DO NOT CHANGE
The Arrangement of Items In
This Folder
Head, Shoulders, Knees, and Toes:
The Origins of Posture Photographs at Wellesley College, 1875-1942

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Fig. 111: A. Correct standing position. Head up, chin in, ribs up, pelvis nearly horizontal, back almost flat. B. Incorrect standing position. Chin out, ribs down, increased cervicodorsal and lumbar curves. Pelvis tipped forward.

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Introduction

In January 1995, a cover story appeared in the *New York Times Sunday Magazine* claiming that the Ivy League schools had for several years allowed William H. Sheldon, an anthropologist and eugenicist, to use posture photographs taken of their students in order to further his work linking body type to character and success and failure. Wellesley was one of the colleges mentioned in the article—indeed, the photographs on the magazine cover included college portraits of Wellesley graduates Hillary Rodham Clinton, Nora Ephron, and Diane Sawyer.

Rosenbaum's story was essentially this: "An unsuspecting employee of Yale University" accidentally ran across thousands of nude photographs of students taken from front, back, and side angles. In the side-angle photos, the students appeared to have pins sticking out of their backs "like the record of a bizarre body-piercing ritual" or "a kind of kinky voodoo ritual." The employee was "mystified," as was the athletic director; but when the athletic director "found out what they were," he had all the photographs professionally shredded and burned by a "document-disposal expert." Despite this careful disposal, Rosenbaum wrote ominously, "thousands upon thousands" of such photographs of nude students "survive to this day."1 The rest of the article, written in similar language, follows Rosenbaum as he tracked down the story behind the photographs. A Yale graduate, he himself

had stripped down, had the metal spikes taped to his spine, and then been photographed during freshman orientation week in the mid-1960s. For him, the story carries some of the weight of a personal quest.

Rosenbaum discovered that posture photographs had been taken for many years at the Ivy League and Seven Sisters schools. After a public squabble between Dick Cavett and Naomi Wolf, both of whom had had posture photos taken, a Yale art history professor wrote to the *Times* claiming that the photographs actually "had nothing to do with posture" but were a cover for the misguided anthropological research of W. H. Sheldon of Columbia University, who thought that body type, or somatotype, corresponded with moral and intellectual characteristics. As Rosenbaum explains:

While the popular conception of Sheldonism has it that he divided human beings into three types—skinny, nervous "ectomorphs"; fat and jolly "endomorphs"; confident, buffed "mesomorphs"—what he actually did was somewhat more complex. He believed that every individual harbored within him different degrees of *each* of the three character components. By using body measurements and ratios derived from nude photographs, Sheldon believed he could assign every individual a three-digit number representing the three components, components that Sheldon believed were inborn—genetic—and remained unwavering determinants of character regardless of transitory weight change. In other words, physique equals destiny.²

The "real" purpose of the photographs, according to the art history professor, was to guide a eugenic program that would encourage Ivy Leaguers to breed with Seven Sisters graduates in order to produce a master race.³ So,

² Rosenbaum, p. 31.
³ Rosenbaum, p. 30.
Rosenbaum wondered, what exactly was the relationship between the posture photographs taken at these elite schools and the research of Sheldon and other eugenicists, such as the physical anthropologist Ernest Hooton of Harvard? Were the schools being used, unknown to their administrators, or were the administrators and the eugenicist anthropologists in cahoots? Were there more photographs, and if so, where were they?

Rosenbaum's sleuthing took him to the Smithsonian's National Anthropological Archives, where thousands of photographs remain. A co-worker and follower of Sheldon's whom Rosenbaum tracked down, Ellery Lanier, confirmed that the posture program had been only a cover for Sheldon's work, and that the schools may have been unaware of this. Another Sheldon colleague, Roland Elderkin, agreed. Sheldon was enough a part of the mainstream in the 1940s and 1950s that he was able to gain access to the posture photo programs at elite schools, but in 1950, parents of students at the University of Washington, shocked by their daughters' stories of having nude photographs taken at school complained to the university. The program was summarily shut down and the photographs burned. After this point, Sheldon was slowly forced out of the business. Many other schools burned their photographs, but some survived. Posture photograph programs closed down completely during the 1960s and 1970s.

It is an interesting story that raised many questions about ethics, eugenics, scientific racism, and the role of the university in all these. It also raised questions about Wellesley College, because, as Rosenbaum put it, "it was at Wellesley College in the late 1920's that concern about postural correctness metamorphosed into a cottage industry with pretensions to science. The department of hygiene circulated training films about posture measurement to other women's colleges, which took up the practice, as did
some 'progressive' high schools and elementary schools. . . . Although Lanier assumes that Sheldon took the [Hillary] Rodham [Clinton] photo, Wellesley archivists believe that Sheldon didn’t take posture photos at their school."4 The whole story therefore is of consequence to Wellesley College. Had Wellesley actually led other schools into using such a disreputable and pseudo-scientific program? Had Wellesley been actively involved in using posture to promote eugenics?

The college archivist, Wilma Slaight, looked into the records to see what the story was. There was plenty of material on the photos themselves—no surprise, since their existence had never been a secret. But Ms. Slaight found no records of contact with Sheldon, and the Smithsonian assured the College that they had no posture photographs of Wellesley students. The Smithsonian also had a letter from Wellesley declining to take part in Sheldon’s research. Thus reassured, Ms. Slaight wrote up a brief fact sheet for the Public Information office so the office could handle questions from callers responding to the New York Times article.5

The question of Sheldon’s misuse (or non-use) of Wellesley’s photographs was answered, but another remained in its place. What was going on? What had the hygiene department at Wellesley thought it was doing? What was it about posture that moved well-established college institutions (and, it turns out, public elementary and high schools) to have their students strip down for nude photographs as part of a regular physical examination? The answers turn out to be less sinister, more complex, and more interesting than Rosenbaum’s exposé suggested. Through the obsession with posture can be seen medical and cultural links from the last

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4 Rosenbaum, p. 40.
quarter of the nineteenth century carrying on through the early and mid-
twentieth century: links to ideas about women's health, especially
menstruation, childbearing and childrearing; about the effects of education
upon women in the light of their health; about American health in general;
ideas about immigrants and thus an interest in eugenics; and links to the
early movement for public health in the United States. Most important to
this study is the connection between orthopedics and the professionalization
of physical education. I argue in the following pages that the posture
photographs arose from the field of physical education's need to establish its
credibility in the face of academic and bureaucratic distrust. To do so, they
found an ally in orthopedics. In the alliance with this medical field, physical
educators took on the attributes of science as they saw them—measuring,
quantifying, creating numbers, dealing with nude bodies—to solve a medical
problem: scoliosis, a curvature of the spine. For over a decade, they engaged
in a fruitless chase after reliable ways to measure posture and to correct
postural defects through exercise, ultimately failing.

The chapters examine the posture program at Wellesley College from
the founding of the school in 1875 through the period of its greatest activity
during the second half of the 1920s and the 1930s. Chapter 1 gives some basic
background on American ideas about health during the last quarter of the
nineteenth century, when the obsession with posture first seized the
American imagination. Chapter 2 provides background on the Boston
Normal School of Gymnastics (BNSG)—a physical education school founded
by a Boston philanthropist named Mary Hemenway in the late 1880s—its
merger with Wellesley College in 1909, and the years up to the beginning of
the posture photograph program in 1926. The chapter also looks at ideals of
health and physical education at Wellesley through the process of the
physical examination, and touches briefly on posture ideology as an attempt at social control. Chapter 3 provides a detailed look at the study of human body measurement and the machinery designed for measuring posture during this period. During the same period, physical education linked itself to advances in orthopedics and a growing public health movement, the topic of Chapter 4. Physical educators saw health education as part of their mission; the needs of orthopedists in the service of public health provided an avenue through which physical educators could do good and at the same time give much-needed ballast to their profession's reputation.

It is important to state at this point that I am not saying categorically that eugenics played no role at all in Wellesley's posture program. Although I have not yet found solid evidence, there are indications here and there that some faculty members were connected in some manner with the Race Betterment Society, for example, although nothing yet shows deep involvement—which again is not to say that there was none: A note in a department file suggests that the name "physical education" was awkward, akin to saying "history education" or "geography education," and that a better name would be eusomatics, thus making a triangle of Eusomatics, Euthenics, and Eugenics. The national publications of the American Physical Education Association, when they acknowledged race at all, show a racism that, while not directly connected to eugenics, was blatant.

None of this appears to have had a direct effect on the posture program at Wellesley; some when taken alone are probably innocuous. But taken together the pattern points to more intimate connections between posture and eugenics. The subject deserves a more thorough search than I have been able to accomplish in the course of a single school year. However, I believe

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6 WCA: Department: History, General: 1882-1946, paper dated June or July 1920(?).
that it was necessary to establish a clear lineage for the origins of the posture photographs as a specific artifact. Eugenics is not the "real" reason for the posture photographs. The larger story is more complex and, despite its blundering, has a more humane side.
The Desire for Health

Posture photographs were taken at Wellesley College between 1926 and 1969, but posture was already a concern at Wellesley and elsewhere before the photographic technique was used as an aid to diagnosis of postural problems. The first question that comes to mind is, why? What did physical educators in the late nineteenth and early twentieth centuries see and believe that led them to focus enormous energy and attention on posture as a problem that must be solved? In this chapter, I will show how immigration around the turn of the century increased Americans' anxiety over a perceived decline in their health, notions that were supported in part by the selective use of body measurements to show evidence of "race mixing." In addition, I touch briefly on the effect of higher education for women as a health issue.

The concern for posture seems to have sprung from several sources. One was the late-nineteenth century notion that the current American generation was weaker than former generations. Urbanization was rendering children flabby and their parents were either overwhelmed by poor working conditions or simply not getting the exercise their own parents ostensibly had had back on the farm. Physical educators sought to reverse this physical decline by establishing hygiene and physical training courses of various sorts in the public school system across the nation. Whereas only a few states had

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in the public school system across the nation. Whereas only a few states had mandated physical education in public schools at the turn of the century, between 1914 and 1931 most other states added requirements of their own.\(^2\) Massachusetts passed a bill in 1917 instituting compulsory physical education in elementary schools and stipulating that one of the three positions in each school be held by a woman;\(^3\) attention to male-female differences was prominent in physical education early on. City officials built parks and playgrounds when they became convinced of the health and social benefits of providing places for children to run and play. In addition, percolating through American society were more general ideals of perfect health and what the perfectly healthy body should look like, carried along on a wave of health-reform and back-to-the-land movements. Erect posture was part of this ideal.

Posture is a potent symbol that can encompass many meanings, often deeply embedded in the English language. A despicable or pitiful person is spineless, headed for a downfall, on his knees. A woman does not want to date a man whose knuckles scrape the ground. Hardship and worry produce a bent-over back. Someone really awful is not even vertical, but slithers on her belly like a snake. A good and admirable person is upstanding, outstanding, upright, stands on her own two feet, has backbone, is no slouch. To stand upright is to be moral. To take a posture is to assert one's self. To take a stand is to represent finer human values. Such imagery was not lost on Americans during the period under study here, roughly 1875 to 1940.

The obsession with posture was not purely an American one, for Europeans also had physical training programs that emphasized vitality and

included erect posture as part of ideal health.\textsuperscript{4} Erect posture is one of the defining characteristics of our humanity, as the name \textit{homo erectus} shows. Physical anthropologists studying human evolution had started to make comparisons with apes, and Europeans and Americans in the last quarter of the nineteenth and early decades of the twentieth centuries seem to have been drawn to posture as an ideal because it differentiated humans from such relatives. The notion of descent from apes appalled many Victorians, and even the Scopes trial was as late as the 1920s.

The positive attributes accorded to upright posture adhered social meanings to postural ideals. Progressives used the imagery to associate physical education with democratic values. "The ultimate objectives of all education of this century are worthy living and democratic citizenship, or self-realization and social realization. Control is fundamental to these, self control, personality or personal power; control of environment or economic efficiency; control of people or leadership," wrote Helen McKinstry in a 1920-21 publication for Wellesley College alumnae. "To secure any great degree of control, such as the foregoing, one must have courage and initiative, poise, health, strength, vitality and endurance, coordination (neural and muscular), cooperation and adaptability."\textsuperscript{5}

If vitality was a prerequisite for democracy, the United States was in trouble. Americans were distressed when thirty percent of recruits to their army for World War I were turned away because they were not healthy enough. This challenged physical educators' claims to usefulness: If they were not making people healthier and sturdier, what were they doing? "Practically every one of the Springfield boys has gone through our schools,"

\textsuperscript{4} Professor Jonathan Knudsen, personal communication.
lamented a teacher in Springfield, Massachusetts, after the war. "We, as teachers, have had a big opportunity and missed it. Let's not miss it any longer!" Physical educators would have to redouble their efforts to strengthen the American citizenry. Paradoxically, despite their failure to prepare a generation of young men for combat, the failure of recruits in World War I gave a boost to the perceived need for physical education, and the market for physical education teachers in the schools boomed.

Immigration and Anthropometry

The need for social control held great appeal for a population in the midst of change. Many educators and politicians believed that the great wave of European immigration at the turn of the century threatened to overwhelm the "native American stock" (citizens of European extraction born in the United States) if this "native" stock did not shape up. Statisticians' reports bolstered such fears. The eugenics movement stirred public opinion against immigrants on the grounds that the current flood would dilute the so-called Old American Stock (mostly Anglo-Saxons, also Germans, Dutch, and Scandinavians) and produce an inferior "stock." In their Applied Eugenics, editor-eugenicists Paul Popenoe and Roswell Johnson claimed not to be anti-immigrant; their own forebears had been immigrants, too. But the founders of the American colonies had been brave Nordic pioneers, they wrote, and later pre-Civil War immigrants "belonged mostly to the same stock, and

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6 WCA: Grace (Withum) Baxter, "No Child with a Remedial Handicap." Bulletin 1920-21, p. 3.
8 Lears, p. 29.
therefore mixed with the early settlers without much difficulty";10 Popenoe and Johnson referred here not to only cultural, but also to genetic mixing. The new immigrants were "principally the Mediterranean and Alpine," bringing the threat of so-called cross-breeding that would damage "the race." Worse, the new immigrants were not the adventurous spirits who had conquered America, but the dregs of Europe, peasants without imagination or initiative who included a higher than usual proportion of what Popenoe and Johnson called "the 'three D's'—defectives, delinquents and dependents."11 The Immigration Commission did its best to weed out the worst, but potential criminals and public charges were sure to get through.12

Eugenicists conceded that most immigrants were not criminals, only "vigorous, industrious, ignorant peasants" who would be fine if they would stay at home, but should not come here to settle. The results of inevitable "race mixing" would include not only a less attractive and smaller people, but a concomitant fall-off in morality, lessened intelligence and overall ability, and "an increase in gross fecundity."13 As Popenoe and Johnson concluded, "The direct biological result to be expected from the assimilation of such newcomers is the swamping of the best characteristics of the old American stock, and a diminution of the average of intelligence of the whole country."14

In his study of turn-of-the-century antimodernism, No Place of Grace: Antimodernism and the Transformation of American Culture, 1880-1920, T. Jackson Lears points out that "respected statisticians like Frances A. Walker

10 Popenoe and Johnson, p. 301.
11 Popenoe and Johnson, p. 301.
12 Popenoe and Johnson, p. 302.
13 Popenoe and Johnson, p. 301.
14 Popenoe and Johnson, p. 304.
and Frederick L. Hoffmann" shared fears of immigrants, and "restrictionists like Henry Cabot Lodge insisted that the newer Latin and Slavic immigrants, unlike their Nordic predecessors, were biologically unassimilable to American life."\textsuperscript{15} Theodore Roosevelt worried about Anglo-Saxon "race suicide" through its failure to procreate.\textsuperscript{16} Some studies could be construed to support the notion that Americans were deteriorating physically due to so-called race mixing. A study published in the \textit{American Journal of Anatomy} in 1931 used military data to show that American males of that time were about a half inch shorter than American males from the period between the Civil War and World War I, "probably as a result of extensive immigration by short races during this period."\textsuperscript{17}

It is important to be clear that physical education in itself was not eugenics, and its practitioners were not necessarily eugenicists. In turn, eugenics is not necessarily racist. Couples use eugenic ideas, for example, when they choose not to bear children because their genetic make-up indicates a likelihood that a child would suffer severe deformity or a life-threatening condition. But it is equally important to be clear that the body measurements and assessments used by physical educators, including posture photographs, were also used by some physical anthropologists, physicians, immigration officials, and others who had a racist agenda.

Anthropometry was the science of measuring the human body, generally of the length, girth, depth, breadth, and strength of limbs and muscles. The Boston Normal School of Gymnastics and Wellesley College, even before the merger described in Chapter 2, used anthropometric

\textsuperscript{15} Lears, p. 30.  
\textsuperscript{16} Lears, p. 30.  
\textsuperscript{17} D. C. MacKinnen and C. M. Jackson, "Changes in the Physical Measurements of the Male Students at the University of Minnesota during the Last 30 Years." \textit{American Journal of Anatomy} 47, No. 2 (Jan.-Mar. 1931), p. 412.
measurements in the physical examination of students because they were thought to indicate something about the vigor of the individual. Dr. Clelia Duel Mosher, who will be introduced more fully in the next section, objected to their use on women because she thought that the emphasis on the size of muscles made anthropometric measurements more useful for men.

Gymnastics often had anthropometric ends in view. Different systems of gymnastics had been developed during the nineteenth century, often with nationalistic impetus behind them. In many cases such gymnastics were intended to build muscle symmetrically; a man would lift weights in order to be strong and to produce equal measurements of his biceps.  

We use anthropometric measurements today when our physicians (or fitness trainers) take our height and weight. In the nineteenth and early twentieth centuries, orthopedists, physical anthropologists, and physical educators used anthropometric measurements to assess the physical state of individuals and to collect data for statistics on the human body. In the country's first physical education program, at Amherst College, Dr. Edward Hitchcock made anthropometric measurements for over twenty years. He believed that "the stature of man is influenced by climate, occupation, surrounding circumstances, etc.: races having their own distinctive characteristics. Likewise, different classes in the same race are distinguished from each other but not in so marked a degree." Many people likewise

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18 A fascinatingly opinionated dissection of German, Swedish, French, and English gymnastics is given in Luther Halsey Gulick, Physical Education by Muscular Exercise. Philadelphia: P. Blakiston's Son & Co., 1904.


20 WCA: Anthropometry: Measurements: (1894-1895): Edward Hitchcock, "The Average Anthropometric Table used in recording an examination, Wellesley College Gymnasium" and "A Comparative Study of the Average Measurements: Amherst, Mt. Holyoke, and Wellesley Colleges." This brief work consists mostly of a table of fifty body dimensions, ranging from girth of the biceps to the breadth of the nipples.
believed that there was some connection between body measurements and character traits, even moral traits. At the Boston Normal School of Gymnastics, it was taught by the dean of the Harvard Medical School. Anthropometry remained a part of the Wellesley curriculum in the Department of Hygiene and Physical Education for many years. As I will recount in Chapter 4, such measurements were eventually found to be virtually useless and were succeeded by orthopedic measurements and measurements of strength, endurance, heart rate, and the like.

The Neurasthenic Syndrome and Women's Health
Available historical records are inadequate to gauge how healthy or unhealthy Americans really were, but there is no doubt that there was a wide perception of illness during the period in question—not necessarily one's own, but at least the illness of others around one. As Lears has pointed out, the perception itself is worth historians' attention. In the late nineteenth and early twentieth centuries, doctors and social commentators considered that a condition called neurasthenia was running rampant. The term was coined by George Miller Beard, a neurologist. In his *American Nervousness* (1880), Beard used the term to cover a multitude of symptoms that today would be called either stress or neurosis, various ailments that added up to "a paralysis of the will." In 1908, a writer noted in the *North American Review*, "On every street, at every corner, we meet the neurasthenics."

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22 Lears, pp. 50-51.
23 Lears, p. 51.
24 Quoted in Lears, p. 50.
Characterized by self-absorption, weakness, worry, and suffering, neurasthenia lingered on from the nineteenth century up to World War I. It was associated with the middle class, frequently (but certainly not exclusively) the women, whom critics thought could afford to malinger. The image of the well-dressed but distressingly weak and limp woman reclining wearily on the sofa is the stereotype of the neurasthenic. Lacking clinical definition, the term could be vaguely applied to the women who were overburdened with problems as well as to the pampered and bored, to the seriously depressed as well as to dissatisfied middle-class women who had no apparent reason for unhappiness or lack of "vigor." The "nervousness" even infected young girls. In 1910, Margaret Slattery wrote of a class of eighth-grade girls where forty-one of fifty were "nervous," according to their mothers. This Slattery blamed on too much stimulation, "going out," and preoccupation with social life. In other words, the neurasthenic condition was a failure of moral backbone. Perhaps female ill health had to do with feminine mishandling of freedom. The remedy was fresh air, regular habits, plenty of sleep, and an even-tempered approach to life that would produce vitality in these young girls. Their improved condition would surely show up in their superior posture.

Whatever the source of their imperfect health, women had an obligation to become well. Even childless working women could not shirk their obligations to their employers, while the majority, those women with children, had to make homes for their families. Women's obligations transcended personal satisfaction: in the words of a 1900 graduate of the

Boston Normal School of Gymnastics, Helen McKinstry, a mother must also "increase and not decrease the strength and vitality and virility of her family, her nation and the race."27

In 1855, a time when only a few women's colleges had appeared in the United States, Catharine Beecher was a champion for women's health. She thought that the women of her day were "feeble" than the women of the previous generation, "so that most of our young girls have started in life with a more delicate organization than their mothers."28 Based on a survey of self-reports of her friends, and each of those same friends' opinions of the health of ten other friends, Beecher proclaimed that most American women were not in good health. In fact, they were so accustomed to ill health that they had to be prodded into remembering to report aches, pains, and weariness. Such nuisances pervaded their lives to such a degree that they were simply considered normal.

Women's health in relation to their educability was the focus of passionate debate during the nineteenth century, especially during the last half, when many women's colleges were founded. Beecher's survey showed that health complaints sometimes held girls back from education: "As soon as my little girl begins school she has the headache," Beecher cited one mother as saying; another said, "I sent my daughter to such a boarding-school, but had to take her away on account of her health."29 Whether the girls were trying to avoid school or if they were suffering actual ill health is not clear, but it is clear that ill health was considered a viable reason to withdraw a girl from her education. Or was all that brain work simply making the girls sick? Many Victorian doctors, educators, and other

27 McKinstry, Bulletin 1916-1917, p. 27.
28 Catharine Beecher in Nancy Cott, p. 266.
29 Beecher in Cott, p. 266.
influential people thought so, and it was Wellesley's explicit mission to prove them wrong.

Concern for women's health could come from sympathy for women, as in the case of Catharine Beecher, or as a way to discipline women and assure that they continued to fulfill their socially assigned roles as wives and mothers. Thus the anthropologist and eugenicist Karl Pearson in England asserted that first it had to be discovered "what is the physical capacity of woman, [and] what would be the effect of her emancipation on her function of race-reproduction before we can talk about her rights."30

Similarly, William Alcott, prominent in the American health reform movement of the mid-1800s, believed that, "if woman deteriorates, all deteriorate."31 What he had in mind was not only the illnesses that beset women due to overwork, but also moral deterioration. He believed that some of women's ill health was caused by loose living, too many parties, the reading of "lascivious and impassioned works, viewing voluptuous paintings," and "too assiduous cultivation of the fine arts"; more forthright than Beecher, he also cited "masturbation, the abuse of coition, pruritus of the vulva, inflammation of the nymphae, clitoris, neck of the uterus and ovaries; to which we may add the irritation of the ascarides in the rectum; and, finally, the drastic use of purgatives, and the internal or extensive external employment of cantharides."32 His suggestions for prevention and cure were tailored to the middle class: well-supervised travel for the daughters of well-to-do families, strict avoidance of feather beds (too warm, making it too

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31 Alcott in Cott, p. 280.
32 Alcott in Cott, p. 281.
easy to stay in bed and allow the fantasy to stray—"The coarsest, most porous, and coolest beds are to be secured"), arising as soon as awake, sleeping in a cool room, and eating bland food. He blamed women for not taking care of their health for reasons of "ignorance, pride, fastidiousness, morbid delicacy, carelessness, and recklessness." An appeal to women to take care of their health could therefore be a way of talking in code about their behavior. The symptoms Alcott described were those of the neurasthenic, that is, self-indulgent; and his cure was stern. Women had to be trained to disciplined, regular habits and not left on their own to tend to their health.

Women had their champions, too. Although not always the case, some women physicians saw the empowerment of women as their mission. One such person was Dr. Clelia Duel Mosher (1863-1940), mentioned briefly in the section on anthropometry. In studies made during 1893-1896, Dr. Mosher found that fashionable young woman students who wore heavy skirts and petticoats around their cinched waists suffered "severe pain and a long flow," whereas the more sensibly dressed young women studied during 1910-1914 had far less pain and shorter periods. Important to the story of posture photographs in other ways I will discuss later, for thirty years Mosher conducted comparative anthropometric studies of students at Stanford, Vassar, and Smith. She wrote two books of advice to women on health and became a strong advocate of dress for women that allowed comfort and freedom of movement. She was especially critical of the tight waists of fashionable dress, and developed a set of abdominal exercises to strengthen the trunk so that it would both look better (and not require strained cinching)

33 Alcott in Cott, p. 280.
34 Alcott in Cott, p. 283.
and would hold the rib cage in the best position to allow for proper digestion and placement of internal organs.

Mosher also crusaded against the notion of the menstrual period as a "sick time." Women who were told to go to bed during their period were encouraged to think of themselves as sick and unable when in fact exercise, fresh air, and good food would help them to easily withstand the minor discomfort of menses. She developed a set of abdominal exercises that were used for decades in women's physical education classes at Wellesley and other colleges. Fortunately for the women of 1917, lighter, looser clothing and social acceptance of sports for women made it easier for women to keep themselves healthy. In the study of the decline in height of American men cited above in the section on immigration, Mosher was cited for her collection of anthropometric data showing that, while east-coast men had gained one inch in height over earlier generations, the women had gained over and inch and a half. This she attributed to greater participation in sports and to sensible dress reform.

Women's clothing had gradually become less burdensome and constricting. The experiment with bloomers is well known to us today. Less famous is Dr. Mosher's research on women's respiration. It was accepted by many physicians at the time—even was part of their training—that men breathe from the diaphragm while women breathe from the top of the lungs.

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35 WCA: Bulletin 1916-1917: Helen McKinstry, "The Hygiene of Menstruation," pp. 24-25. The paper was originally one lecture in a series of eight given to the first-year students at Pratt Institute in New York City. McKinstry was a graduate of the Boston Normal School of Gymnastics in 1900 and went on to become prominent in the physical education field.
38 MacKinnen and Jackson, p. 414.
Mosher checked her women's breathing with their corsets unlaced and proved that it was their restrictive corsets that forced women to breathe costally; normal breathing for women is the same as normal breathing for men. This finding was corroborated two years later by a male researcher at Harvard.

Of moment at Wellesley College and other institutions involved with the education of women was the importance of women's health to women's education: some believed that women needed help withstanding the rigors of higher learning, while others sought to prove that mental exertion would not debilitate women and prevent them from bearing healthy children. The story of women's health in the context of higher education at Wellesley College is the subject of Chapter 2.
By the 1930s, many colleges, and not just the elite ones, had instituted posture photograph programs. Wellesley College was distinctive because its Department of Hygiene and Physical Education also offered a certificate program to train physical education teachers and a master's program that produced research that for many years focused largely on posture. By 1924, the program was one of only eight nationwide that provided graduate-level professional training for physical education instructors. The certificate and master's programs closed down in 1953, although the department remains today to carry out physical education classes for undergraduates. This chapter outlines the early history of physical education at Wellesley College, including the Boston Normal School of Gymnastics and its merger with Wellesley, the physical examination given to students, and the research focus that took the form of posture photographs and development of therapeutic exercises.

The Boston Normal School of Gymnastics

Wellesley probably would never have become involved in the physical education and public hygiene movements in quite the way that it did had it not been for Mary Porter Hemenway, the wife of a Boston shipping magnate...
and owner of a sugar plantation in Cuba. Mary Hemenway was a nurse during the Civil War and afterward turned her attention to rebuilding southern schools destroyed in that war. Her many philanthropic projects in Boston included rescuing the Old South Church from being razed and founding the Old South Patriotic Prize Essays and the Old South Lecture Series.

In 1888, Mary Hemenway founded the Boston Normal School of Gymnastics. The school grew out of an earlier offer she had made to the city of Boston for a year of free instruction in gymnastics for one hundred public school teachers, with the idea that the teachers would then use the exercises with their students in the classroom. Hemenway hired a young Swedish baron named Nils Posse to teach a system of exercises used in Sweden and originally introduced to the United States by Charles Fayette Taylor, an orthopedist. Although criticized by some for being too gentle, Luther Halsey Gulick—a leader in the Y.M.C.A. and later president of the American Physical Education Association—said that the Swedish system’s focus on stretching and strength building was "a corrective . . . designed to combat the effects of the school desk upon the organism," especially children's spines, which needed help in withstanding the strain of hours spent at their desks. The initial year-long program was a success. As a result, Mary Hemenway decided that it would be better to train specialists to teach gymnastics to children, rather than leaving it up to the regular subject instructors, so she

43 Gulick, p. 57.

Although this is from a book on Danish exercises, they were similar to Swedish exercises. Wellesley had apparatus like the bars pictured above. There is a wonderful photograph showing the whole set, at the Wellesley College Club cost room.
established the Boston Normal School of Gymnastics on Appleton Street in Boston.\textsuperscript{44} Her school was open to men and women, although eventually more women than men attended.

Mrs. Hemenway's intelligence, talent for planning, and excellent connections were reflected in the structure, curriculum, and personnel of the Boston Normal School of Gymnastics. Nils Posse was the only instructor for the first year, but the school quickly grew. The next year, along with Swedish Gymnastics, it offered courses in Anthropometry taught by the dean of the Harvard Medical School. By 1893, the catalogue included Physiology, Psychology, and Hygiene.\textsuperscript{45} Students could also take science classes at the Massachusetts Institute of Technology: Physics, Chemistry, General Biology, Comparative Anatomy, Physiology and Histology, and Sanitary Science (covering public health and personal hygiene).\textsuperscript{46} Over the years, the curriculum expanded to address "heredity, adaptation, and natural selection and evolution" in the Physiology and Histology course, and incorporated Corrective Gymnastics, which attempted to treat postural problems with exercises and massage.\textsuperscript{47} Classes on Spinal Curvature, Pathology, and Sanitation and Personal Hygiene were also added in the early 1900s.\textsuperscript{48}

Within the first few years, the school housed a library of over 1,000 books; by the time it merged with Wellesley College in 1909, it possessed 2,000.\textsuperscript{49} The catalogue for 1908-1909 described the objectives of physical training as not only "to promote health" and "to develop and foster love for rational motor

\textsuperscript{44} Taylor, p. 26.
\textsuperscript{45} Taylor, p. 33.
\textsuperscript{46} Taylor, p. 38.
\textsuperscript{47} Taylor, p. 101.
\textsuperscript{48} Taylor, pp. 105, 115.
\textsuperscript{49} Taylor, p. 63.
ability," but also "to correct or prevent faulty postures and movements." Thus good posture was central to the mission of the school.

Mary Hemenway died in 1893, leaving a bequest that would allow the school to continue for a further fifteen years. At the end of that period, in 1909, Amy Morris Homans, who had worked for Mrs. Hemenway for decades, becoming director of the Boston Normal School for Gymnastics, arranged for the school to become a part of Wellesley College. The school built a gymnasium for the college as part of the merger agreement, naming it for Mary Hemenway, to house the Department of Hygiene and Physical Education, which at that time functioned only as a way to organize exercise for the students. Miss Homans joined the Wellesley faculty, founded the master's and certificate programs, and continued to direct the programs until her retirement in 1918. Amy Morris Homans already had a national reputation for her work with the Boston Normal School of Gymnastics. She was an inspiring figure to the physical education movement, especially for women.

Health and Physical Education at Wellesley College

Physical training was not new to Wellesley College when Amy Morris Homans joined the faculty in 1909. Rather, it had been a concern from the college's beginning, as stated forthrightly in the 1876-77 College Bulletin:

... hereafter new students in delicate health will not [be] received. If it is to be considered as an experiment whether girls can bear the strain of a collegiate education, then it would be wrong to make the experiment with

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50 WCA: Wellesley College course catalogue, 1908-1909.
51 At her death in 1933, a special obituary notice appeared in the field's major national publication, *Journal of Health and Physical Education* XIV, No. 10 (Dec. 1933): 35.
students broken down in advance by violation of the fundamental laws of
nature. The experiment must be fairly tried. The faculty will not be
responsible for the health of invalids. . . . [Students] must give thoughtful
& constant attention to their health if they wish to become successful
scholars. 52

The bulletin of 1878-1879 continued the theme, admonishing prospective
students that the future of higher education for women rested on their
physical stamina. Noting the "prevailing delicacy of health in American
girls," the school wagged a finger of disapproval at ill health: "[The school] is
intended for girls who appreciate the blessings of health and have the good
sense to take care of it. . . . [Girls] must be taught that it is necessary to give
constant attention to their health, if they wish to become successful
students." 53 Decades before the construction of Mary Hemenway Hall, the
original college building, which housed all campus facilities in the early years,
from classrooms to bedrooms, also included a gymnasium. To encourage the
students to exercise, the college had a boathouse, bath house, golf course,
tennis courts, and rowing and skating facilities at Lake Waban on the campus
grounds. 54

When the Boston Normal School of Gymnastics first merged with
Wellesley College, it brought with it students who were already enrolled in its
certificate program. Because it was an anomaly at Wellesley, the new
program had to be accommodated somehow to the existing curriculum. At
first, some students in the two-year certificate program had a Bachelor's

52 WCA: History: General (1882-1946): Memo for Miss Elliott from the Hygiene Recorder, May
10, 1945, p. 2.
53 Memo for Miss Elliott, p. 1.
54 Taylor, p. 185.
degree, while others came straight from high school. After the original group that transferred in had completed the program, students had to be enrolled either as an undergraduate in the college or as a special student who met Wellesley's entrance requirements. By June 1919, all students beyond the undergraduate program held a bachelor's degree.

It took several years for the college to work out a practicable plan for the master's degree program, and their difficulties typify the struggle over defining the status of hygiene and physical education that dogged the field for decades more. Initially, the college offered a 5-year course for undergraduates resulting in a bachelor's degree from Wellesley and a certificate for teaching physical education and hygiene. However, the 5-year course proved to be too much work for the students and was logistically impractical. A proposal for a master's degree program met opposition from some staff members, who thought that a master's degree in physical education and hygiene would not find enough demand. Others—perhaps sarcastically—invoked Wellesley's "loose elective system and the fostered Wellesley spirit that students should not study anything that would possibly be useful or study in a way to make it useful." These hesitations proved groundless when the master's degree program was established in 1917, for the program's graduates were hired in great numbers. By 1920, students could work concurrently toward the teaching certificate and the master's degree. Originally a Master's of Arts degree, the degree changed to a Master's in Science, which was first awarded.

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in 1926. Some of the program's graduates worked for ten years or less before marrying and leaving the work force, but a substantial number continued on to take plum positions in school systems, colleges, and universities across the country.

The Physical Examination

Physical examinations were part of the entrance requirements at Wellesley College, as they had been at the Boston Normal School of Gymnastics, and were found in American colleges generally. As I have already demonstrated above, Wellesley was especially anxious to make sure that her students were healthy enough to prove wrong the detractors of education for women. Students were also measured periodically throughout their four-year stay: weight, height, chest height, average total strength, various localized strengths, lung capacity, orthopedics, grip strength, and other factors were measured. Posture was also included and had its own place on the cards where the data for each girl was recorded for filing. The earliest measurements of Wellesley students on file in the archives are from 1884-1885; most records cluster between 1915 and 1926, which perhaps coincidentally is the year the posture photograph program began.

In the interests of enrolling only a healthy student body (singularly and in the aggregate), as indicated in the 1876-77 Bulletin, in the early years

59 WCA: History, General (1882-1946). The sequence of the degree programs is from "History of the Graduate Department . . ." written some time after the department was permanently closed in 1953.
61 The Department of Hygiene and Physical Education kept its own archives. Although no substantial weeding of these files was done when the department closed and transferred their archival holdings to the college archives, it is unknown whether such weeding might have been done before this time. Therefore, the meaning of the large number of records for these years is not clear. It could signify greater activity or it could mean that for unknown reasons it was determined that earlier and/or later files were of less interest.
the college recorded not only the health of the student, but also the health of her parents. The information taken in 1891 included whether parents were of American or foreign origin, probably reflecting the beliefs about the vitiating effect of immigrants on the "native" American stock described in Chapter 1. Other questions revealed anxiety about students' general health and worry about their nerves. In addition to "Marked Hereditary Tendency," "Father's Occupation," and "Resemblance to Parents," the "diseases" of "Weak Back" and "Nervousness" were noted. Numerous tables about the girls themselves recorded "Nervousness," "Increased or Diminished Nervousness (Since Entering College)," "Sleeplessness," "Hours of Sleep," "College Worry" (broken down into Studies, Personal Affairs, Studies and Personal Affairs, and Neither), "Extra Work," "Hours of Daily Out of Door Exercise Before [Since] Entering College," a variety of illnesses, and use of the gym.62

Eventually, the school stopped providing the initial entrance examination, but students were required to submit a Physician's Certificate with their college application. Based on a Department faculty member's assessment, students could be required to take corrective or restrictive gymnastics either "temporarily" or "permanently."63 The exam included strength tests and a demonstration of proper choice in shoes, as well as anthropometric measurements (generally, muscle girth and breadth) and orthopedic examinations (skeletal, especially postural). Remedial work was necessary for a large enough number of students in most years to require more than one class to accommodate them all. During the 1920s, the emphasis of the physical examination turned to trying to arouse in the

62 WCA: Anthropometric Measurements (1894-1895): Tables for 1891 in Box 2.
student an interest in nutrition and in her own health. The emphasis on anthropometric measurements was reduced during the 1920s as doubts about their usefulness were raised, a topic covered in Chapter 4. In 1928, the school instituted a second physical examination for juniors, who were no longer required to take physical education classes, as "a check" on their progress or deterioration.

A student thesis from 1933 outlined in detail the staffing, equipment, and logistics of the physical examination as it stood at that time. The examinations then were given four times a year and were a very important function of the Department of Hygiene and Physical Education as a whole. The categories of exam included medical, menstrual, anthropometric, orthopedic, photographic, postural, and motor. The half-hour medical examination was performed by a woman physician, usually from outside the college. Each student then took her records and forms to the college's resident physician, who checked them and made assessments regarding whether further testing was needed, whether restrictions were necessary, and whether any records were unsatisfactory or incomplete.

By the early 1930s, the authors of the yearly Reports of Hygiene 124 and 125 (Corrective and Restrictive courses), concerned by the poor results of posture work for some students, suggested annually to the president of the college that the services of an orthopedic surgeon be retained for a half-day

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64 WCA: Department of Hygiene and Physical Education: Annual Reports (1918-1935): "Information covering questions submitted by Miss Maude White Stewart to President Pendleton," January 22, 1929.
### Summary Medical Examination

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### Subsequent Information

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### Notes Recorder:

### Notes Chairman:

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### Examiner:

### Recorder:

### Program

per month.67 The lateral curves of scoliosis had proved nearly impervious to exercise, no matter how strong the trunk was made nor how often the girls hung by their arms in the hopes of straightening the spine through sheer weight. Due to frustration with slow progress in correcting spinal problems, classes changed to stress "poise and efficiency in common, every-day movements, such as walking, running, sitting, rising, lifting, carrying, etc."68 The medical focus gave way to the less focused, but apparently more attainable, goal of improved body mechanics to improve posture. By the late 1930s, the posture and body mechanics classes were no longer required and were replaced with extra instruction and occasional individual conferences with instructors.

Posture as an Attempt at Social Control

The Department of Hygiene and Physical Education waged constant battle with students' singular indifference about poor posture. The posture photographs (instituted in 1926 and discussed in the next chapter) were one weapon used to try to provoke interest, but they were not the whole arsenal. For example, there were posture days, not unique at Wellesley. Physical education departments across the country held posture days—even posture weeks—with activities that were earnest, and at times appear even coercive. Posture weeks could include posters, songs, contests, skits, displays of posture measurement instruments, and poems extolling the virtues of good posture. Although I do not have specific information on Wellesley's activities in this regard, Wellesley did have posture days, and they were likely to have

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resembled those of other schools. Some of the activities below are more likely to have occurred at co-educational institutions.

Some approaches used humor, some used shame, some appealed to students' level-headed good sense for paying attention to their health. Some activities showed imagination, some were merely inane. At one school, a tree on the campus was hung with signs that described their "posture": "I have a lordosis curve [meaning swayback]," "I have a right dorsal left lumbar scoliosis curve," "My posture is A." The same school held posture parades in the dining hall and a posture dance in the evening, where dancers with poor posture were asked to leave the dance floor until only a few couples were left and "there was a great deal of interest and excitement" as the last couples were eliminated and the winners danced alone. The evening ended with a bang when the class with the highest percentage of students with good posture grades won a trophy.

Skits were a popular vehicle of propaganda. Young ladies were taught posture's true value in a skit in which "the girl who stood and sat well" was the lucky gal to get the diamond. Another depicted bad postures in association with Despair, Fear, Meekness, Arrogance, and even with the slumped posture of someone thinking too much! Good posture betokened Joy: "How we all love a happy smiling person. Did you ever see a slouchy person with a smile? If you haven't, watch and see if you can find one. You'll probably have a long hunt."

Whatever their specific content, the activities of posture days rarely invoked health reasons for good posture, but focused instead on moral character and physical attractiveness. Dancers who had to leave the dance

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69 Edythe Saylor, "Posture Weeks Still Work," *Journal of Health and Physical Education* VI, No. 8 (Oct. 1935): 32. All examples in this paragraph are from the same article.
70 Saylor, p. 57.
floor because of their poor posture were unsubtly being told that they lacked a
degree of physical attractiveness. The skit that put marriageability as a benefit
of good posture reminded female students that their most important role
would be as wife and mother. Students were warned that they should avoid
Despair, Fear, Meekness, Arrogance, and overindulgence in thought, and
instead to exude Joy, for it would bring the love of everyone around them.

However, the inward feeling of joy was not to be trusted. A girl could
feel quite wonderful yet unknowingly inspire scorn in others. The skit
reproduced in part below used music to parodize the walks of unfortunates
whose posture was not good.71 The author’s directions are included in
parentheses:

(Quick time)
Now Bonnie Bustle always hustles all around the place,
A happy smile of satisfaction lighting up her face.
(Slower)
For little does she realize the trouble that behind her lies,
(Fast and confidentially)
And really it puts her in disgrace!

If she would only stop and look into the mirror,
I'm sure she would discover much. (Stop)
(Slow)
Such facts, I fear, would make her blush
Tch, tch, tch, tch,
Tch, tch, tch, tch.

Poor Bonnie. But some others fared worse. An awkward walk was associated
with the awkwardness of belonging to the wrong race:

(In this number, one speaker, No. 1, uses negro dialect and the other, No.
2, speaks with nasal quality like "Donald Duck.")

1939): .
1: Flat foot floogee wid da duck walk!
2: Flat foot floogee wid da duck walk!
1: Flat foot floogee wid da duck walk!
1: Oh my!
2: Quack, quack!
1: Oh my!
1: Oh my!

1: Her warnin' came wid da slight pronation
2: But to that she paid no attention.
1: She'll be sorry in da by and by,
1: Oh my!
2: Quack, quack!
1: Oh my!
1: Oh my!

Both: She'll be sorry in the by and by,
Both: She'll be sorry in the by and by,
Both: She'll be sorry in the by and by,
1: Oh my!
2: Quack, quack!
1: Oh my!
1: Oh my!

A few other songs depicted Sadie Slump ("the tale of woe") and poked fun at the exaggerated nonchalance some students adopted to impress others with their sophistication. The skit ended with a defense of corrective exercises and then the "Polly Perfects Chorus":

Though you may not think it, we should praise our dear correctives,  
Which hold us in their heart throughout their torturous objectives.  
And those seven points all,  
Are for our benefit.  
If you don't believe it,  
Just take a look at this.  
(demonstration of exercises)

Polly Perfects all are we,  
Such improvement, can't you see,  
We've got charm and all it takes  
To be alluring, and to have no aches!
We now possess that perfect line up,  
From our toes straight up to the top.  
Won't you join our company?  
Polly Perfects are we.

I have cited this example in some detail to give the reader the flavor of posture skits generally. They usually used humor and associated poor postures with negative images and good posture with positive images. The example above is too obvious to require further comment. It is to be hoped that at Wellesley the skits were a little cleverer, less unkind, and less focused on women as potential wives and mothers, but it is likely that the associations of poor and good posture with poor and good characters were the same.

From the first week she arrived on campus until shortly before she graduated, the Wellesley student was made conscious of her stance. Periodic physical examinations reminded her of whether or not her posture could withstand scrutiny. The next chapter examines why and how this was done.
The detailed attention to health at Wellesley and on other campuses was a response to the social conditions of urbanization and immigration, a concern for the socialization of middle-class girls into roles appropriate to their class and gender, and the new world of higher education for women. It is easy to see the symbolic value of posture in such circumstances, but these factors alone do not explain the posture photos. Why were these particular artifacts produced at this particular time? Was Rosenbaum right that Wellesley was leading an exercise in pseudoscientific eugenics, a Nazi-style drive toward breeding a master race through the elite schools?

My work in searching the Wellesley College Archives and reading through dozens of articles on posture in the major journals of physical education does not bear out this interpretation, although there is plenty of racism evident in the pages of Research Quarterly and, as the example at the end of the last chapter showed, Journal of Health and Physical Education. More than anything else, the sources indicate that the photographs were intended to be a tool in a public health attack on scoliosis and other problems of the spine, and that physical educators were working closely with orthopedists to screen college students and children in public elementary and high schools for indications of the syndrome. Graphic depictions of student posture were needed in order to help physical educators, physicians, and orthopedic surgeons to diagnose postural problems and recommend courses.
of exercises for treatment. They were also useful as a motivational tool for convincing students to follow their prescribed treatment: being able to see their own hunched shoulders (called kyphosis) or swaybacks (lordosis) could inspire students to work for improvement. The reasons for interest in problems of the spine were a crystallization of the moral, social, and evolutionary aspects of posture briefly described in Chapter 1, which then fused with the public health movement's genuine concern for children's health.

**Scoliosis and Orthopedics**

Scoliosis is a lateral curvature of the spine that can range from slight to debilitating. Today, medical opinion sees scoliosis in about ten percent of the population, usually becoming apparent during late childhood or teenage years; it is more common in girls. Most scoliosis is idiopathic, that is, the cause is unknown, and most often it does not require extensive treatment. Non-idiopathic scoliosis can be caused by legs of uneven lengths. If caught early enough, a shim worn in the shoe of the shorter leg can stop the curvature from developing further. But in less than one percent of the population, the curve progresses to forty degrees or more during childhood, in which case it is likely that it will progress to a more serious state in adulthood. Because the spine carries the rib cage, severe curvature can affect the placement and function of internal organs, and pressure on the nerves in

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74 Cyriax, op. cit., p. 262.
75 John Albert Odom, M.D., "Spinal Deformities: The Benefits of Early Screening and Treatment." The Colorado Spine Center, Aurora, CO.
the spinal column can cause neurological problems as well. Various combinations of manipulation of the bones, massage, nutrition, injection, braces, casts, and fusion surgery are used to treat scoliosis today.

Orthopedics is a relative newcomer to medicine. The sideways kink of scoliosis was the object of medical attention for centuries, and all sorts of mechanical methods were devised to effect its cure, usually employing steady pressure to force the spine to straighten. In Zurich in 1700, a doctor built a contraption of "chains, pulleys and levels on which the patient was placed and pressure applied." In 1842 in the United States, a doctor tried strapping a wooden board to the patient's back. Presumably other such methods were tried, and as far as is known, all failed. Although the term orthopedics was used during the nineteenth century for activities in medicine dealing with the skeleton, especially the spine and feet, it did not become a fully recognized medical specialty until around 1899, when its first instructor was appointed at Yale University.

The intertwined histories of physical education and orthopedics will be more fully developed in Chapter 4. For the time being, it is enough to note that the two fields found in each other a way to make their place in the world. Physical educators used their place in the colleges and universities to set up laboratories and collect data on thousands of young people, and used their connection to orthopedics to show their colleagues their seriousness as an academic endeavor. The orthopedists received a great deal of data collected by the universities and a steady stream of referred patients. This is not to claim

76 Odom, op. cit.
79 Cyriax 1982, p. x.
cynical collusion, but that physical education and orthopedics each had something to offer the other, and that the posture photographs were an important part of what physical educators proffered to orthopedists.  

**Methods of Recording Posture**

A striking feature of the business of recording posture is that, in the race to find a suitable way to reliably measure posture, physical educators developed so many techniques for the purpose, all of which eventually were found to be flawed. It appears that several methods were used at Wellesley College before an apparently satisfactory camera was installed in 1926 and what came to be known as the Wellesley Method was devised in around 1930. Wellesley first began experimenting with a photographic method for evaluating posture in 1904-1905, but no records seem to exist except for a few sample photographs. Wellesley tried again in 1915, using a special camera that allowed "two to six exposures side by side on the same plate or film." Persistent problems with double exposures, fogging, and handling the plate loaders led to the method's abandonment and a temporary return to the traditional methods involving tracing.

One such method involved the Demeny machine, a fixture at the Boston Normal School of Gymnastics for over twenty-five years. A similar apparatus made its appearance in Wellesley's records in 1916. The Demeny

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80 Surely most students were helped by the exercises recommended by physical educators and orthopedists to strengthen the torso, but none was cured of scoliosis entirely through exercise, and it is possible that a few were even harmed. In his 1982 textbook cited above, Cyriax states that flexion exercises can be harmful because they can dislodge disc fragments and move them "to an unfavorable position." The same text asserts that the flat back, long touted as the superior posture toward which generations of students strove, is actually the only posture "that enhances the likelihood of backache." These findings, however, could not have been known during the years the posture photos were taken, and in fact, the program itself gathered the data that made such a statement possible.

This method does not require total exposure of the body and the record contains nothing that can in any way be objectionable to the subject or render it unsuited for exhibition or demonstration.

For terms, address Mr. Henry H. Austin, Wellesley College, Wellesley, Mass.

Wellesley's adapted Demeny machine. Fig. 4, too dark to see here, shows tracings similar to those found on the next page.

machine was an analogic device: a metal stylus moved down the spine and the breastbone and torso of the patient, while a pencil at the other end of a rod attached to the stylus traced the path on a piece of paper. Ethel Perrin, an 1895 graduate of the Boston Normal School of Gymnastics, reminisced years later that the "French [i.e., Demeny] machines" produced "a life-sized longitudinal tracing of mid front and mid back lines—'normal' in blue pencil, forced inhalation, red, forced exhalation, green" and "a tracing of the circumference of the chest." Marks were then made on the tracings to indicate the exact positions of the seventh cervical and fifth lumbar vertebrae; later tracings could be compared by matching up these marks, and an accurate assessment of any changes could be noted. Changes in successive tracings could be used to inspire patients to continue their exercise programs, as well as to assist physical educators who needed a method of comparison in order to assign posture grades. The machine was easy to use and did not require a great deal of training or expense to run. As the 1915-1916 Bulletin explained to readers, it also did "not require total exposure of the body and the record contains nothing that can in any way be objectionable to the subject or render it unsuited for exhibition or demonstration."84

Clelia Duel Mosher developed a silhouette recording technique that would minimize embarrassment for the women, protecting their privacy while still gathering information Dr. Mosher considered vital. "The possible identification of the individual woman by any one into whose hands the record may fall makes it [photography] permissible only in very rare cases," she said.85 A simple shadow tracing would preserve the secret of the

82 Taylor, p. 230.
85 Mosher, Clelia Duel, "The Schematogram—A New Method of Graphically Recording posture and Changes in the Contours of the Body," School and Society I, #18 (May 1) 1915,
woman's identity. Mosher published a description of the schematograph in 1915, with the practical assistance of Professor E. P. Lesley of the mechanical engineering department of Leland Stanford Junior University.86

The schematograph basically consisted of a camera, a platform, a screen, and lights. Mosher gave specific recommendations for how the apparatus was to be set up: the height of the camera, bulb wattage, size of the screen, exact distance from camera to screen. Even the kind of tracing paper was specified: it had to be thin but strong, since the image would be recorded in the reverse, and the paper therefore had to be turned over in order to get the picture to read right. The procedure took place in a dark room. The student had to stand either in a strong light in front of a dark screen or behind a light screen, so that the tracing was either of the subject herself or even just of her shadow. Wires at right angles divided the screen into a four-panel grid. The camera lens accepted the image onto an upward-slanted mirror, which could be seen through a clear glass plate on the top of the camera. The image from the mirror reflected onto the glass, from which the examiner traced it onto the tracing paper, thus creating the schematogram. The grid lines were also drawn and could be used to line up superimpositions for comparative purposes with later drawings. According to Mosher, the image was "so clear" that "the position of the breasts, the prominence of the collar bones, the supra- and intraclavicular hollows" could be seen, and in thin women even "the costal angle or the line of the spine."87 Putting the camera and examiner in a separate room from the subject, with only the lens poking through, added a further psychological distancing factor to make the process of having her nude body photographed less onerous for the woman. With images

86 Mosher, 644.
87 Mosher, p. 644.
approximately eight inches tall, her face would be barely recognizable, if at all. With the schematograph, "the personal reserve of the woman is respected." Wellesley used the schematograph for about a decade.

The concern with women's feelings about privacy shown in these two methods is of great interest because, after this, the issue was so rarely raised. Tracings were simply curved lines on paper; someone who did not know what they were would not likely have guessed that they described part of an actual human body. The process of making the tracing involved less embarrassment than total nudity. The photographs illustrating a 1916 article on the Demeny machine show a back view of a woman having her spine traced. Her back is bare, but her skirt hangs from her hips. In a similar vein, the Wellesley College Archives has a small group of posture photographs from 1904-1905. In these photographs, the rear view also shows a bare back and skirts gathered low on the hips, below the base of the spine. Dotted lines were drawn directly on the spine, and in some instances lines were drawn on shoulder blades, for example, to emphasize their position. In the side-view photographs, the women wore camisoles, and on some the face was inked out in blue, adding extra protection to the women's modesty. Each woman was identified by a number on a tag clipped to her hair or pinned to her dress, adding another layer of privacy. However, even though they appear to have been snugly fitted, any slight blousing of the material of the camisoles also hid their spines, probably the reason that this method was not continued.

88 Mosher, p. 644.
90 WCA: Anthropometry: Posture Photographs, 1904-1905. The file contains only the photographs. I was not able to find any other information pertaining to them.
91 I do not know whether the inking was done recently or close to the time the photographs were made.
There were other solutions to the problem of privacy. Posture photographs of children in a study for a thesis at Wellesley show many of the children wearing a mask like a carnival mask across their eyes.92 A few even wore a veil covering the whole face. A card with a number on it was placed near the foot to identify the subject without using a name. Even so, faces are not the only attribute that make us recognizable, and the protection seems more a gesture than real.

The photographs taken in the Wellesley program and elsewhere were completely nude. Why is a puzzle, but it is likely that the reasons had to do in part with physical education's attempt to identify itself with medicine by appropriating the privileges of the physician. When actual measurements were made directly on the photos, the acts of measurement and quantification in themselves would have served as distancing techniques: The body in the photograph was not erotic, it was not a whole human; it was an extrapolation of a human being made subject to quality control. Not one of the fifty or more articles I read about posture in the Department of Hygiene and Physical Education's Bulletin or in the national publications mentioned the possibility that students could feel uncomfortable or unhappy about having their nude photograph taken, yet it is hard to believe that this was never the topic of conversation among the faculty, as it surely was among students.

In 1926, an improved method of photography replaced the tracing methods of recording posture at Wellesley, in part because it was thought that it was a better motivational tool. Students would be able to understand their postural problems more easily by looking at their photographs rather than at

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schematograms, perhaps because they were more vivid. Another advantage was that the new camera was easier to load and unload than the 1915 version had been. Instead of using film or plates, the exposures were made onto bromide paper that could be torn off and developed after each exposure. This was fast, cheap, and technically less complicated for the operator, and the student still had the advantage of seeing her picture and receiving instruction based on it right away, just as she could using a schematogram or Demeny tracing. At first, the student's name was written on the back of the bromide paper. Later, a numbering system helped better to protect the woman's identity.

A type of device not used at Wellesley but worth mention because it was used reasonably widely, was based on the principle of what was called conformation. Conformateur devices consisted of an upright on a base, tall enough to record the full back of an adult. The upright had forty or so holes cut through it on the perpendicular. Slender rods fit through these holes loosely enough to respond to pressure. The patient stood with her back against the ends of the rods, which slid into contact with her spine. When all the rods were touching her spine with gentle, even pressure, the rods were locked into place. When the patient stepped away, the impression left by the curve of her spine remained. This impression could be traced or photographed and then recorded by measuring from the tips of the rods to the central upright. In one method, the shape was simply transferred by placing the instrument against a blackboard and tracing with chalk. Again, reference points were marked to facilitate later comparisons, in this case using the

ILLUSTRATION I. THE WOODEN CONFORMATEUR
1. Wooden rods which slide and contact spine.
2. Springs attached to tape for locking rods.
3. Base upon which subject stands with back toward ends of rods.

ILLUSTRATION II. LOCATION OF MEASUREMENTS
A. Location of the seventh cervical spinous process. B. Maximum lateral displacement of the thoracic spine. C. Maximum lateral displacement of the lumbar spine. D. Maximum lateral displacement of the posterior spine of the sacrum. M: Location of the internal malleoli.

Spine tracings such as produced by such methods as the Demeury machines and conformatuer devices.

Spine traction devices and positioning equipment

After p. 87
ILLUSTRATION III. HARD WOOD SPINOGRAPH

1. Groove to fit block 5 which slides vertically. 2. Rod which slides horizontally. 3. Contact point which fits snugly to spinous process. 4. Writing point to trace spine in true size on blackboard. 5. Sliding block. 6. Heel block.

seventh cervical vertebra and sacrum. The graphic produced was similar to that of the Demeny machine, and shared the same advantages and disadvantages in terms of privacy and level of abstraction of the tracing.

**Technical Problems and the Wellesley Method**

By the early 1930s, physical educators at Wellesley and elsewhere were becoming frustrated with the limitations of all the methods for measuring, recording, and evaluating posture. In addition, they wondered whether the measurements they were taking were even worth it, as I will indicate below. The problems with recording posture, and the resultant problems with grading, had to do with the instrumentation, on the one hand, and on those humans doing the measuring and those being measured, on the other. Some problems with instrumentation have already been mentioned, such as the fogging and double-exposures and awkwardness of changing the plates found with the early photographic method of 1915. Photographic methods in general also had problems with lens distortions, lighting distortions, and other technicalities.95 The accuracy of conformateur and Demeny tracings varied with the thickness of the chalk or pencil used in drawing and, due to their abstract nature, probably had less inspirational impact on the patients viewing them than silhouettes or photographs had. Their vividness is probably the primary reason that silhouettes were the most widely used technique in the late 1920s and early 1930s.

In the October 1931 issue of *Research Quarterly*, published by the American Physical Education Association, a prominent member of the association named Thomas K. Cureton voiced the frustration and articulated the problems that physical educators faced in the matter of posture, both in its

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95 Cureton, p. 103.
recording and in its cure. Cureton conducted an experiment wherein conformateur, spinograph (such as the Demeny tracings), and silhouette (such as schematograms and photographs) methods were compared. Using a "manikin," various examiners took measurements using the different methods at least three times each. In the end, the conformateur and spinograph results proved comparable, but silhouettes "were greatly in error." 96 Silhouettes such as the schematogram may have been good for hiding a woman's identity, but since they were only six to eight inches high, any inaccuracies, however slight, were magnified when extrapolated to full size. Since the schematogram ultimately was a tracing done by hand, the ability of the person making the tracing was always an uncontrolled factor, too. Worse, even if these factors could somehow be controlled, the silhouette (whether schematogram or photograph) showed not bones but fat and musculature, and sometimes a bit of elbow or a shoulder blade stuck out and obscured the view even of that. "One of our most important methods of measuring posture at the present time is based upon this procedure," wrote Cureton. 97 The method was "valueless for quantitative measurement or evaluation unless some means is adopted to show clearly and accurately the differences between the true spinal curve and the apparent spinal curve as indicated by the profile of the posture or the silhouette." 98

The news that the most common method used nationwide to record posture was virtually useless was potentially devastating not only to screening programs that were part of undergraduate physical education, but also to posture research, thus threatening the integrity of the research wing of physical education done at Wellesley under the auspices of the Department of

96 Cureton, p. 107.
97 Cureton, p. 108.
98 Cureton, p. 108.
Hygiene and Physical Education. The Department's prominence in posture work, both in gathering statistics and in corrective work, made it imperative for them to come up with a solution to the problem of differentiating the "true spinal curve" from the "apparent spinal curve" visible in silhouette. Wellesley's solution was published a year later in Research Quarterly. Professor Eugene Howe and a graduate student, Charlotte MacEwan, had actually already developed the new method two years earlier that was in use at Wellesley a year before Cureton's article came out. Thus Cureton's article may have prompted the timing of the publication of what became known as the widely used Wellesley Method.

The Wellesley Method was as follows. Three staff instructors and one student were needed to work the photography station. The student being examined undressed completely in a small booth. When she came out, an instructor attached ten pointers along her spine to demarcate the vertebrae. Another pointer was taped to the sternum. The light aluminum pointers are what reminded the Times's Rosenbaum of "body-piercing" or "voodoo ritual." They were uniform in length and were simply taped onto the body so that they were at right angles to the skin. The pointers made it possible to distinguish the curvature of the spine using silhouette methods, since the curve was replicated along the tips of the pointers. A second staff member took two photographs, one view of the side and one view of the back. The photographs were developed on the spot, and the third instructor graded them immediately, so the bromides were ready for the student to take with her to the next booth, where a posture instructor discussed the photograph with her, graded her carriage, and showed her in a three-way mirror what her

This and the following two pages are from Charlotte Gr. MacEwen and Eugene C. House, "An Objective Method for Grading Posture," as it appeared in the October 1932 issue of Research Quarterly, between pages 148 and 149.

Illus. 1. Posture photograph showing outline of the spinous processes and chest. Illus. 2. Loading the camera.

Illus. 3. Tearing off the exposed paper.
Illus. 4. Posture photography room.

Illus. 5. Aluminum pointer; weight, 1/4 gram.

Illus. 6. Posture photograph showing location of points and lines used in grading.

Illus. 7. Posture photograph with triple grading scale superimposed. The scales for the head and segmental angulation measure one unit for each division; that for the spinal curves, two.

Illus. 8. Desks for grading posture photographs.

Illus. 9. The triple scale lifted and a posture photograph inverted.

Illus. 10. Grading desks in use.
posture should be. The whole photographic process took about ten minutes per student; two to three minutes were spent with the postural instructor.

The camera used a short exposure time, was easy to load and unload, and used a lens for which the authors claimed "undistorted definition at full aperture over the full length of the picture."\textsuperscript{100} The short exposure time helped to get rid of any fuzziness that would result from even a slight movement by the subject. Although the pointers solved the problem of locating points on the spine when viewed from the side, "regardless of projecting scapulae, arms, and breasts,"\textsuperscript{101} they did not solve the problems of size or human error. Markings were then made directly on the photograph, using "a pair of bow dividers with No. 10 needle points" and a straight-edge. Grading was "done by slipping the picture under a transparent triple scale and reading off the units as shown on the scale."\textsuperscript{102} The procedure demanded precision so that, as before, any small miscalculation or variance in line thickness was exaggerated when extrapolated up to full size.

\textbf{Problems with Standards and Evaluation}

Even if done perfectly, with no technical mistakes on the part of the person doing the measuring, the Wellesley Method was subject to other problems that no technique could completely avoid. The problem of the pose was not so serious when the photograph (or any other silhouette) was used simply to inspire students to exercise, with no actual therapeutic recommendations made. But what could measurement on a posture photograph accurately tell about serious problems with the spine that might

\textsuperscript{100} MacEwan and Howe, p. 145.
\textsuperscript{101} MacEwan and Howe, p. 146.
\textsuperscript{102} MacEwan and Howe, p. 147.
even require surgery? That the choice of pose was a problem central to the usefulness of the measurements had been recognized and discussed early on, but not taken as a serious obstacle to diagnosis until Cureton's article showed how very inaccurate the silhouette measurements were. If small distortions in the recording method rendered that method useless, then the importance of the pose had to be taken seriously. The camera used in MacEwan and Howe's method was so fast that it could catch the "non-attentive position," thought to be an advantage because students would not have time to be too self-conscious or fake a good posture. Some experts simply assumed that, by giving no special instructions other than to look straight ahead, the subject would be in "her natural pose." But what was really being recorded? As other experts had already pointed out, it could not be guaranteed that the particular pose captured on film typified the person's posture, so measurements were really only of an instance of posture, not its "essence," and comparisons made between photographs were not necessarily between like entities. Given two photographs of the same person taken in succession, what criteria guided the choice of which photograph to judge? What were the effects of the time of day the photograph was taken? A subject photographed early in the day when she was bright and alert might receive a better grade than a subject recorded later in the day, when fatigue had set in. Sympathetic examiners would obtain a different, more relaxed pose from a subject than examiners who were awkward or chilly.

103 MacEwan and Howe, p. 145.
The issue of cultural attitudes toward female nudity affected the pose as well. It is easy to forget how unlike today were attitudes toward revealing the body at all, much less actual nudity. It is likely that many of the girls and young women had never appeared nude in front of anyone before, except as children, and certainly had never been photographed nude; even the family doctor might have observed decorum when making his examinations, and at least his could have been a familiar face. Some girls may have barely begun to menstruate and would be especially vulnerable to feeling humiliated and ashamed during the procedure. Rosenbaum mentioned in his *Times* article that when he was finally permitted to view posture photographs in the Smithsonian, he noticed that the men in the photographs appeared indifferent or bored, while he was struck by the looks of pain and anger on the faces of the women. What kind of natural pose could the student take when she was suffused with self-conscious embarrassment?

Other factors about the pose affected the interpretation of photographs. Physical educators argued whether age was a significant factor in posture when dealing with elementary school populations. For example, a picture taken during a growth spurt might show imperfect posture that was due to the child’s awkwardness with her new height that would correct itself without professional intervention or even conscious attention. As well, children quite likely could stand up straight to be "good" while the picture was being taken, although posture experts thought they had this under

106 Rosenbaum, p. 56.
control, because usually a child's idea of good posture was far from what the experts had in mind. Some educators thought that young children frequently had what would be called poor posture in an adult, for example, notable swayback, but that this was generally outgrown and nothing to be worried about. Arguing the opposite position, Charles F. Foster of the Brookline school system in Massachusetts emphasized that "investigation by the United States government . . . and other investigations show that fully 80% of our seventeen million school children have postural defects. It is time to discard the idea that the child will 'outgrow' these defects; and instead, to eradicate these postural evils at their source during the extreme plasticity of childhood rather than to permit the large majority of students to enter college or business life with deformed bodies."108

Arguments such as these continued for years, for, despite pretensions to scientific exactitude, there was no universally agreed-upon, professional standard for what constituted good posture. Instead, we find a multiplicity of standards and criteria. The American Posture League pioneered what today is called ergonomics. In 1916, their criteria for good posture were that body segments (head, neck, chest, abdomen) "are balanced vertically one upon the other so that the weight is borne mainly by the bony framework and a minimum of effort and strain is placed upon the muscles and ligaments. . . . the long axis of its main segments—head, neck, trunk and legs, when seen in profile, forms a vertical line instead of a zigzag."109 During the same period at Wellesley, the matter came down to centimeters: "Judgment of types: based upon deviations of physiological curves from a line connecting the 7th

cervical and 5th lumbar spinous processes. (a.) Normal = curves falling within 1-2 cm of line; (b.) Round = deviation of over 2 cm to left of line in dorsal region; (c.) Hollow = deviation of over 2 cm to right of line in lumbar region; (d.) Flat = curves falling within 0-1 cm of line.¹¹⁰ There was no accommodation made for height, weight, or length of spine.

Related to the lack of clear standards and the problems with recording techniques were problems of grading posture. Try as they would, physical educators simply could not find a foolproof method of grading in which different judges would assign the same grade to a given posture. In trial after trial, judges using the same set of photographs on which to base their assessments would come up with different grades for the same individual. There were many cases in which a student who received an A from one judge would receive a B from another; there were also cases where an A from one judge would be a C from another; and there were even some cases where a student’s posture could receive an A and an F, or even every single grade on the scale from A to F.¹¹¹ Katharine Wells was a graduate of the physical education program at Wellesley. She operated Wellesley’s posture clinic for local children and was on the faculty of the college for over twenty-five years, making her a leader in the field of posture. In her 1934 master's thesis, for which over five hundred children were graded by eleven judges, she found no cases in which a child received the same grade from all eleven judges, and six in which the child received the entire range of grades. Wells had hoped to improve upon MacEwan and Howe’s method, but MacEwan and Howe’s study, which had used the same camera and most of the same techniques that

¹¹¹ WCA: Wells, pp. 49, 50.
Wells used, found only three of over eight hundred students who received the whole range of grades, as assessed by six judges.  

Posture enthusiasts had made sweeping claims about the evils of poor posture and the glories of the good, and they were occasionally called to task for it. In an address before the Annual Convention of the American Physical Education Association in Philadelphia in 1932, James Rogers, M.D., of the U.S. Office of Education, used humor to try to deflate the overblown claims for posture by some members of his audience. There is no documented relationship between posture and health, he said, and certainly none between posture and morals, "unless it be from some underlying cause affecting both physical and mental condition. . . . But posture is said to be related to health, to mentality, and to morality. This being the case it is somewhat confusing to find very delicate and stupid and immoral subjects at the A end of the scale and very vigorous, bright, and honorable children at the D side." Rogers went on to deflate ideas about the extent of posture's contribution to poor health: beyond serious conditions of scoliosis and the like, "illnesses are due to infections, and to say that posture has any effect upon immunity is just a little absurd." However, Rogers was not suggesting doing away with posture training in the schools, but that such exercises could not fundamentally change a child's inherent posture; physical educators could only try to prevent deterioration with age by strengthening the muscles of the torso. Pretensions to medical effectiveness were preposterous. His speech was humorous but sharp, and ended on this note: "We certainly have no business wasting time and public funds in trying to do the impossible."  

114 Rogers, p. 58.
In 1939, the search for a definition of good posture was still on. In a survey of grading methods in the *Journal of Health and Physical Education*, the article's author, a graduate student named Edward Korb, complained of the plethora of standards: horizontal height equaling vertical height; a relation of body segments arranged so that a plumb line bisects them; comparison to a master chart of approved postures; subjective rating. Korb was reflecting a dissatisfaction widely held by physical educators, as testified by the large number of articles proposing new methods, even after MacEwan and Howe's so-called objective method had come into wide use. Korb proposed a "comparograph" that used as its "standard of posture" the work of Armin Klein. Interestingly, Klein's standards were a composite of silhouettes of 2200 subjects, from which an ideal was derived. Was posture a health issue, then, or a matter of conformity? In explaining his choice of standard, Korb wrote, "Whether this particular standard or some similar standard is used matters little. Some standard must be accepted which meets the requirements of excellent posture according to our present-day knowledge of what excellent posture is. This particular standard is merely one of several possible choices and meets the accepted requirements." Deformity could be a matter of opinion, and perhaps was even beside the point: the point of taking posture silhouettes had gone beyond the detection of scoliosis to encompass vague notions of good posture that were bent on imposing conformity.

The photographs continued to be used to detect scoliosis and related spinal problems, but as the goals became more oriented toward good posture

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117 Korb, p. 143.
for its own sake, the lack of definition became less defensible. Almost never, for example, did any of the physical educators or orthopedists mention in their writing anything about pain. This may be because scoliosis can be pain-free for many years, so pain was not a diagnostic tool. But as this inattention to comfort carried over to postures that were nonpathological, the rationale for the goals set became murkier. If the ideals of perfect posture were so healthy and natural, why did seventy percent of Americans fail to meet that standard?

The constant groping for elusive accuracy and professional standards created tremendous stresses in the field of hygiene and physical education, nor did the problems go unnoticed by other professionals, such as orthopedists, public health and government regulators, and school officials. The very tool physical education had chosen to make itself respectable turned against them. The faces in the posture photographs might have smiled if they had known that they epitomized how the demands of academia, medicine, and the public schools made it a real struggle for physical education to make a place for itself in the world.
Partners in Professionalization:
Orthopedics at the Boston Normal School of Gymnastics and Wellesley College

"A medical examination for every school child.
Health habits that endure.
A class period in physical education every day.
A gymnasium and playground for every school.
The teacher fully trained and accredited.
The coach a member of the faculty.
A graded and scientific curriculum.
Standardized physical achievement tests.
Positive credit for physical education work.
Education for leisure.
An intramural program for after-school hours.
A varsity program that stresses sportsmanship and ethical conduct.
Opportunities for scouting and campcraft.
Equipped and supervised summer playgrounds.
Provisions for wholesome adult recreation.
An athletic program for girls planned and administered by qualified women, stressing
  a. Girls' rules for girls' activities.
  b. Games and types of competition adapted to age, capacity and interest."

—"Professional Objectives," as they appeared on the cover of the first four issues of *Journal of Health and Physical Education* in January through April, 1930. The last item was added to the December cover.
The diverse goals of the American Physical Education Association articulated in the above quote in 1930 had been contending for primacy in physical education for over fifty years. Some of the association's goals were practical and sought simply to stake out a territory, both real and figurative: gyms and playgrounds, trained physical education teachers and coaches. Some had as their objective to establish physical education as a regular part of the school curriculum; school departments had to be convinced of its importance so that they would commit the time for instruction, support for facilities, equipment, and staff, and credit for student work. Other goals were social: educating for intelligent use of leisure, such as camping, and promoting varsity and intramural programs that would socialize students and provide moral instruction through sports and gymnastics. The goals of teaching health habits, creating a scientifically graded curriculum, and providing of physical examinations sought to align physical education with the field of medicine. Finally, socialization for sex roles, although only explicitly added to the December issue quoted above, was long a fundamental underlying assumption of physical education, made by male and female practitioners alike.

Such a variety of goals concurrently pursued is evidence of either great strength and flexibility or, as in this case, of newness and vulnerability in a field. The field of hygiene and physical education was neither part of traditional humanities in academe, nor one of the sciences. Of all the stated goals listed above, those that emphasized their ties to medicine had the greatest scientific cachet and promised the best chance of earning academic respect for departments of hygiene and physical education. In order for physical education to demonstrate its affinity to medicine, it had to adopt
what were seen as the hallmark medical and scientific methods: to measure and quantify.

With no single viewpoint predominating, physical educators entered the field of hygiene and physical education with very different ideas about the purpose of their work and what its most important objectives were, leading to uneven work quality, disagreements over methods, and, ultimately, lack of credibility. The uncertainty rendered more urgent physical education's quest for intellectual respectability, especially in higher education. "Hygiene may truly be called the stepchild of the college curriculum," wrote APEA member Nelson Burden in 1935. "The subject is considered somewhat as a necessary evil by the curriculum committee who usually agree that some form of health teaching is necessary for the college student but hesitate to give due recognition to the course."\(^ {118}\)

This chapter shows that physical educators at Wellesley made their alliance to medicine through orthopedics. Thus, the Department saw posture research as critical to their establishment as a profession and spent years fruitlessly seeking an objective method for measuring posture and designing exercise regimens to cure or modify postural defects.

The Battle for Status at Wellesley

Physical education's difficulties in gaining academic respect can be seen in microcosm at Wellesley College. Athleticism was often taken as a sign of frivolity, as is clear from comments made by Wellesley faculty members in the first decade of the twentieth century. Professor Martha Hale Shackford, who taught English literature, complained about students' lack of seriousness

in regard to their studies, "threatened as we are with a generation of athletic students, almost too calm under the pressure of academic life." Similarly, lack of athleticism could connote the positive attributes of industry and seriousness. Katharine Lee Bates remarked that "pioneer woman [by which she meant the early generations of students at Wellesley] was stoop-shouldered, perhaps, and deficient in social ease, but she took her mind seriously." Margaret Sherwood, in a discussion of falling academic standards, "advised women seeking only to socialize to go elsewhere: 'If she longs for dramatic activity, is there not a stage? If she yearns for the trapeze, is there not the circus?'" Such sentiments led a physical education faculty member to lament, "It is hard for an Academic Faculty to think of the work as other than needed exercise, to feel that it truly is education of a sort worth credit for an A.B. degree."

The faculty that arrived with the merger of the Boston Normal School of Gymnastics had to prove to such stalwarts that not only was their purpose noble—for many admittedly good and noble things are still not intellectual—but that it demanded brains and offered specialized knowledge necessary to the functioning of American society. They regarded their alignment with medical sciences through courses in biological and physiological topics, along with the measurements of anthropometry, as powerful tools in their kit bag.

The Boston Normal School of Gymnastics concerned itself with orthopedics from the beginning. A course entitled Applied Anatomy, Physiology, and Theory of Gymnastics was in the school's curriculum in 1891,

119 Palmieri, In Adamless Eden, p. 212.
120 Palmieri, p. 211.
121 Palmieri, p. 211, citing Sherwood in "The Ideal College, "Wellesley Magazine 15, no. 2 (Nov. 1, 1906): 43-47, esp. 44.
joined the next year by Technicalities of Medical Gymnastics. The name of the latter course was changed to Corrective Gymnastics, probably because it was not taught by a medical person. Massage was added to the course description in 1899. Corrective classes included "lectures and practical demonstrations in detection and correction of postural faults and deficiencies and in massage. Special attention is paid to early stages of spinal curvature and to gymnastic treatment. Practical work with school children needing this treatment forms an essential part of the study. Under supervision of the instructor the students make their own examinations of the children, take measurements, and prescribe gymnastic treatment. The purpose of the course is to enable the future teacher of educational gymnastics to discover faults in posture and carriage of growing children, and to take charge of pupils who may require special work in corrective gymnastics." The next year brought further refinement to the course, "with a view to enable the graduates to recognize [spinal curvature], to know the etiology, development and pathology, to teach the use of preventive measures, avoidance of harmful exercises, and use of proper treatment." For the first time at the school, students were given clinical experience at Children's Hospital in Boston. A course in Spinal Curvature was instituted in 1901. By 1904, students received two years' work experience at the clinic at Children's Hospital as a regular part of the curriculum.

What happened to the connection with Children's Hospital after the Boston Normal School of Gymnastics merged with Wellesley College is, for the purposes of this study, still a mystery, but the types of courses that had

123 Taylor, p. 91.
124 Taylor, p. 91.
125 Taylor, p. 91.
126 Taylor, pp. 95-96.
127 Taylor, p. 107.
been offered at the Boston Normal School of Gymnastics did continue. The corrective course also continued to change its name: Corrective Gymnastics from 1909 to 1911, Corrective Exercises from 1911 to 1914, Corrective Gymnastics again in 1914-1915. For some reason, the course was not offered at all during 1916-1917, but appeared again as Corrective Gymnastics and Massage in 1917 to 1921, and, finally, Corrective Exercise and Massage from 1922 to 1929, after which point the course was no longer offered at all.128

That the course was dropped in 1929 did not mean that corrective work was abandoned, however. In 1921, Wellesley had had the good fortune to meet up with Dr. William MacAusland and Dr. Andrew MacAusland, brothers and orthopedists, who offered their services for free to the school for over twenty years.129 The arrival of the doctors MacAusland was of signal importance to the Department. It is possibly due to the dedication of these two men that the focus on posture reached the level of intensity that it did at Wellesley and that it carried on for so long.

The MacAuslands were Wellesley's most direct and enduring link to the orthopedic world. Their involvement with Wellesley is an example of how orthopedics and physical education worked together in graduate-level research. The MacAuslands gave lectures to the students on orthopedics. As surgeon-in-chief, Dr. William MacAusland provided Wellesley students access to the Carney Hospital Orthopedic Clinic in South Boston, where they were given practice in measuring and assessing orthopedic problems in children. In 1922, they established at Wellesley a yearly $1,000 Research Fellowship for the Study of Orthopedics in Relation to Health and Physical Education, which for many years supported the research of graduate

129 WCA: Faculty File: MacAusland. Access to this file is restricted, but I was able to obtain basic biographical information.
Examples of posture photographs. These appeared in Helen Sue Weaver, "Teaching Body Mechanics in the Elementary School," *Journal of Health and Physical Education* XV, No. 9 (Nov. 1944), p. 302.

The Wellesley method was not used here.

Below, left to right: Fig. 1 and Fig. 2; opposite page, Fig. 3 and Fig. 4. In each figure the first photograph was taken at the beginning of the recaster, the second, at the end.
students;\textsuperscript{130} even after the Department of Hygiene and Physical Education was closed in 1953, the research fellowship was granted to researchers outside this institution. From July to September 1924, William MacAusland gave a summer course in orthopedics, with three lectures a week plus time in the clinic. Other specialists at the Carney Hospital also gave lectures in their specialties that summer, and over the years they came out to campus, also unpaid, to share their knowledge with hygiene and physical education students: oto-laryngology, hygiene of the skin, internal medicine, oral hygiene, hygiene of the nervous system, and pelvic hygiene. Aside from the Carney Hospital, William MacAusland's positions included a trusteeship at the Massachusetts State Hospital for Crippled Children in Canton, and a clinical professorship at Tufts Medical School. He was also closely associated with the Berkshire School for Crippled Children in Pittsfield, Massachusetts, unique in that it provided education up to college level for the children in its charge; the Balch Hospital for Crippled Children in Manchester, New Hampshire; and the Sol-e-Mer Convalescent Hospital for Crippled Children in South Dartmouth, the "most modern unit for the care of crippled children in this country." Dr. Andrew MacAusland was the consulting physician on a monthly basis to Wellesley's Saturday morning posture clinics. Katharine Wells, a graduate who became part of the faculty and ran the clinic, referred to him children whose spines appeared to require the attention of an orthopedic surgeon. Wellesley students in the Department of Hygiene and Physical Education were thus exposed to orthopedics on a regular basis. For the faculty, regular intercourse with orthopedists gave them the claim to medical respectability they sought. It is here that we can see the incentive for

\textsuperscript{130} WCA: Department: Annual Reports, 1921-1924, p. 109.
the Department to pursue posture research in general, with posture photographs as one of its tools.

A Brief History of Orthopedists

An encapsulated history shows that orthopedics was growing as a field during the same years that physical education was, and they sometimes went hand-in-hand. Henry Gassett Davis (1807-1896) worked on fractures using weight-and-pulley traction at hospitals in Millbury and Worcester, Massachusetts, during much of the nineteenth century. The first comprehensive treatment of its kind in the United States, the Manual of Orthopedic Surgery by Henry J. Bigelow (1818-1890) appeared in 1844. Edward H. Bradford (1848-1926), the first professor of orthopedic surgery at Harvard Medical School, founded the American Orthopedic Association in 1887, and in 1904 convinced the state to found the Massachusetts Hospital for Crippled Children, the same hospital with which William MacAusland was later affiliated. Bradford also developed a frame used for treating spinal curves. Royal Whitman (1857-1946) was president of the American Orthopedic Association in 1895. He developed a metal plate for treating flat feet in 1889 and published a textbook in 1901 that was in its ninth edition by 1930. Arthur J. Gillette (1864-1921) was unusual for his time in that he limited his practice entirely to orthopedics. Among his many accomplishments, he helped to found a "state-supported hospital for poor

132 "Henry J. Bigelow" in Kaufman et al., Dictionary of American Medical Biography, pp. 63-64.
134 Royal Whitman, in Kaufman et al., Dictionary of American Medical Biography, p. 801.
crippled children" in 1910-1911, the first in the country.\(^{135}\) In 1915, a new technique for spinal fusing was developed to surgically insert a rod to hold the spine to encourage it to straighten.\(^{136}\) Eight years later saw the first so-called turnbuckle cast, invented by Drs. Lovett and Brewster of Boston.\(^{137}\) The American Academy of Orthopaedic Surgeons was founded in 1933. In 1936, Louis T. Wright (1891-1952), one of the few black orthopedists, invented a brace for cervical fractures.\(^{138}\) Devices and approaches to the treatment of the spine developed in quick succession throughout the twentieth century, and especially in the early part of the century, numerous hospitals for what people then called crippled children were established as an important project of the early public health movement.

In the history just recounted, it is notable that so many of the orthopedists mentioned practiced in Massachusetts, often in the Boston area. The concentration of such activity in this geographical region no doubt influenced the direction of physical education here, too. The rapid development of orthopedics as a medical specialty both drew on and fostered an intensive concern with posture during the years coinciding with physical education's intensive focus on posture and the photographs. Orthopedists published articles about posture in physical education journals, and physical educators routinely referred cases from the schools to orthopedists in clinics and private practice. A prominent local orthopedist, Dr. Joel Goldthwait, owned a gymnasium in Boston, as did Dr. Lovett, who was mentioned above for his invention of a brace for scoliosis in 1923.\(^{139}\) The Wellesley Department

of Hygiene and Physical Education's *Bulletin* of 1916-17 announced Dr. Goldthwait's appointment to the Department of Health and Physical Education at Smith College. Bound together through the gymnasium, orthopedists and physical educators began what turned out to be a decades-long attempt to find a cheap and reliable method of measuring posture that could be used to detect scoliosis and other postural defects.

**Physical Education and Orthopedics**

Physical education's alliance with orthopedists was well established in private practice and in hospitals by 1914, "with the difference [from 1901], however, that there are not so many advanced cases of chronic diseases," wrote Marguerite Sanderson in the 1914-15 *Bulletin* of Wellesley's Department of Hygiene and Physical Education, because "they are brought to the hospital in their earlier stages."\(^{140}\) Sanderson clearly laid out the rationale for corrective work as part of the mission for departments of hygiene and physical education: "[Corrective] work is no longer entirely confined to hospital clinics or to the private practice of orthopedic surgeons. Life demands human efficiency. Mechanical efficiency [i.e., machinery] is not enough if the workman is physically unfit. The academic world must share the burden with the medical world of developing this human efficiency."\(^{141}\)

One reason that the academic world had to share this burden was that teachers of physical education were sometimes working in rural school systems where there might be no orthopedist for miles. Sanderson did not specifically mention the posture photographs here, but her questions showed they were needed for physical educators to communicate with distant

\(^{140}\) Sanderson, p. 19.  
\(^{141}\) Sanderson, p. 16.
orthopedists. She also indicated why there was a need for physical educators to have training in orthopedic exercises: "And who has not met the type of medical inspector who determined you to look after your child yourself?"\textsuperscript{142}

The college setting gave physical educators access to research facilities and laboratories and the air of authority that the institution of higher education confers. Yet by the late 1930s, physical education still had not achieved its desired status and leaders in physical education were searching their souls to discover where they had gone wrong. Medicine, although appreciative of much of the work done by physical education, by no means appreciated what they saw as physical education's attempt to encroach upon their territory. What had gone wrong?

In the same October 1931 article in which he proved the unreliability of silhouettes for measuring purposes, Cureton attacked the overall effectiveness of research on posture. "There are, to date, no worthwhile quantitative studies showing the precise effects of corrective exercises upon the spine,"\textsuperscript{143} he said. "For instance, what specific and immediate effect have hanging exercises? . . . What if it should be demonstrated in time to be largely a waste of time and money?"\textsuperscript{144} Citing a case in "one of the best crippled children's hospitals," he drew the confession out of a nurse that "the weakest part of the program was the lack of definite records."\textsuperscript{145} If records were not meticulous, then how could any claims have been made that such-and-such an exercise produced any particular result? And the record keeping was not the only problem, for the record content was not accurate, either. "No satisfactory method has as yet been produced which is accepted as being

\textsuperscript{142} Sanderson, pp. 16, 17.
sufficiently accurate for research upon the many postural problems staring us in the face for reliable answers."

Reliable answers were not easy to find. The field of hygiene, physical education's sister discipline for many decades, also had trouble with its reputation, which thus tended to reflect badly on both disciplines. "Too much of the traditional subject matter of hygiene has rested upon unscientific data," railed the University of Michigan's Director of the Health Service in the pages of the *Journal of Health and Physical Education*. "Many personal opinions, half truths, and uncontrolled observations have failed to survive immersions in scientific criticism. . . . Such limitations are real reasons why hygiene has not been a very respectable member in the group of subjects at any school level."146 Among other topics, posture was singled out for attention. "There are good reasons based on personal appearance and self-respect why pupils should be encouraged to acquire the habits of good posture, but reasons based on any ordinary considerations of health are very questionable. It is likely that desirable postures depend on rather than promote good health."147

"Is Physical Education a Science?" wondered a headline in the April 1935 *Journal of Health and Physical Education*, and decided it was only "in the stage of becoming a science."148 The February issue had already given some indication of why this was so. It recognized that physical education was at a crossroads at which the Association saw four choices: the profession could continue to try to do everything, thus spread itself too thin; it could narrow its focus to certain topics; it could hew completely to work in the schools and

147 Forsythe, p. 19.
encourage other department to share responsibility for health, safety, citizenship, and leisure time activities; or it could pursue a medical track.

The focus of physical education programs shifted away from the sciences and toward an emphasis on education through the physical rather than education of the physical,\textsuperscript{149} turning attention toward training students in citizenship and fair play through sports and to positive use of leisure time through such activities as tennis and camping. The days of physical education’s domination by biology and physiology started to wind down to the end.

Posture was not the only culprit in this denouement, but it came in for its share of criticism. "It is desirable, of course, for physical education teachers to encourage their pupils to maintain good bodily carriage. It cannot be recommended, however, that departments of physical education undertake orthopedic work of a broader scope," wrote Jackson R. Sharman, associate professor of physical education at the University of Michigan. In his view, "physical education should be conceived of as being primarily an educational and recreational procedure and not a therapeutic procedure."\textsuperscript{150}


adjunct, or of concentrating on the social scientific aspects of recreation or citizenship. Although many acknowledged that good posture was desirable, few argued for posture as important to the field’s mission.

Physical education directed some of its graduates toward further education in physical therapy, which drew from the ranks of nurses and physical educators and gave them a year to eighteen months' more training. Thomas Wheeldon of the Department of Physical Therapy at the College of William and Mary saw a role for physical educators. He made an admittedly hasty survey of the states and found that posture work was woefully lacking in most of them. He believed that physical educators and physical therapists could work cooperatively in the schools. Children deemed through an orthopedic examination to need attention would, depending upon the severity of their need, be given special treatment by either the physical therapist, the physical educator, or both.

In some cases, the marriage of physical education to physical therapy did not go well. Some physical educators performed work that bordered on the medical, and did not do it very well, charged William Snow, a medical doctor and director of physical therapy at Columbia-Presbyterian Medical Center in New York. Physical educators worked in “psychiatry and neurology, [with] the physically handicapped, [as] athletic trainers, [and in] corrective training to structural abnormalities....” Unfortunately, physical educators had not made a good impression on some medical doctors, who detected "a real resentment" and lack of attention to medical ethics by physical educators who, Snow wrote, encroached on medical territory beyond


their range of expertise. Snow was blunt. "[Many] physical education workers in the therapeutic field are accepting responsibilities both in their teaching and in corrective work, with which responsibilities they should not be burdened." Physical education should "avoid any activities which may carry implications of establishment of a cult of medical practice. . . . I frankly believe that the medical profession is prompted by the highest ideals to keep health matters 100 percent under medical supervision. I am sure that adjustments in physical education curricula, and converging points of view will bring physical education in the therapeutic field to a point of medical appreciation not yet achieved." 153 Snow did not mention posture specifically, but since posture was included prominently in corrective work, its inclusion was implied. His observation that physical education had "progressed very slowly for the last ten years" did not reflect well on the years during which posture research at Wellesley was at its pitch.

Maybe Wellesley had been barking up the wrong tree. Had their ambitions been hubris? Or, by hitching themselves to the orthopedic wagon, had they only made the mistake of allying themselves with a field that was in its own way as weak as their own? After decades of trying to carry on a mission to detect and treat scoliosis and what they believed to be other postural defects, physical educators were forced to scale back their goals to screening rather than treatment.

Posture photographs were used long after their scientific use was proved deficient. They had always had a dual use: for orthopedic diagnosis and measurement, and as good motivational tools for students. It was another decade or so before Sheldon's misuse of the photographs was discovered, close to thirty years later before the program ended at Wellesley.

153 Snow, pp. 387, 430.
By the 1960s, Wellesley students were allowed to wear their underwear in the photos, and by then times had changed considerably. Paradoxically, issues of nudity were not nearly so fraught with anxiety as they had been earlier in the century, but students still resented the intrusion over their autonomy.\textsuperscript{154}

Today, chiropractic uses some of the same claims for the severe consequences of scoliosis that physical educators were making in the early part of the century, while the better-established field of orthopedics does not. It is not within the realm of this paper to decide which claim is correct, but it is interesting in the sense that chiropractic today shares with the physical education of yesterday an outsider status to medicine, and seeks the same respectability.

\section*{The Theory of Measurement}

Orthopedists and physical educators were not alone in the pursuit of numbers at the end of the nineteenth century and beginning of the twentieth, but must been seen in the context of growing use of measurement and quantification in other branches of medicine. In his study of measurement and quantification, \textit{Trust in Numbers: The Pursuit of Objectivity in Science and Public Life}, Theodore Porter\textsuperscript{155} noted that it was right at the turn of the century that the pharmaceutical industry engaged in developing methods for testing and standardizing drugs and dosages.\textsuperscript{156} As well, psychologists were devising ways to measure intelligence. Sarah Russell Davis, a Boston Normal School of Gymnastics graduate in 1907, argued in 1917 that it was

\textsuperscript{154} This is purely anecdotal and at this point unattributable, but undoubtedly can be backed up.
\textsuperscript{156} Porter, p. 29.
"not the psychological moment" for physical education to stop making measurements, since "everyone else" was making them.\textsuperscript{157}

Although Porter focused primarily on engineering and actuarial work, his remarks can be generalized to other fields. He argued that when objectivity within a discipline is doubted by outsiders, "mechanical objectivity"\textsuperscript{158} emerges, that is, scrupulous attention to rules, regulations, and norms. Objectivity thus established provides that reference point that resides outside the desires of the human heart, and to which a community (such as physical educators) can refer when communicating with one another and with outsiders. Numbers are an extremely useful and powerful form of objectivity. Their universality carries the authority of an apparently natural law. They "minimize the need for intimate knowledge and personal trust" because of their impersonal nature.\textsuperscript{159} They obviate the need to assess individuals’ judgments; the measurements that numbers represent are ostensibly the same no matter who takes them, and one's membership in a field gives other members reason to believe that the numbers have been honestly and conscientiously obtained. Thus the use of numbers can strengthen a field by allowing it to articulate standards, thereby imposing hierarchical control over local communities of practitioners who by their adherence to the standards signal their membership in that community. The Demeny machines, calipers, rulers, camera lenses, grids, screens, light wattage specifications, aluminum pointers—the instruments and technical considerations of measurement in posture graphics were attempts at securing mechanical objectivity. These devices and methods were supposed to obtain precisely the same results no matter whose hands guided them. That this was

\textsuperscript{157} Davis, p. 7.
\textsuperscript{158} Porter, p. 3.
\textsuperscript{159} Porter, p. viii.
not in fact the case was a central problem in posture research and the reason for the constant quest for better and more refined. The obsession with this search in turn kept an army of researchers from testing to see whether their assumptions about connections between posture and organic and mental health were even in fact true.

Posture's trajectory as a vehicle for intellectual and professional respectability led posture researchers to cut corners and not look too deeply into the efficacy of methods that were cost effective. Porter's idea that "if the most accurate methods are too expensive, inferior ones may become standard"\textsuperscript{160} apply very well in this case: Bureaucrats in government and school systems needed technologies they could afford. Assessments of the various techniques—schematography, photography—were cost conscious and time conscious; researchers included in their criteria how easy a given technology was to use, how expensive or cheap the materials were, how fast the procedure was, how many bodies could be processed in a given amount of time.

Porter also points out that "quantification is a technology of distance,"\textsuperscript{161} carrying meaning across space and even language. A physical educator could tell another physical educator not that a student had a little curve in the spine, but that she had a twenty-degree lateral curve at the fifth lumbar vertebra, which they could agree signified the need for torso exercises, or she had a forty-degree curve, which signified the need for orthopedic surgery. Photographs share with numbers the ability to carry information across distances. Physical educators strained the parameters of graphic devices such as the posture photographs by forcing them to be tools of measurement

\textsuperscript{160} Porter, p. viii.
\textsuperscript{161} Porter, p. 8.
rather than simply tools to add visual impact to the numbers. "What if you are in a remote town without access to a competent opinion on scoliosis? What if the only medical man available can't see a deviation of the spine when you show it to him?" wrote Marguerite Sanderson in the 1914-1915 Bulletin. What physical educators could do in such cases was to take a photograph and send it to the nearest orthopedist. What they did at Wellesley and elsewhere was to go further by making measurements on the photographs, recording the information for statistical purposes, and recommending treatment based on the numbers. If the orthopedist in the distant city did not see the curve or think it very severe, measurements might convince him otherwise.

The distance that numbers can cross includes emotional distance. Quantification takes the personal sting from a number that has negative meaning: a person might have had a serious postural problem, but she was not alone, and when she was simply one in a tally, her personal identity was of no consequence to the physical educator, orthopedist, or public health worker using the statistics or looking at her photograph. The act of measurement rendered the individual women invisible. This is one reason why concern for women's modesty dropped out of the conversation as the posture program was increasingly put forward as the physical education department's justification for its claims to science: they were not looking at the shy girl, the fat girl, the angry one, they were looking at her spine and how closely it conformed to an ideal or a standard that may or may not have had any useful relationship to her actual body. Many articles in the Journal admonished physical educators that they were doing corrective work with

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162 Sanderson, p. 17.
individual humans, not "cases," but the fact that the reminder was so frequently made testifies to the likelihood that it was frequently forgotten.

Another important aspect of numbers is their ability to serve a bureaucratic function. Posture measurements provided data to be compiled for statistics that could be used to convince school systems, hospitals, and government officials of physical education's utility. "With these facts in our possession we are better able to substantiate the reasons for our requests for increased facilities or opportunities," continued Sarah Russell Davis in her defense of measurement. "School boards, trustees, principals and presidents are more apt to attend to requests clearly presented, ably demonstrated and backed by fact. Let us then take courage, and develop our tool anthropometry into a serviceable weapon in the campaign for the advancement of hygiene and physical education in the institutions and communities with which we are concerned."163

Although there is strength in numbers, their use can signify quite the opposite condition: something might be awry if a field needs to fortify itself with stridently numerical proof of its rightness. "While . . . numbers and systems of quantification can be very powerful, the drive to supplant personal judgment by quantitative rules reflects weakness and vulnerability," wrote Porter. He argued "that the transition from expert judgment to explicit decision criteria did not grow out of the attempts of powerful insiders to make better decisions, but rather emerged as a strategy of impersonality in response to their exposure to pressures from outside."164 If a great effort is being exerted to impose uniformity by creating the rule of numbers, it shows that individual, local judgments are not to be trusted. Porter attributes this to

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163 Davis, p. 11.
164 Porter, p. xi.
"a response to conditions of distrust attending the absence of a secure and autonomous community." This shows through very clearly in the case of physical education. Posture measurements replaced personal judgment as physical education became increasingly involved with orthopedic issues. Orthopedists first had to be persuaded that physical education had the capability and the tools to provide them valuable information. The Sarah Russell Davis quotation above perfectly demonstrates that pressure came in the form of power over funding wielded by school and public administrators, who had to be convinced that investment in the program of physical education would be worthwhile.

More profoundly, Porter points out how over-reliance on numbers "evades the deep and important issues." Again, this clearly was the case in anthropometry and posture photographs. Silhouette methods were used for years before Cureton proved how useless they were to orthopedists' needs for exactitude for making diagnoses. The constant search for better methods of measuring also distracted physical educators from noticing that the exercises they were prescribing were not working. Sanderson cited a study that showed that children in the local high school had worse posture than the elementary school children—"And this after eight or nine years of physical education in the schools!"

The kinds of moral and characterological deficiencies supposedly shown by bad posture could not in reality be cured or affected in any worthwhile way by an improved stance. The temptation to think otherwise was powerful. "Mentally, many ordinary reflexes are connected with posture which conduce to poise, dignity, self-reliance, and efficient and healthful

165 Porter, p. xi.
166 Porter, p. 5.
167 Sanderson, p. 17.
work. The study of conditioned reflexes suggests that in subtle but significant ways conditioned reflexes of the utmost importance to physical and mental health may be developed in connection with posture," claimed the American Posture League in 1917. To officials in governmental agencies such as public health or education, physical educators offered a method that would attain social goals by influencing individual character through posture work. There was no need to bother with more radical change through political means.

The obsession with numbers, meant (among other things) to save children from suffering by detecting back problems early, instead carried the potential for negative consequences. How did the treatment for scoliosis affect children, especially those in the hospitals? What did it mean to be singled out as defective? Some photograph evaluators imposed ideas of connections between posture and character and intelligence onto the photographs. How many children who were considered to be unintelligent or in some manner socially undesirable were labeled as posturally defective and relegated to separate corrective classes, rather than participating in ordinary games with the rest of the children, which even could have helped them socially? How did class bias function in interpreting the photographs? Of course, the same questions also apply to college students. How many missed out on participating in popular activities because their spines did not fit some carefully designated but nevertheless arbitrary standard; and the enforcement of nudity, however it may have been dressed in medical garb, embarrassed and humiliated generations of female students. Posture researchers lusted after numbers because they implied rigor, as Porter says,

"skill, diligence, and impersonality." The negative side of impersonality unfortunately won out. The pursuit of numbers not only led posture researchers on a wild goose chase, it led them to overlook the human consequences of their mistaken judgments.

169 Porter, p. 50.
Conclusions and Notes for Further Research

The preceding chapters have outlined the major themes of the posture photographs as seen through the archival material at Wellesley College and the major publications of the American Association for Health and Physical Education. I have shown how the American obsession with posture from the last quarter of the nineteenth century up through nearly to World War II arose from vague sensations of ill health, in the form of neurasthenia, from fears of physical deterioration of "old-stock Americans" through breeding with immigrants, and from the desire to prove women able to withstand the rigors of higher education. Rather than the eugenic story told by Ron Rosenbaum in his *New York Times* article, I found that the production of posture photographs was intimately linked to the desire to establish physical education as a research field, and its use of orthopedics toward that end. I have stayed very close to the story of orthopedics because it explains what other aspects of posture photographs do not explain. I believe that I have demonstrated why the particular artifact—the posture photograph—rose in importance during the 1920s and 1930s as physical educators used it in an attempt to be useful to orthopedics, why this ultimately failed, and why the photographs continued to be used long after this failure was recognized. However, the more I looked and thought, the more I could see other lines of research to follow, which I will mention here.
Some areas of interest have to do with bits of evidence or hints that I was not able to follow up, but found tantalizing. First, I would like to establish more clearly whether there is a relationship between Loretto Fish Carney, a faculty member in the Department of Health and Physical Education, and the Carney Hospital in South Boston. Likewise, a member of the academic faculty was named Emily Greene Balch, and one of Dr. William MacAusland's affiliations, aside from the Carney Hospital, was with the Balch Hospital for Crippled Children in Manchester, New Hampshire. This may be entirely coincidental, but the name Balch especially is unusual, and I think it worth pursuing. In a similar vein, it could be rewarding to look into records of the gymnasiums in Boston that were owned by orthopedists. I know of Goldthwait's and Lovett's, both prominent orthopedists, but during the same period there were many other gymnasiums in Boston. Did they used posture photographs? What systems of exercises did they use, and what apparatus, what instrumentation?

Second, I have a sense that when the heavy investment that Wellesley's Department of Hygiene and Physical Education made in posture failed to fulfill its initial promise, this became a contributing factor in the Department's downfall and closure in 1953. Had the research facility been thriving and on the cutting edge of physical education research, it might have had a better chance of remaining at Wellesley, even though it did not fit Wellesley's overall liberal arts mission. This thesis has explored the origins of the posture photographs; research into their demise will give a truer picture of their meaning to researchers and the Department.

Third, an article entitled "Sharpening the Focus on Health" was written by a member of the Metropolitan Life Insurance Company named W. P. Shepard, who wrote of a partnership between physical education and
insurance. How were orthopedics regarded by the insurance industry? How was scoliosis covered by insurance, and in what ways could physical educators have figured into this partnership? In the preface to his 1982 textbook, the British orthopedist James Cyriax noted that orthopedic work was not covered by the National Health Service, a situation that is not likely to have changed today. A parallel status might obtain in the United States, perhaps meaning that orthopedics still has not attained the medical autonomy it desired a century ago. Were posture photographs used by orthopedists not only for diagnostic purposes, but also as proof to insurers of their judgments?

Fourth, there is a vast literature arguing the merits or utter uselessness of various anthropometric measurements, and reasons that physical education should continue or discontinue taking them. These arguments often provoked hostility from other fields defending their territory from physical education's encroachment, as evident in Dr. Snow's article at the end of Chapter 4.

Finally, it might be a fruitless search, but it would be fascinating to go through other department files to see if there is any discussion that took place in other departments about the posture photographs. Interviews with retired faculty would be more likely to produce interesting information, although not many alive now would have been around when the habit of nude photography began. I expect there was a mixture of heated discussion, bafflement, shock, ridicule, and approval in reaction to the odd practice in which the new department engaged. How did traditional academia react to the medicalization of what used to be merely exercise classes? How did the struggle for respectability that engulfed so much of physical education's energy compare to similar battles fought by other new departments in the
social sciences that tried to fight their way into the Wellesley curriculum? When and how did Hygiene drop out of the title of the Department of Hygiene and Physical Education?

I have not dwelled on the specific meanings for women inherent in the posture photographs, but this is not because there is little to say. Precisely the opposite: it would take more research to confirm this, but posture studies seemed to have a strong bias toward women and children. It is true that the military made use of them sometimes, as did all-male colleges and coeducational institutions. But at a time when non-sexist language had not even been thought of, *she* is used more often in the literature as a generic term for *student* than I expected. Whether or not this turns out to be true (and a little pronoun quantification could help to find out), posture photographs did have meanings for women that were separate from the meanings to men. Nudity has already been touched upon, but other issues include how the photographs encouraged women to fit into some particular ideal, for example, of femininity. What notions of obedience led generations of intelligent Wellesley women to submit to having their photographs taken nude? Was it their status as guinea pigs for women's education? A feeling that their "no" would not be respected? Did the ordeal of having the photographs taken take on aspects of an initiation ritual?

I have also left untouched the anthropological aspects of posture photographs, only briefly alluding to them in the introduction. I believe that the connections of posture to eugenics and the founding of a master race were not the core of the posture photograph program at Wellesley, but I want to dispel any impression I might have left that Rosenbaum's racist-eugenicist slant was completely off the mark. Anthropologist were very deeply involved in the measurements of human beings. Franz Boas's name comes
up in the physical education literature, and physical anthropologist Ernest Hooton was doing posture photography at the Peabody Museum at Harvard—in fact, he even started his program in 1926, the same year Wellesley acquired its special camera. Eugenicists such as Paul Popenoe and Roswell Johnson used anthropometry and measures of posture in their quest to maintain racial purity. Closer to home, references to the Race Betterment Association are scattered through the literature and are even mentioned in the Department's Bulletin. Battle Creek, Michigan, was a center for eugenics, and Wellesley Department of Hygiene and Physical Education faculty members attended at least one lecture program there. The racism of Journal and Research Quarterly is so candid that it is clear that racism was an underlying assumption.

Further research into the history of the origins of orthopedics and its rise in the medical profession is a study in its own right, as is the rise of the public health movement that turned the nation's attention toward children's health. The roots of the posture photograph program are complex and reach so deeply into so many facets of American life—and European life, too—that it remains a rich field for future exploration.
WHAT DO YOU WISH FOR STUDENTS AT WELLESLEY?
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Archival Sources
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