of Physical Training in the Public Schools of the United States,” *American Physical Education Review*. 10 (1905). 202—213.

82. McCurdy, “Characteristics of Physical Training.”

Walker had stated in his Phi Beta Kappa Address—that attempts to organize athletics solely for “educational” ends were constantly overshadowed by the presence of the more spectacular “intercollegiate” model. Although various efforts had been made to place the control of athletics in the hands of the faculty since the 1880s, little success was achieved until the founding of the Intercollegiate Athletic Association of the United States (N.C.A.A.) in 1906 and the organization of high school athletic leagues in the early 1900s.⁸³

Since at least the 1890s some members of the A.A.A.P.E. had acknowledged that athletics (subject to certain constraints) might be an appropriate—even important-form of physical training. By 1906, as Guy Lewis has shown, the emphasis in curricular physical education was rapidly moving from gymnastics to sport.⁸⁴ The assumed “developmental” potential of athletics, long associated with what were believed to be desirable male qualities, was given added luster by Victorian ideologies which attributed to them such values as “manliness,” and “character,” and “sand.” Those who maintained that athletics as well as formal gymnastics might serve both *hygienic*, and more importantly, *educational* ends drew upon this tradition.

The transition from a gymnastics-centered to a sports-centered curriculum was facilitated by developments in evolutionary biology, physiological psychology, and work on the association of ideas, instinct, interest, recapitulation, and play during the late 1800s and early 1900s. These combined, within the broader context of Progressive Era concerns about society and social issues, to move the professional field of physical education toward an emphasis on questions dominated by social science and psychology rather than physiology. The new interest in play and games also drew heavily upon the Child Study Movement and educational reforms that G. Stanley Hall had initiated in the 1880s and assumptions about the nature and role of “habit.”

In 1887, William James had written in *Popular Science Monthly*: “every state of ideational Consciousness which is either very strong or habitually repeated leaves an organic impression on the cerebrum.” James’ conception of “habit” was expanded in his influential text *Psychology* (1891): “An acquired habit, from the physiological point of view, is nothing but a new pathway of discharge formed in the brain. . . .” Drawing upon Henry Maudsley’s *Psychology and Pathology of the Mind* (1867), he used the examples of proficiency in swimming, skating, fencing, writing, and singing to support the physical basis of habit and the plasticity of the nervous system in the formation of ethical behavior.⁸⁵

Addressing the Boston Medical Improvement Society in 1896, Edward M. Hartwell referred to various contemporary views of “habit” and evolutionary

83. Walker, “College Athletics.”

84. Guy M. Lewis, “Adoption of the Sports Program, 1906—1939; The Role of Accommodation in the Transformation of Physical Education,” *Quest*, 12 (1969), 34-46.

85. William James, *Psychology* (New York: Henry Holt and Co., 1913), 65-66; 134-150; Henry Maudsley, *The Physiology of the Mind* (New York: D. Appleton and Co., 1883), especially chapter 7; see also, Anita C. Fellman and Michael Fellman, *Making Sense of Self: Medical Advice Literature in Late Nineteenth Century America* (Philadelphia: University of Pennsylvania Press, 1981), chapter 7.

theory. The two ends of exercise, the A.A.A.P.E. President reminded his audience, were “. . . the promotion of health . . . and the formation of proper habits.” The former was a *hygienic* end; the latter, distinctively *educational*. Citing Mercier’s *Nervous System and the Mind* (1888), he distinguished between muscular *action* (predominantly a physiological function) and muscular *movements* (identified as a psychological function). The first, Hartwell continued, concerning processes that occurred *within* the organism; the latter involved the adjustment of “. . . the *processes that occur within the organism to the conditions that exist outside of it. . .*” The study of the psychological functions of the nervous system, then, was “. . . the study of conduct;”⁸⁶ and “conduct” implied action in accordance with the standards of a social group.

Drawing from Drummond’s Lowell Lecture on the Ascent of Man (1894) and Kidd’s *Social Evolution* (1894), he urged his listeners to devote attention to recent work on evolution and criticized earlier theories that saw education as unfolding rather than as a series of developmental stages, each with its need for particular forms of physical activity. While both were always needed, *hygienic* forms were most appropriate from birth through age thirteen; *educative* forms should increasingly predominate from age fourteen to twenty-four. Although he continued to reject “rampant athleticism,” Hartwell acknowledged that “. . . the predilection of collegiate youth for athletic sports and contests may be justified as natural and fitting by the teachings of neurology and psychology, if once it can be admitted that the development of mind and character, as well as brain and muscles, is subject to the laws of evolution.” Finding the problems of education to be fundamentally problems of evolution, he concluded that “. . . the new education will be . . . the quintessential of the biological sciences.” The basis of all education, of course, was clearly physical training.⁸⁷

Given his training in physiology and medicine, it is not surprising that Hartwell would proclaim education to be a biological science. Yet like most of his contemporaries, he recognized that man was a social as well as biological organism. Other proponents of physical education, drawing also upon evolution, recapitulation theory, work on heredity and environment, and the growing volume of “play” literature, intentionally and unintentionally moved the field of physical education closer to the social sciences. In 1898, Luther Gulick discussed “Some Psychological Aspects of Physical Exercise” in *Popular Science Monthly*, dividing the play life of the child into five stages. Whereas the play of early childhood was “individualistic” and “non-competitive,” that of later childhood and adolescence was “competitive” and “socialistic.” Gulick followed with an article for *The Pedagogical Seminary* in March 1899 in which he equated group games and “team work” with “. . . qualities indigenous to the Anglo-Saxon youth. . . .” It was now recognized, he asserted, that it was necessary to attend to the types of social issues that sociologists had recently

86. Edward M. Hartwell, “Physical Training, Its Function and Place in Education,” *American Physical Education Review*, 2 (1897), 148. The quote is attributed to Mercier, italics in the source.

87. *Ibid.*, 133–51.

begun to raise. Six months later T. R. Croswell published his survey of the *variety* and *character* of the games and amusements of 2,000 Worcester, Massachusetts school children, a lengthy article that also summarized the main points of the major recent studies of play.⁸⁸

Even the irascible George Fitz was caught up in the new enthusiasm for “play” and the importance of the social environment. Speaking to the Primary Section of the Massachusetts Teachers Association in 1897, the director of the Harvard B.S. program in Anatomy, Physiology, and Physical Training drew heavily upon Karl Groos’ *Die Spiele der Tier* (1895) to argue the importance of “. . . play as an educational factor. . . .” Pointing to “instinct” and the association of pleasure with the satisfaction of instinct, Fitz concluded by informing his audience: “Play thus relates itself to the truest conception of evolution, the development of power, the power of the individual to act as a self-directed unit in civilization.”⁸⁹

Although Fitz was predominantly interested in psycho-physiological questions, others focused far more on psycho-social concerns. The 1898 volume of the *American Physical Education Review* reflects the diversity of approaches. Boston’s mayor Josiah Quincy emphasized the social influences of the gymnasium in winter and the playground in summer, while Dr. Henry Ling Taylor discussed the value of gymnastics over games in training “. . . the nerve centres, the intelligence, and the character, as well as the muscles. . . .” George E. Johnson, a student at Clark University, drew upon Maudsley, James, Groos, recapitulation theory, and “instinct” to argue that because play was driven by “inner necessity and impulse,” it was a more valuable educational form than were routine gymnastics. Games—the more formal and *social* form of play—were of most value when they retained play’s basic elements.⁹⁰

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The ascendance of a psycho-social over a physiological perspective—and an *educational* over a *hygienic* emphasis—was fully evident in the “Tentative Report of the Committee on a Normal Course in Play” published by the Playground Association of America three years after its founding in 1906.⁹¹ Although separate organizations, the P.A.A. and the A.P.E.A. shared a number of similar goals with regard to physical exercise and the welfare of children, and many of the same men and women were active with both groups. Gulick, for example, was President of both the P.A.A. and the A.P.E.A., and the

88. Luther Gulick, “Some Psychical Aspects of Physical Exercise,” *Popular Science Monthly*, 52 (1898), 793-808; idem “Psychological, Pedagogical, and Religious Aspects of Group Games,” *Pedagogical Seminary*, 6 (1899), 135-151; T. R. Croswell, “Amusements of Worcester School Children,” *ibid.*, 314-371.

89. George Fitz, “Play As a Factor in Development,” *American Physical Education Review*, 2 (1897), 209-215.

90. Josiah Quincy, “Playgrounds, Baths and Gymnasias,” *American Physical Education Review*, 3 (1898), 235-241; Henry Ling Taylor, “Exercise and Vigor,” *ibid.*, 249-257; George E. Johnson, “Play in Physical Education,” *ibid.*, 179-187. See also, idem, “Education by Plays and Games,” *Pedagogical Seminary*, 3 (1894), 97-133.

91. “Tentative Report of the Committee on A Normal Course in Play of the Playground Association of America,” *Proceedings of the Third Annual Playground Congress and Yearbook*, 1909.

founder of New York's Public School Athletic League in 1903. Clark Hetherington was deeply involved with the P.A.A., A.P.E.A., and N.C.A.A.

In 1906, Hetherington composed a lengthy article, "Analysis of Problems in College Athletics," in which he went to great pains to distinguish between "sporting" and "educational" athletics: "From the educational viewpoint, [athletics] are encouraged or promoted, sometimes sought, for the values which they contain as an educational discipline. Consciousness of social values is prominent. Nature made the play instinct the guardian of an organic need. The educational interest interprets and idealizes nature's aims and advocates athletics for the good of race and society."⁹² The aims of physical education, therefore, were: organic development; psycho-motor development; health; mental, moral, and social discipline. In 1907, Hetherington was instrumental in founding the Athletic Research Society to "... study athletic problems . . ." and "... widen the public consciousness of the moral and social values of play and athletics . . ."⁹³ By 1908, the *American Physical Education Review*, the official organ of the A.P.E.A., was regularly publishing annual reports of both the P.A.A. and the N.C.A.A.

Paul Phillips, M.D., Professor of Hygiene and Physical Education and Director of Pratt Gymnasium at Amherst College, summarized the new impulses in the field of physical education when he declared in 1912: "Thanks to the work of Groos, Gulick, Fitz, Hetherington, and others it has been shown that normal play is not only important but also absolutely necessary to the normal development of boys and girls physically and mentally, and morally as well. Play and the play spirit constitute perhaps the most important single element in growth and education."⁹⁴ While physiological and other laboratory research was by no means abandoned by the field of physical education, it was regulated to a proportionally much smaller sphere of influence for the next half century. So, too, were physicians, who occupied a diminishing role in the leadership of the profession as the twentieth century progressed.

92. Clark W. Hetherington, "Analysis of Problems in College Athletics," *American Physical Education Review* 12 (1907), 154-181.

93. J. Thomas Jable, "The Public Schools Athletic League of New York City: Organized Athletics for City School Children, 1903-1914," in Wayne M. Ladd and Angela Lumpkin (eds.) *Sport in American Education: History and Perspective*. A.A.H.P.E.R.D. History of Sport and Physical Education Academy Symposia, March 24, 1977 and April 6, 1978, pp. ix-18; Arnold W. Flath, "A History of Relations Between the National Collegiate Athletic Association and the Amateur Athletic Union of the United States: 1905-1963 (Champaign: Stipes Publishing Co., 1964), Chapter 3. Although physical educators by no means ever formed a major part of the governance of the N.C.A.A., Hetherington (Missouri), Stagg, Phillips, and C. W. Savage (Oberlin) had all served on the Executive Committee by 1910, and Savage and R. Tait McKenzie, M.D. (Pennsylvania) had been Vice Presidents.

94. Paul C. Phillips, "The Extension of Athletic Sports to the Whole Student Body at Amherst," *American Physical Education Review*, 17 (1912), 339-342.