

# 'Athlete's Heart': The Medical Debate Over Athleticism, 1870-1920

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'What lamentations do we hear?,' marvelled two members of the London Athletic Club in 1890.

Rachel weeping for her children; mothers discussing the injuries that have occurred to their athletic progeny; how Ajax is afflicted with valvular disease of the heart, and Priam with most dangerous spasms. They inveigh against sports of all kinds, and wish that athleticism had never been an institution.<sup>1</sup>

There was irony as well as error in these anti-athletic lamentations, for the Rachels who were weeping the loudest were physicians. Exercise, after all, had been a cardinal element of the medical profession's code of hygiene since antiquity. Doctors through the centuries had recommended regular and moderate exertion for enjoyment of vitality and resistance to disease. During the nineteenth century particularly, American physicians, worried by the increasing sedentariness of a nation rapidly changing from a rural to an urban lifestyle, exhorted the public to counteract the staleness of the counting room with the exhilaration of the field and the gymnasium. The people generally refused to comply with the exercise prescription, though, until the post-Civil War boom in games and athletics suddenly roused them to levels of physical activity which often exceeded what had been intended by their physicians. The heart of hygienic philosophy had always been "moderation," and the new enthusiasm of the public for ball-games and cycling and other athletic endeavors appeared to many physicians to overleap even the most liberal bounds of moderation. These doctors thus ended up among the staunchest foes of a trend of "athleticism" which had been originally set in motion and pushed ahead with considerable eagerness by the medical profession, and was still being energetically advocated by physicians who saw only good in the expansion of traditional exercise into boat racing and football. The resulting clash of opinions over the medical consequences of athleticism was one of the profession's livelier intramural confrontations around the turn of this century (fought along identical lines in America and in Europe), and was a significant factor both in the crystallization of sports medicine as an area of specialization and in the formation of public attitudes toward strenuous exertion.

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While systematic exercise, and even play had been promoted by physicians before the mid-1800s, there was a heightening of medical interest in the 1850s and '60s in response to the growth of gymnastics—first the demanding German Turnen, and then “the new gymnastics” of Dio Lewis, a gentler system of calisthenics and games employing music and apparatus such as wooden dumbbells and bean bags. Lewis’ gymnastics was all the rage in educational circles for a season, but despite its author’s assurances that his exercises were “not less fascinating than the most popular games,”<sup>2</sup> the new gymnastics were sometimes perceived as rigidly prescribed drills which lacked spontaneity and unpredictability and heated competition, were more duty than fun, and which had, moreover, a touch of the absurd about them. The various posturings required could make a group performance of Lewis gymnastics take on successively the appearance of “a series of windmills—a group of inflated balloons—a flock of geese all asleep on one leg— . . . a whole parish of Shaker worshippers, —a Japanese embassy performing *Ko-tow*.”<sup>3</sup>

An activity more entertaining to spectators than practitioners was destined for only passing popularity, and as baseball, football, and tennis rose in public esteem, American society passed from the “gymnastic era” to the “athletic era.” Edward Hitchcock, the physician who identified that change of epochs, epitomized the medical profession’s initially positive reaction to the advent of athleticism. The first professor of physical education at an American college (Amherst), Hitchcock had originally been a proponent of Lewis gymnastics, but by the 1890s he was certain that although

a man may get simple muscular development in a gymnasium, and be strong in arms, legs, lungs, and back, . . . he cannot get the real brawn, effective muscle, capacious lungs, a tough skin and the best of digestion, or a really reliable heart, unless he gets more of the natural process of health from mother earth and her surroundings of air, water, temperature, ozone, and the actual touch of soil and grass . . . Man needs outdoor discipline as well as that of the training master indoors, if he would secure the bodily condition and the physical power that make him the best man to conduct a business, to edit a newspaper, or to make the most effective use of high intellectual attainments in any calling.<sup>4</sup>

Outdoor games, the standard argument for athleticism ran, had greater hygienic value because, being more enjoyable, they attracted more participants; and being conducted in a natural environment, they were more beneficial to the organs of a human animal who was the product of a long process of biological evolution within nature.

The greatest advantage of athletics, however, was not muscular, but moral. It was not just that the strength, energy, and endurance built by sports endowed one, as Hitchcock suggested, with the power to better conduct his business or otherwise use his intellectual attainments. Nor was it sufficient to recognize the worth of open-air games for diverting one from the relentless nervous excitement of the urban bustle. The value of athletics for combatting the great epidemic of civilization—“neurasthenia” or nervous weakness, with accom-

panying exhaustion of creative energy and spiritual fortitude—was generally and gratefully acknowledged, but doctors were most impressed by the usefulness of sport for building the most prized of Victorian virtues, character. That hope was already being furthered in the public sphere by the penetration of the British ethic of “muscular Christianity” into popular thought during the 1860s. Suggested by the novels of Charles Kingsley and Thomas Hughes, muscular Christianity became a kind of social gospel which affirmed the compatibility of the robust physical life with a life of Christian morality and service; which indeed contended that bodily strength built character and righteousness and usefulness for God’s (and the nation’s) work.<sup>5</sup>

Even had they been insulated from the popular interpretations of Kingsley and Hughes, physicians could have developed their own version of muscular Christianity from the medical philosophy of sanitary reform. The beginning of modern public health activity, the sanitary reform movement was a mid- to late-nineteenth century campaign to clean city streets and supply pure water and efficient drainage to city houses, and thereby eradicate the problem of physical disease. Removal of decomposing organic refuse, it was presumed, would prevent the generation of the foul miasms which polluted the urban atmosphere and were believed to be the source of cholera, yellow fever, and most of the other acute infections which plagued the period. Sanitary reform had a moral face as well. The evangelical equation of ungodliness with uncleanliness encouraged sanitarians to concentrate on the association of immorality and licentiousness with filthy living conditions too, and to see themselves as crusaders against moral disease as well. The ardent sanitationist was almost as bent on cleansing souls as streets. New York’s John Griscom, the first American physician to strongly urge sanitary reform, introduced his 1845 survey of the sanitary condition of his city’s laboring population by asking what was the effect of “this degraded and filthy manner of life” upon not only the health and lifespan of slum residents, but also “their morals, their self-respect, and appreciation of virtue.” His summation for the implementation of thorough-going public sanitation had as a critical link the argument that a clean population in a decent environment would not be guilty of nearly so much lawlessness, and therefore be less difficult and expensive to govern.<sup>6</sup> That economic ploy was vital for winning legislative backing of sanitary programs, but Griscom and most other sanitarians were far more deeply concerned about human lives than dollars. As one saw it, “sanitary science” must take as its eventual goal nothing less than the advancement of “human felicity” by every means possible.<sup>7</sup> As late as 1887, as sanitary reform was yielding to “the new public health” founded on the germ theory of disease, the American physician Frances White still felt confident presenting an address entitled “Hygiene as a Basis for Morals,” in which she described the ideal city to be built by sanitarians. Her name for the city—Ethica!—underscores the ultimately moral thrust of the sanitationist spirit.<sup>8</sup>

When that professional ethos fused with the pervasive lay excitement over muscular Christianity, there inevitably resulted a medical-moral philosophy of athletics which supposed the personal, internal sanitation of strenuous exercise must perfect the spirit as well as the body. Late Victorian physicians fairly tumbled over themselves searching for character-enhancing elements within the various outdoor games and recreations. Thus the bicycling craze of the 1890s was greeted with ecstatic pronouncements of not only the limitless physical improvement it promised the masses, but also the opportunities for spiritual and social growth it offered. Every societal end from strengthening of the family to the curing of alcoholism and opium addiction was credited to the wonderful exercise of wheeling.<sup>9</sup>

Cycling was still secondary as a character-builder to football, rowing, and other competitive sports. There were a number of professional bicycle racers, but the vast majority of cyclists were interested only in recreation, not competition. And competition was a crucial consideration in determining the character value of a sport. The struggle to win forced a competitor to dig to the bottom of his physical and moral reserves to meet the rival's challenge. "If you abolish contests," an English doctor submitted, "you do away with emulation and stifle the cry of 'Excelsior' " In truth, he continued, "the more hazardous the game the better for the development of the character of the individual."<sup>10</sup> Such feelings, widely shared among physicians, had special relevance at a time when American football was being attacked as senseless and brutal. The University of Pennsylvania's R. Tait McKenzie, a leader among medical advocates of athletics, rose to the sport's defense with a *moral* argument. "The football is the only field we have, in the absence of actual fighting," he reminded, "for that training in presence of mind, audacity, courage, endurance of pain and fatigue, pluck and 'sand' that must characterize the youth of a nation which must play a leading part in the work of the world."<sup>11</sup> Professional colleagues readily echoed those sentiments, one noting that, "It is your physical wrecks who become perverts,"<sup>12</sup> another announcing that, "*Football has ended a career of debauchery for more than one youth.*"<sup>13</sup> At the University of Pennsylvania, it was attested, undergraduate sexual morality became "incredibly higher" after students became involved in athletics,<sup>14</sup> while it was the non-dangerous and relatively non-competitive games like golf and bowling which one found "essentially associated with substantial oaths and Scotch whisky."<sup>15</sup>

All competitions, though football especially, were seen to give the athlete "heart," the self-discipline and drive which "fitted [him] for the stem work of life that assails us all at some time."<sup>16</sup> But his physical, as opposed to metaphoric, heart made the athlete the object of grave disquietude among a second set of physicians. This group was not, it must be explained, blindly anti-athletic. Its members recognized hygienic value in exercise, and usually agreed that physical improvement brought mental and moral improvement in

its train. They were nevertheless deeply troubled by the medical implications of competition: that same thirst for victory which put starch in a man's spirit, they realized, might lead him to overextend himself physically and injure his muscles and vital organs. Their aphorism that, "Athletics for health is safe. Athletics for prowess and superiority may be dangerous,"<sup>17</sup> was a logical conclusion from the fear of intemperance ingrained by their medical training (and by Victorian culture generally). Because intemperance is a relative term, applied after subjective evaluation of an activity, it was easy for many physicians (particularly the unathletic) to recoil from competitive sports as debilitating excesses rather than embrace them as muscle and backbone builders. Their distrust of contests was reinforced by the fact that games attracted mostly young men, and while "intemperance in any form is injurious to the body," it must be "especially [so] in its immature condition."<sup>18</sup>

That same youth implied immature judgment too, the inability of young men to foresee that their "courage and willpower were stronger than their bodies."<sup>19</sup> And though the foolishness of youth had always been a hazard, in many fields other than athletics, the danger had intensified in recent years with the growth of inter-collegiate competition. The injection of do-or-die for *alma mater* spirit into contests had made footballers and rowers seemingly maniacal in their battle for victory. "This was not true in earlier days," a nostalgic doctor complained, "when college men took their sport like gentlemen."<sup>20</sup> Now, though, they were goaded into ungentlemanly, almost superhuman exertions by their own collegiate loyalties, and by fanatical crowds of spectators equally committed to redeeming the school's honor (The health of those spectators, incidentally, was a subject of some concern also to the critics of competition; those unable to qualify as "the 'beef' of the college," it was charged, were ignored by physical educators and trainers and allowed to degenerate into "a horde of pimply-faced, hollow-chested boys, whose ideal of physical training is to smoke cigars, drink beer, [and] give the college yell.")<sup>21</sup> In giving the yell, furthermore, these "mollycoddles of the bleachers"<sup>22</sup> drove their more muscular classmates to exhaustion: "It is this public admiration which has much to do with the overdoing and therefore the undoing of the student contestant."<sup>23</sup>

The contestant's undoing was supposed to be worked in several ways, beginning with his excessive muscular development. Medical prejudice against extraordinary strength and large muscles dated to the beginnings of the modern physical education movement. In their eagerness to democratize exercise and extend its benefits to the masses, physicians of the 1850s and '60s had often renounced the apparently difficult and specialized (therefore elitist) accomplishments of *Turners* and weightlifters. This early ridicule of heavy musculature became an article of faith among subsequent generations of physical educators, and many drew no distinction between the physiques of renowned weightlifters like Sandow and the considerably less awesome (but still "ab-

normal”) bodies of college rowers and football players. The big muscles built by concentrated training, according to these analysts, were an evolutionary anachronism. In industrial societies, natural selection favored brain power; heavy muscular work was for “animals or the lower races.” Greater than usual bulk was thus a burden in the “race of life;” “piles of parasitic muscles” required “an undue amount of nourishment,” lowering bodily efficiency (and thus brain power), and making athletes into “physiological profligates.”<sup>24</sup> Clear evidence of that squandering of bodily reserve power was to be had in the incidence of death from infectious disease, which several observers claimed was notably higher for the muscular than for the average population. Tuberculosis particularly was laid to physiological poverty brought on by athletic indulgence.<sup>25</sup>

Lowered resistance to infection was but one, and a relatively minor one at that, of the injuries believed to be the wages of athleticism. Emphysema and other lung ailments were expected to occur as the respiratory rate and pulmonary blood flow surged beyond natural limits. The discovery of protein in the urine of athletes after they had competed (now accepted as a normal condition) was interpreted as evidence of sport-induced kidney damage.<sup>26</sup> Some physicians revived the ancient Greek association of athletic training with decreased libido. At a time when doctors were as worried as the public about the declining birthrate among Anglo-Saxon Stock—what Roosevelt sensationalized as “race suicide”—that revival was likely to be accomplished with a vengeance. The life records of America’s professional athletes, one commentator reported, demonstrated that “comparatively few athletes marry. Of those that do marry, a small percentage have children. A large percentage are divorced by their wives, and it is doubtless true that not a few completely lose the instinct of the normal man.”<sup>27</sup> A fellow physician disclosed that “the best athletes possess poorly developed sexual organs,” and rationalized this generalization with the argument that “severe athletic training and muscle building are at the expense of the nervous and glandular systems.” The same reasoning accounted for the “fact” that “many athletes are sexual perverts.”<sup>28</sup> And though the college sportsman might preserve his normal sexuality, his presumed higher mortality rate meant that he nevertheless participated in race suicide. “If we must have the excitement [of competition],” a medical editor insisted, “we can turn to other fields—the shortening of the life of a race horse, or of a game cock, or even of a professional pugilist need not concern us much.” It was racial stupidity to “impair the futures of our best of young men, the college graduates.”<sup>29</sup>

Even the relaxation from care and worry enjoyed by the recreational sportsman was denied to the competitor. Not only was the contest itself a nerve-grating struggle to win glory and avoid shame. The between-games anticipation of upcoming battles turned the entire season into a period of nervous turmoil for the athlete: “he can never remain at ease for a minute at a time, and

like the caged lion is forever on the move during his waking moments.”<sup>30</sup> The final payment exacted by this nervous taxation could actually be mental breakdown. “Our ancestors with fewer gymnasiums were a remarkably sane people,” a casual epidemiologist noted, “and we may ask ourselves the question if the great increase in insanity has anything to do with our present system of physical training. Asylums and hospitals are crowded and athleticism increases in proportion.”<sup>31</sup>

Such exaggerations of the effects of athleticism dramatize the uncomfortable situation in which doctors found themselves. Faced with an unprecedented mass athletics and armed with only the most rudimentary knowledge of the long term effects of repeated stressing of the heart, lungs, and nervous system, it was only natural for physicians to err on the side of safety and suspect danger where a later, more experienced and sophisticated generation would see invigoration. That tendency was reinforced by the ease of rationalizing pathology by the post hoc assumption that since a condition had no other obvious cause and it had appeared after the patient’s involvement in athletics, it must have been caused by the unnatural and peculiar strains of his sport. Doctors made uneasy by heavy or prolonged exercise were also quick to generalize from single incidents. “Pessimists,” McKenzie called them, “who argue from the early death of some hero of the gridiron or cinder path, that we are yearly sacrificing the flower of our youth to the molech of athleticism.”<sup>32</sup>

Of all the pathological artifacts offered in tribute to this “molech,” though, none even approached in frequency and severity the condition of “athlete’s heart.” The heart was the most obviously vital of organs, and the one whose functioning, in the form of accelerated beat, was most clearly affected by exercise. Heart attack victims were often stricken while engaged in exercise or work, and even though athletes completing a game or race were not experiencing cardiac failure, their appearance of pained breathlessness and exhaustion aroused an uneasy wonder in the spectator. This visceral fear of heart injury from overexertion was being strengthened by the end of the nineteenth century by the medical preoccupation with the rising incidence of heart disease. As infectious diseases were steadily brought under control, chronic degenerative ailments became more prominent. One of America’s most prominent cardiac experts, Alfred Stengel, began the new century with a warning that the rate of heart disease had climbed remarkably during the past fifty years.<sup>33</sup> Only ten years later, the editor of the country’s most prestigious medical journal despaired that, “Every year the death rate from cardiac disease is increasing, and unless something is done to check this it will become more of a menace than tuberculosis or acute respiratory diseases.”<sup>34</sup> Given this alarm over the new epidemic, it is not surprising to find so many physicians urging that, “The relations of violent muscular exertion to such diseases should be thoroughly understood.”<sup>35</sup>

The anti-athletic doctor's understanding of those relations was derived from seemingly pertinent observations. The heart of the trained athlete does present different clinical data than that of the "normal" person. The athletic heart is larger, beats less frequently, often exhibits murmurs and a diffuse impulse, and is sometimes subject to arrhythmias. Physicians are still warned not to misinterpret unusual radiographic and electrocardiographic findings in athletes as necessarily pathological. Appreciation that these "abnormalities" are physiological responses to training has developed only very recently, however. To most early twentieth century physicians, an enlarged and irregular heart with murmurs was a diseased heart, and athletes were thus easily diagnosed as casualties of their sport. To be fair, some probably were victimized by exercise: rheumatic fever was more common, and the fact that heart problems could also result from heavy exertion during other acute infections was not yet known by athletes. Cardiac damage could also occur in competitors with undiagnosed hypertension (a condition which was not commonly detected at the time).<sup>36</sup> Finally, athletes were already notorious for supplementing their competitive labors with less wholesome physical conquests. "No one will dispute," a proponent of athleticism acknowledged, that sportsmen often fell into immoral dissipation. If it was true that many athletes emulated John L. Sullivan, a man who made "continuous use of alcohol" and "was no less assiduous in his worship of Venus," then heart disease of syphilitic origin may well have been a common end to the sporting life.<sup>37</sup>

There were numerous other competitors, though, the large majority, whose hearts experienced only a physiological hypertrophy, but who were diagnosed as injured and used as tragic case histories of "athlete's heart." Benjamin Ward Richardson, a leading English sanitary reformer who nevertheless feared athletics required *excessive* exercise, was among the first to warn of the new condition. Already in the early 1870s, he "venture[d] to affirm there is not in England a trained professional athlete of the age of thirty-five, who has been ten years at his calling, who is not disabled." His damning generalization was based on a total of only seven former athletes who might "have lived to a vigorous old age under a system of exercise less lawless against nature and less suicidal." But what he lacked in statistical backing, Richardson more than made up with his compelling pathological rationale. Cardiac hypertrophy was the essence of athletic heart. "Undue muscular development" of the heart, he reasoned, must increase the pressure of the blood on vessel walls and cause steady degeneration of vascular tone and, consequently, lowering of overall vitality. The effects would become particularly noticeable in later years, Richardson believed, as the ex-athlete's body decreased in strength due to aging and cessation of training. The overdeveloped heart, though, he expected to remain strong, too strong for the body, "so that movement is laborious, breathless and even exhaustive."<sup>38</sup>

No doubt had he looked longer he could have found many more than seven

middle-aged men who had become laborious and breathless in movement since abandoning the athletic life. Other physicians did find similar cases of post-athletic decay, and quickly expanded Richardson's theory into a grand scheme of cardiac pathology. That scheme retained enlargement of the heart as the fundamental type of athletic injury. Heart size was determined (albeit not very reliably) by percussion and auscultation in most instances, and sometimes (after 1900) by X-ray examination of the cardiac shadow. When enlargement was found, it might be explained as either hypertrophy (actual growth of the muscular tissue of the heart) or dilatation (enlargement of the cavities of the heart, due to stretching of the muscular walls). The latter was the more ominous diagnosis, having been long recognized as a common product of heart disease and grounds for a most grave prognosis.<sup>39</sup> Dilatation was also expected to result from an overpowering of the heart by sudden and excessive demands for effort: "a disproportion between the work the heart has to do and its ability to do it." The disproportion might come from "a prolonged debauch," but could result more quickly from such superficially healthful activities as "a hasty run [or] a spurt on a bicycle."<sup>40</sup> All that was required was that the effort be "violent and sustained," comparable to the regimen of the London distance runner who died during the training season and was found to have ventricles which were "enormously dilated."<sup>41</sup>

The unfortunate runner's dilatation was discovered by autopsy and is not to be disputed. He was undoubtedly not the only case of undiagnosed heart disease who committed unwitting suicide with athletics. The regular implication in the medical reports of such cases, though, that dilatation was caused by athletic effort, made doctors unnecessarily jittery about exercise. That readiness to find fault with sport was intensified by the apparent belief of many that murmurs, bradycardia (lowered heart rate), diffuse cardiac impulse, and irregular beat invariably indicated dilatation and/or valvular dysfunction, and by the fact that diagnostic techniques could not always clearly distinguish between dilatation and hypertrophy. Athletic training normally causes a physiologic hypertrophy, which actually represents an improvement in cardiac function, but it is evident doctors often mistook hypertrophy for dilatation and diagnosed their athletic patients as cases of serious heart disease.<sup>42</sup>

It nevertheless appears that the athlete's heart was more often than not correctly recognized as hypertrophied, although that conclusion scarcely improved his outlook, for hypertrophy was also regarded as a necessarily pathological condition. It had been known, for some time, to be associated with such problems as persistent high blood pressure and valvular defects, and was regarded as being almost as threatening a sign as dilatation. The association of pathologic hypertrophy with exertion can be traced to J. M. Da Costa's studies of Union soldiers. As early as 1862 the pioneering cardiologist recognized a functional disorder of "irritable heart" which often affected soldiers with palpitations, tachycardia, and chest pain, as well as breathlessness and dizzi-

ness. Attributing the condition to the extreme physical demands of long military campaigns—particularly exhausting forced marches—Da Costa argued that the functional irritation eventually led to an organic injury: hypertrophy.<sup>43</sup> That pathologic progression was not to be substantiated by later investigations; still it was only during the early 1900s that it became clear that “irritable heart” or “soldier’s heart” was not a sign of impending structural injury. By that time, the idea that hypertrophy was an abnormality produced by excessive exercise had become securely seated in many physicians’ minds. As competitive athletics involved not only unusual physical efforts, but was also a form of war, or at least heroic struggle, it was inevitable that the concept of “soldier’s heart” would be enlarged to include “athlete’s heart.” Already an early reviewer had seen Da Costa’s work as timely primarily because of the burgeoning public fascination with athletics. “This excessive devotion to muscular acquirements is fraught with danger to the body,” he warned, and ended with the assertion that Da Costa’s real service had been to alert the public to the need to “avoid athletic excess.”<sup>44</sup>

Even after it became apparent that irritable heart was only a functional syndrome, not an organic disease, and occurred typically in frail and nervous people unable to cope with physical and psychic stress, the new name given the condition—“effort syndrome” (1918)—was hardly calculated to assuage fears of the cardiac effects of athletic effort. By 1940, the experts could agree that many cases of “athlete’s heart” had actually been victims of effort syndrome and had not suffered any permanent damage from sports, but that realization had only gradually dawned over the preceding three decades. Through the first third of the century at least, physicians could easily be led to suppose that athletic hypertrophy was pathological.<sup>45</sup> They could also easily formulate a rationale for the pathology. The blood pumped by an enlarged, more powerful heart must apply more pressure to arterial walls, it was reasoned, and that “constant hammering” must certainly shorten the life of the “vital rubber” in those walls. Arteriosclerosis was the consequence, though it might be accompanied or preceded by valvular disease (the enlarged heart’s valves were also hammered).<sup>46</sup>

Finally, even when the hypertrophy resulting from competition was recognized as physiological and of no immediate pathological import, it was still commonly supposed to be an eventual threat to health. That the bulging biceps of football players, blacksmiths, and other muscle workers shrank once the individual retired from his activity was a commonplace observation. Either because the muscular shrinkage was more noticeable than for the aging non-athlete, or because too many famous athletes turned to dissipation in their later years and thus dramatized their physical decline, it had become established opinion that muscle fibers built up by athletics suffered serious degeneration once training ceased. “The powerful muscles of the quondam athlete,” this conventional wisdom ran, “are turned into flabby, pendulous

lumps of tissue.”<sup>47</sup> Since the heart was also a muscle, the hypertrophied heart of the athlete would necessarily suffer a similar deterioration once his competitive days ended. “Fatty heart” was the cardiac counterpart to flabby, pendulous biceps. As the hypertrophied heart muscle fibers withered, without compensating growth of intermuscular fibers, the heart wall might be expected to weaken and undergo dilatation.<sup>48</sup>

Middle-age, it was generally agreed, was the critical time period for the manifestation of this postponed damage. An Illinois college president bemoaned the tragic ends of his varsity tennis players by relating that, “Many have died of heart disease between the ages of forty and forty-five, when they should have been at their best physically.”<sup>49</sup> Mr. C., a case reported by a New York physician, lived a bit longer, to age 52, but finally the heart he had enlarged through cycling turned on him after sedentary years as a bookkeeper. The weakened organ began demanding beer, then cigars, but in the end even these stimulants proved inadequate. Mr. C. was stricken with shortness of breath and angina while walking up only a moderate incline. “Diagnosis: Myocarditis [inflammation of cardiac muscle], dilated heart, arteriosclerosis.”<sup>50</sup> Most shocking demonstration of the inevitability of cardiac degeneration was given by William Blaikie, an exemplar of athleticism. Stroke on the Harvard crew in the mid-1860s, Blaikie turned to weight lifting after college and authored a highly popular volume entitled *How To Get Strong and How To Stay So* (1879). Blaikie remained active until his 60th year, but then became so involved in his law practice he gave up physical exercise altogether. At the age of 61, he was dead of a stroke, a cardiovascular complication of his failure to “keep up his heart muscle.”<sup>51</sup>

Critics of athleticism were at least willing to allow that keeping up the heart muscle would forestall degeneration and dilatation. They doubted, however, that that theoretical safeguard would have any significant impact on real athletic mortality. Only a small percentage of athletes, they believed, could be expected to continue vigorous exercising for any time beyond their college days, and a smaller percentage still would remain life-long athletes. Assuming that physical training was drudgery, they could scold that, “The penalty of early athletics is athletics all of one’s life;” in that view, the athletic life was a wearisome treadmill, and to step off was to risk early death.<sup>52</sup>

Most would step off anyway, it was believed, and sooner rather than later, for the treadmill was tedious, and the penalty for leaving it so remote in time. The remoteness of the penalty also doomed any efforts to discourage young men from seeking athletic glory and getting onto the treadmill in the first place: “What is invalidism or disability to one who has made a record, and how trivial seems the hypertrophied heart to the winner of the Olympic games.”<sup>53</sup> Athletes would be athletes, and doctors could only warn them of the consequences for later life, and hope that gradually they would pay heed. In the

meantime, it was imperative to stand vigil over young competitors and rescue any showing evidence of immediate injury from athletics by barring them from further participation in sports or any strenuous exercise.

One can only guess at the number of athletic careers ended prematurely, the amount of pleasurable and healthful recreation forbidden to people throughout their lives, the degree of hypochondria and anxiety suffered by athlete's heart "patients." The great Yale economist Irving Fisher, for example, was told in 1896 that he had strained his heart "by hill-climbing on the bicycle." The diagnosis "frightened me. I feared sudden death, and I feared to hear my heart beat on my pillow." Worry caused him to lose sleep for two years, to become run down, and thus contributed, he believed, to his eventual attack of tuberculosis.<sup>54</sup> Even if the patient's fear for his heart did not reduce him to consumption, the misdiagnosis was still an iatrogenic problem of serious proportions. It caused loss of invigorating exercise, worry, depression. How many repetitions were there, one must wonder, of the case of the man who was an athlete in college, but whose father feared he was overstraining himself and insisted he see a physician. The doctor diagnosed cardiac inflammation and demanded he give up athletics. The poor youth was made to squander two decades in fretful inactivity, with accompanying nervous symptoms, until at last finding a physician who was not a believer in athlete's heart. This doctor, in fact, put him on a program of slowly increasing exercise to treat his neurasthenia, until after about six weeks, "he suddenly remarked after quite a bit of lively exercise, 'By jove, for the first time in 20 years I forgot I had a heart while exercising.'" After continued improvement, "He often remarks, 'What would I have given to have been convinced of my condition ten years ago.'" <sup>55</sup>

What might many have given to have been spared the diagnosis of athlete's heart? Fortunately the above physician's skepticism was not an isolated attitude, but one shared by a respectable number of medical supporters of athleticism. Nor did the skeptics confine their denial of sport-induced heart disease to the salvaging of individual misdiagnosed patients. They aired their doubts before the profession, confronted critics with statistical studies indicating the healthfulness of competition, and challenged them to counter with something more solid than anecdote and hypothesis. Indeed, the repudiation of athlete's heart became a major element of the medical campaign to promote the athletic life.

That campaign was waged on several fields, corresponding to the particular sports which at different periods aroused the greatest anxiety among the anti-athletic forces. It actually began as a nautical struggle, for crew racing was the competition which initially forced the issue. Rowing was an especially taxing sport, and the first to generate intense intercollegiate rivalry. The annual University Boat Race between Oxford and Cambridge, especially, was the occa-

sion for extraordinary public excitement, “a kind of Derby day with the Londoners,”<sup>56</sup> a critic disparaged, attendant with drinking, gambling, and wild cheering among the thousands of spectators who lined the Thames. It was obvious to any reflecting person that the roaring of that frenzied crowd, coupled with the collegians’ immature notions of the cosmic significance of victory, might drive the young rowers to demand almost impossible, ultimately injurious effort from their still developing bodies. Though statements to that effect had been issued regularly since the inauguration of the race in 1829, they seem to have had no lasting effect until 1867. In the wake of that year’s contest followed a warning from the medical journal *Lancet* that dilatation and aneurysm were the frequent consequences of the race, and then F. C. Skey, a London surgeon, vented his disgust with this “national folly” on the editorial pages of the *Times*. The folly, in Skey’s eyes, was *competition*, the “death or victory” obsession which made the rower expend “every inch of power inherent in his muscular system.” Perhaps the majority survived that expenditure unscathed, Skey admitted, but a significant minority undoubtedly crawled exhausted from their boats with “a seed sown” in their cardiovascular systems, and with time the seed would become “a formidable tree.” For that reason, the English could take little pride in their abolition of animal-baiting and other cruel sports; the cruelest sport of all remained.<sup>57</sup>

Skey’s perfervid attack on a cherished institution drew stinging rebukes from retired rowers, but it also elicited a poignant confession from “The Father of a University Oarsman.” The correspondent had reluctantly granted his son permission to row in the contest, and the boy had been out of health ever since. Never again, the father vowed, would he give his consent to “the greatest folly and cruelty which has, probably, ever been perpetrated in the annals of athletics.”<sup>58</sup> The paper’s editor concluded the debate the day following with a summary which perfectly exemplified the ambivalence so many doctors of the next half century would feel about athletic competition. Racing might well have serious physical consequences, he agreed, but if so, they were as desirable as they were unfortunate; they were that element of risk, of adventure, which was vital to the life of a nation. The seeking of complete physical security, the editorial decided, was more deadly than the risk of exertion: “It is not by so niggardly an economy of nerves that noble races acquire or preserve their vigor.”<sup>59</sup>

The less impassioned opening paragraph of the editorial had more significance. There it was recognized that the question of the effects of rowing could be answered only by a thorough statistical evaluation of the long-term health of many men who had participated in the sport. John Edward Morgan, a Manchester physician, at once accepted the challenge, and produced a study which the champions of athleticism were to regard as the most authoritative analysis of the subject until well into the twentieth century. The favorable conclusions of *University Oars* might have been expected, for Morgan, captain of his crew

for three years at Oxford, was hardly a disinterested observer. The whole project, he announced in his introduction, had been “a labour of love” prompted “by a deep-rooted conviction that . . . we should not allow so manly and health-giving an exercise to be unjustly assailed.”<sup>60</sup>

Happily, there was no need for Morgan to doctor the statistics to make them support his deep-rooted conviction. Succeeding in locating all but 4 of the 255 survivors of the Cambridge and Oxford oarsmen for the period from 1829 through 1869, Morgan inquired into each man’s health and found the overall report to be most reassuring. True, one 41 year old gentleman lamented he was “quite obsolete from an hypertrophied heart (I believe),” and a few others attributed lesser ailments to their youthful exertions. Most, however, believed improved health to have been the product of their athletic careers. Thirty-nine additional oarsmen had died by 1869, but only three had been diagnosed as heart disease victims, half as many as had died in accidents. Both the heart disease and the pulmonary and total mortality rates were comparable to, or better than, the rates established for the general population. Similarly, calculations projected that surviving oarsmen might expect life spans significantly beyond the average. The University Boat Races, Morgan decided with no little satisfaction, did not destroy, or even weaken, its participants; in fact, the training it demanded actually strengthened the cardiovascular system and made it more efficient for later life. Final gratification was found in the fact that crewmen had gathered relatively more academic honors than their non-athletic classmen.<sup>61</sup>

Morgan’s conclusions (as well as most later surveys of athletic longevity) were weakened by being based on a relatively small number of subjects who enjoyed physical, economic, and educational advantages over the general population. One could argue that robust college graduates might be expected to live somewhat longer than ill-nourished and ignorant factory workers even if rowing did damage their hearts. The optimistic slant of *University Oars* nevertheless continued to rule subsequent examinations of the health of American college rowers. Within five years of the publication of Morgan’s book, a Dr. E. H. Bradford reported similar statistics regarding the health of men who had rowed for Harvard during the previous 25 years.<sup>62</sup> Bradford’s figures were derived entirely from correspondence, however; he did not personally examine any of his subjects. A far more thorough survey was conducted in 1903 by George Meylan, medical director of the gymnasium of Columbia University. Meylan secured extensive health data through personal examination as well as correspondence, from nearly all the men who had rowed for Harvard from 1852 through 1892. His findings were even more favorable to rowing than Morgan’s. Comparing his oarsmen to the typical healthy American male as defined in life insurance tables, he found the former to enjoy five years greater life expectancy per man. The rowers were, as a group, freer from disease (including heart affections), more robust and energetic, ruddier

in complexion, and more prolific as parents. They even had placed proportionately greater numbers of men in *Who's Who* than had college graduates as a whole, or even members of Phi Beta Kappa. The retired crewman discovered by Meylan bore little resemblance to the dull-witted, flabby, undersexed, weak-hearted ex-athlete of popular stereotype.<sup>63</sup>

The stereotype persisted nonetheless. As late as 1914 an unusually detailed report of the high frequency of cardiac lesions among athletes at the University of Wisconsin stirred that school's medical faculty to protest. Although the report had suggested damage from football, basketball, and track as well, rowing was the sport singled out for attention by the faculty. The resolution they adopted for transmission to the University Athletic Council warned that "the severe training deemed necessary for preparing crews for intercollegiate contests puts so severe a strain on the heart that an undue proportion of men are seriously injured and that, therefore, a continuation of inter-collegiate rowing is indefensible from the health standpoint."<sup>64</sup>

In the meantime, the suspicion of mischief from rowing had been extended to other sports. One of the most unsettling of these was long-distance bicycle racing, a new event which seemed to require unprecedented, nearly unimaginable effort. Medical commentary on the record-seeking exploits of competitive cyclists was filled with awe. Five hundred miles in twenty-four hours, grueling hill-climbing contests, the seemingly insane six-day races: these were "competitions that have never before been dreamed of in the history of the world." This shaking of the head in wonder was a motion immediately transmitted to the physician's finger, which he vigorously wagged at those young men who were "deliberately sacrificing their future health for the sake of winning a few prizes." The sheer enormity of the work accomplished by the racing cyclist's heart—estimated by Richardson to be 200 foot tons in a 24 hour competition—forced amazed doctors to *assume* the organ must be damaged; that it could escape unharmed, Richardson submitted, "is not, as it *seems* to me, within the range of possibility."<sup>65</sup>

The dilatation, hypertrophy, valvular disease, and functional derangement laid to cycling were not reserved for its competitive form exclusively. The bicycle was perceived as a unique sports threat, for it had proved itself so enjoyable as to inspire mass participation at high levels of exertion. The recreational cycling of many, in fact, seemed as strenuous as competitive activity in other sports. Too many wheelmen (and women!) strove to complete "century runs" (non-stop rides of 100 miles), struggled to ride against strong head winds, and pedalled up sharp grades instead of walking. And some cyclists were positively contemptuous of overstrain. The popular magazine *Wheeling*, ignoring the bicycle as a *cause* of heart disease, advocated its use for the diagnosis of *weak* heart:

The cyclist who has doubts as to the strength of his heart may easily put the matter to the test by

riding up a steep hill as far as possible, and if there is any heart weakness a sharp pain will strike him in the back, between the shoulders. If the pain does not appear, the cyclist may take it that his heart is practically sound.<sup>66</sup>

There was little cause for wonder, then, at the frequency of reports of sudden death among riders during, or shortly after, cycling outings. The greater concern, however, remained for the chronic effects of the activity, and physicians discovering hypertrophy in devotees of the wheel were quick to diagnose “bicycle heart.” Men were actually rejected from military service because they were found to be victims of the complaint!<sup>67</sup> That such spurious disabilities were largely the inventions of overprotective physicians personally uncomfortable with athletic endeavor is suggested by the naive limits commonly set on activity. A British heart specialist, for instance, concluded his discussion of cycling as a cause of heart disease with the urgent advice that, “*On no account should the cyclist continue riding after he has commenced to feel short of breath.*”<sup>68</sup> A more sophisticated doctor at once objected that were that rule observed, “no athletic exercise could be practised,” but his common-sense wisdom was lost on many colleagues.<sup>69</sup>

The epidemic of bicycle heart nevertheless subsided, as the cycling craze itself faded after the late 1890s. It was replaced by the presumption of heart disease from distance running, a sport in which shortness of breath was even more prevalent. Distance running had actually been suspect as long as rowing, but it remained in the latter sport’s shadows until the institution of the marathon race. That exceptional test of endurance was adopted as the finale to the Olympic Games when they were revived in 1896. The romantic recreation of the feat of the legendary Pheidippides, the soldier who in 490 BC supposedly ran the forty kilometers from Marathon to Athens to herald the Greek defeat of the Persians—then fell dead from exhaustion—immediately captured the fancy of the sports-minded public. The first American running of the race followed within months, the weary winner being greeted by a “crowd . . . howling itself hoarse.” “Women . . . waved their handkerchiefs and fairly screamed with excitement . . . There was a pandemonium of joy.”<sup>70</sup>

There was also a pandemonium of medical apprehension, particularly after the Boston Athletic Association (several members of which had competed in the first Olympic marathon) instituted its annual race in 1897. As the *Journal of the American Medical Association* stated so bluntly, that heart damage must be a common result of marathoning was “unquestionable.”<sup>71</sup> Still no attempt to actually measure the unquestionable cardiac effects of the Boston Marathon was made until its third running, in 1899. Two Tufts Medical School faculty members examined nearly all of the fourteen men who completed the course, both before and after, to determine their pulse rates, heart sizes, and heart sounds. Most were found to have hypertrophy and, after the race, murmurs, but the physicians were unperturbed. The hypertrophy they recognized as physiological, and the murmurs as temporary manifestations of

cardiac fatigue. They doubted any lasting damage had been done, and concluded the contest had been “far less injurious than other practices indulged in by exuberant young men.” (In fact, they identified only a single casualty—a member of the ambulance corps which accompanied the runners, whose bicycle collided with a dog.)<sup>72</sup>

Quite similar studies were made on marathon contestants over the next three years, and similar findings recorded. A lengthy summary of these observations, published in 1903, concluded all enlargement and murmurs were physiological and that there was no evidence of permanent injury. In this instance, blistered feet comprised the most serious type of injury.<sup>73</sup>

There was nonetheless a definite degree of uncertainty in such interpretations. The authors of both Boston marathon investigations admitted they could not be sure the “abnormalities” they found were only the passing effects of severe exertion. There was room for subjectivity in this still nebulous realm of athletic cardiology, and doctors with less favorable opinions of exercise could draw very different, darker conclusions. Such a reaction became especially likely after 1908. The triumph of Johnnie Hayes, the first American to win the Olympic marathon, fired a national passion for the race akin to (though less intense than) the marathoning enthusiasm which followed Frank Shorter’s 1972 victory. The sudden increase in the number of contestants and races, and especially the eagerness of still teenaged boys to join in this epic competition, brought significantly sharper medical attention to bear on the marathon. For many physicians, the sight was most unsettling, the cases of extreme exhaustion, delirium, and collapse triggering an emotional judgment that that suffering “is testimony enough that such races menace athletes.” “The death of the first marathon runner as he announced a great victory,” this Jeremiah went on to decree, “should have been an object lesson for all time.”<sup>74</sup>

More sober evaluations of marathoning, however, continued to belie such charges. The most thorough of all marathon medical surveys was conducted during the race’s peak period of popularity, in 1909. A team of Pittsburgh physicians headed by Watson Savage, Physical Director of the Pittsburgh Athletic Association and former president of the American Association for the Advancement of Physical Education, actually organized the Pittsburgh Marathon that year as an experimental test of the effects of extreme exertion. All 55 entrants were required to submit forms detailing medical history, physical measurements, training and eating habits, use of alcohol and tobacco, even the weight of their running clothes. Savage and his coworkers also performed examinations of heart size and sounds, pulse, and blood pressure, as well as of temperature and urine, before and after the race. The contest was run over a very hilly course, in hot weather punctuated with heavy rain showers, and nearly half the entrants failed to finish. But despite the examples of extraordinary physical depletion, Savage could find no conclusive evidence of perma-

nent injury. He recommended prolonged training prior to attempting the distance, and advised those under 20 and over 40 to abstain from so strenuous an endeavor, but stopped well short of describing the race as a menace. A colleague in the study published separate articles which took a slightly dimmer view, suggesting that in some cases pathological conditions had developed. Even he acknowledged, though, that most returned to normal more or less quickly after the competition, and would venture nothing more than "it may be" that some would suffer permanent injury.<sup>75</sup>

Comparable inconclusiveness reigned in the discussion of the medical effects of running shorter races; cries of "(permanent injury to the heart" from distances in excess of one mile met retorts that cross-country and track races were the most beneficial components of a schoolboy's physical (and moral) education.<sup>76</sup> Exactly the same debate was waged over all other popular, strenuous sports. Football, for example, was a "wolf in sheep's clothing" to some;<sup>77</sup> to others it was "the 'goat' of all the sports," the one automatically blamed whenever any mishap befell a participant. "If he dies of heart disease or acute indigestion," a pro-football physician moaned, "If a player is killed in a railroad wreck; . . . if he dies during the football season, football did it."<sup>78</sup> In other instances it was basketball which did it, or even baseball!<sup>79</sup>

The opponents of athleticism displayed, ironically, impressive endurance and competitive drive, continuing to make a contest of the athlete's heart issue into the 1910s. Their final shot at victory came under the leadership of Charles Stokes, Surgeon General of the United States Navy. His 1911 report on the long-term effects of athleticism on midshipmen at the Naval Academy bristled with disdain for competition. His charge that the training required to allow a young man to excel in sports caused degenerative physical changes was backed by his inquiry revealing nearly a third of the Academy athletes of the past two decades to be suffering "disabilities or abnormal conditions." Fully one-quarter of the disabled were afflicted with heart ailments ranging from murmurs to dilatation. The production of "winning teams," he concluded, was not in "the best interests of the Navy."<sup>80</sup>

The anti-athletic forces rallied behind the Surgeon-General's call, but only, as it turned out, to make their last stand. Their praise of his report, though loud, lacked substance and was easily overcome by the advocates of athleticism. Some critics proposed that it was actually post-Academy ship life, with its lack of opportunity for continued athletics and its boredom that drove men to drink and venery, which was responsible for the distressing statistics. There were others who denied that the statistics were distressing, who calculated that Stokes' ex-athletes still suffered only one-third the mortality rate of all midshipmen during that same recent period, and pronounced the report "entirely devoid" of solid support for his opinions.<sup>81</sup> McKenzie, finally, went beyond the limited question of Naval Academy athletics and seized the Stokes

controversy as an opportunity to dismantle the concept of athlete's heart from any source. "The hour has arrived," he proclaimed in 1912, "for a complete reconsideration of the whole question of exercise in relation to the heart."<sup>82</sup> His review of the evidence that cardiac hypertrophy and irregularities of sound and beat were variations within the normal rather than signs of pathology was buttressed by a report of his own examinations of University of Pennsylvania students, and a recitation of others' careful studies of athletic mortality. The latter included not only those analyses of specific sports discussed above, but also surveys of more diverse athletic populations. Such, for instance, was the study of William Anderson, the physician-physical educator who directed the Yale Gymnasium. Anderson determined the mortality rate for Yale participants in crew, football, baseball, and track for the half century from 1855 to 1905, and found that the man who "won the 'Y' . . . does not die young nor is heart disease a leading cause of death."<sup>83</sup> The weight of McKenzie's meticulously organized case was such as to force anti-athletic physicians to yield ground. They did so grudgingly, but over the course of the next quarter century, as maturing cardiology reinforced McKenzie's position, "athlete's heart" gradually became a medical curiosity.

But McKenzie's argument had not stopped at the denial of cardiac injury from sports. He had, in fact, by maintaining that "the heart needs constant and varied movement for its proper development,"<sup>84</sup> identified the athletic heart as the ideal. To a degree, his views were prophetic of the meaning "athletic heart" would acquire during the second half of the twentieth century. Not only would exercise be exonerated of causing heart disease, it would win increasing respect as a means of improving the heart. The "Athletic Heart Syndrome" would be redefined as a desirable condition, the athletic, hypertrophied heart extolled as "a functionally superior pump rather than a liability."<sup>85</sup>

Such a definition holds obvious implications for preventive medicine, and the more sanguine interpreters have envisioned a holistic future in which "society will start thinking of 'mileage' instead of 'medication, [and] the annual physical will be replaced by a quarterly 42-km. hike." That "hike," of course, is the marathon, the ultimate test of cardiac endurance. The race had seemed unquestionably dangerous in the early 1900s but 70 years later, as a second wave of marathon mania swept the country, the grueling training regimen required to prepare for that distance was actually presented as the surest method to achieve *immunity* to heart disease. The representatives of the American Medical Joggers Association who offered that guarantee also endorsed participation in the marathon as a program of rehabilitation for men recovering from heart attacks! Such promises and programs have struck more than a few physicians as extreme, and have been subjected to criticism, yet the revival of the controversy over athlete's heart can provide little satisfaction to the shades of the first generation of anti-athletic doctors. The fact that the question now at

issue is the superiority, rather than inferiority, of that heart is a rather conclusive indication of the outcome of that first debate.<sup>86</sup>

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