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**Strength for Sport: The Development of the Professional Strength and  
Conditioning Coach**

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## **Dedication**

To Valerie, supportive beyond measure, and the highlight of each of my days.

To Milo, who always reminds me that you can never be too busy to play with trucks.

To my parents, grandparents, and the rest of my family who gave me the room to find my passion and the encouragement to pursue it.

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# **Strength for Sport: The Development of the Professional Strength and Conditioning Coach**

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The University of Texas at Austin, 2013

Supervisor: Janice S. Todd

This dissertation examines the social and scientific factors which fostered the inclusion of strength training as an adjunct to sport preparation programs. It utilizes Thomas Kuhn's theory of "paradigm shift," outlined in his 1962 treatise *The Structure of Scientific Revolutions*, to describe how strength training went from an activity perceived as harmful and deleterious to sport, to one which is now considered an indispensable component of optimal performance.

In the late-nineteenth and early-twentieth centuries physicians, physiologists, and physical educators theorized that the body operated under the constraints of fixed capacities. Increased demands by one component of the body necessarily robbed nourishment from other parts. Under this paradigm, increased muscular strain posed a risk to other organ systems and was advised against. Through a thorough exploration of the scientific literature, this work demonstrates the evolution of the understanding of physiology which precipitated the displacement of the old paradigm.

In addition to scientific literature, popular magazines are also utilized because of their importance in the erosion of the old paradigm and in laying the groundwork for the

acceptance of the current paradigm of strength training as an adjunct to athletic performance. Moreover, this work discusses the importance of the Second World War, the Cold War, and the Olympics in hastening the demise of the belief that strength training was physically and athletically harmful.

The number of athletes training with weights in the United States dramatically increased in the 1950s and the pace accelerated through the 1960s. The endorsement of the new paradigm was cemented with the hiring of specialists in strength training who went on to create their own literature and sponsor their own research. Completion of the paradigm shift is evident in the contemporary ubiquity of weight training which is performed for nearly all sports, all age groups, year-round, often in highly specialized facilities and overseen by individuals certified as strength and conditioning or performance-enhancement specialists.

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## INTRODUCTION

During the summer of 2010 the popular magazine website ESPN.com ran a series of articles on college football's strength coaches. The articles included a breakdown of the coaches by conference, with the names and brief resumes of head coaches at each college.<sup>1</sup> The resumes included personal vignettes, work experience, education, and professional certifications, so that rabid college football fans could compare *their* strength expert to that of their arch-rivals. Additional articles briefly discussed the history of the profession and profiled specific coaches such as Paul Longo of Notre Dame and former University of Nebraska strength coach Boyd Epley.<sup>2</sup> In a sport as rankings-driven as college football, an article ranking the strength training facilities at the football powerhouses was almost a foregone conclusion.<sup>3</sup> The article listed the top-ten college weight rooms as assessed by coaches, National Football League (NFL) scouts, and college administrators. The list was headed by the University of Texas' Nasser Al-Rashid Strength and Training Center and the top facilities could have doubled as a set of national football rankings and included the universities of: Nebraska, Alabama, Florida, Oklahoma, Notre Dame, Oregon, and Louisiana State.

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<sup>1</sup> Chris Low, "A Look at the SEC Strength Coaches," *ESPN.com*, 23 June 2010, [http://espn.go.com/blog/sec/post/\\_id/11487/a-look-at-the-sec-strength-coaches](http://espn.go.com/blog/sec/post/_id/11487/a-look-at-the-sec-strength-coaches) (accessed May 30, 2012); Adam Rittenberg, "A Look at the Big Ten Strength Coaches," *ESPN.com*, 23 June 2010, [http://espn.go.com/blog/bigten/post/\\_id/13376/a-look-at-the-big-ten-strength-coaches](http://espn.go.com/blog/bigten/post/_id/13376/a-look-at-the-big-ten-strength-coaches) (accessed May 30, 2012); Ted Miller, "A Look at the Pac 10 Strength Coaches," *ESPN.com*, 23 June 2010, [http://espn.go.com/blog/pac10/post/\\_id/10662/a-look-at-pac-10-strength-coaches](http://espn.go.com/blog/pac10/post/_id/10662/a-look-at-pac-10-strength-coaches) (accessed May 30, 2012); Brian Bennett, "Who's Who Among Big East Strength Coaches," *ESPN.com*, 23 June 2010, [http://espn.go.com/blog/bigeast/post/\\_id/10105/whos-who-among-big-east-strength-coaches](http://espn.go.com/blog/bigeast/post/_id/10105/whos-who-among-big-east-strength-coaches) (accessed May 30, 2012); David Ubben, "Shoutout to the [Big 12] Strength Coaches," *ESPN.com*, 23 June, 2010, [http://espn.go.com/blog/big12/post/\\_id/13640/shoutout-to-the-strength-coaches](http://espn.go.com/blog/big12/post/_id/13640/shoutout-to-the-strength-coaches) (accessed May 30, 2012); Heather Dinnich, "Meet the ACC's Strength Coaches," *ESPN.com*, 23 June 2010, [http://espn.go.com/blog/acc/post/\\_id/12035/meet-the-accs-strength-coaches](http://espn.go.com/blog/acc/post/_id/12035/meet-the-accs-strength-coaches) (accessed May 30, 2012).

<sup>2</sup> Pat Forde, "Strength Coaches Doing Heavy Lifting," *ESPN.com*, 24 June 2010 [http://sports.espn.go.com/nfc/columns/story?columnist=forde\\_pat&id=5310210](http://sports.espn.go.com/nfc/columns/story?columnist=forde_pat&id=5310210) (accessed May 30, 2012); John Lukacs, "Programs Decades in the Making," *ESPN.com*, 22 June 2010, <http://sports.espn.go.com/nfc/news/story?id=5312405> (accessed May 30, 2012).

<sup>3</sup> Bruce Feldman, "Heavy Lifting's Best Starts with Horns," *ESPN.com*, 23 June 2010, [http://insider.espn.go.com/nfc/blog?name=feldman\\_bruce&id=5318369](http://insider.espn.go.com/nfc/blog?name=feldman_bruce&id=5318369) (accessed May 30, 2012).

To earn such vaunted status, athletic departments invest millions of dollars in their facilities.<sup>4</sup> Amenities of top-tier weight rooms frequently include 20,000 or more square feet of floor space, indoor 50-70 yard sprint tracks, plyometric areas lined with artificial turf, rows of lifting stations that each cost several thousand dollars, and a wide variety of specialized strength machines and cardiovascular equipment.<sup>5</sup> The Anderson Center at the University of Kansas even boasts a twenty yard indoor hill that is divided into a ramp, stadium steps, and plyometric steps filled with shredded tires.<sup>6</sup> At Nebraska, lifting stations are equipped with a small touch-screen computer. Athletes sign into the computer and then see their daily workout on the screen. The workouts are tailored to individual athletes by the strength coaches and include specific weights to be used by the athlete for each set of the workout. Once the athlete has loaded the bar with the specified weight, they tap a “start” button on the screen and commence lifting. Once the exercise is completed, they tap a “stop” button on the screen which starts a pre-set timer, again tailored by the strength coach, that regulates the athlete’s rest time and which corresponds to the intensity of the set. While the athlete waits to perform their next set, they can peruse the touch screen to see bar velocities for each repetition of their previous set as well as a video playback to monitor their form. Strength coaches also have access to the videos and information about bar velocities and weight lifted, which is used to monitor the progress of athletes.<sup>7</sup>

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<sup>4</sup> For example, the University of Florida’s weight room underwent a \$28 million overhaul in 2008. John Lukacs, “Follow these Rules...or Else,” *ESPN.com*, 23 June 2010, <http://sports.espn.go.com/ncf/news/story?id=5315610> (accessed May 30, 2012).

<sup>5</sup> Ibid; A major national supplier of strength training equipment to colleges and universities lists the price of lifting stations between \$2,000 and \$4,500. Power Systems Inc. “Lifting Stations, Racks, and Platforms,” Powersystems.com at: <http://www.power-systems.com/s-39-lifting-stations-racks-and-platforms.aspx> (accessed 30 May, 2012).

<sup>6</sup> Feldman, “Heavy Lifting.”

<sup>7</sup> The computer system is explained by assistant strength coach Brandon Rigoni in a sidebar video. Huskers.com, “Myers Performance Center Strength Complex,” at: [http://www.huskers.com/ViewArticle.dbml?&SPSID=57698&SPID=22&DB\\_OEM\\_ID=100&ATCLID=603653](http://www.huskers.com/ViewArticle.dbml?&SPSID=57698&SPID=22&DB_OEM_ID=100&ATCLID=603653) (accessed May 30, 2012).

In addition to overseeing palatial facilities, the highest-level strength coaches claim salaries that are almost as large as the facilities. Hired in January of 2011 from the University of Tennessee to revive a flagging Texas Longhorns football program, Bennie Wylie earns \$315,000 annually.<sup>8</sup> That salary is the twenty-eighth highest compensation package at the university. Moreover, of the twenty-seven higher earners, thirteen are in the athletic department and eight of those are football coaches. Only eight full professors, one of whom is a Nobel laureate, make more than Texas' football strength and conditioning coach. While those figures are staggering, Wylie is not the top-earning strength coach. That designation appears to go to Mickey Marotti who was recently hired to overhaul the strength program at Ohio State and will reportedly earn \$380,000.<sup>9</sup> Additionally, Scott Cochran at the University of Alabama had his salary increased from \$310,000 to \$325,000 in the spring of 2012 following a football national championship, while coaches at Louisiana State and Auburn University, as well as at the Universities of Oklahoma, Arkansas, and Tennessee each make at least \$200,000 annually.<sup>10</sup>

The rationale for the substantial pay for strength coaches is that, in addition to playing a key role in developing the athletes' physical capacity for sport, they have the greatest access to players under National Collegiate Athletic Association (NCAA) rules. During the offseason athletes have little, if any, contact with their sport coaches. Moreover, during the season,

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<sup>8</sup> Texassports.com, "Bennie Wylie," at: [http://www.texassports.com/sports/m-footbl/mtt/wylie\\_bennie00.html](http://www.texassports.com/sports/m-footbl/mtt/wylie_bennie00.html) (accessed May 30, 2012); *Texas Tribune.org*, "Government Employee Salaries," at: <http://www.texastribune.org/library/data/government-employee-salaries/the-university-of-texas-at-austin/> (accessed May 30, 2012).

<sup>9</sup> Private colleges, such as Notre Dame and the University of Southern California, do not have to make salary figures publicly available. Tyler Robinson, "Mickey Marotti 'Antsy' to Get Buckeyes Buff," *The Lantern*, 1 February 2012, <http://www.thelantern.com/sports/mickey-marotti-antsy-to-get-buckeyes-buff-1.2761147> (accessed May 30, 2012).

<sup>10</sup> "Nick Saban Gets Raise, Extension," *ESPN.com*, 27 March 2012, [http://espn.go.com/college-football/story/\\_/id/7740227/alabama-crimson-tide-grant-coach-nick-saban-raise-2-year-extension](http://espn.go.com/college-football/story/_/id/7740227/alabama-crimson-tide-grant-coach-nick-saban-raise-2-year-extension) (accessed May 30, 2012); David Ching, "UGA Rejuvenates S&C Program," *ESPN.com*, 25 April 2012, [http://espn.go.com/colleges/georgia/football/story/\\_/id/7853700/georgia-bulldogs-rebuild-strength-conditioning-staff](http://espn.go.com/colleges/georgia/football/story/_/id/7853700/georgia-bulldogs-rebuild-strength-conditioning-staff) (accessed May 30, 2012); Pete Thamel and Thayer Evans, "Strength Coaches Have Valued Role at Oklahoma and Florida," *New York Times*, 7 January 2009, <http://www.nytimes.com/2009/01/08/sports/ncaaf/08college.html?pagewanted=all> (accessed May 30, 2012.)

coaches typically only interact with their specific position players or units. Strength coaches interact with all the players throughout the year and, as such, play a key role in determining the atmosphere of an athletic program.<sup>11</sup> Common justifications for lavish strength complexes include their utility as a recruiting tool and source of motivation. The gigantic facilities, often with floor to ceiling windows overlooking the football field, are designed to impress potential recruits. Additionally, their size and multitude of equipment allows entire teams to work out simultaneously, which coaches speculate enhances camaraderie. The aesthetic appeal of the facilities is intended not only to impress, but to be inviting, presumably encouraging athletes to stay and train for longer periods of time.<sup>12</sup>

The investment universities make in strength facilities and personnel are relatively recent developments in the arms race of intercollegiate sports. In fact, since the first intercollegiate sport contest, a rowing event between Harvard and Yale in 1852, American universities have looked for any edge, any new method of training that will give them an advantage over their opponents on the field and in recruiting.<sup>13</sup> In the second half of the twentieth century, the desire for enhanced performance led to a new type of professional emerging within the ranks of collegiate (and professional) sports. Called strength coaches, these individuals' fundamental responsibility is to improve the physiological parameters associated with a sport, such as strength, speed, power, and agility. They do not coach the actual techniques of the sport, like blocking or tackling in football. Rather, they attempt to improve a player's physical capacity so that they will be able to perform their sport skills more effectively and efficiently. For the purpose of this project a "strength coach" is a person whose primary job duties include,

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<sup>11</sup> Forde, "Strength Coaches Doing Heavy Lifting."

<sup>12</sup> Jim Catalano, "Building Strength," *Athletic Management*, June/July 2003, <http://www.momentummedia.com/articles/am/am1504/strength.htm> (accessed May 29, 2012).

<sup>13</sup> Ronald Smith, *Sports & Freedom: The Rise of Big-Time College Athletics* (New York: Oxford University Press, 1988).

“assess[ing], motivat[ing], educat[ing], and train[ing] athletes for the primary goal of improving sport performance.”<sup>14</sup>

This project investigates the social and scientific factors which led to the development of the strength and conditioning profession and explores the circumstances which both fostered or hampered the profession’s development. It incorporates Thomas Kuhn’s model of shifting paradigms to explore the evolution of strength training in the United States through the latter decades of the twentieth century. Through discussion of the first two collegiate strength coaches, it explains how strength training became a necessary adjunct to college sport. Additionally, it incorporates Alan Guttman and Melvin Adelman’s models of “modern sport” to explain the role of strength training in “modernizing” contemporary sport. It further utilizes Guttman’s model to explore how strength training, in its own right, assumed some of the aspects of modern sport. Finally, it considers the impact of the strength and conditioning profession on contemporary American sports.

The history of strength training is a relatively new area of research in the larger field of sport history. Jan and Terry Todd have written extensively about all facets of strength training, including the history of strength implements, pioneering figures in the “Iron Game,” the history of competitive lifting, and the impact of anabolic steroids.<sup>15</sup> Moreover, the Todds founded the

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<sup>14</sup> N. Travis Triplett, Chat Williams, Patrick McHenry, and Michael Doscher, “Strength and Conditioning Professional Standards and Guidelines,” National Strength and Conditioning Association, 8 July 2009, <http://www.nscs-lift.org/Publications/SCStandards.pdf> (accessed May 20, 2012).

<sup>15</sup> See, for example: Jan Todd, “Legacy of Iron: A History of the Men, Women, and Implements That Created the Iron Game,” in *Resistance Training: The Total Approach*, ed. Lewis Bowling (Durham, NC: Carolina Academic Press, 2007), 165-215; Terry Todd, “Steroids: An Historical Perspective,” *Iron Game History: The Journal of Physical Culture* 1, no. 2 (April 1990): 1-3; Jan Todd, “The Mystery of Minerva,” *Iron Game History: The Journal of Physical Culture* 1, no. 2 (April 1990): 14-17; Terry Todd, “A Pioneer of Physical Training: C.H. McCloy,” *Iron Game History: The Journal of Physical Culture* 1, no. 6 (August 1991): 1-2; Jan Todd, “The Legacy of Pudgy Stockton,” *Iron Game History: The Journal of Physical Culture* 2, no. 1 (January 1992): 5-7; Jan Todd, “From Milo to Milo: A History of Barbells, Dumbbells, and Indian Clubs,” *Iron Game History: The Journal of Physical Culture* 3, no. 6 (December 1994): 4-16. Jan Todd, “Chaos Can Have Gentle Beginnings,” The Early History of the Quest for Drug Testing in American Powerlifting: 1964-1984,” *Iron Game History: The Journal of Physical Culture* 8, no.

journal *Iron Game History: The Journal of Physical Culture (IGH)* in 1990, which has served as an important resource on the history of strength training. One of *IGH*'s frequent contributors, John Fair, has also written a number of important works on strength training in the twentieth century. Fair's work has covered the development of competitive weightlifting, the rise of bodybuilding, and the relationship between strength training and masculinity.<sup>16</sup> Similarly, Kimberly Beckwith, currently *IGH*'s associate editor, has written about the history of barbells and weight training as well as a number of strongmen.<sup>17</sup> Another frequent contributor to the journal, Scottish historian David P. Webster, has profiled a number of pivotal weightlifters and strongmen from around the world.<sup>18</sup>

In addition to this work on the history of strength training, a number of important manuscripts have dealt with the history of bodybuilding and the intersection of strength training,

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3 (May-June 2004): 3-22. Hereafter, *Iron Game History: The Journal of Physical Culture* will be referred to simply as *Iron Game History*.

<sup>16</sup> John Fair, "George Jowett, Ottley Coulter, David Willoughby, and the Organization of American Weightlifting 1911-1924," *Iron Game History* 2, no. 6 (May 1993): 3-15; John Fair, "Father Figure or Phony? George Jowett, the ACWLA and the Milo Barbell Company 1924-1927," *Iron Game History* 3, no. 5 (December 1994): 13-25; John Fair, "From Philadelphia to York: George Jowett, Mark Berry, Bob Hoffman and the Rebirth of American Weightlifting, 1927-1936," *Iron Game History* 4, no. 3 (April 1996): 3-17; John Fair, "That Man's Just Too Strong for Words to Describe,' The Weightlifting Exploits of John C. Grimek," *Iron Game History* 6, no. 1 (April 1999): 64-71; John Fair, "Searching for the Real Paul Anderson," *Iron Game History* 7, no. 1 (June 2001): 22-29; John Fair, "Mr. America: Idealism or Racism: Color Consciousness and the AAU Mr. America Contests, 1939-1982," *Iron Game History* 8, no. 1 (June/July 2003): 9-30; John Fair, "Katie Sandwina: 'Hercules Can be a Lady,'" *Iron Game History* 9, no. 2 (December 2005): 4-7; John Fair, "Jimmy Payne: The Forgotten Mr. America," *Iron Game History* 11, no. 4 (January 2012): 22-35.

<sup>17</sup> Kimberly Beckwith, "Building Strength: Alan Calvert, The Milo Bar-Bell Company, and the Modernization of American Weight Training" (PhD diss., University of Texas – Austin, 2006); Kim Beckwith, "Thomas Jefferson 'Stout' Jackson: Texas Strongman," *Iron Game History* 3, no.2 (January 1994): 8-15; Kim Beckwith and Jan Todd, "Requiem for a Strongman: Reassessing the Career of Professor Louis Atilla," *Iron Game History* 7, nos. 2 and 3 (July 2002): 42-55; Kim Beckwith, "Weight-Lifting 'As a Sport, As a Means of Body Building, and As a Profession': Alan Calvert's *The Truth About Weight-Lifting*," *Iron Game History* 10, no. 4 (January 2009): 22-33; Kim Beck with and Jan Todd, "George Hackenschmidt vs. Frank Gotch: Media Representations and the World Wrestling Title of 1908," *Iron Game History* 11, no. 2 (June 2010): 14-25; Kim Beckwith and Jan Todd, "*Strength*, America's First Muscle Magazine: 1914-1935," *Iron Game History* 9, no. 1 (August 2005): 11-28.

<sup>18</sup> David Webster, *The Iron Game: An Illustrated History of Weight-Lifting* (Irvine, Scotland: John Geddes Printers, 1976); David Webster, "Giovanni Belzoni: Strongman Archaeologist," *Iron Game History* 1, no. 2 (April 1990): 10-11. David Webster, "Oscar Heidenstam," *Iron Game History* 1, no. 6 (August 1991): 14-15; David Webster, "Monte Saldo," *Iron Game History* 2, no. 1 (January 1992): 17-19; David Webster "A Chronology of Significant Events in the Life of Eugen Sandow," *Iron Game History* 2, no. 4 (November 1992): 17-18; David Webster, "William Pagel: Circus Strongman," *Iron Game History* 4, no. 1 (July 1995): 11; David Webster, "The Flemish Hercules," *Iron Game History* 6, no. 2 (January 2000): 26-30.

gender, and identity. Randy Roach's two-volume, *Muscle Smoke and Mirrors* meticulously describes the origins and growth of bodybuilding, as well as the dietary practices of bodybuilders.<sup>19</sup> David Chapman's *Sandow the Magnificent* details the career and impact of legendary strongman Eugen Sandow.<sup>20</sup> Chapman credits Sandow with a key role in the development of bodybuilding as a stand-alone sport, demonstrating that physical perfection could be developed, revolutionizing standards for the male physique, and enticing an entire generation to take up weight training at the turn of the twentieth century. In *Houdini, Tarzan, and the Perfect Man*, John Kasson similarly asserted that Sandow "represented a new standard of male fitness" in his examination of the relationship between the male body and modernity.<sup>21</sup> The construction of masculinity through the training of the body is explored in greater detail in Kenneth Dutton's 1995, *The Perfectible Body*.<sup>22</sup> The construction of gender identity through physique development is not limited to males, of course, and pioneering work has been done by Jan Todd, Patricia Vertinsky, and Roberta Park on relationship between exercise and femininity.<sup>23</sup>

As a subset of a relatively small discipline, even less work has been done on the history of the strength and conditioning profession. An unpublished master's thesis by Scott McQuilkin

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<sup>19</sup> Randy Roach, *Muscle, Smoke, and Mirrors, Volume One* (Bloomington, IN: AuthorHouse, 2008); Randy Roach, *Muscle, Smoke, and Mirrors, Volume Two* (Bloomington, IN: AuthorHouse, 2011).

<sup>20</sup> David Chapman, *Sandow the Magnificent: Eugen Sandow and the Beginnings of Bodybuilding* (Urbana, IL: University of Illinois Press, 1994).

<sup>21</sup> John F. Kasson, *Houdini, Tarzan, and the Perfect Man: The White Male Body and the Challenge of Modernity in America* (New York: Hill and Wang, 2001).

<sup>22</sup> Kenneth Dutton, *The Perfectible Body: The Western Ideal of Male Physical Development* (New York: Continuum, 1995).

<sup>23</sup> Jan Todd, *Physical Culture and the Body Beautiful: Purposive Exercise in the Lives of American Women 1800-1870* (Macon, GA: Mercer University Press, 1998); Jan Todd, "Bernarr Macfadden: Reformer of the Feminine Form," *Journal of Sport History* 14, no. 1 (Spring 1987): 61-75; Jan Todd, "The Classical Idea and Its Impact on the Search for Suitable Exercise: 1774-1830," *Iron Game History* 2, no. 4 (November 1992): 6-16; Jan Todd, "As Men Do Walk a Mile, Women Should Talk an Hour...Tis Their Exercise," and Other Pre-Enlightenment Thought on Women and Purposive Exercise," *Iron Game History* 7, nos. 2 and 3 (July 2002): 56-70; Roberta Park, J.A. Mangan, and Patricia Vertinsky, *Gender, Sport, and Science: Selected Writings of Roberta J. Park* (London: Routledge, 2009); Patricia Vertinsky, *The Eternally Wounded Woman: Women, Doctors, and Exercise in the Late Nineteenth Century* (New York: St. Martin's Press, 1990).

at Pennsylvania State University detailed the history of the first and largest organization of strength coaches, the National Strength and Conditioning Association (NSCA), and covers the years from 1978 to 1993.<sup>24</sup> As an organizational history, however, there is only a brief discussion of the precipitating factors which led to the development of the profession. McQuilkin's work focuses primarily on the governance and growth of the organization. John Fair's biography of Bob Hoffman and the York Barbell Company, *Muscle town USA*, briefly discusses the efforts of Hoffman to advocate the application of strength training to athletic preparation.<sup>25</sup> The true focus of the book, however, is on Hoffman himself and the rise and fall of American Olympic weightlifting. Only three pages are devoted to discussing weights and sport performance. Similarly, a thesis and dissertation have been written about the United States' Olympic weightlifting team. Mark Kodya's thesis explores the impact of social and political events on the team, but does not discuss the impact of competitive lifting or Bob Hoffman on sport training.<sup>26</sup> Similarly, while William Kutzer's 1979 dissertation purports to be a history of the U.S. weightlifting team, it is largely a catalog of major competitions and results, without a discussion of the broader influence of Olympic lifting.<sup>27</sup> Nicholas Bourne's dissertation, "Fast Science: A History of Training Theory and Methods for Elite Runners Through 1975" is a far more satisfying treatment of the evolution of training for track and field through the latter twentieth century.<sup>28</sup> Bourne's work includes a discussion of the addition of

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<sup>24</sup> Scott McQuilkin, "The World's Source for Strength and Conditioning Information: A History of the National Strength and Conditioning Association 1978- 1993" (MS thesis, Pennsylvania State University, 1995).

<sup>25</sup> John Fair, *Muscle town USA: Bob Hoffman and the Manly Culture of York Barbell* (University Park, PA: Pennsylvania State University Press): 1999.

<sup>26</sup> Mark Kodya, "An Exploration of the History of Weightlifting as a Reflection of the Major Socio-Political Events and Trends of the 20<sup>th</sup> Century" (MS thesis, State University of New York – Empire State College, 2005).

<sup>27</sup> William Kutzer, "The History of Olympic Weightlifting in the United States" (PhD diss., Brigham Young University, 1979).

<sup>28</sup> Nicholas Bourne, "Fast Science: A History of Training Theory and Methods for Elite Runners Through 1975" (PhD diss., University of Texas – Austin, 2008).

weight training to track programs as well as the development of periodization and its diffusion to the United States, which is of particular relevance for this project. Historian Jan Todd has written about the history weight training for female athletes as well as many of the scientific pioneers in this area.<sup>29</sup> Perhaps the earliest author in this area is Terry Todd, who has done ground-breaking work on muscle-binding, the role of strength training at colleges and universities, and on early strength coach Al Roy.<sup>30</sup> This project builds particularly on his work by examining more specifically the development of a strength and conditioning specialist.

Another of Terry Todd's key contributions to the history of strength training is his work on the history of anabolic steroids in sport.<sup>31</sup> In addition to Todd's work, a number of other prominent sport historians and sport policy analysts have discussed the history of anabolic steroids and their impact on sport. These authors include: Charles Yesalis, John Hoberman, Thomas Hunt, Paul Dimeo, Rob Beamish, and Ian Richie.<sup>32</sup> The history of anabolic steroids and

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<sup>29</sup> Jan Todd, "The Origins of Weight Training for Female Athletes in North America," *Iron Game History* 2, no. 2 (April 1992): 4-14.

<sup>30</sup> Terry Todd, "The History of Resistance Exercise and Its Role in United States Education" (PhD diss., University of Texas - Austin, 1966); Terry Todd, "The Myth of the Muscle-Bound Lifter," *NSCA Journal* 7, no. 3 (1985): 37-41; Terry Todd, "Al Roy: Mythbreaker," *Iron Game History* 2, no. 1 (January 1992): 12-16; Terry Todd, "Al Roy: The First Modern Strength Coach," *Journal of Physical Education, Recreation, and Dance* 79, no. 8 (2008): 14-16; Terry Todd, "The History of Strength Training for Athletes at the University of Texas," *Iron Game History* 2, no. 5 (January 1993): 6-13; Terry Todd, "The Expansion of Resistance Training in U.S. Higher Education Through the Mid-1960s," *Iron Game History* 3, no. 4 (August 1994): 11-16.

<sup>31</sup> Terry Todd, "A History of the Use of Anabolic Steroids in Sport," in *Sport and Exercise Science: Essays in the History of Sports Medicine*, eds. Jack W. Berryman and Roberta J. Park (Urbana, IL: University of Illinois Press, 1992), 319-350; Terry Todd, "Anabolic Steroids: The Gremlins of Sport," *Journal of Sport History* 14, no. 1 (Spring 1987): 87-107.

<sup>32</sup> Charles E. Yesalis and Michael S. Bahrke, "History of Doping in Sport," *International Journal of Sports Studies* 24, no. 1 (2002): 42-76; Charles Yesalis and Michael S. Bahrke, "Anabolic Steroid and Stimulant Use in North American Sport Between 1850 and 1980," *Sport in History* 25, no. 3 (2005): 434-452; Charles E. Yesalis and Virginia S. Cowart, *The Steroids Game: An Expert's Look at Anabolic Steroid Use in Sports* (Champaign, IL: Human Kinetics, 1998); John Hoberman, *Testosterone Dreams: Rejuvenation, Aphrodisia, Doping* (Berkeley, CA: University of California Press, 2005); John Hoberman, *Mortal Engines: The Science of Performance and the Dehumanization of Sport* (New York: Free Press, 1992); Terry Todd and John Hoberman, "Yearning for Muscular Power," *Iron Game History* 9, no. 3 (January-February 2007): 20-32; Thomas Hunt, *Drug Games: The International Olympic Committee and the Politics of Doping, 1960-2008* (Austin, TX: University of Texas Press, 2011); Paul Dimeo, *A History of Drug Use in Sport, 1876-1976: Beyond Good and Evil* (New York: Routledge, 2007); Paul Dimeo, *Drugs, Alcohol, and Sport* (New York: Routledge, 2006); Rob Beamish, *Steroids: A New Look at Performance-Enhancing Drugs* (Santa Barbara, CA: Praeger, 2011); Rob Beamish and Ian Richie, *Fastest, Highest,*

their use in athletics has also been covered by journalists and other authors, including: Shaun Assael, Daniel Rosen, and Matt Chaney.<sup>33</sup>

Testosterone was isolated in 1927 and was first synthesized in 1935. Though initial uses for the hormone centered on sexual potency and combating aging, the idea that testosterone could be a performance-enhancing drug appeared by 1939.<sup>34</sup> Testosterone garnered more widespread attention following the publication of Paul de Kruif's 1945 book *The Male Hormone*. According to Terry Todd, de Kruif "saw this new hormone as a way to extend man's sexual life and increase his productivity" and noted the increased muscle mass observed in studies which had administered testosterone.<sup>35</sup> After discussing the increased muscle mass produced by testosterone supplementation, de Kruif remarked that, "It would be interesting to watch the productive power of [a]...professional group [of athletes] that would try a systematic supercharge with testosterone."<sup>36</sup>

In the years following de Kruif's comment, athletes would begin doing just that. The Soviet weightlifting team began using testosterone in the early 1950s, which aroused the suspicion of American Olympic coaches and physicians. By 1958, the Ciba pharmaceutical company had begun marketing Dianabol (methandrostenalone), the first anabolic steroid sold in the United States. The new synthetic version of testosterone was designed to maximize the anabolic (tissue building) characteristics of the hormone, while minimizing its androgenic

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*Strongest: A Critique of High-Performance Sport* (New York: Routledge, 2006); Rob Beamish and Ian Richie, "From Fixed Capacities to Performance Enhancement: The Paradigm Shift in the Science of 'Training' and the Use of Performance-Enhancing Substances," *Sport in History* 25, no. 3 (2005): 412-434.

<sup>33</sup> Shaun Assael, *Steroid Nation: Juiced Home Run Totals, Anti-Aging Miracles, and a Hercules in Every High School: The Secret History of America's True Drug Addiction* (New York: ESPN Books, 2007); Daniel Rosen, *Dope: A History of Performance Enhancement in Sports from the Nineteenth Century to Today* (West Port, CT: Praeger, 2008); Matt Chaney, *Spiral of Denial: Muscle Doping in American Football* (Warrensburg, MO: Four Walls Publishing, 2009).

<sup>34</sup> Hoberman, *Testosterone Dreams*, 2-4; Todd, "A History of the Use of Anabolic Steroids in Sport," 324.

<sup>35</sup> *Ibid.*, 325.

<sup>36</sup> *Ibid.*

(masculinizing) effects. Shortly thereafter a physician who worked with the American weightlifting team, Dr. John Ziegler, began administering the drug to three members of the York Barbell Club with Bob Hoffman's blessing. Each of the lifters made phenomenal improvements in size and strength while on the drug, though the exact cause of the gains was kept secret.<sup>37</sup> Publicly Hoffman claimed that the lifters' astonishing advances were due to the use of a new program of isometric contractions.<sup>38</sup> As the true reason for the lifters' success began to leak out, other athletes began to incorporate the new drug into their training programs. As an example, Alvin Roy, an associate of the York team and the man Terry Todd has called "the first modern strength coach," purportedly incorporated it into the pre-season training regimen of the American Football League's San Diego Chargers in 1963.<sup>39</sup>

As this project will show, while strength training was largely shunned by athletes in the first half of the twentieth century, by the 1950s and 60s many athletes began to train with weights in order to augment their performance. Testosterone and anabolic steroids were also incorporated into athletic regimens during those same years. The close relationship between weight training and muscle-building drugs makes it difficult to discern how much of the increased size, strength, and speed of modern elite athletes is due to proper training versus chemical enhancement. While the effects of anabolic steroids have been much discussed, little attention has been paid to the proliferation of weight training for athletes. As Jan Todd has pointed out, "for the first time in history, athletes are [now] employing scientifically-organized

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<sup>37</sup> Ibid., 325-326.

<sup>38</sup> Bob Hoffman, "The Most Important Article I Ever Wrote," *Strength & Health*, November 1961, 30-34.

<sup>39</sup> Chaney, *Spiral of Denial*, 46-48; Terry Todd, "Al Roy: The First Modern Strength Coach," *Journal of Physical Education, Recreation and Dance* 79, no. 8 (2008): 14-16.

strength training throughout their entire sporting careers.” Further, Todd highlights the fact that “many of today’s star players began training as children and continue to train year-round.”<sup>40</sup>

The systematic training of athletes from their youngest years and continuing throughout their careers has surely played a larger role in developing bigger and faster athletes than have anabolic steroids. Because the history of anabolic steroids has been so thoroughly discussed, with a relative dearth of literature on the paradigm shift related to strength training for athletes, this project will concentrate on the factors which led to the adoption of strength training by athletes. Additionally, this work focuses heavily on strength training related to college football. As the first modern strength coach, Alvin Roy initially worked with a high school football team, but received national attention following his work with the Louisiana State University squad. The first full-time, professional strength coach Boyd Epley, who was hired to train the University of Nebraska football team. Both men were brought in as specialists in strength training. Kuhn posited that acceptance of a new paradigm is marked by “the formation of specialized journals, the foundation of specialists’ societies, and the claim for a special place in the curriculum...”<sup>41</sup> Moreover, both Melvin Adelman and Allen Guttmann’s models incorporate specialization as a key component for modern sports.<sup>42</sup> College football, then, is a logical place to focus because strength training specialists marked an important point in modernizing the game and because the hiring of specialists in this new field demonstrated that the paradigm had shifted with regard to the utility of strength training for sport.

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<sup>40</sup> Jan Todd, “Size Matters: Reflections on Muscle, Drugs, and Sport,” *Iron Game History* 10, no. 3 (August 2008): 20.

<sup>41</sup> Kuhn, *Structure of Scientific Revolutions*, 19.

<sup>42</sup> Adelman uses the term “role differentiation.” Melvin Adelman, “The First Modern Sport in America: Harness Racing in New York City, 1825-1870,” in *Sport in America: From Wicked Amusement to National Obsession*, ed. David K. Wiggins (Champaign, IL: Human Kinetics, 1995), 96; Allen Guttmann, *From Ritual to Record: The Nature of Modern Sports* (New York: Columbia University Press, 1978), 36-40.

In order to tell the story of the paradigm shift in strength training, this manuscript is divided into five chapters. The first chapter serves as a broad overview of the theories and events which led, in the early decades of the twentieth century, to the pervasive belief that weight training impaired athletic performance and, potentially, health. The roots of weight training for sport and the concern about athletic over-development both date back to the ancient Greeks of the fourth and fifth centuries B.C. As Greek athletes used weighted implements and became ever more specialized, the earliest physicians fretted that they were developing an imbalance between their physiques and their intellect; an imbalance, they argued, that invited disease and ill-health. This notion of the importance of physical and intellectual balance reappeared in the Renaissance and then was revived by physicians in the United States in the middle of the nineteenth century. Interestingly, at mid-century weight training had become a popular means of developing one's body and a handful of highly successful athletes trained with weights and made every effort to show others how strength training could augment athletic talent. With the 1876 death of one of strength training's most vocal proponents, George Barker Windship, however, weight training received a critical blow. Physicians and physical culturists who warned of the dangers of over-development were given renewed credibility. Weight training would not begin to recover its former popularity until the turn of the century when strongman Eugen Sandow demonstrated that barbells could develop physical perfection. Two men inspired by Sandow, Bernarr Macfadden and Alan Calvert, helped to further popularize weight training through their promotion of exercise and weight equipment in popular magazines. Weight training was also bolstered when the scientific community, in the early 1930s, came to understand that the body's structural adaptations to training were beneficial, not pathological. In the decade leading up to

World War Two weight training was beginning to rehabilitate its reputation when two passionate weight trainers began a concerted campaign to clear its name.

Chapter Two discusses the roles of strength promoters Robert (Bob) Hoffman and Joseph Weider in dispelling the myth that strength training would hurt athletic performance. This chapter focuses specifically on the magazines produced by Hoffman, which included *Strength & Health* and *Muscular Development*, and those of Joseph Weider, which were numerous, though specific attention will be given to *Your Physique*, *Muscle Power*, *Muscle Builder*, *Mr. America*, and *All-American Athlete*. Both men promoted weight training through slightly different lenses. Hoffman was explicit about the connection between resistance training and improved sport performance because he first began weight training to improve his performance in aquatic sports. Born in 1898, Hoffman's formative years were spent in the midst of the cult of strenuousness and his promotion of strength training reflected this trend. His appeals to take up weight training were grounded in fears of creeping effeminacy and national decline. Weights could make a man better at sports, and by extension a better worker and more able defender of America.

Weider was born in 1920 in Montreal. As a member of the city's Jewish minority, Weider took up strength training to build an intimidating physique to dissuade bullies. The tactic was apparently successful and Weider's promotion of strength training was initially grounded in the idea of the appearance of strength. Although Weider was less explicit about developing strength for sport performance in his earliest publications, he eventually established a magazine solely about sport training that inspired greater interest in the scientific aspects of strength training.

Both men played key roles in dispelling the notion that strength training was detrimental to athletes. They railed against medical authorities who warned of muscle-binding, athlete's

heart, rupture (hernia), and other supposed outcomes of weight training. Each man also promoted the idea of weights as transformative. They could transform an ardent trainee from a wretched weakling to a man who was envied by other men, wanted by women, and successful in any endeavor.

The fervent advocacy of strength training by Hoffman and Weider may have appealed to the masses, but many professionals remained unconvinced. Chapter Three focuses on the shift in the academic and medical literature which led to widespread acceptance of strength training. The willingness to investigate the charges against strength training was the result of a number of factors, including the budding understanding of muscular and cardiovascular physiology, the increased exposure of physicians and physical educators to weight trainers, the harsh realities of World War Two, and the Cold War economic and athletic rivalry between the United States and the Soviet Union. The notion that the body's adaptations to chronic exercise were beneficial and not pathological, which began to solidify in the 1930s, was a crucial step that allowed medical doctors and physiologists to embrace systematic training. The promotion of strength training by Hoffman, Weider, and their predecessors made it increasingly likely that professionals who opposed weight training would come into contact with a person who disproved their assumptions. As an example, when Peter Karpovich saw the power and flexibility of weightlifters John Grimek and John Davis, he began to conduct his own research into the effects of strength training. Army physician Thomas DeLorme read Hoffman's magazines as a young man and became an accomplished weightlifter himself before revolutionizing rehabilitation programs by employing the training theories of competitive lifters. Physical educator C.H. McCloy began to encourage research into strength training at the University of Iowa after students, who had seen servicemen on the campus lifting, asked if the practice was harmful.

In the early days of World War Two, some physical educators fretted over the physically “soft life” led by Americans and promoted strength training as a remedy. Fears of soft living were renewed in the early Fifties when American soldiers performed poorly in the opening days of the Korean War and American schoolchildren were shown to be significantly less fit than European counterparts. Fears of soft living led politicians, including Dwight Eisenhower and John Kennedy, to actively promote physical fitness as integral to the health of the nation. Coupled with Soviet victories at the 1956 and 1960 Olympic Games, the stage was set for an academic exploration of the utility of strength training.

Following Thomas DeLorme’s groundbreaking work in the 1940s, researchers in the 1950s began to systematically research the effects of strength training and found that, not only did it not decrease movement speed or range of motion, if correctly employed, it could increase both. The 1960s saw a shift toward applied research, as investigators compared the results of various strength training protocols and examined their effects on sports performance.

The acceptance of strength training in the middle of the twentieth century was evident in the increasing number of weight training courses being offered at colleges and universities, competitive weightlifting clubs, and athletic teams that trained with weights. Chapter Four examines how the promotion of strength training in the popular press and its acceptance by researchers resulted in an explosion of weight training on college campuses in the 1950s and 1960s. During these decades *Strength & Health* magazine ran a semi-monthly feature on the use of weights on college campuses. The series was titled “Barbells on Campus” and it discussed the use of weights by both students and athletes. A different university was featured in each article, which was typically authored by a student or faculty member at the school. Other magazines, including Walt Marcyan’s *Physical Power*, Peary Rader’s *Iron Man*, and Joe Weider’s *All-*

*American Athlete* also periodically discussed weight training on college campuses, but *Strength & Health*'s treatment was the most thorough. The articles detailed training at some colleges that stretched back into the 1910s, but most schools began their programs in the years after World War Two as college populations exploded with returning servicemen. These GIs had trained prior to or during their service and wished to continue during their tenure as undergraduates. Athletes who had trained with weights in high school also began to filter into college programs and often found other students and athletes eager to learn about their training. From an athletic standpoint, weight training blossomed in the 1950s due to the increasingly competitive world of international and collegiate sport. Olympic losses to the muscular Soviets made weight training more appealing, and Paul Anderson's 1955 lifting in Moscow brought a renewed focus to the sport. At the collegiate level, the sanctioning of athletic scholarships by the National Collegiate Athletic Association (NCAA) in the 1950s solidified the status of college athletes as *de facto* professionals. As the pressure to win ratcheted up, coaches were more amenable to including weight training in their programs and the early programs that incorporated weight training often saw dramatic results. Teams from Florida to Washington went from nearly winless seasons to championships after one off-season spent with barbells. Some of the most spectacular results were garnered by teams under the guidance of Alvin Roy, who took a talented Baton Rouge, Louisiana high school football team and made them record-breaking champions. He also played an integral role in the first national football championship for the Louisiana State University Tigers, and a league championship for the San Diego Chargers.

Teams across the country began adopting weight training programs in the 1950s and 60s and the extraordinary turnarounds of the 1950s became rare. Instead, teams like the University of California and Wake Forest University adopted weight training and still finished with losing

records. As weight training became increasingly common, one university took the next step in the closing year of the 1960s and hired a new coach whose job description was supervising the strength program.

The Fifth chapter focuses on this coach, Boyd Epley, who was hired by the University of Nebraska to become the nation's first full-time strength coach. Epley attended Nebraska as a scholarship pole-vaulter. When a back injury derailed his preparation for his 1969 junior season, Epley spent his time in the tiny weight room, largely crafting his own rehabilitation program based on his prior experience with the training of bodybuilders, powerlifters, and Olympic-style weightlifters. He quickly developed a following of other injured athletes, many of them football players. When the players returned to the team in better shape than they had left, the young offensive coordinator, Tom Osborne investigated. After meeting Epley he proposed a team-wide strength program. Implementation required the blessing of head football coach Bob DeVaney. In spite of his fear that strength training reduced performance DeVaney agreed to the program, in part because after consecutive 6-6 seasons the coach was under increasing pressure from boosters. While he agreed to give weight training a try DeVaney warned Epley that, "If anyone gets slower, you're fired." Under pressure to produce rapid results and keep his job, Epley began to solicit best practices in strength training from professors and other sport coaches. This drive for measurable performance enhancement and a willingness to discuss tactics with others led Epley to spearhead the creation of the National Strength Coaches' Association in 1978. One of the group's early objectives was to create a source of information about effective strength training, based on practical experience and the little research available. The new group sought to dispel the idea of training based simply upon "received wisdom" and even began sponsoring and

promoting research. In this way, the group created by Epley defined a burgeoning field and professionalized training for sport.

## **CHAPTER ONE: FROM “TRUCK HORSE MUSCLES” TO CONCURRENT REVOLUTIONS: PHYSICIANS, PHYSICAL EDUCATORS, PHYSICAL CULTURISTS, AND STRENGTH TRAINING THROUGH 1930**

On June 1, 1892 the Medical Society of Berlin opened a conference on medical anomalies. Along with an infantile tumor and a distorted face, the day’s topics included a man with excessive muscularity. Though the man’s large muscles seemed to convey health, according to medical doctor Hans Virchow, they revealed quite the opposite. The “muscle-man” suffered from breathing difficulties and vertigo. Virchow and his colleagues were quick to attribute the difficulties to the man’s well-developed chest musculature which, they contended, pressed down upon his ribcage and kept it from expanding. With only minimal excursion of his ribs, they speculated, the man was unable to sufficiently ventilate his lungs, which caused his symptoms.<sup>1</sup>

That the physicians would attribute sickness to significant muscular development seems curious from a modern perspective, but the association was common in the latter nineteenth and early twentieth centuries. Resistance training was not new, of course, having been practiced for millennia before the modern era and as a component of sports preparation since the fifth century B.C. Concerns of overdevelopment were similarly ancient as physicians warned against the dangers of excessive exercise as early as the fourth and fifth centuries B.C. The view of exercise as potentially damaging and as an activity which must be closely supervised returned to prominence in the latter decades of the nineteenth century, however, due to a limited understanding of human physiology, concerns over a sport and weight training boom, and the untimely death of a prominent promoter of heavy strength training. These flawed notions of the

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<sup>1</sup> A German physiologist Emil du Bois-Reymond also speculated that the massive muscularity of the Farnese Hercules would render a person with those proportions unable to walk. John Hoberman, *Mortal Engines: The Science of Performance and the Dehumanization of Sport* (New York: The Free Press, 1992): 47-49.

dangers of overdevelopment significantly hampered the development of weight training into the twentieth century.

### **“STRENGTH IS HEALTH”: WEIGHT TRAINING THROUGH THE 1870s**

The ancient Greeks are often credited as the first group to utilize resistance training as a means of preparation for athletic events.<sup>2</sup> Beginning as early as 776 B.C., the first Olympic Games included only foot races and it was not until the addition of the pentathlon to the Olympic program in 708 B.C., that the Games began to incorporate disciplines which made strength and power as valuable as fleetness of foot.<sup>3</sup> The events of the initial pentathlon included the stadion race (approximately 200 meters), wrestling, the discus throw, the long jump, and the javelin throw. The initial version of the long jump included the use of *halteres*, or jumping weights. In addition to being used for jumping events, by the fifth century B.C., the hand-held weights were being used in a variety of drills to strengthen the upper and lower body. The fourth and fifth centuries B.C. also saw the writings of the Greek physician Hippocrates. Regarded as the “founder of Western scientific medicine,” Hippocrates discussed the relationship of food consumption and exercise, advocating moderation in each. The Roman physician Galen, who lived during the second century A.D., was heavily influenced by Hippocrates and urged moderation of the “non-naturals” as keys to health. These non-innate components of health included: air and environment, food and drink, motion and rest, sleep and wake, excretions and

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<sup>2</sup> “Ancient Greece,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lutchter Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 18, 2013).

<sup>3</sup> Stephen G. Miller, *Ancient Greek Athletics* (New Haven, CT: Yale University Press, 2004), 63-68; Jan Todd and Terry Todd, “Legacy of Iron: A History of the Men, Women and Implements That Created the ‘Iron Game,’” in *Resistance Training: The Total Approach*, ed. Lewis Bowling (Durham, NC: Carolina Academic Press, 2007), 183-185; Jan Todd, “From Milo to Milo: A History of Barbells, Dumbbells, and Indian Clubs,” *Iron Game History: The Journal of Physical Culture* 3, no. 6 (April 1995): 4. Hereafter, *Iron Game History: The Journal of Physical Culture* is referred to simply as *Iron Game History*.

retentions, and emotions.<sup>4</sup> While Galen advocated exercise for all ages, he specifically warned against its excess. Both Galen and his predecessor Hippocrates saw the over-development of athletes as a dangerous extreme, with Galen contending that the “athlete’s health, for example, is so far from being highly desirable that it was rightly criticized.”<sup>5</sup> Athletic development was worthy of condemnation because athletes sought “the acquisition not only of good mixture, but also of physical mass – which cannot take place without an ill-balanced type of filling. And thus the state is rendered both dangerous, and from the point of view of public service, valueless.”<sup>6</sup>



Figure 1. Hippocrates and Galen (National Library of Medicine)

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<sup>4</sup> Jack Berryman, “Ancient and Early Influences,” in *Exercise Physiology: People and Ideas*, ed. Charles M. Tipton (New York: Oxford University Press, 2003), 2-5.

<sup>5</sup> *Ibid.*, 5.

<sup>6</sup> *Ibid.*, 5-6.

In spite of this view, Philostratus wrote about rationalizing the training of athletes in the third century A.D. His text, *Concerning Gymnastics*, discussed training methods employed by endurance and strength athletes, as well as the value of resistance training.<sup>7</sup> According to historian Jack Berryman, Philostratus' treatise was, "one of the earliest recommendations of weight lifting and resistance training to develop strength beyond normal use."<sup>8</sup> It was also surprisingly sophisticated, including the discussion by Philostratus of an early form of cycling or periodization.<sup>9</sup>

After the fall of the Roman Empire, the church discouraged sport as spectacle and, as a result, the training that accompanied it withered.<sup>10</sup> A revival of interest in physical training occurred during the Renaissance, following the rediscovery of ancient Greek texts on health and exercise. Sir Thomas Elyot became one of the first of this era to discuss lifting weights when, based on one of Galen's approximately four hundred treatises, *De Sanitate Tuenda* (Hygiene), he specifically recommended the lifting of "alteres," as well as heavy stones or bars in 1531.<sup>11</sup> Three decades later, the Italian physician Hieronymus Mercurialis published *De Arte Gymnastica*, a manuscript largely comprised of ancient Greek ideas on exercise and medicine. The text included copious drawings of different exercises, going through five editions in the

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<sup>7</sup> Berryman, "Ancient and Early Influences," 8; "170-244 A.D.: Flavius Philostratus Argues to Make Training a Science," *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lucher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 18, 2013).

<sup>8</sup> Berryman, "Ancient and Early Influences," 8.

<sup>9</sup> Nicholas Bourne, "Fast Science: A History of Training Theory and Methods for Elite Runners Through 1975" (PhD diss., The University of Texas – Austin, 2008), 55—57.

<sup>10</sup> *Ibid.*, 186; Shirl James Hoffman, *Good Game: Christianity and the Culture of Sports* (Waco, TX: Baylor University Press, 2010), 45-50.

<sup>11</sup> "1531 & 1544: Renaissance Authors Elyot and Camerarius Suggest Weight Training," *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lucher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 18, 2013); Terry Todd, "The History of Resistance Exercise and its Role in United States Education" (PhD diss., University of Texas – Austin, 1966), 34-35; Todd, "From Milo to Milo," 4.

following century, remaining influential into the 1800s.<sup>12</sup> Shortly after the publication of *De Arte*, the French essayist Michel de Montaigne described how his father used wooden canes filled with lead and shoes with leaden soles to improve his ability to run, leap, throw, and fence.<sup>13</sup>

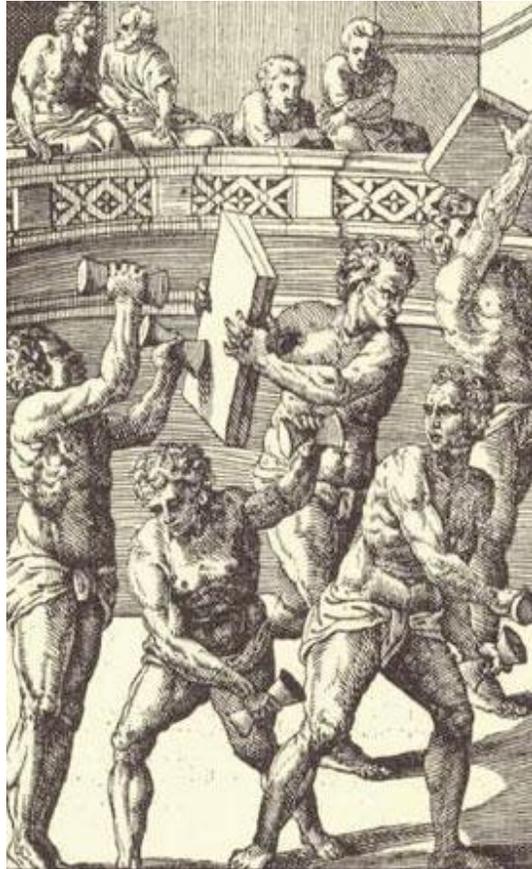


Figure 2. An illustration from *De Arte Gymnastica* depicting training with weighted implements in an ancient gymnasium. Image from H.J. Lucher Stark Center “Quest for Victory” timeline [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/)

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<sup>12</sup> Ibid., 5-6.

<sup>13</sup> Michel de Montaigne, “Of Drunkenness,” *Essays*, no. 8 (Paris: 1580), accessed January 18, 2013, <http://www.gutenberg.org/files/3600/3600-h/3600-h.htm#link2HCH0059>; “1580: Michel de Montaigne Describes Weight Training for Sport,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lucher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 18, 2013).

In the late eighteenth century, German physical educator Johann Friedrich GutsMuths oversaw a program of required manual labor and gymnastics at the Schnepfenthal Philanthropic School. As one of Western Europe's earliest physical educators, GutsMuths sought to restore interest in the ancient Greek methods of training. His gymnastics program included climbing ropes and poles, discus throwing, and swinging weighted implements. The program gained extensive influence after the publication of his widely read *Gymnastics for Youth or a Practical Guide to Healthful and Amusing Exercises for the Use of Schools. An Essay Toward the Necessary Improvement of Education; Chiefly as it Relates to the Body* in 1793. The first English translation appeared in London in 1800 and in Philadelphia in 1802.<sup>14</sup> Another German educator and follower of GutsMuths, Friedrich Ludwig Jahn, expanded the gymnastics program at the Johann Ernst Plamann's school beginning in 1809. Two afternoons each week, Jahn taught students to perform a series of gymnastic exercises on outdoor equipment he built. While GutsMuths was interested in improving the individual, Jahn's training program had a strong element of nationalism. Napoleon's French forces invaded Jahn's home state of Prussia in 1806 and Jahn thus intended his program to foster both German identity and to physically prepare his countrymen to resist their occupiers. In his 1810 book *Deutsches Volksthum*, Jahn deliberately avoided referring to the exercises as "gymnastics," a term of Greek origin, but chose instead to call his system *Turnen* in an attempt to establish a uniquely German system. Three years later, in 1813, Jahn and his students were among the Prussian forces that ousted the French occupiers. The government that formed after Prussia's liberation was wary of Jahn and his followers' radical politics and officially banned *Turnen* in 1819.<sup>15</sup>

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<sup>14</sup> Jurgen Giessing and Jan Todd, "The Origins of German Bodybuilding: 1790-1970," *Iron Game History* 9, no. 2 (December 2005): 8.

<sup>15</sup> *Ibid.*, 8-11; Jan Todd, *Physical Culture and the Body Beautiful: Purposive Exercise in the Lives of American Women 1800-1870* (Macon, GA: Mercer University Press, 1998), 33-37; "1809: Father Ludwig Jahn and the Birth

The ban on *Turnen* and related political pressure caused many of Jahn's followers to leave Germany in the 1820s. One follower, Karl Beck, took a position at the Round Hill School in Northampton, Massachusetts in 1825. In addition to teaching Latin, Beck built an outdoor gymnasium near the school and taught the *Turnen* system of exercises.<sup>16</sup> Three years later Beck published *A Treatise on Gymnastics*, which, according to historians Jan and Terry Todd, “was largely responsible for introducing the German system to America.”<sup>17</sup>

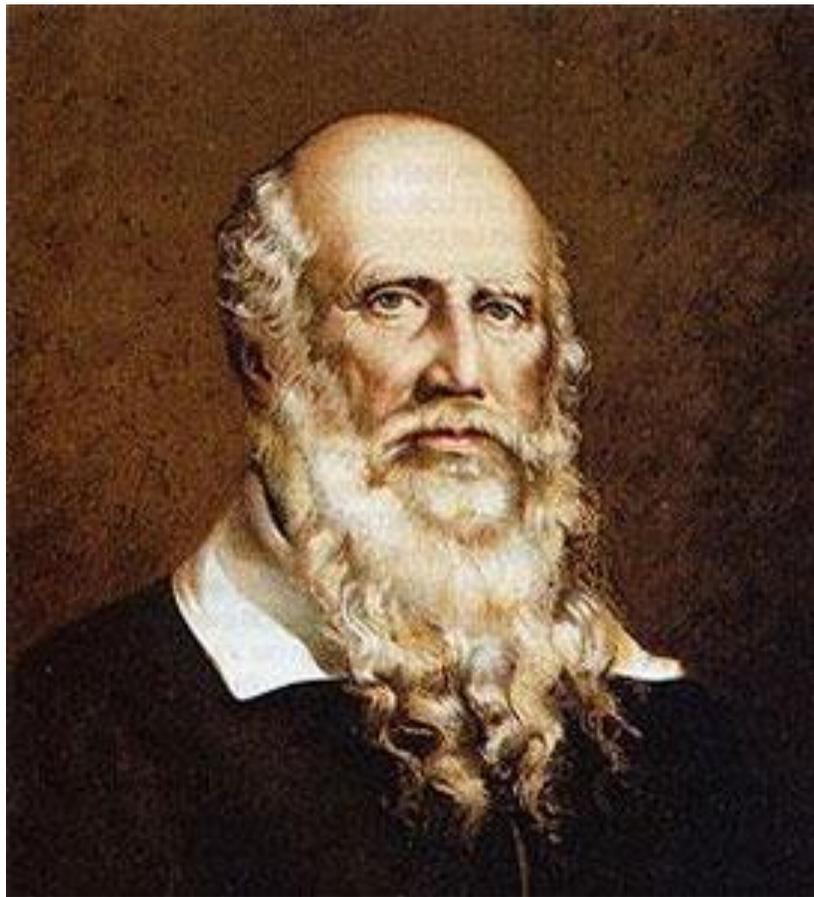


Figure 3. Friedrich Ludwig Jahn. Image from H.J. Litcher Stark Center “Quest for Victory” timeline [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/)

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of German Gymnastics,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Litcher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 20, 2013).

<sup>16</sup> Erich Geldbach Marburg – Cappel, “The Beginning of German Gymnastics in America,” *Journal of Sport History* 3, no. 3 (Fall 1976): 238.

<sup>17</sup> Todd and Todd, “Legacy of Iron,” 172.

Resistance training took an important step in expanding beyond American schoolboys when William Wood opened the first commercial gym in New York City in 1835. The gym held exercise classes that included training with Indian clubs using Wood's "original system."<sup>18</sup> Wood also hosted exhibitions that included strength displays, acrobatics, trapeze, and fencing. Owing to his reputation as an outstanding athlete, out of fifty-four races as a professional rower Wood won forty-eight times, the gym was frequented by rowers, wrestlers, boxers, and baseball players who all sought his training advice.<sup>19</sup> As a former Yale rower, the Yale crew hired Wood to coach them in 1864 after several consecutive losses to Harvard. Serving as the first professional coach for a college athletic team, Wood put the Yale crew through a series of weight training exercises, early morning runs, and extensive rowing in the weeks leading up to the 1864 regatta. The training paid off as the team from New Haven easily bested the Harvard crew.<sup>20</sup>

By the mid-nineteenth century, then, there was a burgeoning interest in the United States in physical training for health and athletic performance. This interest was due, in part, to the influence of the Second Great Awakening and preachers like Charles Finney who preached about human perfectibility. As Protestant church membership soared in the first half of the nineteenth century, the inspired faithful sought to bring "God's kingdom" to earth through good works and striving for personal perfection. The Awakening spawned a host of reform movements

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<sup>18</sup> "Local News in Brief," *New York Times*, January 28, 1869, <http://query.nytimes.com/mem/archive-free/pdf?res=F70F15FF3B5B1A7493CAAB178AD85F4D8684F9> (accessed January 20, 2013); "1835: William Wood Opens the First Commercial Gym in New York City," *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lutchter Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 20, 2013).

<sup>19</sup> *Ibid.*; "William Wood Dead," *New York Times*, September 22, 1900, <http://query.nytimes.com/mem/archive-free/pdf?res=F70E17FD385A16738DDDAB0A94D1405B808CF1D3> (accessed January 20, 2013).

<sup>20</sup> Ronald A. Smith, *Sports and Freedom: The Rise of Big Time College Athletics* (New York: Oxford University Press, 1988), 34-35.

advocating temperance, the abolition of slavery, educational reforms, and prison reform.<sup>21</sup> In addition to improving society, many sought to improve themselves, including physically. The drive toward physical improvement received a spark in the late 1850s when a host of foreign visitors derided the poor physical condition of Americans. British consul Thomas C. Grattan charged that a lack of exercise and sports resulted in American men whose “physical powers are subdued and their mental capability cribbed into narrow limits.”<sup>22</sup> Similar judgments were rendered by Charles Dickens, James Silk Buckingham, Frances Trollope, Harriet Martineau, and Sir Charles Lyell.<sup>23</sup>

The call to remedy Americans’ poor health was heard in a variety of quarters in the years after the Civil War. In the words of historian Eliot Gorn, “before the Civil War, a handful of influential doctors, educators, reformers, and clergymen advocated sports and recreations. During the next generation, these occasional voices merged into a chorus.”<sup>24</sup> For their part, many physicians sought to remedy the poor condition of Americans by “rekindling” interest in Galen’s non-naturals in the antebellum era.<sup>25</sup> Echoing Galen, they asserted that health could be maintained by obeying “natural laws” and maintaining balance and moderation, with particular attention to nutrient intake and proper amount of physical activity. The idea of health through moderation was reinforced by the primitive understanding of physiology in the 1860s in which the body’s physiological systems were viewed as operating under the restrictions of the first law

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<sup>21</sup> James West Davidson and others, *Nation of Nations: A Narrative History of the American Republic* (New York: McGraw-Hill, 2008), 321-343.

<sup>22</sup> Eliot Gorn and Warren Goldstein, *A Brief History of American Sports* (Urbana, IL: University of Illinois Press, 2004), 81.

<sup>23</sup> *Ibid.*, 82; David L. Chapman, *Sandow the Magnificent: Eugen Sandow and the Beginnings of Bodybuilding* (Urbana, IL: University of Illinois Press, 1994), 2.

<sup>24</sup> Gorn and Goldstein, *A Brief History*, 98.

<sup>25</sup> Jack Berryman, “Exercise and Medical Tradition from Hippocrates Through Antebellum America: A Review Essay,” in *Sport and Exercise Science: Essays in the History of Sports Medicine*, eds. Jack Berryman and Roberta Park (Urbana, IL: University of Illinois Press, 1992), 35-47; James C. Whorton, *Crusaders for Fitness: The History of American Health Reformers* (Princeton, NJ: Princeton University Press, 1982), 270-271.

of thermodynamics – they were a closed system where the amount of energy available was constant.<sup>26</sup> This fixed amount of energy was often referred to as vitality or vital force. With energy fixed, excessive activity by any one part of the organism took away from other systems and exposed the individual to developing ill health. As Randolph Faires, a physician and instructor of physical education at the University of Pennsylvania in the 1890s warned, “overdevelopment of one part is always accompanied by a corresponding weakness.”<sup>27</sup>

Physicians set about explaining disease through this lens. One of the most prominent conditions caused by a violation of natural laws was neurasthenia. The condition, first diagnosed in 1869, entailed “exhaustion of the brain and nervous system,” and resulted from too much “brain work” at the expense of physical activity and recreational pursuits.<sup>28</sup> Prescriptions to correct the condition could include complete rest, exercise, or both. Presumably the goal was to allow one’s vitality to revert to a more neutral state through rest and then to balance them with a combination of brain work and physical activity.

Conversely, too much physical activity could also be pathological. Just as excessive activity on the part of the brain caused the brain to be “flushed with blood,” potentially starving other tissues, disproportionate physical exertion caused the opposite effect.<sup>29</sup> Some physicians went so far as to classify hypertrophied muscles as “parasitic” because they “impose[d] a severe

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<sup>26</sup> Roberta Park, “Physiology and anatomy are destiny?!: Brains, bodies and exercise in nineteenth century American thought,” *Journal of Sport History* 18, no. 1 (1991): 47-8; Roberta Park, “Muscles, symmetry, and action: ‘Do you measure up?’ Defining masculinity in Britain and America from the 1860s to the early 1900s,” *International Journal of the History of Sport* 24, no. 12 (December 2007): 1617; Rob Beamish and Ian Ritchie, “From fixed capacities to performance-enhancement: The paradigm shift in the science of ‘training’ and the use of performance-enhancing substances,” *Sport in History* 25, no. 3 (December 2005): 414-16; Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley, CA: University of California Press, 1992), 52-68.

<sup>27</sup> Randolph Faires, “Physical Education,” *Medical News* 64, no. 7 (1894): 173; To justify this assertion, Faires discussed the limited quantity of blood and that directing it toward one area of the body deprived other areas, causing them to “suffer.” This theory was discussed twelve years earlier by another University of Pennsylvania physician and professor of nervous diseases, Dr. Horatio Wood. Park, “Physiology and anatomy,” 42.

<sup>28</sup> Harvey Green, *Fit for America: Health, Fitness, Sport, and American Society* (Baltimore, MD: Johns Hopkins University Press, 1986): 137-8; Park, “Physiology and anatomy,” 40.

<sup>29</sup> *Ibid.*, 42.

strain on the rest of the organism.”<sup>30</sup> The muscles were parasitic because, not only had nutrients been directed disproportionately to them to allow for their hypertrophy, but their continued existence in an enlarged state drew blood and other nutrients away from other tissues.<sup>31</sup>

The quest for health through balance precipitated what Jan Todd has called “the First American Weight Training Boom.”<sup>32</sup> In addition to William Wood’s gym, other weight training facilities sprouted. Charles and Hubert Ottignon opened a gym in New York City in the early 1850s.<sup>33</sup> Like Wood, Hubert Ottignon was an all-around athlete and put on exhibitions that demonstrated his strength and versatility. As examples, during the months of February and March 1856, he displayed his muscular endurance by pulling down a cable machine with thirty pounds of resistance 5000 times in sixty-five minutes, won a sprint race of just over 1/3 of a mile against twelve competitors, and then gave a weightlifting exhibition. The Ottignon’s New York Gym was so successful that they opened another gym in Chicago in 1854. In 1860, management of the New York branch was transferred to one of Hubert’s protégés, William Buckingham Curtis. Cut from the same mold as Wood and Ottignon, Curtis successfully competed in a variety of athletic events that included rowing, sprinting, shot put, hammer throw, and a fifty-six pound weight throw for height. Also like Wood and Ottignon, Curtis hosted special events to promote interest in the gym. At a “mammoth gymnastics competition” in 1861, he invited the

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<sup>30</sup> Victor Vaughan, “Hygiene and Public Health,” *American Journal of Medical Sciences* 140, no. 5 (1910): 778.

<sup>31</sup> The notion of conservation of energy was also used as justification to prevent women from pursuing serious academic or athletic endeavors. Menstruation was said to pose such a strain on women’s energy reserves that either intellectual or physical exertion could be disastrous. With menstruation consuming so much of their energy, women would clearly be unable to devote as much effort as men to academics or athletics. Testicles, it seems, had an energy source of their own. Park, “Physiology and anatomy,” 36-7.

<sup>32</sup> Jan Todd, “Strength is Health’: George Barker Windship and the First American Weight Training Boom,” *Iron Game History* 3, no. 1 (September 1993): 3-14.

<sup>33</sup> “1854: Hubert Ottignon and William Curtis,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lucher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 21, 2013).

prominent physician and strength advocate Dr. George Barker Windship to speak and demonstrate his strength in a lifting contest.

By the time of the invitation, Windship was well known, having been a touring lecturer on the benefits of strength training since 1859. Unlike other health reformers, Windship did not advocate light training or vegetarianism.<sup>34</sup> The path to health, he claimed, was not moderate exercise – it was to be as strong as possible. He claimed to have “discovered” through his own training that with increased strength came increased resistance to disease. This revelation led to his oft-repeated dictum, “Strength is Health.” Windship began training shortly after entering Harvard as a five-foot-tall freshman of sixteen years, who barely tipped the scales at one hundred pounds. The diminutive freshman was jeered by his classmates and resolved to build his body through training.<sup>35</sup> He spent part of most evenings in the Harvard gymnasium doing bodyweight gymnastics exercises. By the time he graduated, his body had transformed and he was known as the strongest man at Harvard.<sup>36</sup> In 1854 he tested his strength on one of the lifting machines that had begun to appear as novelties at circuses, fairs, and on this occasion on a street corner in Rochester, New York. The twenty-year-old Windship performed a 420-pound partial deadlift on the machine but failed to impress the crowd. The disappointment caused him to alter his training and instead of concentrating on gymnastic movements, he focused on lifting heavy weights and devised his own partial deadlift machine in his back yard. By the time of the 1861 invitation, Windship could raise more than 1200 pounds in the partial movement. To demonstrate his belief in the importance of strength, Windship typically performed a lifting exhibition after his lecture.

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<sup>34</sup> Todd, “Strength is Health,” 3

<sup>35</sup> Historian Harvey Green has described the event that led up to Windship’s taking up weight training, in which he was teased by a bully, as “a scenario that would become a classic in the marketing of bodybuilding.” The scenario was immortalized in the twentieth century advertising campaign of “Charles Atlas” (Angelo Siciliano). Green, *Fit For America*, 199.

<sup>36</sup> G. B. *Windship*, “Autobiographical Sketches of a Strength Seeker,” *Atlantic Monthly* 9 (January 1862): 102-115.

At the gymnastics extravaganza hosted by William Curtis, an offer of \$200 to any man who could out-lift Windship added drama to the evening. William Thompson of Chicago's Metropolitan Athletic Club was the only man to take up the challenge. In what Jan Todd called "the first American weightlifting contest" the men competed in two events: the partial deadlift and a harness lift.<sup>37</sup> Windship won the partial deadlift with a pull of 1,100 pounds when Thompson failed to budge the same weight. In the second lift, Windship used a yoke and chains that fit around his shoulders to lift 1,500 pounds. With a personal best of 1,934 pounds in the lift, the 1,500 was effectively a warm-up. Unfortunately for Windship, the first attempt broke his lifting harness. Thompson then got out his leather harness which fit around his hips. The implement offered a clear mechanical advantage over Winship's apparatus by taking out the spinal column and resting the weight on the pelvis. Accordingly, Thompson easily bested Winship's previous record with a lift of 2,106 pounds. The first American weightlifting meet was a draw, but more than that it served as an exemplar of pre-modern sport.<sup>38</sup>

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<sup>37</sup> Todd, "Strength is Health," 6-7.

<sup>38</sup> *Ibid.*, 7.



Figure 4. George Barker Windship. Image from H.J. Lucher Stark Center “Quest for Victory”  
timeline [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/)

Historian Melvin Adelman has identified six key differences between pre-modern and modern sport: organization, rules, competition, role differentiation, public information, and statistics and records. In pre-modern sport the rules are “simple, unwritten, and based upon local customs and traditions,” whereas modern sport is marked by “formal, standard, and written” rules.<sup>39</sup> In this first weightlifting meet, there was clearly some agreement on the lifts to be performed, though the specifics were not laid out, which gave a significant advantage to Thompson even if Windship’s harness had not broken. In spite of the draw, Windship and his theories received important validation and exposure later in 1861 when they were discussed in an article in *Atlantic Monthly*. The article by minister and health reformer Thomas Wentworth Higginson explained the benefits of heavy training, both the brand advocated by Windship, and as practiced in German-style gymnasiums.<sup>40</sup>

Competitive weightlifting was in good company in its pre-modern state during this era. Baseball, the sport which Eliot Gorn contends, “may well have been the most important sport of the antebellum era” was also in the early stages of its evolution toward modernity.<sup>41</sup> Dozens of clubs had formed in the 1850s and, as a result of the Civil War, became increasingly standardized in the 1860s and 70s. Soldiers from different regions, accustomed to playing by different rules, worked to develop common rules. Another aspect of the Civil War was to have greater impact – mass production. As cities grew, production shifted ever-more toward a national market, facilitated by railroads, steamships, and telegraph lines. One category of goods

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<sup>39</sup> Melvin Adelman, “The First Modern Sport in America: Harness Racing in New York City, 1825-1870,” in *Sport in America: From Wicked Amusement to National Obsession*, ed. David K. Wiggins (Champaign, IL: Human Kinetics, 1995), 96.

<sup>40</sup> Thomas Wentworth Higginson, “Gymnastics,” *The Atlantic Monthly* 7 (March, 1861): 289; “1861: Thomas Wentworth Higginson Publishes ‘Gymnastics,’” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lucher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 21, 2013).

<sup>41</sup> Gorn and Goldstein, *A Brief History of American Sports*, 79.

seeking a national market was sporting goods.<sup>42</sup> In order to secure a foothold in the market, manufacturers like Albert G. Spalding produced “guidebooks” for sports like baseball. The books served multiple purposes, they promoted the sport and informed readers how to use the company’s products, but they also functioned to standardize the rules of games as companies vied to produce “official” books for leagues and games. According to historian Stephen Hardy, sporting goods manufacturers “became the first line of promoters and educators during the great sports surge of the late nineteenth century...teaching not only the use of equipment but the value of physical activity.”<sup>43</sup> The push to promote and standardize sport came from many fronts, of course. William Buckingham Curtis played an important role in doing so when he helped found the New York Athletic Club in 1866 and the Amateur Athletic Union in 1888. Both organizations worked to sponsor and promote a variety of sports as well as establish records and rules.<sup>44</sup>

By the 1870s, weight training as a component of sport training had become “widely accepted on the American sporting landscape.”<sup>45</sup> Athletes like William Buckingham Curtis had successfully demonstrated that strength and superior athletic ability went hand in hand. Like sporting goods manufacturers, purveyors of weight training equipment explained the benefits of strength training and their products. Sim Kehoe, a manufacturer of Indian clubs published *The*

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<sup>42</sup> Stephen Hardy, “Adopted by All the Leading Clubs: Sporting Goods and the Shaping of Leisure,” in *Sport in America: From Wicked Amusement to National Obsession*, ed. David K. Wiggins (Champaign, IL: Human Kinetics, 1995), 133-150.

<sup>43</sup> *Ibid.*, 146.

<sup>44</sup> Curtis has been called “the Father of American Amateur Athletics.” “The Life of an Athlete: William B. Curtis, The Father of American Amateur Athletics,” *New York Times*, July 8, 1900; Lowell M. Seida, *William Buckingham ‘Father Bill’ Curtis: Father of American Amateur Athletics* (Westchester, IL: by the author, 2001), 33-9, 42-3; Richard G. Wettan and Joe D. Willis, “William Buckingham Curtis: The Founding Father of American Amateur Athletics, 1837-1900,” *Quest* 27 (Winter, 1977): 28-37; Kimberly Beckwith, “Building Strength: Alan Calvert, the Milo Barbell Company, and the Modernization of American Weight Training” (PhD diss., University of Texas – Austin, 2006), 62-64; Gorn and Goldstein, *A Brief History of American Sports*, 113.

<sup>45</sup> “1870s: A Weight Training for Athletics Explosion,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lutchter Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 21, 2013).

*Indian Club Exercises* in 1866 which, in addition to explaining the benefits of using his products also contained the endorsement of famed boxer John C. “Benecia Boy” Heenan.<sup>46</sup> Kehoe’s advertisements listed other top boxers as well as well-known rowers and pedestrians as followers of his methods.<sup>47</sup> Other instructional manuals included *Athletic Exercises for Health and Strength* by Robert DeWitt, as well as a series of guides published by Ed James, including *How to Acquire Strength and Muscle*, and *Practical Training for Running, Walking, Rowing, Wrestling, Boxing, Jumping, and All Kinds of Athletic Feats*.<sup>48</sup>

At the same time, the “muscular Christianity” movement was starting to garner more widespread attention. An English import and vestige of the perfectionism and millennialism of the first half of the century, proponents of muscular Christianity “contended that bodily strength built character and righteousness and usefulness for God’s (and the nation’s) work.”<sup>49</sup> Physical weakness, according to psychologist and professor G. Stanley Hall was “dangerously near” wickedness.<sup>50</sup> A primary cause of both weakness and wickedness was urbanization. Urban life lacked the autonomy and physical vigor widely associated with the more bucolic family farm. The growth of cities was precipitated by a booming population, growing from less than forty million in 1870 to over ninety-two million by 1910, and by the rise of massive corporations like Standard Oil, Carnegie Steel, and the Pennsylvania Railroad.<sup>51</sup> America’s burgeoning industries

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<sup>46</sup> Sim D. Kehoe, *The Indian Club Exercise* (New York: American News Company, 1866).

<sup>47</sup> “1866: Sim D. Kehoe Advocates a Heavier Approach to Indian Club Training,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Litcher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 21, 2013).

<sup>48</sup> “1870s: A Weight Training for Athletics Explosion.”

<sup>49</sup> Whorton, *Crusaders for Fitness*, 271; Chapman, *Sandow the Magnificent*, 3.

<sup>50</sup> G. Stanley Hall worked extensively on child development, between 1884 and 1920. According to Hall, “too few realize[d] what physical vigor is in man or woman and how dangerously near weakness often is to wickedness.” Clifford Putney, *Muscular Christianity: Manhood and Sports in Protestant America, 1880-1920* (Cambridge, MA: Harvard University Press, 2001), 30.

<sup>51</sup> Much of the population boom was due to immigration as eight million immigrants would come to the United States between 1870 and 1890, with another fourteen million coming between 1900 and 1914. John Kasson, *Houdini, Tarzan, and the Perfect Man: The White Male Body and the Challenge of Modernity in America* (New

required large, centrally-located workforces that included both bureaucrats and factory workers. Moreover, as companies consolidated, they put smaller organizations out of business and transformed small-time owners into wage-earners.<sup>52</sup> The shift toward wage-earning led to a crisis in masculinity, due to the implicit loss of financial and professional independence.<sup>53</sup> This loss of independence was made more acute in the face of the many depressions between 1873 and 1907 – as companies blossomed and collapsed, putting thousands out of work at a time, men saw how little authority they held in the industrial age.<sup>54</sup> Moreover, the jobs associated with this “corporate revolution” were often repetitive and sedentary, requiring progressively less physical exertion.<sup>55</sup> This brand of lifeless and tedious work was thought to sap vigor. Proponents of muscular Christianity worried that life in the cities led to “stiff-jointed, soft-muscled, paste-complexioned youth” and feminized men.<sup>56</sup> This was particularly troublesome in an era when the Lamarckian concept of evolution, in which characteristics acquired over the span of one’s lifetime could be passed on, had still not been discredited.<sup>57</sup> In this view physical degeneration in the current generation would portend degeneration in the next. Inherited debility would presage disaster as more robust nations would inevitably subsume the United States, industrially or militarily.<sup>58</sup> The cure for this physical, and many believed inextricably linked, moral, malaise

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York: Hill and Wang, 2001), 12; Michael Kimmel, *Manhood in America: A Cultural History* (New York: The Free Press, 1996), 85; Davidson, *Nation of Nations*, 545-546.

<sup>52</sup> Arthur M. Schlesinger, Jr., ed, *The Almanac of American History* (New York: Barnes and Noble, 2004), 315.

<sup>53</sup> *The Independent* fretted, “The middle class is becoming a salaried class, and rapidly losing the economic and moral independence of former days.” Kasson, *Houdini, Tarzan, and the Perfect Man*, 11; Kimmel, *Manhood in America*, 31.

<sup>54</sup> Davidson, *Nation of Nations*, 556; Kimmel, *Manhood in America*, 206.

<sup>55</sup> Kasson, *Houdini, Tarzan, and the Perfect Man*, 11.

<sup>56</sup> Putney, *Muscular Christianity*, 31.

<sup>57</sup> Carl Degler, *In Search of Human Nature: The Decline and Revival of Darwinism in American Social Thought* (New York: Oxford University Press, 1991): 20-25.

<sup>58</sup> The fear of “race suicide” was a key aspect of the anxiety about physical fitness in the latter decades of the nineteenth century. As immigrants came increasingly from southern and eastern Europe, some fretted that white Anglo-Saxon protestants were being out-bred by “beaten men from beaten races; representing the worst failures in the struggle for existence.” Physical culturists like Eugen Sandow and Bernarr Macfadden encouraged physical culture to “raise the average standard of the race as a whole” and, in the case of Macfadden, offered financial

was to engage in the “strenuous life” through a combination of out-of-doors pursuits, sports, and exercise.<sup>59</sup>

To facilitate this vigorous activity churches opened gyms to “save citified children” and “ensure healthfulness.”<sup>60</sup> Another site for exercise and evangelism was the Young Men’s Christian Association (YMCA). Founded by London dry goods clerk George Williams in 1844, the organization first established itself in the United States with a Boston location in 1851. The organization grew rapidly, expanding from Boston to twenty locations by 1853, fifty-six in 1856, and 205 by 1860. The earliest YMCAs included reading rooms, libraries, and Bible classes. When the YMCA modified its mission to provide for the “improvement of the spiritual, mental, social, and physical condition of young men” in 1866, many locations added gyms, which often included weight training implements.<sup>61</sup> According to historian Clifford Putney, “there existed no greater place for physical exercise in the Progressive Era than YMCA gymnasias.”<sup>62</sup>

By the 1870s, then, serious strength training was becoming increasingly common, both as a means of improving health and augmenting sport performance. This was to change with the untimely death of George Barker Windship in 1876.

#### **WINDSHIP’S DEATH AND THE PUSHBACK AGAINST WEIGHT TRAINING**

On September 12, 1876, George Barker Windship died of an apparent aneurism at his home. At only forty-two years of age, detractors of heavy strength training were quick to denigrate the methods he so ardently advocated. Prior to his death a competitor, Lewis Janes, had cautioned

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incentives for physically fit men and women to wed and have children. Kasson, *Houdini, Tarzan, and the Perfect Man*, 10; Chapman, *Sandow the Magnificent*, 108-109; Mark Adams, *Mr. America: How Muscular Millionaire Bernarr Macfadden Transformed the Nation through Sex, Salad, and the Ultimate Starvation Diet* (New York: Harper Collins, 2009), 127.

<sup>59</sup> Benjamin Rader, *American Sports – from the Age of Folk Games to Televised Sports* (Upper Saddle River, NJ: Prentice-Hall, 1999): 123-6.

<sup>60</sup> Putney, *Muscular Christianity*, 63.

<sup>61</sup> “1870s: A Weight Training for Athletics Explosion.” *The Quest for Victory*.

<sup>62</sup> Putney, *Muscular Christianity*, 67.

against the training advocated by Windship, pointing to “the pernicious effects of forcing abnormal muscular development.”<sup>63</sup> Medical doctor Benjamin Lee in a paper presented before the Philadelphia Medical Society asserted that Windship’s death had been the result of his strenuous training.<sup>64</sup> Assertions like Dr. Lee’s implicitly validated the thinking of much of the medical and physical education communities that heavy strength training was deleterious to health. These groups often held views similar to Galen’s that too much added mass violated “nature’s laws” and would lead to ill-health.

Another competitor of Windship’s, Dioclesian (Dio) Lewis, also disparaged the type of heavy training he recommended. Lewis began developing his own exercise program in the late 1850s. He intended the system to be practiced by school children to ensure “all-sided development” that could not be provided by “one game or set of games.”<sup>65</sup> Lewis’ system was based, in part, on the Swedish “movement cure” system of gymnastics which sought to correct ailments through specific exercise prescriptions. According to Jan Todd, Lewis felt that the therapeutic exercises practiced in the United States “placed too much emphasis on the development of strength...and not enough on flexibility and speed of movement.”<sup>66</sup> Lewis referred to his system as the “New Gymnastics,” and, with an August 1860 resolution by the American Institute of Instruction, it “became the first system to receive the endorsement of a national group of educators.”<sup>67</sup> As the “New Gymnastics” began to directly compete with such heavy strength training methods as Windship’s, Lewis directed a component of the 1868 edition

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<sup>63</sup> Lewis G. Janes, *Health-Exercise: The Rationale and Practice of the Lifting-Cure or Health Lift* (New York: Lewis G. Janes, 1871), 44; “1876: The Death of George Barker Windship and the Emergence of the Anti-Weightlifting Position,” *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Lutchter Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 21, 2013).

<sup>64</sup> *Ibid.*; Benjamin Lee, “The Health Lift: Is it Rational, Scientific, or Safe?” *The Medical and Surgical Reporter* 38 (April 1878): 261-365.

<sup>65</sup> Todd, *Physical Culture and the Body Beautiful*, 218.

<sup>66</sup> *Ibid.*; Whorton, *Crusaders for Fitness*, 275-277.

<sup>67</sup> Todd, *Physical Culture and the Body Beautiful*, 222.

of his *The New Gymnastics* text toward discrediting other systems. Lewis contended that heavy strength training would make a man too large and slow, in his words “lifting great weights affects him as drawing heavy loads affects the horse.” Practicing the brisk movements of the “New Gymnastics,” by extension would result in the agility of a smaller carriage horse. As discussed by Terry Todd, the larger body and muscularity of a draft horse is the result of selective breeding, not of training.<sup>68</sup> Nonetheless, iterations of this argument would prove tenacious, as evidenced by advocates of strength training still attempting to refute it into the 1950s.<sup>69</sup>



Figure 5. Dio Lewis. Image from Fred E. Leonard’s *A Guide to the History of Physical Education* (1923) page 252.

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<sup>68</sup> Terry Todd and John Hoberman, “Yearning for Muscular Power,” *Iron Game History* 9, no. 3 (January/February 2007): 22-23; Terry Todd, “Myth of the muscle-bound lifter,” *NSCA Journal* 7, no. 3 (1985): 37-41

<sup>69</sup> Physiologist and professor Peter Karpovich and *Strength & Health* writer Jim Murray mentioned this argument in their 1956 book *Weight Training in Athletics*. Jim Murray and Peter Karpovich, *Weight Training in Athletics* (Englewood Cliffs, NJ: Prentice-Hall, 1956): 44.

One of the most prominent physicians and physical educators who eschewed heavy training was Dudley Allen Sargent.<sup>70</sup> Appointed as an Assistant Professor of Physical Training at Harvard University in 1879, Sargent became interested in physical training after seeing a picture of an Englishman named Harrison swinging heavy Indian clubs in a text called *The Family Gymnasium*. The fourteen year old Sargent “regarded this man Harrison’s physique with envy” and crafted his own Indian clubs in an attempt to build a similar physique to the Englishman.<sup>71</sup> By sixteen, Sargent also engaged in boxing and systematic heavy gymnastics, becoming so enthusiastic about the training that he organized a group of gymnasts who trained with him in a barn equipped with parallel bars, a pommel horse, and rings, among other apparatus. In 1867, Sargent joined a traveling circus, but by the fall of 1868, had grown weary of the “tawdry trappings, the inevitable company of loafers, and the artificiality of the show life” and sought a way to advance his education while fostering his interest in training.<sup>72</sup> To that end, he accepted a position as Director of Gymnastics at Bowdoin College in 1869. In the antiquated Bowdoin gym Sargent found the standard gymnastic equipment, similar to that found in the barn in which his group trained in Belfast. Students generally avoided the gymnasium, in part because the gymnastic apparatus took a significant amount of strength to use. The few weights which were found in the gym were also too heavy for most students with little training experience to lift.<sup>73</sup> In order to work around this impediment, Sargent invested in light dumbbells, Indian clubs, and adjustable machines which would accommodate varying levels of strength and training experience amongst the student body. With the new apparatus, students

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<sup>70</sup> James Whorton has referred to him as the “Newton of his field.” Whorton, *Crusaders for Fitness*, 283.

<sup>71</sup> Dudley Allen Sargent, *Dudley Allen Sargent: An Autobiography* (Philadelphia: Lea & Febiger, 1927), 33.

<sup>72</sup> *Ibid.*, 82.

<sup>73</sup> The students, Sargent claimed, viewed the apparatus as “a form of torture.” *Ibid.*, 92.

saw significant results in a relatively short amount of time. The faculty at Bowdoin was impressed, and made the training compulsory for all students in 1872.<sup>74</sup>

His experience at Bowdoin caused Sargent to shift his view of training, from emphasizing strength to democratizing exercise and focusing on balanced physical development, rather than maximizing ability at any one skill.<sup>75</sup> Sargent left Bowdoin in 1875 to pursue his medical doctorate from Yale, which he attained in 1878. After failing to convince the Yale faculty of the necessity of a department of physical education, Sargent took a similar position at Harvard in 1879.<sup>76</sup> There he employed anthropometrical measurements similar to those performed by Edward Hitchcock who supervised the Department of Physical culture at Amherst (MA) College from 1861-1911.<sup>77</sup> Sargent utilized girth measurements to create a hypothetical perfect form. Students were then given an “exercise prescription” to help them attain that form by improving lagging aspects of their physiques.

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<sup>74</sup> Ibid., 101.

<sup>75</sup> Carolyn de la Pena, “Dudley Allen Sargent: Health Machines and the Energized Male Body,” *Iron Game History* 8, no. 2 (October, 2003): 3-19; In his 1904 book *Health, Strength, & Power*, Sargent pointed out that, “...it is very seldom at the present day that one’s life depends upon the speed with which he can run, or the distance he can jump, though his ability to swim might be the means of self-preservation. It is a question, therefore, how far boys should be encouraged to attain a high degree of excellence in these various sports.” Dudley Allen Sargent, *Health, Strength & Power* (Boston, MA: H.M. Caldwell, 1904), 46.

<sup>76</sup> Sargent, *Autobiography*, 142-45; See also, Bruce Bennett, “Dudley A. Sargent – A Man for all Seasons” *Quest* 29 (Winter 1978): 33-45.

<sup>77</sup> Measures of strength recommended by Sargent include use of a dynamometer to measure the strength of the back in a lift similar to a straight-legged deadlift, a measure of leg strength by doing a partial deadlift, compressing a dynamometer to test chest strength, as well as a test of number of dips that could be completed on the parallel bars, chin-ups completed on either the flying rings or horizontal bar, and a measure of grip strength using the dynamometer. Dudley Allen Sargent, *Anthropometric Apparatus with Directions for Measuring and Testing the Principal Physical Characteristics of the Human Body* (Cambridge, MA: 1887), 13-14; William McArdle, Frank Katch, and Victor Katch, *Exercise Physiology: Nutrition, Energy, and Human Performance* (Baltimore, MD: Lippincott, Williams, and Wilkins, 2010), xl-xliv.

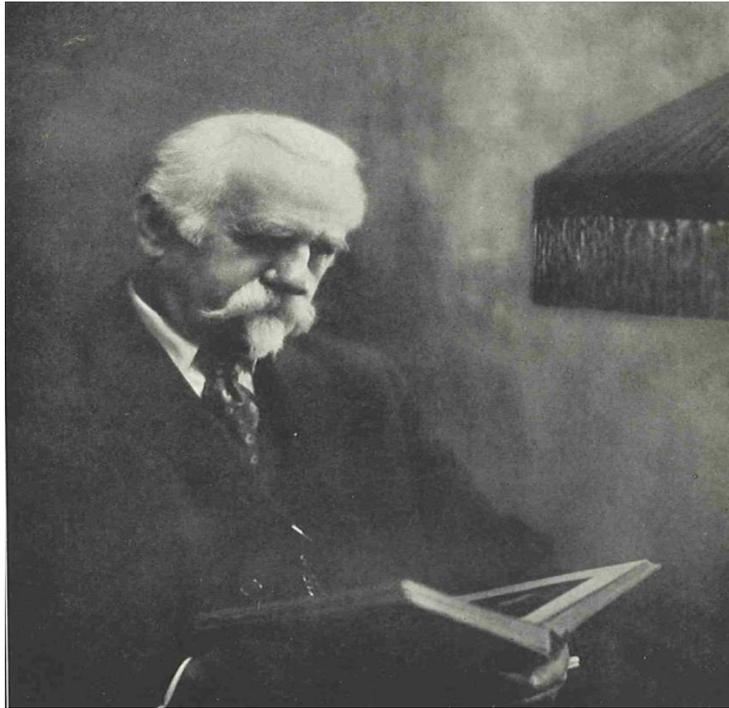


Figure 6. Dudley Allen Sargent. Image from his 1927 autobiography.

This view of balanced development was also promoted by William Blaikie in his 1879 text *How to Get Strong and Stay So*, which helped expose Sargent's ideas to a much wider audience.<sup>78</sup> Blaikie, a member of the Harvard crew before his graduation, was an influential associate of Sargent. The focus on balance "rendered weak" the athlete by presenting his ability to excel in few tasks as problematic and, in fact, a marker of his lack of development.<sup>79</sup> Heavy strength training was disdained because it tended to lead to imbalance between physique and psyche as the muscles grew out of proportion with Sargent's ideal form.<sup>80</sup> This view of training

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<sup>78</sup> Doug Bryant, "William Blaikie and Physical Fitness in Late Nineteenth Century America," *Iron Game History* 2, no. 3 (July 1992): 3-6; Whorton, *Crusaders for Fitness*, 284.

<sup>79</sup> De la Pena, "Dudley Allen Sargent," 6.

<sup>80</sup> Sargent warned that, "overdevelopment of any one part, organ, or function throws the remaining organism out of gear, and constitutes a greater or less tendency to disease." Sargent, *Health, Strength & Power*, 16.

was very influential among physicians and physical educators as Sargent spread his theories through summer institutes at Harvard. He counted among the attendees of these programs Edward Hartwell, William Anderson, and R. Tait McKenzie who brought similar programs to Johns Hopkins University, Yale, and the University of Pennsylvania, respectively.<sup>81</sup> Luther Gulick, a dominant figure in the YMCA, also attended the institute.<sup>82</sup> As an example of the influence of Sargent and the balanced physical development philosophy, R. Tait McKenzie, a medical doctor and the first professor of physical therapy in the United States warned as late as 1924 that overdeveloped muscles were “parasites” of vitality. Pictured on the same page as this assertion was a photograph of an impressively muscled man with a caption that read, “extreme muscular development without a corresponding increase in heart and lung power.” The caption continued, “this man could not float in sea water and died prematurely.” Though McKenzie implied that the man’s density and his premature death are related, no further explanation was given.<sup>83</sup> Some physiologists and physicians took the attacks on strength training a step farther by attributing to it a host of fanciful negative outcomes ranging from impotence to insanity or an early grave.<sup>84</sup>

In his widely read *How to Get Strong*, Blaikie specifically cautioned that heavy weight training would result in movements which were, “stiff and ungainly.”<sup>85</sup> Echoing Dio Lewis, he contended that, “he who does work of the grade suited to a truck-horse is far more likely to acquire the heavy and ponderous ways of that worthy animal.” This analogy was seemingly

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<sup>81</sup> De la Pena, “Dudley Allen Sargent,” 14; Jack Berryman, *Out of Many, One: A History of the American College of Sports Medicine* (Champaign, IL: Human Kinetics, 1995), 4.

<sup>82</sup> De la Pena, “Dudley Allen Sargent,” 14.

<sup>83</sup> Though McKenzie was not an advocate of heavy strength training, it is important to note that he was a strong advocate of both exercise and athletics. R. Tait McKenzie, *Exercise in Education and Medicine* (Philadelphia: WB Saunders, 1924): 22; Park, “Muscles, Symmetry and Action,” 1616; Whorton, “Athlete’s Heart,” 113.

<sup>84</sup> Ferdinand LaGrange, *Physiology of Bodily Exercise* (New York: D. Appleton and Co Publishing, 1896), 242; Herbert Conn & Caroline Holt, *Physiology and Health* (Boston: Silver, Burdett, and Co., 1921), 215-16.

<sup>85</sup> Terry Todd, “Myth of the Muscle-Bound Lifter,” *NSCA Journal* 7, no. 3 (1985): 38.

cemented in humans by professional strongmen, many of whom were very large men moving extremely heavy weights.<sup>86</sup> While the nervous system is undeniably important in feats of strength the primary limitation on force production is the cross-sectional area of the muscles.<sup>87</sup> Bigger men were and are usually capable of lifting more weight than smaller men. The men who astonished audiences with their feats of strength, then, tended to be for the most part large men. Because they made their living lifting large weights, they devoted their time to maximizing this skill; and most had no need for quick movements or agility. As such, they were “ponderous men performing their feats by brute strength,” rather than exemplars of athletic prowess which budding athletes might seek to emulate.<sup>88</sup> The combination of seemingly common sense criticisms of heavy lifting, as well as the over-sized performers that many associated with great strength helped cement the notion of a “muscle bound” condition in the minds of many people. The popular understanding of the condition was a combination of decreased speed and coordination that resulted from heavy lifting.

Physicians suspected that danger was closely associated with strenuous athletic participation well into the twentieth century.<sup>89</sup> In addition to muscle-binding, one of the most common charges against heavy strength training, as well as other high-intensity anaerobic exercises, was that they might produce a sudden and excessive strain on the heart. Physical educators and physicians alike were disturbed by the obvious strain, redness, and distention of

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<sup>86</sup> For example, the famed French-Canadian strongman, Louis Cyr, measured 5’10.5” and 315 pounds in his prime in the late 1800s. David Webster, *The Iron Game: An Illustrated History of Weight-Lifting* (Irvine, CA: John Geddes Printers, 1976): 36-38.

<sup>87</sup> McArdle, Katch, and Katch, *Exercise Physiology*, 521.

<sup>88</sup> Benjamin Massey, Harold Freeman, Frank Manson, and Janet Wessel, *The Kinesiology of Weightlifting* (Dubuque, IA: Wm. C. Brown Co. Publishers, 1959): 18.

<sup>89</sup> As examples, in their 1921 text *Physiology and Health*, Herbert Conn and Caroline Holt, continued to warn that “the man who gives his body too much severe exercise is a little more foolish than the one who takes none at all,” contending that the over-exerciser would die early from the strain on the heart. In 1936, weight training advocate and magazine publisher Bob Hoffman asked readers, “Have you been led to believe that exercise or athletics may injure your heart?” If so, he advised them, “you have been misinformed.” Conn and Holt, *Physiology and Health*, 215; Bob Hoffman, “Your Heart and Exercise,” *Strength & Health*, March 1936, 12.

neck veins that accompany heavy lifting. Regarding the effect on the heart, some warned against the damage likely to result due to the rapid increase in intrathoracic pressure that results when lifters hold their breath while lifting. Medical doctor and physical educator Percy Dawson pointed to “bed pan death” as evidence that weak hearts, in particular, were not up to such stress.<sup>90</sup> It was recognized that the increased intrathoracic pressure caused by expelling air against a closed glottis resulted in decreased return of blood to the heart.<sup>91</sup> Dawson explained that, “the flooding of the heart which occurs as soon as the subject desists from his effort, by the dammed back venous blood, has been regarded as favoring acute dilation of heart which has been weakened by the previous coronary anemia.”<sup>92</sup> Following a similar discussion, R. Tait McKenzie remarked that exercises of strength and speed produced the greatest strain on the heart and blood vessels.<sup>93</sup>

Many endurance sports also prompted medical doctors to warn participants of development of such maladies as athlete’s heart and “bicycle face.”<sup>94</sup> Any activity performed in a competitive setting was particularly dangerous because it might cause the athlete to overextend himself because of the enthusiastic spectators. “The intense emotional appeal of competition” said medical doctor A.M. Kerr, could carry a “boy on to feats of strength and endurance he

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<sup>90</sup> Dawson’s description of “bed pan death” was related to the straining during defecation that resulted from constipation. It had been observed that individuals died suddenly while attempting to move their bowels. It was believed that this increase in intrathoracic pressure strained an already weakened heart and resulted in a myocardial infarction. Percy Dawson, *The Physiology of Physical Education for Physical Educators and Their Pupils* (Baltimore, MD: Williams & Wilkins, 1935), 489.

<sup>91</sup> The maneuver was described by Italian physician Antonio Maria Valsalva in 1704. Alterations in cardiovascular function as a result of the maneuver were first described by German physiologist Edward Weber in 1851. Luiz Fernando Junquiera, Jr., “Teaching Cardiac Autonomic Function Dynamics Employing the Valsalva (Valsalva-Weber) Maneuver,” *Advances in Physiology Education* 32, no. 1 (2008), 100-106, <http://advan.physiology.org/content/32/1/100.full> (accessed September 14, 2012).

<sup>92</sup> Dawson, *Physiology of Physical Education*, 489.

<sup>93</sup> McKenzie, *Exercise in Education and Medicine*, 52.

<sup>94</sup> According to Harvey Green, bicycle face was “characterized by a strained facial expression, a result of continually trying to maintain balance while pedaling hard.” Other maladies that resulted from strenuous bicycle riding included “bicycle throat” from breathing dusty air and “bicyclist’s heart,” the same type of condition that affected a variety of other athletes. Green, *Fit for America*, 232.

would otherwise find impossible.”<sup>95</sup> In his 1914 book on training for track and field events, Olympic and University of Pennsylvania track coach Michael Murphy noted, “Although we hear less about it now than we once did, nearly every athlete will be told at one time or another that participation in athletics is likely to shorten his life – that it will give him the ‘athletic heart.’”<sup>96</sup> Though it could affect weightlifters, the athletic heart was primarily a disease thought to afflict rowers, runners, and bicyclists. The heart could be adversely affected primarily in two ways: hypertrophy or dilation. Hypertrophy of the heart resulted in a heart that was so strong that it pounded the arterial system with blood, weakening the vessels. This could be particularly problematic as one aged when, after the cessation of regular training, the overdeveloped heart continued to wear away at the increasingly weak tissue. The association between high blood pressure, heart valve defects, and cardiac hypertrophy was well known and, as a result, many believed any degree of hypertrophy to be pathological.<sup>97</sup> Dilation could be caused by a sudden or persistent overfilling of the heart with blood. The increased volume of venous blood returning to the heart during exercise was thought to overflow and stretch the vessel, resulting in distension and weakening of the heart’s walls.<sup>98</sup> A major problem with diagnosing either condition was that the tools of measurement were imprecise at best. Initial investigations were carried out by percussing the chest to find the outline of the heart, determining heart size based on the locations of its sounds, or using radiographs. Radiographs are much more sensitive at depicting hard tissue, such as bone, not soft and moving structures like the heart. Nonetheless, medical doctors

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<sup>95</sup> A.M. Kerr, “Safeguarding the Heart in High School,” *Journal of Health and Physical Education* 2, no. 1 (January 1931): 16.

<sup>96</sup> Michael Murphy, *Athletic Training* (New York: Charles Scribner’s Sons, 1914), 149.

<sup>97</sup> Whorton, “Athlete’s Heart,” 119.

<sup>98</sup> Medical doctor Ferdinand LaGrange attributed dilation of the heart to chronic overwork. He discussed hypertrophy as a positive effect of exercise resulted in a heart that was “thicker, [and] heavier, with stronger walls.” Dilation occurred when there was “excessive exercise” which “induces wearing and degeneration of the fibres, lessening the resisting power of the organism and, while producing dilation of the cavities of the heart, at the same time leads to a thinning of their walls and to diminished strength of their fibres.” LaGrange, *Physiology of Bodily Exercise*, 158-159.

proceeded to identify individuals afflicted by the condition. One physician, T. Abutt, even diagnosed the condition in himself while mountain climbing in 1875. “During the ascent Abutt was suddenly seized with air hunger and a feeling of stretching in the epigastrium. He had to lie down, and he confirmed upon himself an evident enlargement of the heart dullness to the right.”<sup>99</sup>



Figure 7. Physical educators like R. Tait McKenzie, the sculptor of this work, were concerned about the strain induced by a variety of physical activities. Image from McKenzie’s *Exercise in Education and Medicine* (1923).

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<sup>99</sup> That the physician would be “seized with air hunger” while mountain climbing is not surprising, given the decreased partial pressure of oxygen and saturation rate of hemoglobin. As a result, the heart would have been working harder at altitude, reflected by an increased heart rate at rest and during exertion. Felix Deutsch and Emil Kauf, *Heart and Athletics: Clinical Researches Upon the Influence of Athletics Upon the Heart* (St. Louis, MO: C.V. Mosby Co, 1927) , 23.

Perhaps the largest study was performed by Felix Deutsch and Emil Kauf who examined more than 1,700 athletes at the Vienna “Heart Station.” The athletes came from a wide variety of sports including: swimming, track, soccer, rowing, weightlifting, wrestling, boxing, skiing, and several others. The doctors used orthodiagrams, a specialized type of radiograph, to record the transverse diameter of the heart. From their imaging, the authors concluded that the athletes did have larger hearts than a group who engaged in similar activities for fun. The resultant enlargement “cannot be looked upon as harmless” and resulted from dilation, though the authors suggested the condition could be reversed with rest.<sup>100</sup> Of note for this work is that, in the weightlifters, there was “no marked influence upon the heart.”<sup>101</sup> Deutsch and Kauf mentioned that several champion weightlifters tended to have larger hearts but could not determine that the size was due to their training. As a confounding factor, they noted that, “the mode of life of this class of men must be given consideration. They are all worshippers of Bacchus.”<sup>102</sup> The finding that strength training had little impact on heart size presumably played a role in the assessment that weight training actually did not work the heart enough.<sup>103</sup>

### **A PHYSICAL CULTURE “REVOLUTION”**

As many medical doctors wrung their hands over the effects of strenuous exercise and vigorous athletic participation, a nascent “physical culture revolution” was beginning in 1893.<sup>104</sup> The exhibition of strongman Eugen Sandow as part of the World’s Columbian Exposition in Chicago served as the primary spark. Unlike other strongmen who, in the words of David Chapman were typically “huge mountains of flesh and sinew,” Sandow was both exceptionally

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<sup>100</sup> Ibid., 172-4.

<sup>101</sup> Ibid., 80.

<sup>102</sup> Ibid., 81.

<sup>103</sup> George Gillesby, “The Physiologists Speak on Weight-Lifting,” *Journal of Physical Education* 36, no. 1 (September-October 1938): 16.

<sup>104</sup> Beckwith, “Building Strength,” 46.

muscular and exceptionally lean. In addition to his pleasing appearance, Sandow's strength equaled or surpassed his more rotund counterparts. According to historian John Kasson, his unique combination of muscularity and definition "represented a new standard of male fitness, beauty, strength, and potency" as "physical fitness experts and journalists alike hailed him as the 'perfect man.'"<sup>105</sup>

In his formative years Sandow trained as an acrobat and gymnast, which laid the foundation for his physique. This training made him remarkably lean and symmetrical but it did not develop the size for which he would later become famous. That size developed after Sandow began training with Louis Durlacher, better known as Professor Attila. While heavy strength training had fallen out of favor in the late 1800s Attila, himself a notable strongman, insisted that it was integral to producing both size and strength. He introduced Sandow to the progressive strength training which developed his physique.<sup>106</sup> In addition to playing a key role in Sandow's development, Attila helped train world heavyweight champion boxer "Gentleman" Jim Corbett and numerous other athletes at his gym in New York City which opened in 1893.<sup>107</sup>

Two weeks prior to Sandow's debut in Chicago, historian Fredrick Jackson Turner asserted that, as of the 1890 census, the American frontier had closed.<sup>108</sup> Turner believed that the progression of American civilization was tied to westward expansion. Men were transformed by the wilderness from something European into "a new product that is American."<sup>109</sup> That new product formed because the frontier offered a space for the exercise of individualism, fostered egalitarianism, and though not explicitly stated, developed manly self-reliance. With the

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<sup>105</sup> Kasson, *Houdini, Tarzan, and the Perfect Man*, 28, 7.

<sup>106</sup> Chapman, *Sandow the Magnificent*, 9-11

<sup>107</sup> "1893: European Strongman Louis Durlacher Becomes Gentleman Jim Corbett's Strength Coach"; For additional information about Attila's career, see: Kim Beckwith and Jan Todd, "Requiem for a Strongman: Reassessing the Career of Professor Louis Atilla," *Iron Game History* 7, nos. 2 and 3 (July 2002): 42-55.

<sup>108</sup> Kasson, *Houdini, Tarzan, and the Perfect Man*, 68-69.

<sup>109</sup> *Ibid.*

disappearance of the frontier, a certain brand of American masculinity was also passing. In this context, men were willing to embrace the new standard of masculinity set by Sandow.



Figure 8. Eugen Sandow. Image from Randy Roach's *Muscle, Smoke, and Mirrors, Volume One* (2008) cover.

During his stay in Chicago for the Columbian Exchange, thousands streamed to the Trocadero theater to see Sandow. The desire to see this “new standard of male fitness” was so great that his shows were sold out throughout his tenancy.<sup>110</sup> Many of those who witnessed the German’s superbly developed muscles desired to build a body like his and they became, in the words of historian Kim Beckwith, “Sandow’s ripples.”<sup>111</sup> One of those ripples was health reformer Bernarr Macfadden. Just one year younger than the then twenty-six year old Sandow,

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<sup>110</sup> Beckwith, “Building Strength,” 46.

<sup>111</sup> *Ibid.*, 23.

Macfadden had already been a fervent believer in the power of exercise and strength training for ten years. Macfadden had been a “weak and sickly” child who contracted a variety of diseases and recovered slowly.<sup>112</sup> One particularly debilitating bout with illness came after being vaccinated for smallpox, which resulted in “blood poisoning” and required six months of convalescence.<sup>113</sup> The experience left Macfadden with the deep mistrust of medical doctors and traditional medicine that would color his later health crusade. In addition to his own illness, Macfadden’s alcoholic father died when he was five and his mother succumbed to tuberculosis when he was nine. Shortly after informing the boy of his mother’s death, the relatives who were caring for Bernarr declared that he would likely be “going the same way soon.”<sup>114</sup> Following his mother’s death, Macfadden was sent to live on a farm where he did a great deal of manual labor and ate a variety of fresh foods. The experience left him feeling stronger and healthier and helped establish his fervent beliefs in the importance of diet and exercise. After watching gymnasts and weight lifters at a St. Louis gym in 1883, Macfadden’s life was changed, “thereafter,” he declared “I had but one object in view...I would not be satisfied until I was a strong man.”<sup>115</sup> To that end he began lifting dumbbells and reading incessantly about diet and exercise programs, which included reading Blaikie’s *How to Get Strong*.<sup>116</sup> By the time of the Columbian Exhibition, Macfadden was well on his way to becoming the “one-hundred percent, do-as-I-do health crusader...a zealot, body and soul” for which he would be remembered.<sup>117</sup> His stay in Chicago was financed by serving as a pitch man for the Whitely wall mounted exerciser,

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<sup>112</sup> Robert Ernst, *Weakness is a Crime: The Life of Bernarr Macfadden* (Syracuse, NY: Syracuse University Press, 1991), 4.

<sup>113</sup> Ibid., Clifford Waugh, “Bernarr Macfadden: The Muscular Prophet” (PhD diss., State University of New York – Buffalo, 1979), 7.

<sup>114</sup> Ernst, *Weakness is a Crime*, 7; Adams, *Mr. America*, 11.

<sup>115</sup> Ibid., 16-17.

<sup>116</sup> Ibid., 21.

<sup>117</sup> Waugh, “Bernarr Macfadden,” 15.

a pulley machine marketed to businessmen. Like others who saw Sandow, Macfadden was suitably impressed by his physique particularly when Sandow, dusted in white powder, assumed the poses of classical statuary against a black backdrop. Macfadden later copied this technique for some of his own photographs.<sup>118</sup>

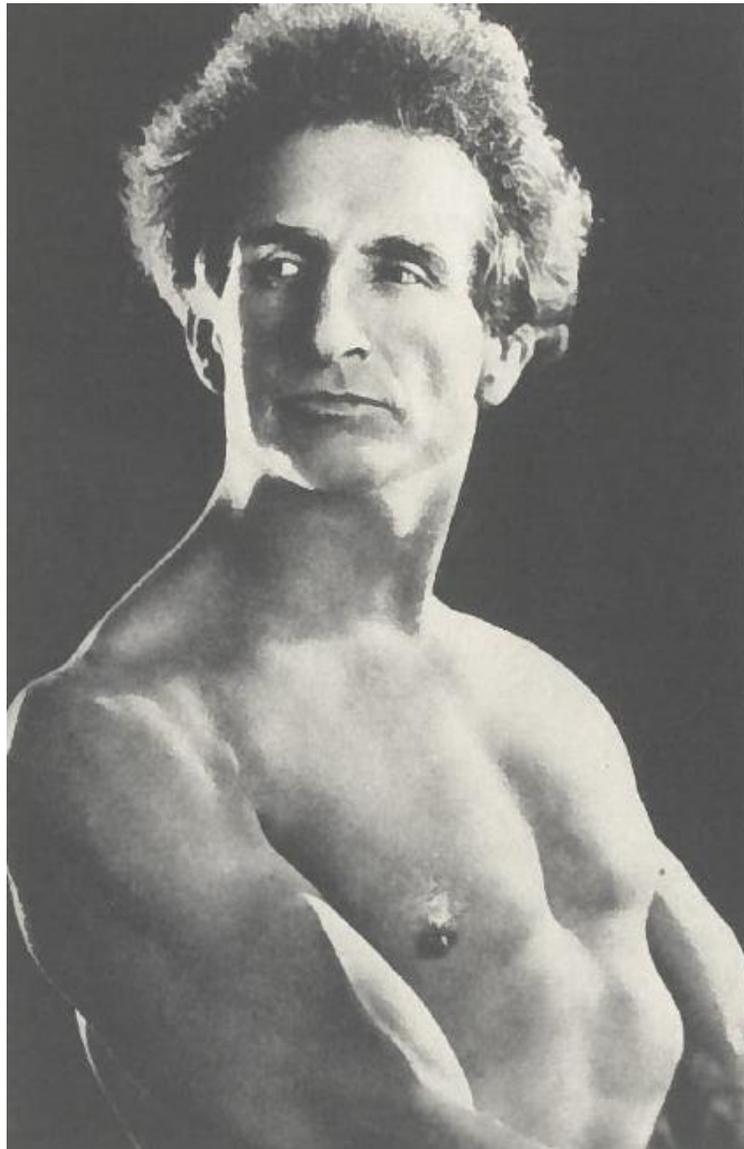


Figure 9. Bernarr Macfadden in 1931. Image from inside cover of Robert Ernst's *Weakness is a Crime: The Life of Bernarr Macfadden* (1991).

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<sup>118</sup> Adams, *Mr. America*, 35.

Both Sandow and Macfadden began publishing physical culture magazines in 1898. Though Macfadden's *Physical Culture* started out as "an exercise catalog at best," hocking equipment and exercise books, he quickly moved to make it a more legitimate publication and in just over three years the magazine's circulation had topped more than 100,000.<sup>119</sup> Macfadden used the magazine to rail against corsets, drugs, alcohol, sexual ignorance, muscular inactivity, overeating, and medical doctors.

In addition to magazines, both men put on massive physique and fitness competitions. Sandow's "Great Competition," held in London in 1901, was "the world's first major bodybuilding contest."<sup>120</sup> Macfadden followed with his own "Physical Culture Exhibition" in New York City in 1903 at which he named Al Treloar and Emma Newkirk the most perfectly developed physical specimens for their genders. It is worth noting that Treloar was another of Sandow's "ripples," having worked as an apprentice under him during the Columbian Exhibition.<sup>121</sup> Macfadden's 1903 show was followed by another massive exhibition in 1905 at Madison Square Garden. The second Physical Culture Exhibition garnered extra attention after Anthony Comstock, the head of the Society for the Suppression of Vice, attempted to shut the show down for obscenity because of the white union suits used to accentuate the forms of the female physique competitors.<sup>122</sup> The additional publicity that resulted from the clash between Macfadden and Comstock resulted in a massive crowd for the Exhibition – on opening night 20,000 people thronged to Madison Square Garden, which only held 15,000. The event marked

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<sup>119</sup> Waugh, "Bernarr Macfadden," 23, 25

<sup>120</sup> Chapman, *Sandow the Magnificent*, 129

<sup>121</sup> *Ibid.*, 189; Adams, *Mr. America*, 51-52.

<sup>122</sup> Jan Todd, "Bernarr MacFadden: Reformer of the Feminine Form," in: *Sport and Exercise Science: Essays in the History of Sports Medicine*, eds. Jack W. Berryman and Roberta J. Park (Urbana, IL: University of Illinois Press, 1992), 213-232.

only the third time in the venue's history that paying customers had to be turned away.<sup>123</sup> The second exhibition also differed from the first in that the contest included both evaluation of the competitors' physiques and their athletic ability in a series of races and weight-lifting events. The capacity crowd was able to see clearly that a well-developed physique and athletic ability were not mutually exclusive.<sup>124</sup>

While both men had a monumental impact on the physical culture movement, it is important to note that both publicly eschewed heavy strength training. In spite of the heavy weights that developed his physique, Sandow recommended light weights and high repetitions in his courses.<sup>125</sup> Macfadden recommended using the muscular system to fatigue but to avoid straining or exhaustion. As Clifford Waugh noted, "some [of the workouts authored by Macfadden in *Physical Culture*] included specialized movements for particularly weak areas of the body such as the upper-legs and calves, arms, shoulders, forearms and abdomen, but most were general over-all routines utilizing for resistance chairs, stools, light weights (but never heavy weights) and even one's own muscles."<sup>126</sup> Moreover, from the first issue Macfadden urged his readers to avoid using heavy weights, asserting that they were "of no value to a man who desires simply superabundant health."<sup>127</sup> Like many of the medical doctors he railed against, Macfadden viewed heavy weight training through the lens of energy conservation and believed that it would drain vitality and decrease longevity.

Nonetheless, *Physical Culture* did feature occasional articles which melded resistance training and sport performance. A 1926 article by Earl Gregory included the contention that

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<sup>123</sup> Adams, *Mr. America*, 55-56.

<sup>124</sup> "1898: Bernarr Macfadden Finds *Physical Culture* Magazine," The Quest for Victory: A History of Weight Training for Sports, The H.J. Lutchter Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 27, 2013).

<sup>125</sup> Chapman, *Sandow the Magnificent*, 90.

<sup>126</sup> Waugh, "Bernarr Macfadden," 45.

<sup>127</sup> *Ibid.*; Beckwith, "Building Strength," 116-117.

better developed muscles would lead to better swimming ability. To that end, Gregory discussed an exercise program to strengthen the muscles. The program was largely a series of bodyweight exercises and stretches, though the author mentioned that, “if one has done these exercises without the desired results, then weights may be held” to make them more difficult.<sup>128</sup> Another 1926 article detailed how Babe Ruth had resurrected his career through “physical culture.” Suffering from a variety of ailments, including an abscess, poor eyesight, constipation, indigestion, obesity, muscular weakness, the prolific slugger had a disappointing 1925 season. After being put on a rigid schedule by trainer Art McGovern that included more sleep, elimination of caffeine and alcohol, long walks, manual labor, and some light resistance exercise, Ruth reported to spring training nearly twenty pounds lighter than he had been at the end of the prior season.<sup>129</sup> The improvement in his performance was dramatic – during the 1926 season Ruth played in an additional fifty-four games, improved his batting average from .290 to .372 and nearly doubled his previous year’s home run total.<sup>130</sup>

Another of Sandow’s ripples, Alan Calvert, was a believer in heavy strength training and actively worked to promote it. Like Macfadden Calvert had read Blaikie’s *How to Get Strong* and done some of his own training during his teenage years. He followed the advice of Blaikie and other high-repetition, low-weight proponents but was ultimately disappointed with the results. According to historian Kim Beckwith, after seeing Sandow in Chicago, Calvert realized that heavy weights were the key to developing significant muscularity and attempted to secure

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<sup>128</sup> Earl C. Gregory, “Exercise Your Swimming Muscles,” *Physical Culture*, July 1926, 51-52, 70, 72; “1898: Bernarr Macfadden Founds Physical Culture Magazine,” *The Quest for Victory*.

<sup>129</sup> Ruth’s trainer was an accomplished athlete himself having been an amateur boxing champion as well as professional boxer and multi-event track athlete. *Ibid.*, Art McGovern and Edwin Goewey, “Babe Ruth Brought Back by Physical Culture,” *Physical Culture*, August 1926, 38-39, 107-111.

<sup>130</sup> “Babe Ruth Statistics,” ESPN.com, [http://espn.go.com/mlb/player/stats/\\_id/27035/babe-ruth](http://espn.go.com/mlb/player/stats/_id/27035/babe-ruth) (Accessed January 27, 2013).

the tools which would help him develop his own physique.<sup>131</sup> Calvert quickly found, however, that there were no commercially available barbells in the United States.<sup>132</sup> To remedy the situation, he designed his own. Calvert's father, Pehrson Butler Calvert, had owned a tinplating business since Alan's birth. As a result, Alan was familiar with metal working, which facilitated his ability to design and make barbells.<sup>133</sup> He applied for his first barbell patent in January of 1902 and opened the Milo barbell company in April of the same year. According to David P. Willoughby, the opening of Milo was "the greatest single impetus ever given to weight-lifting in this country."<sup>134</sup> Barbells with a standard design could now be acquired by prospective lifters and gyms relatively easily. To advertise his new product, Calvert took out advertisements in Macfadden's *Physical Culture* and Richard K. Fox's *National Police Gazette*. As previously discussed, heavy strength training was not something Macfadden advocated, so readers of his magazine were not overly eager to procure Calvert's barbells. Fox's *Police Gazette* contained stories about and challenges between strongmen but it was primarily a sport magazine, not a strength magazine.<sup>135</sup> Like Albert Spalding and the sporting goods manufacturers in the mid-nineteenth century, Calvert needed to create a market for his product by teaching people about its proper use. So, like those manufacturers, he created his own "guidebook" in the form of *Strength* magazine in 1914.

In the new magazine Calvert derided programs which called for light weight training, saying "if there were anything in light dumbbell exercise, the United States by this time would

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<sup>131</sup> Beckwith, "Building Strength," 26-27.

<sup>132</sup> Kimberly Beckwith and Jan Todd, "Strength: America's First Muscle Magazine, 1914-1935," *Iron Game History* 9, no. 1 (August 2005): 11-28; Beckwith, "Building Strength," 15-44, 69-95.

<sup>133</sup> *Ibid.*, 35, 94.

<sup>134</sup> "1902: Alan Calvert Finds the Milo Barbell Company," *The Quest for Victory: A History of Weight Training for Sports*, The H.J. Litcher Stark Center for Physical Culture and Sports, [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/](http://www.starkcenter.org/static/quest_for_victory/timeline/) (accessed January 27, 2013).

<sup>135</sup> Beckwith and Todd, "Strength," 14; Beckwith, "Building Strength," 77-78, 107-111

be the finest developed nation in the world; you would meet Samsons and Apollos in every block, for I suppose almost every man has, in his time, practiced light dumbbell exercises to some extent.”<sup>136</sup> Calvert ridiculed light training with the same conviction that Lewis, Blaikie, and others had when they dismissed heavy training. He vigorously rejected the notion that heavy weights produced muscle-binding. As an example, in his March 1915 article, “What Does Muscle-Bound Mean?” he pointed to boxers James J. Jeffries and Stanley Ketchel as being both strong and quick. He also asserted that if weights were lifted through the full range of motion, they could actually increase, not lessen, flexibility.<sup>137</sup>

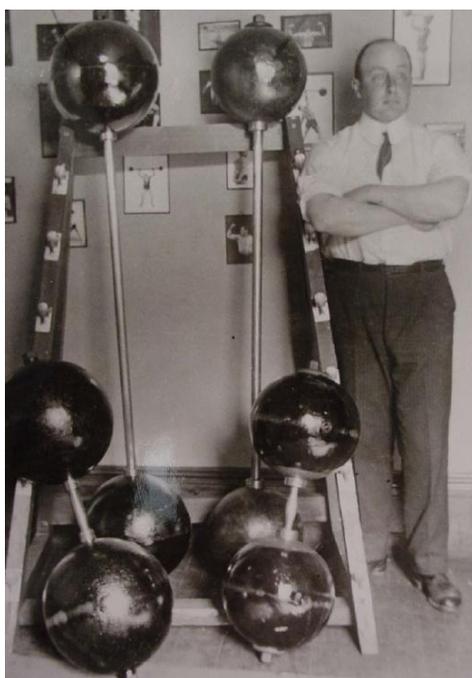


Figure 10. Alan Calvert and his weights. Image from Kimberly Beckwith’s dissertation, “Building Strength: Alan Calvert, the Milo Barbell Company, and the Modernization of American Weight Training,” page 127.

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<sup>136</sup> Beckwith and Todd, “*Strength*,” 18-19.

<sup>137</sup> A 1922 feature story by David Wayne discussed the training routine of professional track athlete R.P. Williams. Williams credited Calvert with convincing him that weight training would not cause muscle-binding and credited weight training as playing a key role in his performance. Similarly, in 1923, Harry Glick asserted that weights enhanced speed and coordination and concluded, “if the weights had made me slow or clumsy, I would have quit them a long time ago.” David Wayne, “The Greatest of Them All,” *Strength*, December 1922, 47-48, 78; Harry Glick, “Does Lifting Make You Muscle Bound?” *Strength*, June 1923, 40-43; Beckwith and Todd, “*Strength*,” 20.

As Kim Beckwith has shown, Calvert played a key role in making weight training respectable by calling for standardization. As a competitive sport, weight lifting had progressed some since the competition between Windship and Thompson in 1861. A supervisory body to establish rules had been created in Germany in 1891. Weightlifting was also contested at the Olympic Games in 1896, 1904, and 1908 and the first “world championship” meet had been held in Vienna in 1898.<sup>138</sup> While weight lifting was becoming more reputable as a competitive endeavor overseas, in the United States it still held a less than respectable character, owing to the shenanigans of strongmen who used a variety of tricks to market themselves as the strongest in the world.<sup>139</sup> Calvert criticized the “very foolish and short-sighted attitude of professional lifters in this country” who were more interested in their own finances than their impact on weight lifting. To remedy the situation, he called for the use of tested scales, standardization of the performance of lifts, establishment of weight classes, and an “American Board of Control” to oversee competitive lifting.<sup>140</sup> Calvert’s call was taken up by Ottley Coulter, George Jowett, and David Willoughby who worked to transform weightlifting into an organized sport in the United States during the 1920s.<sup>141</sup> As a result of Calvert’s efforts, Beckwith argues that weightlifting “evolved in the early twentieth century into a respectable, modern sport and into an accepted training method to enhance one’s general fitness and appearance.”<sup>142</sup>

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<sup>138</sup> Todd and Todd, “Legacy of Iron,” 192-193.

<sup>139</sup> These tricks are discussed at length in Beckwith, “Building Strength,” 179-190.

<sup>140</sup> John Fair, “George Jowett, Ottley Coulter, David Willoughby and the Organization of American Weightlifting, 1911-1924,” *Iron Game History* 2, no. 6 (May 1993): 3.

<sup>141</sup> *Ibid.*, 3-15; John Fair, “Father-Figure or Phony? George Jowett, the ACWLA and the Milo Barbell Company, 1924-1927,” *Iron Game History* 3, no. 5 (December 1994): 13-25; John Fair, “From Philadelphia to York: George Jowett, Mark Berry, Bob Hoffman, and the Rebirth of American Weightlifting, 1927-1936,” *Iron Game History* 4, no. 3 (April 1996): 3-17.

<sup>142</sup> Beckwith, “Building Strength,” 98.

## A PHYSIOLOGY “REVOLUTION”

Another revolution was taking place alongside the physical culture revolution of the early twentieth century. That revolution would be a shift in the understanding of physiology away from the notion of conservation of energy and toward a more contemporary understanding of the ability to enhance one’s physical capacity through specific training. One of the earliest refutations of the conservation of energy conception of physiology was put forth by a medical doctor who had trained with weights, Austin Flint, who contested this view as early as 1878.<sup>143</sup> Flint was a professor of physiology at Bellvue (New York) Hospital Medical College and a Fellow in the New York Academy of Medicine. In his text, *On the Source of Muscular Power*, Flint pointed out that, with training, a man “becomes capable of greater and prolonged muscular effort, with precisely the same food than the same man out of training.”<sup>144</sup> The idea that the body simply burns the food without alterations in the muscular system was untenable. The body’s capacity to perform work, then, must be enhanced. The idea of expanded capacities, however, would not begin to be accepted until the 1930s following a series of key discoveries about the functioning of the muscular and cardiovascular systems.

In the interim, researchers and physical educators alike largely focused on improving efficiency, not expanding capacities. As discussed by historians Rob Beamish and Ian Richie, “training” at this time was synonymous with repetition of specific sports skills.<sup>145</sup> Athletes and coaches did not emphasize improving the antecedents of performance, rather they sought to refine the performance itself. For example, in Norman Bingham’s 1895 coaching text, he

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<sup>143</sup> Discussing his own training, Flint said that, “At the age of forty years and weighing one hundred and eighty-three and three-quarter pounds without clothing, I myself accomplished the feat of raising with one hand above my head and standing erect with the arm straight under a dumb-bell weighing one hundred and eighty and one-half pounds.” Austin Flint, *On the Source of Muscular Power: Arguments and Conclusions Drawn from Observations Upon the Human Subject, Under Conditions of Rest and Muscular Exercise* (New York: Appleton, 1878), 23.

<sup>144</sup> *Ibid.*, 15.

<sup>145</sup> Beamish and Richie, “Fixed Capacities to Performance-Enhancement,” 415-16.

advocates only repetition of the sport's skills to prepare for football. Bingham used the example of Everett Lake, Harvard half-back, who spent his summer practicing holding tacklers at arm's length. "When Autumn came, he was one of the most difficult halves in the country to stop, because, in addition to his great weight and strength, the tackler was nearly always kept at arm's length."<sup>146</sup> In a later chapter on rowing Bingham recommended a combination of walking, running, gymnastics, and weight training. Regarding weight training he called for the use of wrist weights, "arm and chest weights," and the "setting up" exercise, which resembled a deep squat on the toes. Bingham recommended up to forty minutes of gymnasium exercise, which decreased to ten to fifteen minutes after the season had begun.<sup>147</sup> It is important to point out, however, that this type of training had been practiced by college crews since the 1860s.<sup>148</sup> In his 1914 text on training for track, Michael Murphy discussed the importance of strength for sprinters but his training recommendations consisted largely of practicing one's technique in starting the race. For quarter-mile training, the coach recommended jogging distances up to 600 yards and sprints of 200-300 yards with occasional "trial" runs of the full distance.<sup>149</sup>

This type of training was in keeping with Fredrick Winslow Taylor's principles of scientific management which sought to increase worker productivity by decreasing the number of movements that workers had to perform and then perfecting those movements.<sup>150</sup> Taylor's ideas would have a profound impact on the study of exercise physiology as early research sought to identify the causes of fatigue, not for sport purposes, but to maximize efficiency. For example, the Harvard Fatigue Laboratory, described by historian Andrea Johnson as "the single

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<sup>146</sup> Norman Bingham, *The Book of Athletics and Out-of-Door Sports* (Boston: Lothrop Publishing, 1895), 29.

<sup>147</sup> *Ibid.*, 58-9.

<sup>148</sup> Smith, *Sports and Freedom*, 34-35.

<sup>149</sup> Murphy, *Athletic Training*, 30-51.

<sup>150</sup> Frederick Winslow Taylor, *The Principles of Scientific Management* (Mineola, NY: Dover Publications, 1988); De la Pena, "Dudley Allen Sargent," 13; Beamish and Richie, "Fixed Capacities to Performance Enhancement," 417.

most important laboratory in the history of American exercise physiology,” was housed in the basement of Harvard’s business school and initially funded by the Rockefeller Foundation for Research in Industrial Hazards.<sup>151</sup> The interest in work and fatigue led physiologists to use athletes, including themselves, as their experimental subjects. Archibald Vivian (A.V.) Hill, “the father of exercise physiology” was a runner himself and based some of his theories on energy production on his own experience. Further, Hill utilized athletes in many of his studies because they “can be experimented on without danger and can repeat their performances again and again.”<sup>152</sup> The experiments on fatigue lead to a series of important developments regarding the function of muscles and the adaptations of the neuromuscular and cardiovascular systems to exercise.

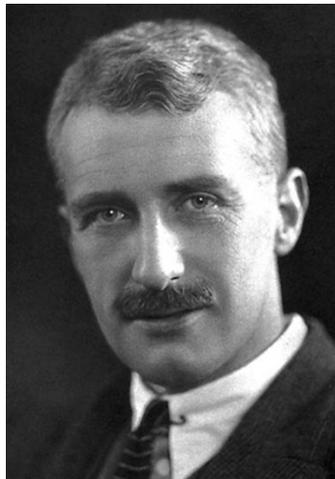


Figure 11. A.V. Hill shared the 1922 Nobel Prize in “Physiology or Medicine” with Otto Fritz Meyerhoff “for his discovery relating to the production of heat in the muscle.” Image from Nobelprize.org, the official site of the Nobel Prize.

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<sup>151</sup> Andrea Johnson, “Human Performance: An Ethnographic and Historical Account of Exercise Physiology” (PhD diss., University of Pennsylvania, 2009), 76-77, 87. McArdle’s text says that the Fatigue Lab “formed the cornerstone for research in modern laboratories of exercise physiology.” McArdle, *Exercise Physiology*, 1. See also: Steven Horvath and Elizabeth Horvath, *The Harvard Fatigue Laboratory: It’s History and Contributions* (Englewood Cliffs, NJ: Prentice-Hall, 1973); Carleton Chapman, “The Long Reach of Harvard’s Fatigue Laboratory, 1926-1947,” *Perspectives in Biology and Medicine* 34, no. 1 (1990): 17-33.

<sup>152</sup> Tudor Hale, “History of Developments in Sport and Exercise Physiology: A.V. Hill, Maximal Oxygen Uptake, and Oxygen Debt,” *Journal of Sports Sciences* 26, no. 4 (2008): 368; McComas, “The Neuromuscular System,” 73.

As early as 1807, lactic acid, a byproduct of intramuscular anaerobic energy production was discovered in hunted stags. It would be one-hundred more years until Walter Fletcher and Frederick Gowland Hopkins of Cambridge University were able to prove that it was produced by muscular contraction. In 1920, Otto Meyerhoff in Heidelberg, Germany showed that the acid was produced from glycogen, the muscles' storage form of carbohydrate. This led to the erroneous theory, advanced by A.V. Hill, that muscle contraction was fueled directly by lactic acid. By 1929, Karl Lohmann, Cyrus Fiske and Yellapragada Subbarow had identified both adenosine triphosphate (ATP), the molecule whose hydrolysis fuels muscle contraction, and phosphocreatine, the molecule which most directly replenishes ATP, though their roles were not yet understood. Hill's theory would be disproven by Bruce Dill, H. Edwards, and Rodolfo Margaria of the Harvard Fatigue lab whose work pointed to the importance of "phosphagen" in muscle contraction. Their theory of excess post exercise oxygen consumption to resynthesize phosphates was in agreement with the work of Einar Lundsgaard whose 1930 and 1932 experiments showed that muscle contraction could occur in the absence of lactic acid production. Between 1926 and 1932, then, according to Hill, a "revolution" had taken place in the understanding of muscle physiology.<sup>153</sup>

In addition to sowing the seeds for the contemporary understanding of muscle contraction, scientists were also beginning to understand how the muscles and cardiovascular system changed with training. Experimenting on dogs and rabbits, scientists in Germany showed

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<sup>153</sup> McComas, "The Neuromuscular System," 39-80; George A. Brooks and L. Bruce Gladden, "The Metabolic Systems: Anaerobic Metabolism (Glycolytic and Phosphagen)," in *Exercise Physiology: People and Ideas*, ed. Charles M. Tipton (New York: Oxford University Press, 2003), 323-52. For a contemporaneous discussion of the revolution in muscle physiology, see: Arthur Steinhaus, "Physiology at the Service of Physical Education – The Theory of Muscular Contraction is Being Renovated," *Journal of Health and Physical Education* 3, no. 1 (January 1932), 44-5.

that training increased the volume of intramuscular glycogen and phosphocreatine.<sup>154</sup> As early as 1897 the work of German physiologist B. Morpurgo had shown that individual muscle cells increase in size (hypertrophy), rather than increasing in number (hyperplasia), to account for muscle growth in dogs trained by running. In 1899 C. Hirsch noted that there was a direct relationship between the size of skeletal musculature and the size of the heart. W. Roux made the connection between chronic exertion and muscular size in 1905, and in 1928 W. Siebert found that muscular growth in rats was increased when the rats ran at higher speeds.<sup>155</sup> In addition to intramuscular changes in response to exercise, adaptations made by the heart became more apparent by the early 1930s.

One of the key advances was the identification of what would become known as the Frank-Starling Law of the Heart. In a 1926 article, E.H. Starling and M.B. Visscher showed that, rather than becoming dilated by the excessive blood flow returning to the heart during endurance exercise, the ventricles actually responded to the stretch with a stronger contraction.<sup>156</sup> Instead of damaging the heart, the increased venous return strengthened it. This finding was discussed in exercise physiology texts by the early 1930s. For example, in a 1931 text by two researchers at the Harvard Fatigue Lab, A.V. Bock and D.B. Dill, Starling's work was cited along with the assertion that the dilation of the heart during exercise was a "strictly physiological process" which enabled the heart to pump more blood per beat during exercise.<sup>157</sup>

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<sup>154</sup> Arthur Steinhaus, "Chronic Effects of Exercise," *Physiology Reviews* 13 (January 1933): 106-7; Arthur Steinhaus, "Physiology at the Service of Physical Education - Chemical Changes in Muscle Due to Training," *Journal of Health and Physical Education* 3, no. 7 (September 1932): 52, 54.

<sup>155</sup> Arthur Steinhaus, "Physiology at the Service of Physical Education - Muscle Hypertrophy," *Journal of Health and Physical Education* 3, no. 6 (June 1932): 36-7; Steinhaus, "Chronic Effects of Exercise," 137-8; Beamish and Richie, "Fixed Capacities to Performance Enhancement," 416.

<sup>156</sup> E.H. Starling and M.B. Visscher, "The Regulation of the Energy Output of the Heart," *Journal of Physiology* 62 (1926): 243-261.

<sup>157</sup> F.A. Bainbridge, A.V. Bock, and D.B. Dill, *The Physiology of Muscular Exercise* (New York: Longmans, Green, and Co., 1931), 76, 86.



Figure 12. David Bruce Dill, one of the founders of the Harvard Fatigue Lab. Image from Jack Berryman's *Out of Many, One: A History of the American College of Sports Medicine* (1995), page 10.

Similarly Adrian Gould and Joseph Dye, professors of hygiene and physiology, respectively, at Cornell University noted that a heart stretched by increased blood volume responded with a more forceful contraction.<sup>158</sup> Not only was dilation of the heart an important adaptation that allowed for increased performance, the hypertrophy that resulted from exercise also came to be viewed as physiological, not pathological. Steinhaus affirmed that the heart hypertrophied by exercise resulted in a “more efficient” heart which was “not to be considered pathological in any sense of the word.”<sup>159</sup> Bock and Dill called the notion that cardiac hypertrophy was pathological “entirely erroneous” and said that “opinion is now essentially unanimous that the condition [athletic heart] does not exist.”<sup>160</sup>

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<sup>158</sup> Adrian G. Gould and Joseph A. Dye, *Exercise and its Physiology* (New York: A.S. Barnes and Company, 1935), 308.

<sup>159</sup> Arthur Steinhaus, “Physiology at the Service of Physical Education – The Heart Size – Effects of Training,” *Journal of Health and Physical Education* 2, no. 10 (December 1931): 42.

<sup>160</sup> Bainbridge, Bock, and Dill, *Physiology of Muscular Exercise*, 183, 241.

During this era of increased understanding of muscular physiology and the effects of exercise on the heart, there was little discussion of strength or how to produce it. For example, in the Bock and Dill text, while the authors noted that a highly developed muscular system was a necessity for an athlete, there was no discussion in the chapter on the effects of training regarding methods to develop that system.<sup>161</sup> Gould and Dye stated that running speed was, in part, dependent upon the strength of the muscles, which in turn depended upon the muscles' cross-sectional area.<sup>162</sup> There was no mention, however, of performing strength training to improve cross-sectional area and thereby running speed. In a later chapter on the effects of training on the muscular system, the authors mentioned that progressive training increased the size and power of the muscles, though strength training was not specifically discussed. The section went on to say that training reduced the oxygen requirement for a given workload, hinting that the training they were referring to was endurance, rather than resistance training.<sup>163</sup> Arthur Steinhaus remarked that “the amount of work done in a unit of time, not the total work done is the decisive factor in calling out these muscle changes [hypertrophy].” He further mentioned that “apparatus work and wrestling” resulted in greater hypertrophy than track and field, but made no connection between the two or comments on the utility of that hypertrophy.<sup>164</sup>

The lack of interest in the production of strength explains the response received by Ohio State undergraduate physical education major John Capretta, to a survey he mailed to the leading physiologists of his era as part of a class project.<sup>165</sup> The survey asked these experts to define the condition known as “muscle bound” and to discuss its characteristics. Capretta received twenty-

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<sup>161</sup> Ibid., 220-35.

<sup>162</sup> Gould and Dye, *Exercise and its Physiology*, 179.

<sup>163</sup> Ibid., 377-380.

<sup>164</sup> Arthur Steinhaus, “Physiology at the Service of Physical Education – Muscle Hypertrophy,” *Journal of Health and Physical Education* 3, no. 6 (June 1932):36-7.

<sup>165</sup> John Capretta, “The Condition Called Muscle-Bound” *Journal of Health and Physical Education* 3, no. 2 (February 1932): 43, 54.

two responses by return mail, but only seven attempted to define the “muscle bound” condition. The other fifteen experts admitted that they knew nothing about the subject. Although only an undergraduate, Capretta sent his report to the *Journal of Health and Physical Education*, where it was published in 1932. His work marks one of the first times that strength was discussed in a professional physical education journal and it exemplifies how poorly understood it was in this era. Of those who offered a theory on the condition, some speculated that it was caused by an overgrowth of connective tissue that resulted from the strain on the muscles. Perhaps the physiologists were making the observation voiced later by *Strength & Health* writer Jim Murray that in beef, the cheap cuts of meat are the toughest and most fibrous and come from the muscles accustomed to doing the most work.<sup>166</sup> Physiologist W.O. Tenn speculated that the muscles became overdeveloped relative to their connection to the nervous system.<sup>167</sup> Such a condition could result in decreased coordination, though Tenn’s speculation rested on an increase in the number of muscle fibers which, based on animal experiments, appeared not to be the cause of muscle growth.

## CONCLUSION

By the 1930s, the groundwork had been laid for the incorporation of heavy resistance exercise into sport training programs. Physiologists successfully refuted the notion of an “athletic heart” as a detrimental effect of athletic participation and training. Moreover, the adaptations of skeletal muscle to various training methods became increasingly clear. Few researchers, however, showed much interest in specifically investigating strength training. Nonetheless, weight training had its own dedicated publication in the United States in *Strength*

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<sup>166</sup> Jim Murray and Peter Karpovich, *Weight Training in Athletics* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1956), 37.

<sup>167</sup> Capretta, “Condition Called Muscle-Bound,” 43, 54.

magazine, and received periodic discussions in other health-related publications like *Physical Culture*. These magazines and the commercial availability of barbells produced many new converts for weight training in the first three decades of the twentieth century. Old beliefs die hard, however, and many still avoided weight training out of fear that it would damage their heart or result in muscle-binding. As posited by Thomas Kuhn, it takes a generation or more for new paradigms to be fully accepted by the scientific community as hold-outs continue to argue against the new position.<sup>168</sup> Thus, modern notions of muscular and cardiovascular adaptations to exercise were not fully incorporated into physiology texts until the early 1930s. As a result, men who had been trained under the old paradigm of energy conservation and balance held sway in the first half of the twentieth century. By 1940, however, strength training had added two spectacularly fervent adherents. These men, Bob Hoffman and Joe Weider, railed against the anti-weightlifting camp at every opportunity and played a major role in hastening the paradigm shift.

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<sup>168</sup> Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1996).

## **CHAPTER TWO: PROPHETS OF POWER: BOB HOFFMAN, JOE WEIDER, AND THE PROMOTION OF STRENGTH TRAINING FOR SPORT: 1932-1969.**

In April 1934, Arthur Steinhaus, a physiologist and professor at George Williams College, presented a paper to the Central District Physical Education Association in Saint Paul, Minnesota. The talk, titled “Why Exercise?” was intended to demonstrate all of the scientifically verified benefits of exercise. Among these benefits he listed increased efficiency of the heart, decreased fatigue, weight control, increased strength, and fun. While Steinhaus marveled at the feats performed by a trained heart, he was more skeptical of developed strength. He explained in the most straightforward terms, “any exercise which is heavy enough to tax a muscle to its limit will stimulate the muscle to grow larger, and with this hypertrophy there comes greater strength.” Continuing, he queried “but let us ask ourselves, is strength a desirable goal? Does modern man need large muscles?” Answering his own question, Steinhaus asserted, “The ideal muscular development is that which has just enough margin of strength and power to maintain posture without effort, to do the day’s work easily and to handle one’s body weight readily.” He then contended, “Beyond this point it is wise to observe the maxims: ‘Truck horse muscles are out of place on a buggy-horse job,’ and ‘Why bang around with a five-ton truck when a run-about will do?’”<sup>1</sup>

Four years later, medical doctor and professor at Springfield (MA) College, Peter Karpovich, echoed Steinhaus’ position. “In principle,” Karpovich began, “heavy weight-lifting is a thing of the past. It is a relic of the idea that big muscles are essential for man’s success in life. It was correct in primitive society. Now the place for a strong man is in a circus.”

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<sup>1</sup> Arthur Steinhaus, “Why Exercise,” *Journal of Health and Physical Education* 5, no. 5 (May 1934): 5-6; Berryman, *Out of Many*, 7.

Karpovich went on to caution that lifting excessively heavy weights caused “great strain” and could lead to a man being “muscle bound.”<sup>2</sup>

The sentiment, expressed by Steinhaus and Karpovich, that large muscles were superfluous in the twentieth century arose largely out of the technological innovations of the 1920s. Heavy construction machinery that included steam turbines and shovels, belt and bucket conveyors, and electric motors became “common” at work sites. Innovations in technology replaced an estimated 200,000 workers annually, which led to the coining of a new phrase: “technological unemployment.”<sup>3</sup> As the economy shifted during the decade from a production economy to one of consumption, a variety of affordable labor saving devices became available. Automobile production and purchasing boomed during the 1920s with an increase from ten million cars on the road in 1920 to twenty-six million by 1929. The availability of cars changed the face of cities, as residents could live farther from work and commute downtown, rather than living there. The proliferation of labor-saving commercial products and industrial machinery seemed to render physical strength gratuitous, rather than as a marketable asset.<sup>4</sup>

By 1925 even Alan Calvert, the founder of the Milo Barbell Company turned against weightlifting, though his conversion took almost everyone by surprise. Calvert sold his company to Daniel Redmond, son of the treasurer of Fairmont Foundry in 1919. The foundry supplied Milo’s weights and, during latter 1910s, Calvert became deeply indebted to them.<sup>5</sup> To settle his debts, Calvert sold his company and “agreed never again to re-enter the Bar Bell business,”

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<sup>2</sup> George Gillesby, “The Physiologists Speak on Weight-Lifting,” *Journal of Physical Education* 36, no. 1 (September-October 1938): 16.

<sup>3</sup> James West Davidson and others, *Nation of Nations: A Narrative History of the American Republic* (New York: McGraw-Hill, 2008), 693.

<sup>4</sup> *Ibid.*, 693-698.

<sup>5</sup> Kimberly Beckwith, “Building Strength: Alan Calvert, the Milo Bar-Bell Company, and the Modernization of American Weight Training” (PhD diss., University of Texas – Austin, 2006), 292-294.

though he continued to write for *Strength* magazine through 1924.<sup>6</sup> After he cut ties with Milo Calvert published two booklets which, astonishingly, perpetuated all of the criticisms of weightlifting.<sup>7</sup> Calvert said that he lost faith in the system he promoted for more than two decades and was now distressed by the possibility that overexertion from weight lifting could lead to rupture [hernia], heart damage, blood vessel ruptures or drain vitality. Instead of heavy lifting, Calvert promoted the system of Edwin Checkley, which involved no equipment at all. This system, he claimed, developed “natural” strength, the practical variety which enabled a man to perform daily tasks better. Barbells, he asserted, developed “made” strength, which was showy and impractical. He went on to warn parents that heavy weight training was more dangerous than football. By the time he finished his censure of weight lifting, according to John Fair, “virtually all of the myths that exercise scientists have spent most of the twentieth century refuting were perpetrated by this father of sport.”<sup>8</sup>

Efforts to organize weight lifting also faltered in the 1920s. Along with Ottley Coulter and Bernard Bernard, George Jowett established the fledgling American Continental Weight-Lifters Association (ACWLA) in 1922. The organization was modeled after the British Amateur Weight Lifters Association (BAWLA) and would standardize lifts and records and certify referees. When Jowett served as the editor of *Strength* between 1924 and 1927, he promoted the organization, and himself, heavily and with some success. Though the number of the meets held across the country increased in 1926, the ACWLA national meet in November of that year had to

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<sup>6</sup> Ibid., John Fair, “Father-Figure or Phony? George Jowett, The ACWLA and the Milo Barbell Company, 1924-1927,” *Iron Game History* 3, no. 5 (December 1994): 13.

<sup>7</sup> Ibid.; Alan Calvert, *An Article on Natural Strength Versus “Made” Strength, Preceded by an Explanation of Why I Abandoned the Field of Heavy Exercise* (Philadelphia, PA: by the author, 1925); Alan Calvert, *Confidential Information on Lifting and Lifters* (Philadelphia, PA: by the author, 1925).

<sup>8</sup> Fair, “Father-Figure or Phony?” 18.

be cancelled due to insufficient entries.<sup>9</sup> Milo owner Daniel Redmond replaced Jowett as editor in 1927 and his replacement, Mark Berry, quickly formed the rival Association of Bar-Bell Men (ABBM). Along with the German-American Athletic Club, the organizations jockeyed for lifters and association with the Amateur Athletic Union.

Though weightlifting struggled in the 1920s, athletic endeavors as a whole flourished during this “Golden Age of Sport.” One of the primary causes of this upsurge in athletic participation and interest was, according to historian Mark Dyreson, that between 1876 and 1919 “a critical mass of American thinkers began to argue that modern sport is one of the most important tools for shaping human societies.”<sup>10</sup> Sport came to be viewed as a “social technology,” which could build a sense of community and pro-social values. The result was that “unprecedented numbers of Americans threw themselves into sports, games, and organized play.”<sup>11</sup> Many of them were thrown into participation by the First World War. Though soldiers had played sports informally during their down time in previous conflicts, World War I marked “the first time in American history [that] sports were formally linked to military preparedness.”<sup>12</sup> Athletic competitions were used to boost troop morale and fitness, and to keep them from pursuing more unsavory activities during their free time. Fitness was a particular concern following passage of the Selective Service Act in May of 1917. The size and fitness of American soldiers had been a subject of concern since at least the Mexican-American War when measurements revealed that American-born recruits weighed less than their European counterparts and were much more likely to be rejected for being too slender or having

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<sup>9</sup> Ibid., 17-20.

<sup>10</sup> Mark Dyreson, *Making the American Team: Sport, Culture, and the Olympic Experience* (Urbana, IL: University of Illinois Press, 1998), 2-3.

<sup>11</sup> Eliot Gorn and Warren Goldstein, *A Brief History of American Sports* (Urbana, IL: University of Illinois Press, 2004), 169.

<sup>12</sup> Ibid., 178.

“contracted chests.”<sup>13</sup> The first million draftees for the Great War measured almost exactly the same size as their Civil War counterparts and in fact, with an average height of sixty-seven and a half inches and weighing 141.5 pounds, they were actually almost one-half pound lighter than the soldiers who fought more than fifty years earlier.<sup>14</sup> In light of these disheartening statistics, physical fitness and athleticism became “patriotic virtues,” laying the ground work for physical education and scholastic sports programs in the decades that followed.<sup>15</sup>

In addition to the war, spectator sports grew in popularity owing to changes in working conditions and the media. The average time workers spent on the job decreased from just over forty-seven hours per week in 1920 to forty-two hours by 1930. Paired with a twenty percent increase in real wages over the same span, consumers had the time and the disposable income to enjoy sports.<sup>16</sup> The accessibility of sports also changed as radio broadcasts brought boxing, baseball, and college football into peoples’ homes on a regular basis. If consumers wanted to go to the games, there were still plenty of seats, particularly for college football which experienced an explosion of stadium construction and expansion. A prime example is found in the Big Ten conference, in which every member built a stadium in the 1920s. Ohio Stadium, home of the Ohio State University Buckeyes, could hold as many as seventy-five thousand spectators, one of seven stadiums constructed during the decade which could hold more than seventy thousand spectators.<sup>17</sup> The portrayal of the athletes who played in these and other stadiums also changed during this “Golden Age.” Murray Sperber has discussed the rise of “Gee-Whiz” journalism in

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<sup>13</sup> David Chapman, *Sandow the Magnificent: Eugen Sandow and the Beginnings of Bodybuilding* (Urbana, IL: University of Illinois Press, 1994), 125.

<sup>14</sup> Ibid.

<sup>15</sup> Gorn and Goldstein, *A Brief History*, 180-181.

<sup>16</sup> James West Davidson et al., *Nation of Nations: A Narrative History of the American Republic* (New York: McGraw-Hill, 2008), 693, 702.

<sup>17</sup> Ronald A. Smith, “Far More than Commercialism: Stadium Building from Harvard’s Innovations to Stanford’s ‘Dirt Bowl,’” *International Journal of the History of Sport* 25, no. 11 (2008): 1453-1474.

which writers mythologized prominent athletes and hyped games.<sup>18</sup> Writers, like Grantland Rice, created the legend of Notre Dame's "Four Horsemen" and lionized Knute Rockne.<sup>19</sup>

In the latter years of this era, weight lifting would experience a "rebirth," owing to the efforts, dynamic personality, and financial resources of Bob Hoffman.<sup>20</sup> Though a mediocre lifter at best, Hoffman revered strength and worked to promote weightlifting as a sport as well as weight training for fitness. Somewhat uniquely, however, Hoffman made a concerted effort to promote strength training as preparation for sport. Though others in the nineteenth century and a handful of articles in *Strength* and *Physical Culture* in the early twentieth century had promoted the relationship between weight training and sport performance, Hoffman consistently hammered home the point that weight training would improve sport performance for more than thirty years. To do this and, more importantly, to promote the barbells he manufactured, Hoffman started his own magazine, *Strength and Health*, in December of 1932. Hoffman focused on the connection between weight training and sport performance based on his own experience with barbell training and undoubtedly recognized the potentially massive audience created by the sports boom of the 1920s.

Following in Hoffman's footsteps was Canadian-born Joe Weider. While chiefly associated with weight training for aesthetics, not athletics, Weider also made important contributions to strength training as an adjunct to sports performances through his magazines. Weider began publishing *Your Physique* in 1940 and he used it, and subsequent publications like

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<sup>18</sup> Murray Sperber, *Onward to Victory: The Crises that Shaped College Sports* (New York: Henry Holt, 1998), 30-31.

<sup>19</sup> As noted by Eliot Gorn and sports writer Robert Lipsyte, the "Golden Age of Sport" or "Era of Heroes" could just as easily be known as the "Golden Age of Sports Promoters." *Ibid.*, xx; Gorn and Goldstein, *A Brief History*, 192-193.

<sup>20</sup> John Fair, "From Philadelphia to York: George Jowett, Mark Berry, Bob Hoffman, and the Rebirth of American Weightlifting, 1927-1936," *Iron Game History* 4, no. 3 (April 1996): 3-17.

*Muscle Builder* and *All-American Athlete*, to promote weight training and undermine the charges against heavy lifting.

This chapter discusses the “muscle magazines” of Bob Hoffman and Joe Weider, two of the most prolific publishers of this genre during the twentieth century, and their role in changing the paradigm of sport performance.

### **STRENGTH FOR SPORT: HOFFMAN’S EARLY YEARS**

In the first issue of *Strength & Health*, editor, publisher, and author Bob Hoffman claimed that, “graded barbell work and dumbbell exercises taught by our methods will improve any man at his chosen sport.”<sup>21</sup> This claim was at odds with most sport training advice of the time which generally called for simply the repetitive performance of the sport itself as conditioning or, on occasion, recommended light calisthenics or some form of manual labor to get one in shape for competition.<sup>22</sup> Beginning with the first issue of his magazine, Hoffman specifically refuted these ideas and claimed that systematic barbell training would produce greater gains in strength, speed, endurance, and coordination, and do it more rapidly, than the then commonly employed methods. In a refrain borrowed from Alan Calvert, Hoffman pointed out that “a good big man is still better than a good little man,” and advised readers to train for strength and athletic success would follow.<sup>23</sup>

In addition to his claim that barbell training would produce better athletes, Hoffman wrote an editorial for the first issue which outlined the purpose for the magazine. *Strength &*

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<sup>21</sup> Bob Hoffman, “How to Improve at Your Chosen Sport,” *Strength & Health* 1, no. 1 (December 1932): 6-8

<sup>22</sup> For example, in a 1931 lecture on training athletes for the shot-put, discus, and javelin at New York City’s Stuyvesant High School, physical educator H.J. Colbath stated that “form was nine-tenths of success in the weight events and urged extensive practice for the development of form among athletes competing in them.” No mention of weight training or other methods is made. “Favors Sugar Diet,” *New York Times*, January 11 1931, <http://query.nytimes.com/mem/archive/pdf?res=F10B1FFF3C5E1B7A93C3A8178AD85F458385F9> (accessed August 9, 2012).

<sup>23</sup> Hoffman, “How to Improve at Your Chosen Sport,” 6; Alan Calvert, *The Truth about Weight Lifting* (Philadelphia, PA: by the author, 1911), 7.

*Health*'s primary goal was to "keep our country physically equal to or superior to all other nations."<sup>24</sup> This would be done by encouraging people of all ages to lift weights and by advocating for compulsory training for children and adolescents. Much of the encouragement to train with weights was couched in the rhetoric of national decline. In Hoffman's estimation, *Strength & Health* was necessary because other nations were, "outstripping us physically." Hoffman's magazine, then, would provide information on how to train with barbells so that the United States would not be physically embarrassed by stronger nations. These two messages, strength training to improve athletic performance and strength training to stave off national decline, were central to *Strength & Health* throughout its run and were well established in the first issue. Based on Hoffman's view of the utility of strength, his own introduction to weight training, and the conflation of fitness with patriotism, Hoffman found a message ideally suited to young American men at mid-century.

Much of what is known about Hoffman's early years comes from Hoffman himself, and as with other prominent self-promoting physical culturists like Sandow, it was not uncommon that the details of those years changed to suit his needs.<sup>25</sup> As a result, it is difficult to know how much of the tale of his early life is really true. What is known is that, born in Tifton, Georgia in 1898, Robert Collins Hoffman consistently discussed his exploits within the context of physical prowess and athletics. He was the fourth of five children following his sister, Florence, two brothers, Charles (Chuck) and Jack, and preceding his sister, Eleanor.<sup>26</sup> Of his childhood

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<sup>24</sup> Bob Hoffman, "Editorial," *Strength & Health*, December 1932, 1.

<sup>25</sup> In some of Sandow's earliest writings he was a "healthy and well-formed" but average child. In later writings he had become "exceedingly delicate" as a boy which led historian John Kasson to remark "the more he retold the story, the more his health as a youth declined." John Kasson, *Houdini, Tarzan, and the Perfect Man: The White Male Body and the Challenge of Modernity in America* (New York: Hill and Wang, 2001), 30; Chapman, *Sandow the Magnificent*, 4-5.

<sup>26</sup> John Fair, *MuscleTown USA: Bob Hoffman and the Manly Culture of York Barbell* (University Park, PA: Pennsylvania State University Press, 1999), 11-12; Bob Hoffman, "Tis Never Too Late to Start," *Strength & Health* 1, no. 6 (May 1933): 11, 26.

Hoffman claimed the he was, “born with a desire to be athletic and strong,” and that he was trying to outdo his playmates as soon as he could walk.<sup>27</sup> At age four for example, for reasons that are never explained, he claimed he ran repeatedly around a double tennis court. In most versions of this story he did two hundred laps around the court; but in other accounts the laps vary from 100 to 250.<sup>28</sup> Another oft-cited story of his athletic prowess as a child was his claim that he had run a ten mile race at the age of ten. The young Hoffman had supposedly been asked to hold some clothes for two older boys during the race. Knowing they’d need their clothes at the end, Hoffman ran the race himself to ensure their delivery and finished next to the winner “fresh as [he] could be.”<sup>29</sup> By the age of thirteen, Hoffman claimed, he had completed several full (26-mile) marathons in Pittsburgh.<sup>30</sup> Although these early stories cannot be verified, Hoffman did participate in a variety of aquatic competitions after joining the Pittsburg Aquatic Club when he was sixteen.<sup>31</sup> His two older brothers also participated in swimming and canoeing contests and in the earliest competitions his brothers, especially Jack, consistently bested the teenage Bob. He resented being known as “Chuck’s brother” or “Jack’s brother” and began training to beat them, hoping that they would come to be known as “Bob’s brothers.”<sup>32</sup> During the winter after his seventeenth birthday Bob began using some light dumbbells, pulleys and a rowing machine as part of his training. Never one to give credit to others that he could claim for himself, his inspiration for beginning such training is noticeably missing from his various

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<sup>27</sup> Bob Hoffman, “The Story of the World Famous York Barbell Club,” *Strength & Health* (November 1945): 15; Bob Hoffman, *Weight Lifting* (York, PA: Strength and Health Publishing, 1939): 71.

<sup>28</sup> Ibid; Bob Hoffman, “Reaching Your Physical Goal,” *Strength & Health* 1, no. 11 (October 1933): 8; Bob Hoffman, *World Health Ecology News* 6, no. 4 (April 1975): 5; Bob Hoffman, *Bob Hoffman’s Simplified System of Barbell Training* (York, PA: York Barbell Company Press, 1941): 1.

<sup>29</sup> He later claimed to have won the race. Herman Weiskopf, “A Corner on American Muscle,” *Sports Illustrated*, April 9, 1962, <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1134931/index.htm> (accessed January 30, 2013); Fair, *Muscle town*, 14; Hoffman, “World Famous,” 15.

<sup>30</sup> Hoffman, “World Famous,” 15.

<sup>31</sup> Regarding Hoffman’s views on youth training see: Booker O’Brien and John Fair, “‘As the Twig is Bent’: Bob Hoffman and Youth Training in the Pre-Steroid Era,” *Iron Game History* 12, no. 1 (August 2012): 28-51.

<sup>32</sup> Hoffman, “Tis Never Too Late,” 26.

biographies although he did admit to doing some “train you by mail” exercises when he was ten, although these were simply agonist-antagonist co-contraction exercises like Charles Atlas recommended.<sup>33</sup> Of his winter program Hoffman said that he trained for hours on end until the floor was soaked with his perspiration.<sup>34</sup> The training apparently paid off as he “won everything in sight” the following aquatic season.<sup>35</sup>

Shortly after the United States entered World War I in 1917, Hoffman enlisted in the Pennsylvania National Guard.<sup>36</sup> Descriptions of his wartime experience published in *Strength & Health* and his book, *I Remember the Last War* are full of bravado and tales of heroism, some of which are as improbable as his tales of childhood athleticism. Hoffman claimed to have enlisted in order to stop the atrocities which the Germans and their allies had been committing. He did so “expecting to get killed, but hoping to have done more than my part before I got mine.”<sup>37</sup> Among his more improbable tales of heroism, Hoffman maintained that he had been sent on five patrols in one day and been the only soldier to survive three of them and that he survived a bomb blast “right in my face” which killed all of those near him.<sup>38</sup> Such was his gallantry that his superior officers were eventually “ashamed” to send him out on any more “certain death missions.”<sup>39</sup> While these tales may be embellished, Hoffman was cited by General John “Black Jack”

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<sup>33</sup> Hoffman says that these manual resistance exercises were part of a mail-order course his father had purchased. The course was the “Swoboda” system, though Hoffman points out that it was “not the great Viennese lifter who held the world’s record in the continental jerk, but another who had adopted that famous name.” Hoffman, “World Famous,” 15.

<sup>34</sup> Hoffman, *Weight Lifting*, 71.

<sup>35</sup> Hoffman claimed that when he first reached his six foot, three inch stature around the age of fifteen, he only weighed 140 pounds. Before he signed up to join the war effort in 1917, he weighed 167 and, upon returning home at the age of twenty-one, he weighed 180 pounds, still at six foot and three inches in height. *Ibid.*, 70; Hoffman, “World Famous,” 15.

<sup>36</sup> Bob Hoffman, “Should We Prepare for War?” *Strength & Health*, November 1939, 29; Fair, *MuscleTown*, 16.

<sup>37</sup> Bob Hoffman, *I Remember the Last War* (York, PA: Strength & Health Publishing, 1940), 53.

<sup>38</sup> Hoffman, “Should We Prepare for War?” 29; Bob Hoffman, “Especially for Strength and Health’s Boys,” *Strength & Health* 3, no. 1 (December 1934): 20, 48.

<sup>39</sup> *Ibid.*

Pershing for “gallantry in action” and awarded the Belgian Order of Leopold and Croix de Guerre.<sup>40</sup>

In keeping with his persona, Hoffman emphasized that his physical prowess was integral to his survival. In a story for “*Strength and Health’s* Boys,” in 1934, Hoffman told of being pinned behind German lines and surrounded. His only flank not hemmed in by German troops was cut off by barbed wire. In a feat of tumbling prowess, Hoffman somersaulted over the wire and safely returned to his unit. The message of Hoffman’s tale was that his young readers needed to participate in all forms of physical exercise because one never knew when it might pay dividends.<sup>41</sup> Similarly, Hoffman’s physical competence, he claimed in other articles, enabled him to be a “champion digger,” record holding marksman of speed and accuracy, and impervious to disease.<sup>42</sup> Hoffman credited his fitness in helping him to survive the war, saying, “...I owe much of the fact that I am here to careful training, superb physical condition, and being as careful as I can be.”<sup>43</sup>

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<sup>40</sup> Fair, *Muscle town*, 18-19.

<sup>41</sup> Hoffman, “*Strength & Health’s* Boys,” December 1934, 48.

<sup>42</sup> Hoffman, “Should We Prepare for War?” 43; Hoffman, *I Remember the Last War*, 54-55

<sup>43</sup> *Ibid.*

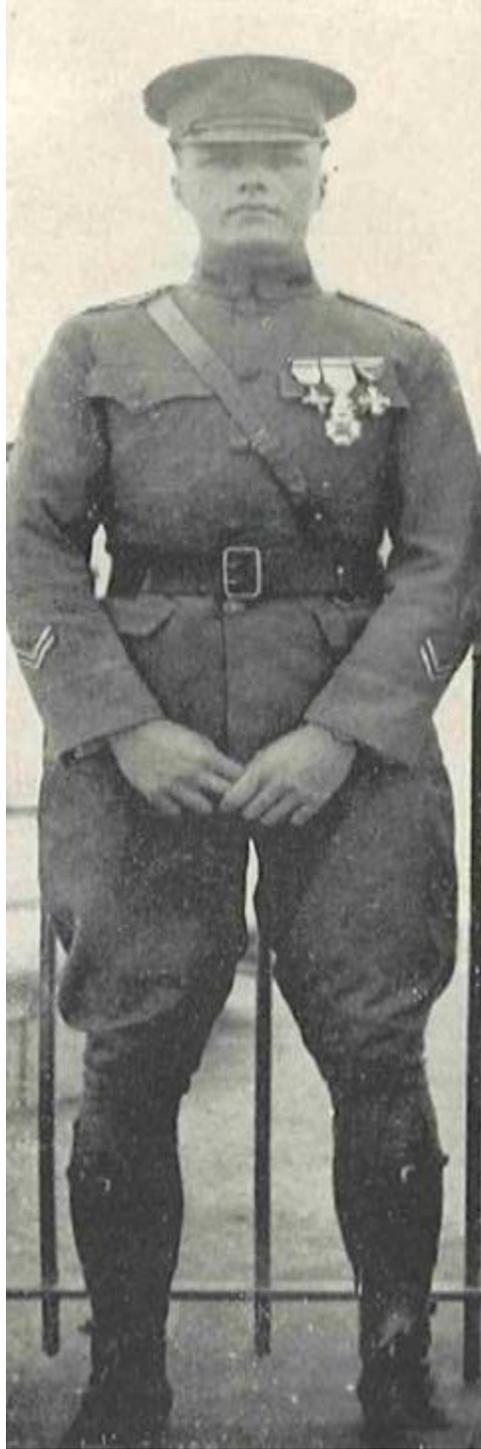


Figure 13. Bob Hoffman shown with his medals earned in World War I, as pictured on page 241 of *I Remember the Last War*.

Shortly after returning from the war Hoffman went into business with his brother Chuck in York, Pennsylvania, selling oil burners. While this business was only marginally successful, Hoffman did learn quite a bit about foundry work, machine work, and pattern making during this venture.<sup>44</sup> He eventually partnered with another man, Ed Kraber, and established a successful oil burner company.<sup>45</sup> While selling oil burners, Hoffman again began to compete in a variety of athletic events and trained as he had before the war, with the addition of some weights he made at the shop. Hoffman also began reading *Strength* magazine and “became convinced that barbell training was the way to gain the strength and muscle [he] desired.”<sup>46</sup> By placing a “swear jar” in the oil burner factory he was able to raise the forty dollars necessary to purchase one of Calvert’s Milo barbells and in short order began training with the new weights. Following a year of intermittent training due to his travel schedule, Hoffman claimed he had added twenty-one pounds to his frame and improved his performance at a variety of sports and athletic events including: handball, the standing broad jump, the high jump, the shot put and even the 60- and 160-yard potato race. Moreover, he claimed to have won the “International YMCA Hexathlon” championship and to have added an astounding ten inches to his high jump and eighteen inches to his broad jump in the span of twelve months.<sup>47</sup> This sudden improvement, as much as anything, confirmed Hoffman’s belief that heavy resistance training could benefit athletic performance.

Hoffman would shift his focus to competitive weightlifting shortly thereafter, and began manufacturing barbells in his oil burner factory beginning in 1929 and organizing a competitive weightlifting club in 1931. While other muscle entrepreneurs struggled during the depression,

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<sup>44</sup> Hoffman, “World Famous,” 36

<sup>45</sup> Fair, *Muscle town*, 21.

<sup>46</sup> Hoffman, “World Famous,” 36-37.

<sup>47</sup> *Ibid.*, 37-38.

Hoffman's physical culture ventures were supported by his oil burner business which remained solidly profitable.<sup>48</sup> Following the 1932 Olympic Games in Los Angeles, Hoffman began publishing *Strength & Health* with strongman and physical culturist George Jowett. For the next fifty-three years until his death in 1985, the magazine served as a megaphone for Hoffman's ideas, helped satisfy his need for celebrity, and publicized his barbells.

His athletic success following employment of strength training profoundly affected Hoffman's view of the utility of barbells and, as a result, he used enhancement of athletic performance as a primary selling point of his new products. Additionally, Hoffman truly felt that being strong and fit contributed to his survival and supposedly heroic deeds in the First World War. In spite of its status as the first modern war with a variety of technological advances in killing machinery, the war Hoffman experienced was decidedly primal. Hoffman's worst fear, he claimed, was being impaled by a bayonet and he reportedly spent a great deal of time training on his own during the war to avoid this gruesome fate.<sup>49</sup> Being able to physically overpower an enemy soldier was crucial to his goal. As a result, Hoffman consistently admonished readers to be strong to avoid being subsumed by other countries. "Many people think that physical strength is not necessary in this age" Hoffman claimed in 1933. He continued, "Yet physical strength is more necessary now than ever before."<sup>50</sup> For Hoffman, weight training was functional, it developed strength and improved one's health, both of which would then enable one to succeed in other endeavors.<sup>51</sup> Weight training also developed one's physique, but this was viewed as somewhat of a by-product of the training, not the overarching goal.

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<sup>48</sup> John Fair, "From Philadelphia to York: George Jowett, Mark Berry, Bob Hoffman and the Rebirth of American Weightlifting, 1927-1936," *Iron Game History* 4, no. 3 (April 1996): 3-17.

<sup>49</sup> Hoffman, *I Remember the Last War*, 53; Hoffman, "Should We Prepare for War?" 43

<sup>50</sup> Bob Hoffman, "Why You Should Be Strong," *Strength & Health* 1, no. 1 (June 1933): 5.

<sup>51</sup> "Few of us would aspire and perspire, persist to develop muscles just to look at," Hoffman claimed in a 1949 editorial. Instead, in Hoffman's opinion, most people lifted weights because of the "unusual endurance, ability to do

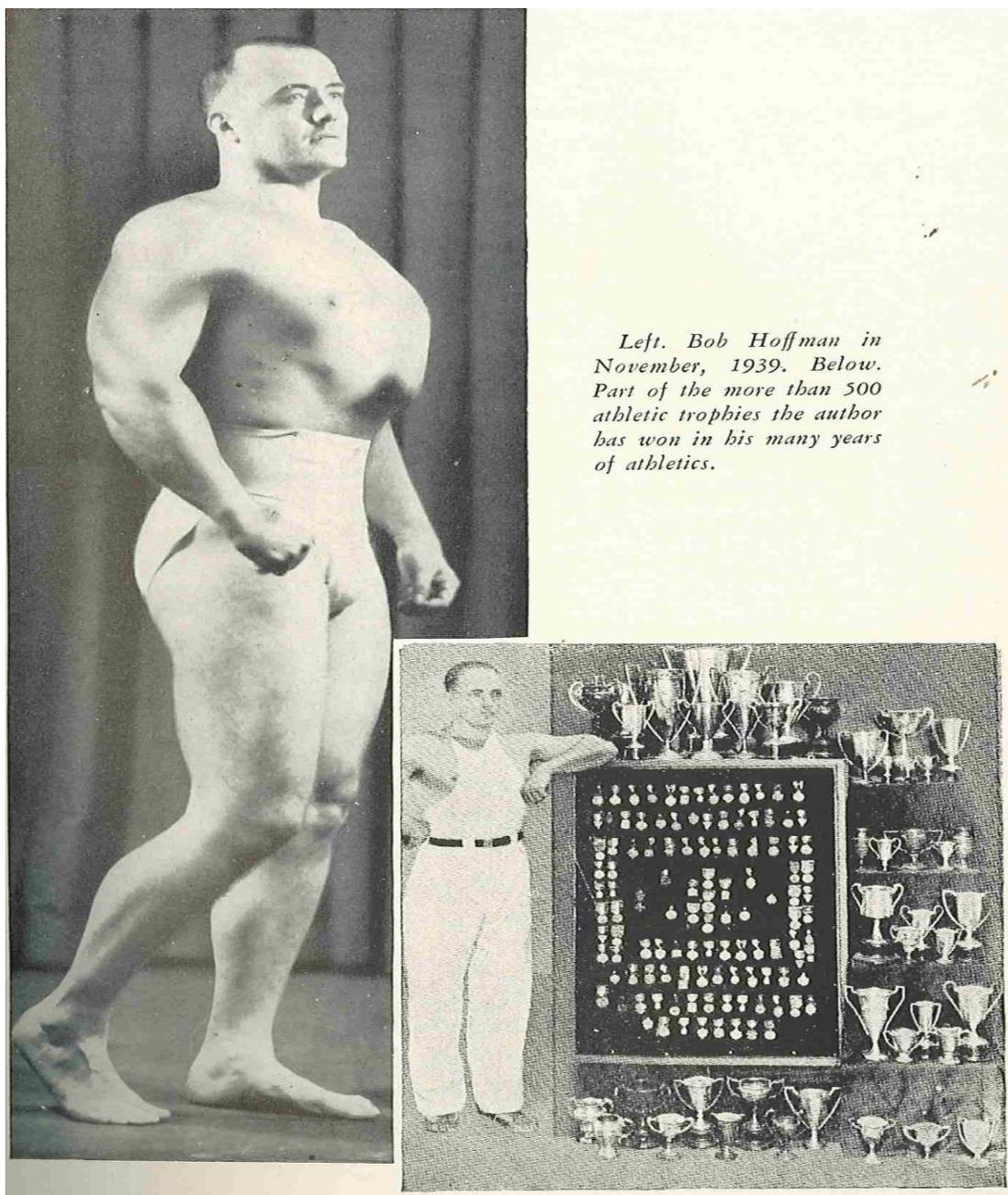


Figure 14. Bob Hoffman showing off his physique and some of the more than 500 awards he claimed to have won in a variety of athletic contests. Image from page 129 of *I Remember the Last War*.

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things...improved feelings, super health, resistance to disease, [and] the expectancy of a long and useful life which is obtained through weight training." Bob Hoffman, "Editorial – What Good Are Muscles?" *Strength & Health*, April 1949, 3, 5, 7.

## JOE WEIDER'S INTRODUCTION TO WEIGHT TRAINING

Hoffman's publishing rival, was Canadian-born Joseph Weider. Joe was born in November 1920 in Montreal, Quebec, to Louis and Anna Weider, who had immigrated from Poland only ten years earlier.<sup>52</sup> Joe was the sixth child born to the couple, the third in Canada, and only the second to survive past infancy. Ben, his younger brother and eventual business partner, was born in 1923. As members of Montreal's Jewish minority, the boys were subject to harassment by their classmates and around town. After years of taking "lots of crap" and periodically getting into fights, Joe sought a way to make trouble avoid him. He initially turned to wrestling but claimed that the local coach would not let him try out because he feared the gangly teenager would get hurt. Dejected, Weider happened upon an old issue of *Strength* magazine while at the library. The magazine contained photos of weight trained men, as well as articles on how to train with weights to gain muscle and strength. One particular image of a man walking out of a lake struck the teenager. The photo was of a young man whose relaxed muscularity conveyed both strength and power to Weider. The text next to the photo said that his impressive physique had been built by lifting weights. Weider claimed that this was his "call" to take up weight training.<sup>53</sup> If such muscularity and implicit power could be manufactured, he could transform himself into a man who would be respected.

To that end, then thirteen year-old Weider attempted to acquire the type of weights he had seen in *Strength*. Unable to find them commercially available, he convinced a foreman at a scrap yard to make him a makeshift set from some small flywheels and a rusted iron shaft. The

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<sup>52</sup> Joe Weider, Ben Weider and Mike Steere, *Brothers of Iron* (Champaign, IL: Sports Publishing, 2006), 2-5. Joe's actual date of birth is unknown. He says "Ma had a rough idea" that it was November 29<sup>th</sup>, either 1920 or 1922. Various forms, he says, have either date. He typically gives 1922 as his year of birth so that he can claim he started his magazine empire at the age of seventeen. Given that Ben's date of birth is known to be February 1, 1923 and the two were three years apart in school, it is more likely that he was born in 1920; Randy Roach, *Muscle Smoke and Mirrors – Volume I* (Bloomington, IN: AuthorHouse Publishing, 2008): 145.

<sup>53</sup> Weider, Weider, and Steere, *Brothers of Iron*, 14-19.

“barbell” was carted back to a shed behind the Weider home, where Joe lifted it religiously until his strength improved to the point that more resistance was needed. A proper weight set was beyond the teenager’s means, however, and he petitioned George Jowett, whose side-business included weight equipment sales, to let him buy a set on a layaway plan.<sup>54</sup> Jowett agreed and Weider mailed him fifty cents each week until he had paid off the seven dollar price of the barbell set. With his new adjustable set, Weider was able to make additional gains in muscle mass and strength. The culmination of Joe’s transformation from a lanky waif to a muscular man came when a local bully followed Ben home to challenge Joe. Ben had attempted to avoid a beating by telling the man that there would be a reprisal by his brother if he were hurt. The man apparently took it as a challenge and went to the Weider home to confront the elder Joe. Joe claimed that, while he deplored violence, his weight-trained muscles allowed him to punch the man so hard that he was bloodied and knocked unconscious in a single blow.<sup>55</sup> Joe Weider’s physical transformation would color his view of the utility of weight training. His appearance had changed, and this led to the change in how he was perceived by women and other men. He apparently only had to actually assert his physicality over another man once, the rest of the time the appearance of strength was sufficient. As a result, increased size and the appearance of power, implicit in enhanced muscularity, was paramount for Joe.

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<sup>54</sup> Ibid.; John Foster, “How It All Began,” *Flex*, June 1985, 90, 96.

<sup>55</sup> Weider, Weider, and Steere, *Brothers of Iron*, 28.

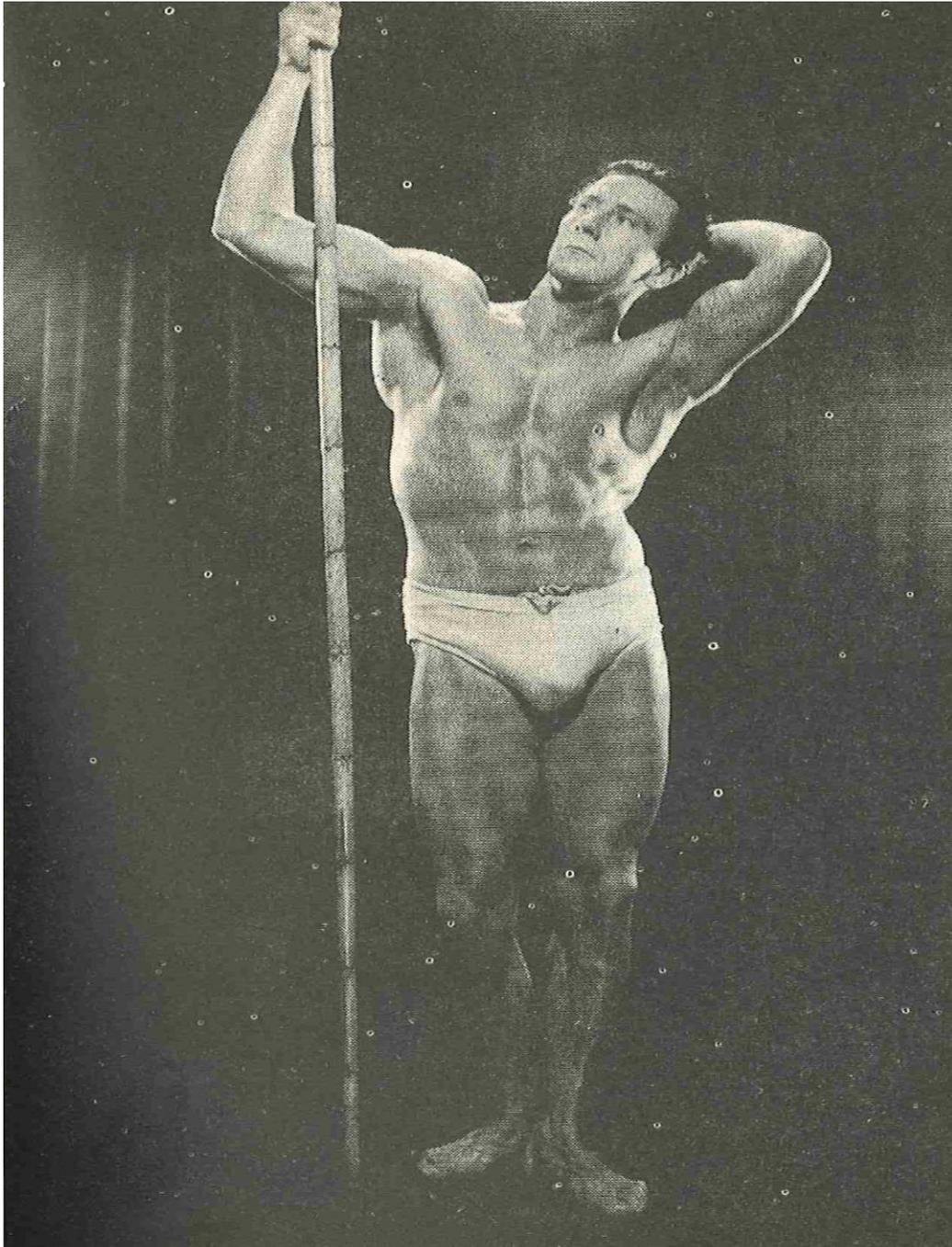


Figure 15. Joe Weider showing his weight-trained physique on page twenty-three of the December issue of *Muscle Power*.

Weider began publishing his own magazine, *Your Physique* in August of 1940. Subtitled the “national health and physical culture magazine,” his first editorial pitched Canadian nationalism. Reminiscent of Hoffman’s first editorial, Weider asserted that Canada had once been a land known for producing some of the strongest men in the world, but had fallen far behind other countries physically.<sup>56</sup> Weider diverged from Hoffman, however, in making clear that his magazine would contain information on competitive weightlifting *and* building a better physique. He urged the readers of his original publication that, “We must preach body-building, so as to get our youth to build up their bodies, and who knows produce championship material, of which we can never have too much.” In keeping with the view that building the body was inherently valuable, Weider and the other writers in his magazines were deliberate in separating the practice of lifting for size and appearance from lifting for competition.<sup>57</sup> Their view, summed up in a maxim that has become part of the arcana of bodybuilding was that, one should “train for shape and strength [would] follow.”<sup>58</sup>

Weight training had made Joe a man. His added muscularity caused bullies to steer clear and those who did not paid the price. An additional benefit of this brand of hypertrophic masculinity was that he received extra attention from girls and more respect from adults. “Bodybuilding changed me body, mind, and soul,” Joe claimed, “and altered my circumstances.”<sup>59</sup> Similarly, weight training had enabled Bob Hoffman to best his older brothers

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<sup>56</sup> Joe Weider, “Editorial,” *Your Physique* 1, no. 1 (August 1940): 4, 21-22.

<sup>57</sup> As an example, a 1942 *Your Physique* article delineates the differences between the two types of training. Weightlifting was “a means of attaining the utmost strength and being able to display it,” while “bar-bell exercise” was “recognized by more and more people who have no intentions of becoming weight-lifters, but who realize that they can overcome certain physical deficiencies and become more shapely by spending a few hours a week with bar-bell exercises.” Harvey Hill, “Is Heavy Exercise Necessary?” *Your Physique* 2, no. 2 (January – February 1942): 6-7.

<sup>58</sup> Roach, *Muscle, Smoke, & Mirrors*, 247.

<sup>59</sup> *Ibid.*, 24.

in aquatics and helped him achieve an identity in his own right. Bob also credited his strength, inherent or developed, with helping him to survive the First World War.

While the tales of a transformation from a child to an independent and self-sufficient man achieved through dedicated strength training are inspiring, they were certainly not unique in the annals of bodybuilding.<sup>60</sup> Both are examples of the oft-told tale of the transformative power of weight training. The story was first used in America by George Barker Windship in an article for the *Atlantic Monthly* in 1862.<sup>61</sup> Similarly, Charles Atlas (Angelo Siciliano) marketed his mail-order course training course—Dynamic Tension—to the public based on the idea that manhood (and strength and courage and success) was equated with the possession of muscles. So effective was Atlas's advertising campaign that it is regarded as the most successful print advertising campaign of all time.<sup>62</sup> First run in 1929, the advertisement titled "The Insult that Made a Man out of Mac" showed a skinny teen-age boy and a young attractive girl sunbathing at the beach when a bully comes along and kicks sand in their faces. Afraid to respond, and embarrassed to be seen as a coward in the eyes of the girl, the boy sends away for Atlas's Dynamic Tension course, and in the next frame of the ad, a newly muscular young man returns to the beach several months later, fells the bully with a single punch, and then walks out of frame with an adoring girlfriend on his arm.<sup>63</sup>

The idea that manhood could be "achieved" through a tangible, physical transformation was a common component of "masculine conversion narratives" in the late nineteenth and early

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<sup>60</sup> The same month that Weider began publishing *Your Physique*, a magazine inspired by his transformational experience with weights, Hoffman's *Strength & Health* included an article which asked, "How many thousands of readers of this magazine have made their start in physical training because they found they were 'picked on' by their bigger and stronger, more capably physical playmates?" Bob Hoffman, "Are the Germans Superior?" *Strength & Health*, August 1940, 10-11, 37-39.

<sup>61</sup> G. B. Windship, "Autobiographical Sketches of a Strength Seeker," *Atlantic Monthly* 9 (January 1862): 102-115.

<sup>62</sup> Sam R. Danna, "Charles Atlas," in *The Guide to United States Popular Culture*, eds. by Ray Broadus Browne, and Pat Browne (Madison, WI: Popular Press, 2001), 50.

<sup>63</sup> Sam R. Danna, "The 97 Pound Weakling... Who Became the 'World's Most Perfectly Developed Man,'" *Iron Game History* 4, no. 4 (September 1996): 3-4.

twentieth centuries.<sup>64</sup> The man of this era was being converted, not necessarily from a child, but was instead setting himself apart from femininity.<sup>65</sup> In a cultural milieu where men searched for identity, autonomy, and personal fulfillment, men could be more easily persuaded to take up weight training. Kenneth Dutton, building on the work of zoologist Desmond Morris, has discussed the weight trained male body as a type of “super normal” stimulus. The increase in muscularity, particularly of the upper extremities, serves as a physical signifier that a young male is reaching physical maturity. Moreover, the muscularity helps set the male apart both from the more androgynous shape of the child and from females. The amplified muscularity that results from strength training, then, is an exaggerated signifier of masculinity as opposed to the physiques of both a child and a woman.<sup>66</sup> Heightened muscularity can then be viewed as a means of gaining gender capital. As discussed by sociologist Michael Kimmel, in the absence of landownership and workplace autonomy, American manhood had to be proven, and this was an ongoing process.<sup>67</sup> An important avenue through which to express manhood was physicality. The hard, muscular body is associated with warriors and physical dominance.<sup>68</sup> The strength,

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<sup>64</sup> Jacqueline Reich, “The World’s Most Perfectly Developed Man’ – Charles Atlas, Physical Culture, and the Inscription of American Masculinity,” *Men and Masculinities* 12, no. 4 (2010): 449; Sociologist Alan Klein noted that “Joe Weider personifies the Charles Atlas ad scenario.” Alan Klein, *Little Big Men: Bodybuilding Subculture and Gender Construction* (Albany, NY: State University of New York Press, 1993), 86.

<sup>65</sup> Michael Kimmel, “Consuming Manhood: The Feminization of American Manhood and the Recreation of the Male Body, 1832-1920.” *Michigan Quarterly Review* 33, no. 1 (1994), 7-36.

<sup>66</sup> Kenneth Dutton, *The Perfectible Body: The Western Ideal of Male Physical Development* (NY: Continuum Publishing, 1995): 189; Psychologists Harrison Pope, Katharine Phillips, and Roberto Olivardia have gone a step farther and pathologized this quest for the exaggerated male physique as “The Adonis Complex.” They note that physical size and strength is one of the few ways in which a contemporary man can accomplish something that women cannot. As a result, according to them, the goal of hypermuscularity is, in part, the consequence of “threatened masculinity” and a way to carve out a uniquely male identity. Harrison Pope, Katharine Phillips, and Roberto Olivardia, *The Adonis Complex: The Secret Crisis of Male Body Obsession* (NY: The Free Press, 2000), 22-24

<sup>67</sup> Michael Kimmel, *Manhood in America: A Cultural History* (NY: The Free Press, 1996), 9.

<sup>68</sup> Thomas Johansson, “What’s Behind the Mask? Bodybuilding and Masculinity.” In *Bending Bodies: Molding Masculinities*, vol. 2, ed. Soren Ervo and Thomas Johansson, 92-106. Burlington, VT: Ashgate Publishing, 2003.

implicit in manufactured muscular size, is part of a “dominance display” in which men may seek to assert authority over other men based on their size.<sup>69</sup>

In addition to securing gender capital, muscularity could also convey a type of American morality. Achieving noticeable hypertrophy of muscles requires regular, planned, and progressive resistance training. The wearer of the muscles then, in a sense, is showing his fitness for capitalist society or, in Hoffman’s words showing that he has, “graduated from the college of strength and health.”<sup>70</sup> His transformation fits with Horatio Alger tales of success achieved through consistent, hard work and ideas of Social Darwinism. This type of story is prominent in the narratives of the muscle magazines of both the Weiders and Hoffman.<sup>71</sup> Indeed, Joe stressed the Alger-like qualities of his own narrative. He commissioned Frederick Tilney to write an article recounting how he transformed himself by “demand[ing] for himself a well-developed body,” and then started the highly successful *Your Physique* magazine in his parents’ kitchen “with a paltry twenty dollars!”<sup>72</sup> In addition to having the gumption to start such an ambitious venture, Weider further proved his capitalistic piety by eschewing drinking or carousing so that he could work. In his retelling, “I didn’t drink or go wild like other young people. I had to be

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<sup>69</sup> Dutton, *Perfectible Body*, 236-239.

<sup>70</sup> “Hoffman, “What Good Are Muscles?” 3; Dutton, *Perfectible Body*, 179-180; Brian Baily and James Gillett, “Bodybuilding and Health Work: A Life Course Perspective.” In *Critical Readings in Bodybuilding*, ed. Adam Locks and Niall Richardson, 91-106. NY: Routledge, 2012; Tara Magdalinski, *Sport, Technology and the Body: The Nature of Performance* (NY: Routledge, 2009), 65.

<sup>71</sup> See, for example, Joe Weider, “Editorial – Bring Out Your Reserve Power!” *Your Physique* 2, no 5 (1942): 3. In the article, Weider assured the reader that, whatever their affliction, it could be overcome by a strong will and exercise. Similarly, some of the earliest issues of Hoffman’s *Strength & Health* featured multiple articles by Alan Carse, titled “Survival of the Fittest,” in which the author asserted that, “All of life is a fight...The man who, through heredity, training or mode of living learns to excel physically is the man who succeeds most.” Alan Carse, “Survival of the Fittest,” *Strength & Health* 3, no. 12 (1935): 18; Alan Carse, “A Tale of Survival of the Fittest,” *Strength & Health* 4, no. 1 (1935): 18, 44-45; Also see: Barton Horvath, “What Can Weight Training Do for Me Besides Build Big Muscles?” *Muscle Power* 18, 9 (1955): 22-23, 50-52; Joe Weider, “You Can be Strong and Muscular!” *Muscle Builder* 1, no.6 (1954): 10-13, 58-60; Charles Smith, “Jack Delinger – From Rheumatic Fever to the World’s Perfect Man,” *Muscle Builder* 2, 3 (1954): 5, 64; Joe Weider, “Alex Aronis Makes Good,” *Muscle Builder* 2, no. 4 (1954): 28-29, 50.

<sup>72</sup> Frederick Tilney, “Getting Acquainted with Your Editor-in-Chief Joseph E. Weider,” *Your Physique* 4, no. 4 (1944): 8-9.

sharp for work in the morning, and I had to save my money.”<sup>73</sup> Much like Alger’s “Ragged Dick” after his conversion experience, Weider succeeded through temperance, hard work, and frugality.<sup>74</sup>

While Hoffman was not loath to brag about his own accomplishments, he and other *Strength & Health* authors also focused their tales of success on members of the Olympic weightlifting team, legendary strongmen, or readers.<sup>75</sup> The stories generally shared the common theme that these tremendously strong or well developed men had overcome debility in their youth. They had done so through dogged determination and arduous physical training, often against the advice of physicians.<sup>76</sup> Hoffman even went so far as to claim that, “the majority of men who are the strength champions of today were inferior physically in the beginning.”<sup>77</sup> An example of this type of feature appeared in the first issue of *Strength & Health*. Joe Miller, author of the piece and a member of the York Barbell Athletic Club and Olympic weightlifting team, recounted how he had not been expected to live past infancy and had been a weak child. Tired of debility, he sent away for a physical culture course and, in a story that pre-dates Weider’s by almost fifteen years, Miller claimed he began to train with equipment he fashioned himself from inner tubes, door knobs, buckets, and an auto axle.<sup>78</sup> Famous strongmen such as

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<sup>73</sup>Weider, Weider, and Steere, *Brothers of Iron*, 48.

<sup>74</sup>Horatio Alger, *Ragged Dick; or Street Life in New York with the Boot Blacks* (New York: Signet Classics, 2005).

<sup>75</sup>Hoffman generally tended to claim that he was average or normal before strength training but had achieved exceptional strength and health from weight training. For example, in *Weight Lifting* he said, “I revere my mother more with each passing year, as my appreciation grows for the physical normalcy with which she endowed me” (p. 3); Mark Kodya, *An Exploration of the History of Weightlifting as a Reflection of the Major Socio-political Events and Trends of the 20<sup>th</sup> Century* (State University of New York – Empire State, Master’s Thesis, 2005), 42; Fair, *Muscle town*, 43-46;

<sup>76</sup>Hoffman did recount a story to this effect from his own childhood. He claimed to have contracted typhoid fever from contaminated drinking water. In his retelling, a doctor had declared him dead, but “when [the doctor] found there was still a spark of life in me, he said that I would never amount to anything, even if I lived, for my heart and other organs were too badly damaged.” Hoffman, like the other strongmen had proven a doctor wrong and rebuilt himself through physical training. Fair, *Muscle town*, 13.

<sup>77</sup>Hoffman, *Weight Lifting*, 92.

<sup>78</sup>Miller claimed to have started training around the age of ten which, based on other dates in the article puts the creation of his homemade weight set around 1919. Weider claimed to have started training at the age of thirteen.

Eugen Sandow, George Jowett, and Anton Matysek, known as “Maxick,” were portrayed as having similarly overcome weakness or sickness, even if such tales were not necessarily true. Harry Good reiterated Hoffman’s claim that nearly all strongmen had to overcome handicaps or debility and then posed the question “if these men succeeded so greatly, starting so heavily handicapped, what excuse can the normal person offer not to take the best care of the body that God gave them and to exercise to help it reach its maximum strength and health...?”<sup>79</sup>

Good’s query exemplified the goal of the Alger tales in both the Hoffman and Weider publications. Readers had to be convinced that they could be like the men shown in the magazines. They had to truly believe that they could redefine their masculinity through the training that both publishers offered. Further, they had to be convinced that the masculinity conferred by muscularity would bestow social benefits. Before they could be convinced of the benefits of strength training, however, they had to be dissuaded that strength training could be harmful.

### **DISPELLING NOTIONS OF HARM**

In spite of their opposing views on the purpose of strength training, both Hoffman and Weider battled diligently against the notion that weight training was dangerous. As noted in the previous chapter, it was assumed in many quarters that weight training created such deleterious conditions as: “athlete’s heart,” less “vitality,” muscle-binding, rupture (hernia), and stunted growth.

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Given his birth date of 1920, his train axle weight workout would have occurred around 1933. Joe Miller, “Joe Miller’s Rise to Fame,” *Strength & Health* 1, no. 1 (December 1932): 8-9; For additional examples of men who overcame debility through weight training see: Phil Gundelfinger, “Once a Cripple Now a Lifter!” *Strength & Health*, May 1945, 15, 39-40; Joe Raymond, “All That I Am, I Owe to Barbell Training,” *Strength & Health* 3, no. 4 (March 1935): 22, 35; Roger Eells, “I Was Given Three Months to Live,” *Strength & Health* 3, no. 5 (April 1935): 26, 44-45.

<sup>79</sup> Harry Good, “Are Strong Men Born or Made?” *Strength & Health* 2, no. 5 (April 1934): 12-13, 29.

The earliest feature article to refute the idea of athlete's heart appeared in March 1935 issue of *Strength & Health*. In the article, author Dr. Walter Laberge contended that there was "no such thing" as athletic heart and that his position was "backed by the foremost heart specialists of America and Europe."<sup>80</sup> As evidence for this statement Laberge cited medical doctor Thomas Lewis of Brigham Hospital in Boston who observed that enlargement of the heart in athletes did not constitute disease. *Strength & Health* author and national weightlifting champion Harry Good had observed two months before that the heart is a muscle and must adapt to training similarly to the other muscles. "An 'enlarged' heart is no more dangerous than an enlarged biceps," Good asserted, "and I know that many thousands of you are striving to get one of them."<sup>81</sup> Later in the same year, New York gym owner and weightlifting advocate Siegmund Klein made the important observation that, as a muscle itself, the heart adapts to strenuous exercise in a similar manner to skeletal muscle.<sup>82</sup> Hoffman used the same analogy in March of 1936 saying, "exercise builds a strong arm muscle and also a strong heart."<sup>83</sup> The notion of athlete's heart being caused by strength training proved tenacious, however, and as late as 1959 *Strength & Health* continued to feature articles on the topic. Physician A.M. Gibson, for example, expressly denying the existence of the condition in two articles that year and echoed Hoffman by asserting that the heart adapted to training in a similar fashion to the other muscles of the body.<sup>84</sup>

The first issue of Joe Weider's *Your Physique* included an article credited to Canadian strongman Arthur Dandurand in which, the long-time strength athlete claimed that he had been

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<sup>80</sup> Walter Laberge, "Little Known Facts Concerning the Heart," *Strength & Health* 3, no. 5 (April 1935): 12, 5.

<sup>81</sup> Harry Good, "Facts to Disprove Time Worn Opinions," *Strength & Health*, February 1935, 41.

<sup>82</sup> Siegmund Klein, "Why We Need Exercise," *Strength & Health* 3, no. 11 (October 1935): 6, 50.

<sup>83</sup> Bob Hoffman, "Your Heart and Exercise" *Strength & Health* 4, no. 4 (March 1936): 38.

<sup>84</sup> A.M. Gibson, "Does Exercise Harm the Heart?" *Strength & Health*, March 1959, 37, 57; A.M. Gibson, "Is Weightlifting Dangerous?" *Strength & Health*, October 1959, 24-25, 46-47.

told in his youth that heavy lifting would result in “muscle-bound, a weak heart, high blood pressure, rupture, and so on.” In spite of these dire warnings, he assured readers, “a lifetime spent in strenuous sports did not have ill effects” on him.<sup>85</sup> His health was purportedly verified by a physician whose findings accompanied the article and reported, “Heart – Regular beat; no murmurs.” In the fourth issue of *Your Physique* Olympic weightlifting coach Mark Berry explicitly denied the existence of “athlete’s heart” as a pathological condition. Berry quoted physician Irvin Cutter who asserted that there was “probably no such thing as athlete’s heart,” in his defense of weightlifting and he assured readers that there was “practically no danger” of heart damage occurring as a result of training with weights.<sup>86</sup>

While many in the medical community continued to warn of “athlete’s heart,” coaches and physical educators were actually more concerned with the far more difficult-to-diagnose condition known as “muscle-bound.” Hoffman, Weider, and their various writers focused most of their energy on dispelling this particular myth, in part by attacking its origins. Both publishers argued that the idea that one could become muscle-bound from lifting heavy weights was an outmoded belief. *Strength & Health* writer Harry Good pointed out in 1933 that the concept was probably due to strongmen who had “plenty of adipose tissue” and created the impression that one must be rotund to be strong. Moreover, their lifting style was slow because “the present science [of progressive training] was not applied.”<sup>87</sup> Hoffman repeated this claim in 1936 and it was reiterated by *Muscle Power* writer W.A. Pullum in 1946.<sup>88</sup> Another York writer, Alan Carse,

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<sup>85</sup> Arthur Dandurand, “I am Young at Sixty-Two,” *Your Physique* 1, no. 1 (1940) 5, 18, 22.

<sup>86</sup> Mark Berry, “Physical Training Problems Simplified,” *Your Physique* 1, no. 4 (1941): 4; For additional examples of refutation of the existence of athlete’s heart, see: W.A. Pullum, “Are Weightlifters Slow?” *Muscle Power* 1, no. 6 (1946): 72-75; Martin Franklin, “Arthur Saxon’s Views on Weightlifting,” *Muscle Power* 4, no. 6 (1948): 20, 42; A.T. Petro, “The Effect of Barbell Exercise on the Heart,” *Muscle Power* 7, no. 5 (1949): 5, 45-46; Bob Hoffman, “What Can We Believe?” *Strength & Health*, October 1943, 26-27, 42.

<sup>87</sup> Harry Good, “Barbells and Their Use Versus Public Opinion,” *Strength & Health* 1, no. 4 (March 1933): 9, 18.

<sup>88</sup> Hoffman, “Improving Athletic Ability,” 19; W.A. Pullum, “Are Weightlifters Slow?” *Muscle Power* 1, no. 6 (September 1946): 72-75

blamed “train-you-by-mail” entrepreneurs for perpetuating the myth in order to sell their mail-order courses that required little to no equipment.<sup>89</sup> Hoffman also discussed the idea of becoming bulky, and potentially awkward, like a draft horse, correctly pointing out that their size was due to selective breeding, not “training.”<sup>90</sup>

#### **LEADING BY EXAMPLE – ANECDOTAL EVIDENCE FOR THE EFFICACY OF BARBELLS IN IMPROVING SPORT PERFORMANCE**

Research examining the effect of strength training on speed and range of motion didn’t begin until the late 1940s and began to be published in the early 1950s.<sup>91</sup> With no experimental evidence to refute the existence of the condition Hoffman, Weider, and their writers relied largely on anecdotal evidence to refute muscle-binding.

Hoffman tended to provide personal testimonials of how weight training had improved his athletic ability, but this was not his only tactic.<sup>92</sup> In many articles, he simply appealed to the readers’ logic, for example, in asserting that “a good big man is better than a good little man.” To football players he emphasized that additional size and strength would allow them to smash through blockers and overpower ball carriers. “Read about those selected for the All-American

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<sup>89</sup> Alan Carse, “The Old Athlete Tells a Secret,” *Strength & Health* 3, no. 6 (May 1935): 66; Alan Carse, “Muscle Bound Frank,” *Strength & Health* 4, no. 9 (August 1936): 19, 40. Hoffman also made this charge: Bob Hoffman, “Editorial,” *Strength & Health* 2, no. 4 (March 1934): 19.

<sup>90</sup> Bob Hoffman, “How Many Repetitions?” *Strength & Health*, December 1940, 19, 36-39; Bob Hoffman, *Secrets of Strength and Development* (York, PA: Strength & Health Publishing, 1940), 28-29.

<sup>91</sup> See, for example: John Paul Endres, “The Effect of Weight Training Exercise Upon the Speed of Muscular Movement” (MS thesis, University of Wisconsin – Madison, 1953); Edward Capen, “The Effect of Systematic Weight Training on Power, Strength, and Endurance.” *Research Quarterly* 21, no. 2(1950): 83; Edward Chui, “The Effect of Systematic Weight Training on Athletic Power” *Research Quarterly* 21 no. 3(1950): 188; W. Zorbas & P. Karpovich, “The Effect of Weight Lifting Upon the Speed of Muscular Contractions.” *Research Quarterly* 22 no. 2 (1951): 145.

<sup>92</sup> For an additional example of Hoffman and other writers describing the effects of weight training on Hoffman’s performance see: Bob Hoffman, “Improving Athletic Ability Through Barbell Training,” *Strength & Health* 4, no. 5 (April 1936): 19, 40; John Terpak, “You Can Improve Your Athletic Ability,” *Strength & Health*, June 1944, 24, 38-39; Tony Sansone, “A Miracle of Barbells,” *Strength & Health* 5, no. 8 (July 1937): 24, 43.

teams and see how few, if any, weigh less than 200 pounds,” he suggested.<sup>93</sup> To a reader who wanted to lift weights for football but feared becoming muscle bound Hoffman highlighted the similar power requirements in football and the Olympic lifts.<sup>94</sup> For those familiar with rowing he noted that the heavier crews almost always beat the lighter groups because while “they have more weight to pull...they have more power to pull it.”<sup>95</sup> The power conferred by weight training would allow a baseball or tennis player or golfer to hit the ball harder and, Hoffman pointed out, “hitting power is the difference between a star and an ordinary player.”<sup>96</sup> That same power would allow track athletes to run faster, jump higher, and throw farther.<sup>97</sup>

Logic and boosterism freely mingled in Hoffman’s appeals to take up weight training for sport. In an attempt to provide evidence for his claims, Hoffman first pointed to the York weightlifters and later used a wide variety of athletes as examples. Hoffman claimed that competitive weightlifters had as much speed, power, coordination, endurance, and flexibility as any athlete. “Weight lifters are never muscle bound,” he claimed, continuing, “they must be terrifically fast and powerful to succeed in the lifting of a heavy weight.” Further he hyperbolically claimed that while only one percent of the population could likely touch the floor with their hands while bending at the waist with their knees locked, all weightlifters could perform such a feat.<sup>98</sup> He also pointed to York lifters like Gordon Venables, “champion

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<sup>93</sup> Bob Hoffman, “How to Become an Athletic Star,” *Strength & Health* 1, no. 2 (January 1933): 9; Also see: Steve Stanko, “Strength Most Important in Football Success,” *Strength & Health*, November 1945, 20-21, 43; W.J. McClanahan, “Strength Most Important in Football Success,” *Strength & Health*, December 1945, 20, 34.

<sup>94</sup> Bob Hoffman, “Your Training Problems,” *Strength & Health*, April 1944.

<sup>95</sup> *Ibid.*

<sup>96</sup> Hoffman, “How to Improve,” 6.

<sup>97</sup> *Ibid.*

<sup>98</sup> Bob Hoffman, “Improving Athletic Ability Through Bar Bell Training,” *Strength & Health* 4, no. 5 (April 1936): 19, 40; Hoffman also issued challenges to athletes to compete against the York lifters in an “all around contest” to determine which athletes had the greatest “physical ability.” Dick Zimmerman, “Best Weightlifters are Best Athletes,” *Strength & Health*, June 1942, 18-19, 35; Bob Hoffman, “Editorial – Weightlifters Are Successful in Other Sports,” *Strength & Health*, August 1947, 3-4.

swimmer, sprinter, runner, jumper, boxer, a star at a host of games” to verify that weightlifters were successful in other sports.<sup>99</sup>

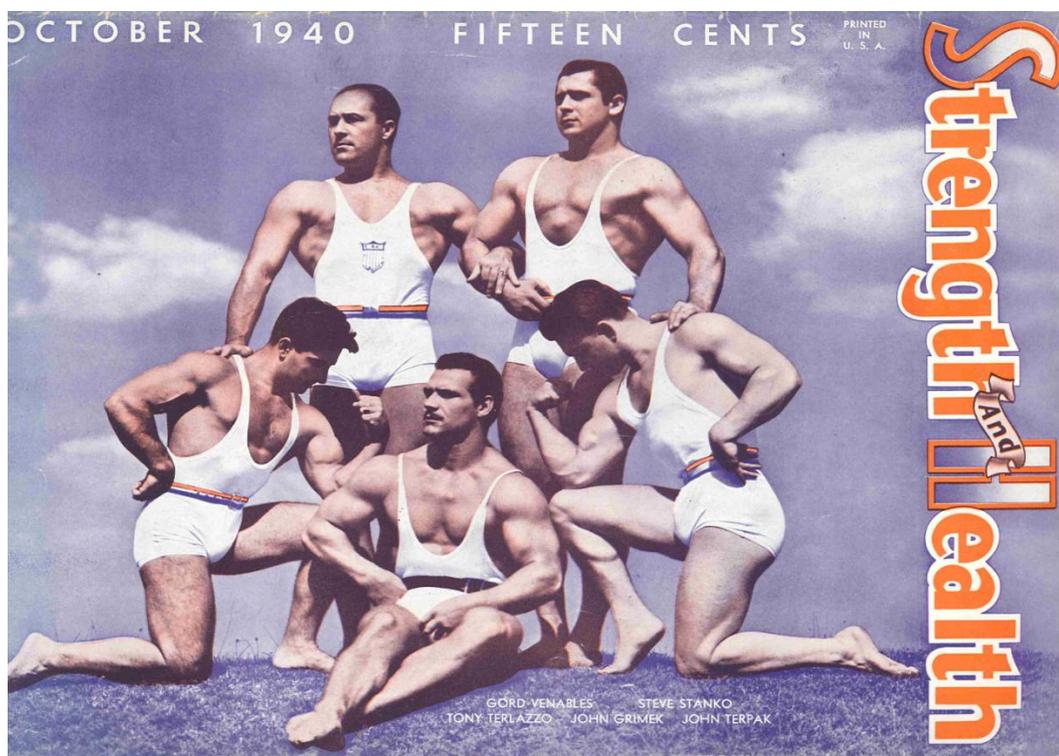


Figure 16. Champion athlete Gordon Venables pictured (back row, left) with other members of the York team: Steve Stanko (back, right), Tony Terlazzo, John Grimek, and John Terpak (front row, left to right) on the cover of the October 1940 issue of *Strength & Health*.

In the first issue of *Strength & Health*, Hoffman’s “How to Improve at Your Chosen Sport” article included the pledge that each issue would include examples of athletes “in every line of sport” who used weights. Concrete examples, other than Hoffman and the York lifters, were not provided for several years, however. In April of 1938, Hoffman mentioned that the York Barbell Club was being represented in boxing and that the pugilists had been trained with

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<sup>99</sup> Bob Hoffman, “There Should Be a Law against It,” *Strength & Health*, 4, no. 6 (May 1936): 14, 36-37. See also: Harry Good, “Gordon Venables: Weight Lifting Champion and Athlete Extraordinary,” *Strength & Health* 3, no. 12 (November 1935): 20-21, 45.

weights to prove that weight training would not adversely affect their punching speed.<sup>100</sup> Few specifics were provided, however, on the team's workouts or success. In order to provide more concrete examples, Jules Bacon began the column, "What Can You Do?" in September of 1941 to solicit stories from readers about how weight training had improved their athletic performance.<sup>101</sup> To help spur readers, Bacon provided a few examples of his own, including golfer Frank Stranahan. The golfer had placed second in the 1941 golf championships and purportedly credited "his strength and skill to the unusual muscles which weight lifting built."<sup>102</sup> The inclusion of a successful golfer is important because it is not a traditional power sport like football or throwing the shot put. While the ability to generate powerful trunk rotation is undeniably important in a successful golf drive, just as important is the fine motor control to keep the club head properly aligned with the ball. Such fine motor control plays a decidedly less important role for most football skills or the shot put. The fact that a highly successful golfer would credit weights with enhancing his performance and not detract from his coordination was a significant endorsement.

Bacon continued his column with the story of Sidney Gold, a high school football player in Los Angeles who had been cut from his school's team. After spending the winter and spring hefting his York barbell, Gold gained twenty pounds and made the varsity roster. "Weight training," Bacon contended, "is the best out of season activity for football players."<sup>103</sup> This tale echoed Hoffman's contention in a 1933 article that weight training should be practiced in the offseason and would allow boys who did not make the team to secure a roster spot the following

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<sup>100</sup> Bob Hoffman, "Are You a Fighter?" *Strength & Health*, April 1938, 28-29, 40.

<sup>101</sup> Jules Bacon, "What Can You Do?" *Strength & Health*, September 1941, 19, 44-46.

<sup>102</sup> *Ibid.*, 19.

<sup>103</sup> *Ibid.*

season.<sup>104</sup> Much like the stories of strong or well-developed men who had overcome infirmity to achieve physical dominance, this athletic Horatio Alger tale would become a prominent theme in *Strength & Health*. Again and again Hoffman and his authors reminded readers that even if you were not born with athletic ability, you could build it with weights and achieve success on the athletic field, and this, of course would presage success outside of the sporting arena as well.<sup>105</sup> The following issue, in October of 1941, featured another “What Can You Do?” column, which featured the story of former college track athlete and friend of the author, Bill Robush. Robush took up weight training after college and it allowed him to maintain his power in the pole vault and high jump despite the fact that he had gained twenty five pounds and aged nearly twenty years.<sup>106</sup>

By the mid-1940s, features on football players and/or the importance of strength training for football were becoming common. Though primarily featured for being the heavyweight national champion in weightlifting, Frank Schofro described how weight training had been integral to his success football and track and enabled him to secure several athletic scholarship offers in 1939.<sup>107</sup> Similarly, York Barbell Club member Steve Stanko told how he had trained with legendary bodybuilder John Grimek while he was in high school. In the first offseason of training Stanko had gone from 5’10” and 120 pounds up to 170 pounds. After another year of

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<sup>104</sup> Hoffman, “Athletic Star,” 8-9.

<sup>105</sup> For examples of the athletic Alger tale, see: Steve Stanko, “Strength Most Important in Football Success,” *Strength & Health*, November 1945, 20-21, 43; Nate Hanson, “A Strength and Health Boy Grows Up,” *Strength & Health*, August 1952, 32-33, 45-46, 49; Jim Murray, “Do You Think You Are Too Small for Football?” *Strength & Health*, November 1953, 10-11, 42; Bob Hoffman, “You Can Be a Better Athlete,” *Strength & Health*, February 1953, 10-11, 52-55.

<sup>106</sup> Jules Bacon, “What Can You Do?” *Strength & Health*, October 1941, 19-39-41.

<sup>107</sup> Frank Schofro, “How I Got That Way,” *Strength & Health*, August 1944, 20-21, 42-43; Frank Schofro, “How I Got That Way – Part II,” *Strength & Health*, September 1944, 29, 7, 9; It is worth noting that Schofro was able to win the championship primarily because John Davis, who was undefeated in the same weight class from 1938-1952, was overseas serving in World War Two. Schofro’s total, 850 pounds, was one that Davis had beaten in his first national championship six years earlier – when he was seventeen. Bob Hoffman, “1938 National Championships – Can We Beat the Germans?” *Strength & Health*, July 1938, 28-9; Bob Hoffman, “1938 World’s Weightlifting Championships at Vienna,” *Strength & Health*, November 1938, 4, 30-31; William Kutzer, *The History of Olympic Weightlifting in the United States* (PhD diss, Brigham Young University, 1979), 85-148.

training his bodyweight had increased to 200 pounds and Stanko was offered a scholarship to play football in college. Though he turned it down to pursue competitive weightlifting, he assured readers, “scores of thousands of high school students are making their teams this fall and building for themselves a football reputation which will mean scholarships at higher institutions, laying the foundation for happy, successful lives through training with weights.”<sup>108</sup> W.J. McClanahan, then a lieutenant in the Air Corps, told of how the discovery of barbell training in the military had made him a better football player for his unit’s team than when he had played for the Ohio State Buckeyes before the war.<sup>109</sup> Further, he asserted that J.C. Wetsel, All-American guard for Southern Methodist University’s national championship football team in 1935 “owed a great share of his grid success to training with weights.”<sup>110</sup> The legendary “strongman priest” Father Bernard Lange, of Notre Dame, who had helped football players and track athletes train with weights since Knute Rockne’s days as a player, authored an article for *Strength & Health* in December of 1947.<sup>111</sup> Lange reinforced the idea of strength training as a key to athletic success, or at the very least, an equalizer for lack of innate ability. “Every boy, deep in his being somewhere loves to play football; yet every boy...does not play because he can not, and he can not simply because his physique, his build, will not permit it.” Weight training, claimed Lange would allow a boy to develop the strength “Mother Nature” had not given him.<sup>112</sup>

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<sup>108</sup> Stanko, “Strength Most Important,” 20-21, 43.

<sup>109</sup> W.J. McClanahan, “Strength Most Important in Football Success,” *Strength & Health*, December 1945, 20, 34.

<sup>110</sup> *Ibid.*, 34.

<sup>111</sup> B.H. Lange, “The Proven Way,” *Strength & Health*, December 1947, 19, 34-7.

<sup>112</sup> *Ibid.*, 19.

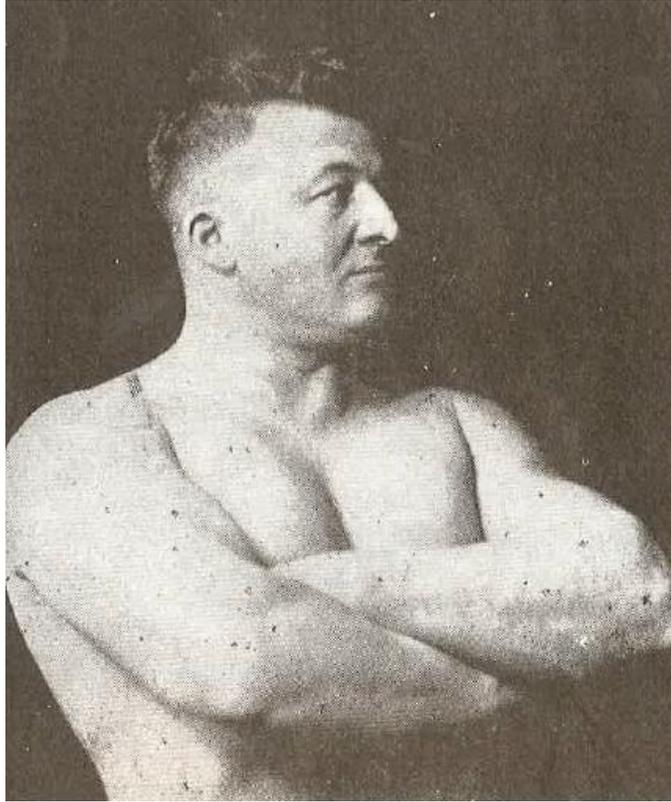


Figure 17. Father Bernard Lange, strongman priest of the University of Notre Dame, pictured on page forty-six of the October 1967 issue of *Strength & Health*.

While Weider was waiting for the scientists to “catch up” he, like Hoffman, peppered his magazines with articles and captions attacking the idea of musclebinding. The articles were similarly anecdotal in nature and most discussed champion athletes who practiced one form of weight training or another. One of the earliest examples was provided by Bill Pullum, who cited a British boxer, Joe Wakeling, a multi-class champion and “one of the fastest men of his weight ever seen in the ring.”<sup>113</sup> Pullum claimed to have trained the boxer personally and wrote that Wakeling “himself used to say that the using of weights had actually made him faster.”<sup>114</sup> References to boxers and wrestlers dominated *Your Physique* in its first decade. A three-part

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<sup>113</sup> Pullum, “Are Weight-Lifters Slow?” 75.

<sup>114</sup> Ibid.

article appeared on heavyweight champion Jack Johnson, the Indian wrestler known as the Great Gama made his first appearance in 1947, and “The Terrible Turk,” another wrestler, appeared in 1949.<sup>115</sup> Later, in *Muscle Power* magazine, writer Martin Franklin quoted strongman Arthur Saxon, who had pointed out that many boxers and wrestlers were, in fact, doing resistance training, though not with barbells.<sup>116</sup> Saxon asserted that weight training had made boxer Tommy Burns faster. Additionally, the strongman discussed the training techniques of boxers Tommy Sayers and Tom Cribb, both of whose training methods included heaving bricks or sacks of coal, which Saxon argued are “crude forms of weightlifting.”<sup>117</sup> Even the spectacular Jack Johnson, Saxon claimed, “occasionally performed the wrestler’s bridge while handling heavy weight.”<sup>118</sup>

This was a recurring theme. In 1950, Joe Weider responded to an apparent deluge of reader letters inquiring about the advisability of weight training for athletes by providing a laundry list of prominent boxers who had trained with weights. Though he didn’t discuss their specific programs or provide evidence, Weider asserted that such champions as Joe Lewis, Primo Carnera, and Max Baer were weight-trained athletes and then made the blanket statement that it was a known fact that “at least 99 % of all the great wrestlers used weights.”<sup>119</sup> In that same issue in “What’s Wrong with Strength?” George Russell Weaver also offered as evidence a number of weight trained athletes, writing, “Frank Strafaci is a barbell trained man who has won golf championships. Joe Walcott was a circus strong-man before he became one of the greatest

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<sup>115</sup> Wilf Diamond, “The Story of Jack Johnson,” *Your Physique* 10, no. 1, 2 & 3 (October, November and December 1948): 14-15, 22-23, 26-27; Charles B. Roth, “Toughest Man on Earth,” *Your Physique* 8, no. 3 (December, 1947): 16-17, 40. See also: S. Muzumdar, “The Great Gama,” *Your Physique* 10, no. 4 (January 1949):8-9, 34; Edmond Desbonnet, “Yousouf: The Terrible Turk,” *Your Physique* 11, no. 1(April 1949): 14-15, 36.

<sup>116</sup> Franklin, “Arthur Saxon’s Views” 20, 42.

<sup>117</sup> *Ibid.*, 42.

<sup>118</sup> *Ibid.*

<sup>119</sup> Joe Weider, “Sports and Lifting,” *Muscle Power* 10, no. 5 (October 1950): 8-9.

boxers...Emile Maitrot, a wrestler and weight-lifter, won a world's championship in speed-cycling. Eugen Sandow, the professional strongman, surpassed Mike Donovan, one of the most agile boxers in a special test of speed in response to a signal. James Hudson, a barbell trained man broke the Georgia State record in the 100-yard breast-stroke swim...Charles Steinman, an active weight-lifter was also captain of the Ohio State University tennis team." According to Weaver, "Such facts as these show the remarkable versatility of weight-lifters."<sup>120</sup>

The first active athlete who wasn't a boxer or wrestler to be featured in a major article in a Weider magazine was golfer Frank Stranahan.<sup>121</sup> Earle Liederman's 1949 article, "Barbells and a Golf Champion!" argued that weight training had made Stranahan a longer and more accurate hitter and, most importantly, that "barbells do not conflict with the delicate sense of touch" necessary for golf.<sup>122</sup> Two years later, Barton Horvath profiled Stranahan again for *Your Physique* and explained how Stranahan had begun lifting weights for football in high school, then found that it also made him a better golfer. According to Horvath, when he asked Stranahan about the theory of musclebinding, "Frank replied with a curt, 'rubbish.'" Many coaches and other golfers had warned him that weight training would only be detrimental to his game, Stranahan explained, but he had just ignored them and followed his own path.<sup>123</sup>

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<sup>120</sup> Weaver, "What's Wrong with Strength?" 9, 31-2.

<sup>121</sup> Barton R. Horvath, "Weight Training Helped Make Him a Champion." *Your Physique*, 15 no. 2 (May 1951): 18-19, 38.

<sup>122</sup> An article on swimmer and film star Johnnie Weissmuller appeared in *Your Physique* in March of 1948 and discusses his use of weights for keeping fit for his films. However, at the time he was already retired as an athlete. George Lowther, "How Johnny Weissmuller Keeps Fit," *Your Physique* 8, no. 6 (March 1948): 8-9, 43; Earle Liederman, "Barbells and a Golf Champion!" *Muscle Power* 8, no. 2 (July 1949): 32, 49.

<sup>123</sup> Horvath, "Weight Training Helped," 38.

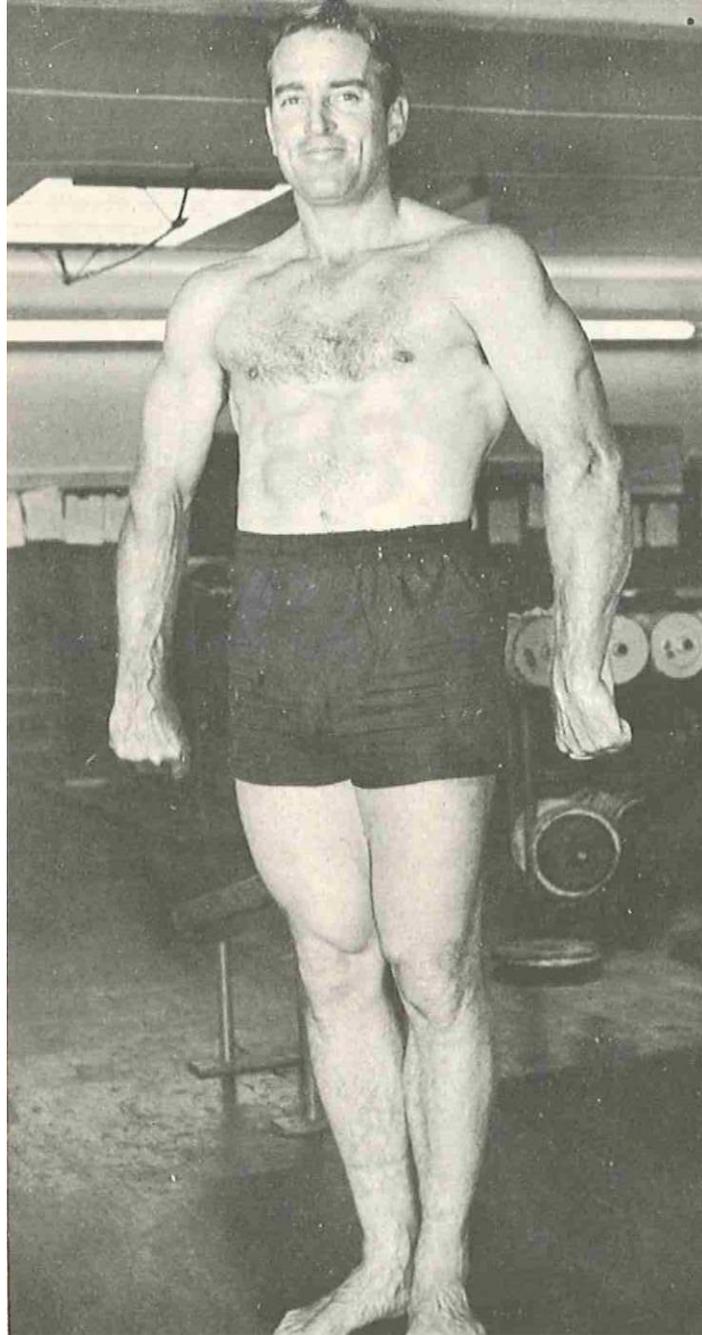


Figure 18. The impressive build of golfer Frank Stranahan, pictured on page twenty-seven of the April 1958 issue of *Strength & Health*.

The inclusion of Stranahan in *Your Physique* was especially important as he was one of the most famous athletes of the mid-twentieth century to be open about his barbell training.<sup>124</sup> Although Stranahan is briefly mentioned in a column by Jules Bacon in *Strength & Health* in 1941, and his career is touched on again in an editorial by Hoffman in 1947, the articles by Liederman and far more fully introduce this remarkable athlete to those interested in weight training.<sup>125</sup> Recognized as one of the greatest golfers in the world, Stranahan had won the British Amateur Championship in 1950, and he regularly played and beat the best pros in the world. And, most importantly, Stranahan did more than train with weights, he also competed in weightlifting and, in 1950, the same year that he won the British Amateur Championships, he entered the Ohio State Weightlifting Championships and pressed 225 pounds, snatched 220 pounds, and cleaned and jerked 300 pounds. According to Horvath he could also “squat with over 400 and deadlift over 500 pounds.”<sup>126</sup> A realist about training, Stranahan told Liederman that one “cannot expect weight training alone to make you a champion athlete.” Being a champion, he explained, also required “many long hours of practice at the sport you are trying to improve.”<sup>127</sup>

In the late 1940s *Strength & Health* writers began to profile track athletes, particularly shot-putters and other throwers, a trend which would continue through the 1960s. John Davis profiled Olympic decathlete Irving Mondschein in 1948, and he also credited weight training with improving his athletic ability.<sup>128</sup> Bob Hoffman quoted from a letter sent by shot-putter Otis

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<sup>124</sup> Stranahan was also featured in: Joseph Weider, “Weight Training Made Frank Stranahan a Champion,” *Muscle Builder* 6, no. 1 (March 1956): 18-19, 48-50.

<sup>125</sup> Jules Bacon, “What Can We Do?” *Strength & Health*, September 1941, 19, 44-46; Bob Hoffman, “Editorial—Weightlifters Are Successful in Other Sports,” *Strength & Health*, August 1947, 3-4. Stranahan was featured later in Leo Stern, “How Frank Stranahan Trains for Golf,” *Strength & Health*, April 1958, 26.

<sup>126</sup> Horvath, “Weight Training Helped.”

<sup>127</sup> Liederman, “Golf Champion!” 49.

<sup>128</sup> John Davis, “Irving Mondschein – U.S. Decathlon Champion,” *Strength & Health*, June-July 1948, 18-19, 28, 30-32.

Chandler who affirmed that weight lifting did not “tie you up” and urged young athletes to take up weight training.<sup>129</sup> Though some articles mentioned athletes in other sports who trained with weights, through the mid-1950s, feature articles in *Strength & Health* largely focused on football and track.<sup>130</sup> Football articles commonly told of high school football teams who employed weight training in the off-season or pre-season, leading to a dramatic reversal of the previous year’s record.<sup>131</sup> One of those high school teams, Istrouma (LA), benefitted from the services of Alvin Roy, the first modern strength coach whose story will be told in Chapter Four. Track athletes profiled included a female shot-putter, Jackie MacDonald, a member of the Canadian Olympic team, as well as American throwers Parry O’Brien, Bobbie Gross, and Bill Neider.<sup>132</sup> British sprinter McDonald Bailey, high jumper Ernie Shelton, and pole vaulter Don Bragg were also featured.<sup>133</sup>

Among the other sport features in the mid-1950s were profiles of Jackie Jensen, outfielder for major league baseball’s Boston Red Sox, and Ohio State University swimmer, Al

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<sup>129</sup> Bob Hoffman, “Weightlifting Builds Better Athletes,” *Strength & Health*, October 1950, 9, 30.

<sup>130</sup> In a 1953 article Hoffman cited the following athletes as having “reached stardom” due to weight training: Dick Cleveland (Ohio State swimmer, 100m world record holder) Bob Richards (Olympic pole vault champion), Mal Whitfield (Olympic 800m champion), Henry Wittenberg (National AAU wrestling champ and 1948 and 1952 Olympian) Walter Barnes (All-American football lineman at Louisiana State University and professional football player), Frank Stranahan, and Bob Feller (Major League Baseball pitcher). Bob Hoffman, “You Can Be a Better Athlete,” *Strength & Health*, February 1953, 52.

<sup>131</sup> For example, York (PA) high school had gone 1-9 (winless in conference) in 1951, making five consecutive seasons of going winless in conference. Head coach Eddie Waleski encouraged weight training at the York Barbell club and local YMCA following the 1951 season. In 1952 the team finished second in their conference. Barbells were brought on campus after the 1952 season and the players again encouraged, but not required, to use them. In 1953 York High won its first football championship in history and placed two players on the “All-State” team. Bob Hoffman, “York High Wins First Football Championship,” *Strength & Health*, March 1954, 12-13, 44. See also: Jim Murray, “Summer Training for Football – With Barbells,” *Strength & Health*, June 1955; Bill Williams, “Barbells Build Winning Football Team,” *Strength & Health*, May 1956, 8-9, 39-40, 42; Joe Kolb, “The Fort Lauderdale Story,” *Strength & Health*, May 1956, 10, 42.

<sup>132</sup> Jim Murray, “Canadian Barbelle Glamazon Seeks Olympic Games Victory,” *Strength & Health*, July 1955, 12-13, 44; George Bruce, “Parry O’Brien – Shotput Champion,” *Strength & Health*, August 1954, 10-11, 36; William Goellner, “Aggie Weight Star Credits Barbells for Improvement,” *Strength & Health*, March 1955, 10, 36; Harry Paschall, “Kansas’ Bill Nieder,” *Strength & Health*, November 1956, 28, 43.

<sup>133</sup> Jim Murray, “British Empire Speedster Uses Weight Training,” *Strength & Health*, March 1955, 11, 40; Harry Paschall, “Can Shelton Break the 7-Foot Barrier?” *Strength & Health*, June 1956, 10-11, 44; Harry Paschall, “The Don Bragg Story,” *Strength & Health*, September 1956, 12-13, 50.

Wiggins. Jensen credited weight training with saving his career after an arm injury in high school. Following a stint in the Navy, Jensen would star as a fullback and pitcher at the University of California in the late 1940s, winning All-American honors in both sports. In baseball the “bull-necked” Jensen was the “best right fielder in the American league” through the mid-1950s and a multi-time All-Star and American League MVP in 1958.<sup>134</sup> Al Wiggins was a very good, but not great, swimmer in his freshman year. Prior to his second season at Ohio State, Wiggins took up weight training after record holding sprint swimmer Dick Cleveland spoke enthusiastically about how weight training had improved his performance. The training paid dividends in the pool as Wiggins played a role in eight team or individual national championships for the Buckeyes between 1955 and 1957, set three world records in butterfly events, and competed at the 1956 Olympic Games in Melbourne.<sup>135</sup> In the article Wiggins explained, “there is one factor which deserves more credit than all the others for my sudden improvement in swimming ability, and that is my training with weights.”<sup>136</sup>

By the mid-1950s anecdotal evidence abounded that strength training improved athletic performance. Hoffman no longer had to tell stories of how weightlifting had improved his performance or of the successes of Olympic lifters in other sports. Nearly every issue of

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<sup>134</sup> Paul Donelan, “Baseball Star Says Weight Training Helps,” *Strength & Health*, August 1955, 10-11, 62, 65; Owen Lake, “Sox Sluggers’ Secret of Success,” *Strength & Health*, June 1958, 16-17, 48; Roy Terrell, “All-Star Who Can Do Without Glory,” *Sports Illustrated*, 23 June 1958, <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1002431/1/index.htm> (accessed August 12, 2012). Though the *Sports Illustrated* article did not mention Jensen’s weight training specifically, it did strongly suggest that his muscularity and power brought about much of his success: “If there is any secret involved in his performance this year, Jackie doesn’t know what it is. ‘I think it’s just experience,’ he says. ‘A hitter should continue to improve up into his middle 30s, just as long as he stays in good physical condition.’” Then he unbuttons a size 44 uniform shirt from around a size 17 neck, and as he walks to the shower the muscles ripple across the broad back and shoulders and in the powerful legs. There is marked unconcern in the Red Sox dressing room over Jackie Jensen’s physical condition.”

<sup>135</sup> Hali Helfgott, “Al Wiggins, College Swimmer,” *Sports Illustrated*, 14 January 2002, <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1024697/index.htm> (accessed August 12, 2012); Torseten Ove, “Obituary: Albert M. Wiggins Jr.” *Pittsburgh Post-Gazette*, 3 July 2012, <http://www.post-gazette.com/stories/local/obituaries/obituary-albert-m-wiggins-jr-set-records-in-swimming-before-a-career-as-attorney-300828/?p=1> (accessed August 11, 2012).

<sup>136</sup> Pete George, “The World’s Greatest Swimmer,” *Strength & Health*, November 1955, 16-18, 56-57.

*Strength & Health* featured another athlete who credited weight training with their stellar performance. The athletes and teams featured were highly decorated and sometimes high-profile, such as Jackie Jensen and Frank Stranahan. What was still lacking, however, was widespread public endorsement from the medical or physical education communities.

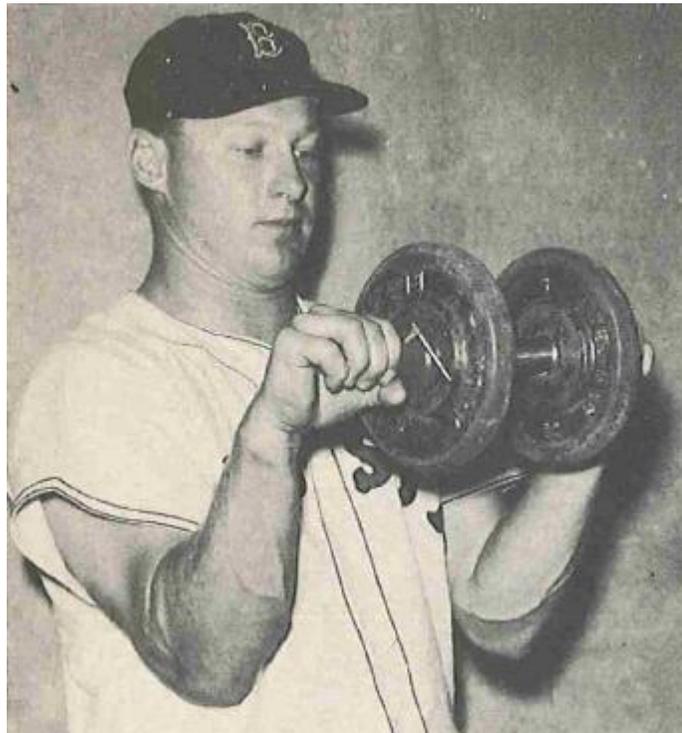


Figure 19. Boston Red Sox outfielder Jackie Jensen, pictured on page seventeen of the June 1958 issue of *Strength & Health*, using weights to increase his forearm strength.

### **CRITICIZING AND THEN, UTILIZING, “EXPERTS”**

As previously discussed, the primary antagonists to weight training were the medical community and “experts” in the field of physical education. As such, Hoffman, Weider, and their writers regularly criticized the so-called experts while heavily leaning on the credibility of their own. “Too long,” Weider alleged, “we have been held in bondage by what the medical

profession has said...I ask what authority are they?"<sup>137</sup> In the same article he quoted physician S.E. Bilik as having claimed that, "the average physician knows little more about healthful living than the average layman."<sup>138</sup> The tenuousness of Weider's position is readily apparent. Physicians who opposed weight training were know-nothings and relics of the past.<sup>139</sup> Doctors who agreed with the Weider camp, such as naturopath Frederick Tilney, were knowledgeable experts.<sup>140</sup> Similarly, Hoffman railed against "antique doctors" who gave advice to avoid weight training while featuring an article by Tilney which proclaimed, "drugs and medicines really have no curative value" in the same issue.<sup>141</sup> Weider and his writers were of the opinion that one should not generally be surprised that the medical establishment was against weight training. "After all, the physician is a specialist in pathology...[and] has had little chance to acquaint himself with health and physical perfection."<sup>142</sup>

One physician who did have a chance to acquaint himself with health and physical perfection was exercise physiologist and medical physician Dr. Peter Karpovich. As a faculty member at Springfield College, Karpovich had been a member of the "anti-weight-training

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<sup>137</sup> Joe Weider, "Our Teachings Have Been Proven Best After All," *Your Physique* 3, no. 5 (1943): 3.

<sup>138</sup> Ibid; Bilik was a prominent figure in the field of athletic training (sports medicine), authoring *The Trainer's Bible* in 1916. He would later be recognized as "The Father of Athletic Training," both for his publications and for helping athletic trainers organize. Richard Ebel, *Far Beyond the Shoe Box: Fifty Years of the National Athletic Trainers' Association* (New York: Forbes Custom Publishing, 1999): 2.

<sup>139</sup> Joe Weider, "Debunking the Opponents of Weight Training," *Your Physique* 12, no. 1 (1949): 16-17, 30-31.

<sup>140</sup> Both Hoffman and Weider used the "Doctor" credential liberally. Few "Doctors" featured in the early years of either publisher were traditional medical doctors. Some, like Tilney were naturopathic doctors, while others like Ernest Stevens held unspecified Ph.D.s. The oft-cited D.A. Downing was a dentist. Others, like Walter Laberge used the title "Dr." without providing further information on their specific credential. Walter Laberge, "Correct Those Little Postural Deficits," *Strength & Health* 3, no. 3 (February 1935): 12, 37; Ernest Stevens, "The Importance of Breath Control," *Strength & Health* 3, no. 3 (February 1935): 13, 38-40; The articles or quotes of some of these physicians featured in the Weider magazines included: AT Petro, "The Effect of Barbell Exercise on the Heart," *Muscle Power* 7, no. 5 (1949): 4, 56-6; Benedict Lupica, "Muscle Power and Reflexes," *Muscle Power* 7, no. 4 (1949): 23, 46; Wilbur Bohm, quoted in: Earle Liderman, "What the Champs are Saying," *Muscle Power* 17, 9 (1954): 7, 42.

<sup>141</sup> Hoffman, "There Should Be a Law," 14; Frederick Tilney, "Re-Engergize Yourself," *Strength & Health* 4, no. 6 (May 1936): 6-7, 42.

<sup>142</sup> George Weaver, "The One Way to Physical Perfection," *Muscle Power* 1, no. 1 (1945): 43. D.A. Downing alleged that medical doctors were rarely healthy because they did not follow their own advice and often smoked, drank, and consumed stimulants or medications in excess. D.A. Downing, "Why Are Medical Doctors Seldom Healthy?" *Strength & Health* 3, no. 10 (September 1935): 60, 84-85.

camp,” telling a reporter in February of 1940 that it was important “to fight these muscle builders.” Bob Hoffman, and men like him who promoted weight training, Karpovich explained, were no better than “quacks” and “faddists,” and some of them apparently believed that heavy training could do “anything—just develop big muscles and . . . (even) all your illness will go (away).”<sup>143</sup>

Later that year, however, after Hoffman visited Springfield College and brought John Davis and John Grimek with him to demonstrate their speed, flexibility and great strength, Karpovich had what historians Jan and Terry Todd describe as a “conversion” experience and began investigating the concept of muscle-binding through scientific research.<sup>144</sup> Another prominent physician in the pro-weight lifting camp was Dr. Thomas DeLorme. DeLorme’s conversion experience occurred when, as a child stricken with rheumatic fever he was told by his doctors that he “must never again exert himself.”<sup>145</sup> Rather than follow the advice of physicians, however, DeLorme took up weight training to rebuild his strength. Like Weider, he crafted his own weights from train wheels and eventually became a competitive weightlifter. After finishing medical school, he joined the Army and, based on his previous experience with weight training took the then unconventional approach of having injured soldiers train with heavy weights.<sup>146</sup> Soldiers in DeLorme’s care recovered much more quickly and completely than

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<sup>143</sup> Quoted in Jan Todd and Terry Todd, “The Conversion of Dr. Peter Karpovich,” *Iron Game History* 8, no. 4 (2005): 4.

<sup>144</sup> *Ibid.*; Jim Murray, “Weightlifting’s Non-Lifting Patron Saint,” *Iron Game History* 4, no. 5 (1997): 3-5.

<sup>145</sup> Bob Collins, “His Fight Was Against a Frail, Weak Physique,” *Birmingham (AL) Post*, Friday, July 21, 1939.

<sup>146</sup> In keeping with the first law discussed earlier, rehabilitation literature in the early twentieth century was similarly concerned with applying too much strain, particularly to an already damaged structure. For example, physician Frank Butler Granger wrote, “In all treatment, care should be taken not to overtake the weakened muscles.” Frank Butler Granger, *Physical Therapeutic Technic* (Philadelphia: WB Saunders Publishing, 1932): 244. Similarly, R. Tait McKenzie, the first professor of physical therapy in the United States advised, “[exercises] should never be continued beyond the point of moderate fatigue.” He went on to explain that hypertrophy was likely detrimental because “if the entire muscular system be developed to its physiologic limit a very considerable drain on vitality is inevitable.” R. Tait McKenzie, *Exercise in Education and Medicine* (Philadelphia: WB Saunders Publishing, 1923): 321-2, 368-9.

soldiers trained using the traditional light-weight, high-repetition exercises.<sup>147</sup> Thus, by the late 1940s and early 1950s, some scientific and medical validation was being given to the idea that heavy strength training might be beneficial. Joe Weider was quick to pounce on these scientific endorsements and featured them in his magazine called *Muscle Power*, several years before Hoffman did in *Strength & Health*.

The findings of DeLorme's research were featured in a 1949 *Muscle Power* article.<sup>148</sup> The article was authored by Philip Rasch, who would go on to have a distinguished career as a physiologist. Rasch discussed both the unconventionality and effectiveness of DeLorme's approach, noting that it had been validated by several other investigations. He noted with obvious satisfaction the implications of the findings: "this must bring a wry smile to the older weight trainers." He continued, "For the last quarter of a century, we have been trying to pound these exact facts into the medical fraternity...at long last the medical profession has caught up with the weight trainers."<sup>149</sup> Karpovich's research was also noted. After citing weight-trained athletic champions, including Frank Stranahan and Mickey Mantle, author and Mr. America George Eiferman noted that Karpovich, "definitely proved that weight training in no way detracted from muscular speed or accuracy." Quite the opposite, "those who trained with weights had sharper reflexes and faster muscle response – so needed for all sports."<sup>150</sup>

The July 1955 issue of *Strength & Health* featured an article authored by C.H. McCloy, Professor of Physical Education at the University of Iowa and early pioneer of strength training research. McCloy detailed his interest in researching weight lifting, which started when he was

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<sup>147</sup> Thomas DeLorme, "Restoration of Muscle Power by Heavy Resistance Exercises," *Journal of Bone and Joint Surgery* 27, no. 4 (1945): 645-667.

<sup>148</sup> PJ Rasch, "In Praise of Weight Training," *Muscle Power* 8, no. 1 (1949): 12-13, 33-35.

<sup>149</sup> *Ibid.*, 34-5; Rasch also co-authored an article on circuit training for athletes in *Strength & Health*. Phil Rasch, Eugene O'Connell, and Gerald Gardner, "Circuit Training for the Athlete," *Strength & Health*, February 1961, 36-37, 55-57.

<sup>150</sup> Eiferman, "Weight Training – The Key to Greater Athletic Ability," 32.

asked by Iowa athletes during World War Two if weight lifting would hamper their performance. Not one to “accept popular literature as scientific evidence,” McCloy first studied the effects of weight training on his own performance and then directed several studies by graduate students on the impact of weight training for athletic performance. “Suffice it to say,” McCloy wrote, “that in every case the trainees improved in speed and muscular endurance.” McCloy continued, “it should be rather obvious by this time that weight training, sensibly planned and conducted, not only does not make the athlete slow and muscle-bound, but, on the contrary, should make him much faster and more efficient.” In his article McCloy indicated the primary obstacle for Hoffman and Weider, as publishers and barbell magnates they lacked credibility in the eyes of the scientific community. With the emphatic support of McCloy, DeLorme, Karpovich, and Rasch, however, the popular press was being validated.<sup>151</sup>

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<sup>151</sup> McCloy’s work was also highlighted in the Weider publications. See: Jim Murray, “How Weight Training Makes Basketball Giants,” *All-American Athlete* 6, no. 12 (1964): 22-25; Jim Murray, “Scientific Studies and High Quality Publications Attest to the Value of Weight Training Exercise,” *Muscle Builder* 11, no. 3 (1967): 26-27, 61-62. For additional information about McCloy, see: Terry Todd, “A Pioneer of Physical Training: C.H. McCloy” *Iron Game History* 1, no. 6 (1991): 1-2; Two authors of the articles cited in the seventy-eighth footnote, Edward Capen and Edward Chui, were graduate students under McCloy’s tutelage. DeLorme was the subject of a 1959 feature article in *Strength & Health*. Owen Lake, “Pioneer of Physical Medicine – Dr. Thomas DeLorme,” *Strength & Health*, June 1959, 22-23, 48, 50-51, 58. The head of the Division of Health, Physical Education, and Recreation at Eastern Washington College, Jack Leighton, also authored an article specifically refuting muscle binding, based on his own research. Jack Leighton, “Are Weight Lifters Muscle Bound?” *Strength & Health*, March 1956, 16, 44-46. Hoffman also mentioned Karpovich and McCloy in a 1955 editorial. Bob Hoffman, “Editorial – Barbells Build Better Athletes,” *Strength & Health*, April 1955, 3-4, 63.

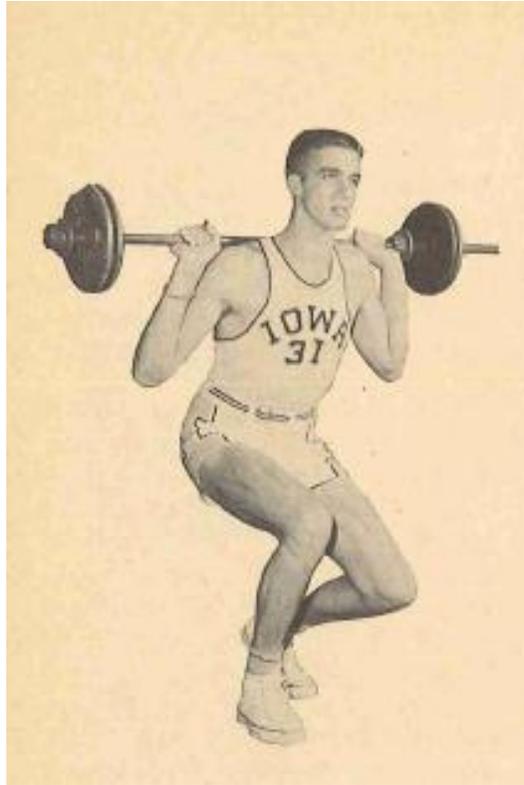


Figure 20. Iowa basketball player Bill Logan performing a “walking squat” on page nine of the July 1955 issue of *Strength & Health*.

For his part, Weider had been claiming that the system of exercise he advocated was “scientific” since the early 1940s.<sup>152</sup> This was a point of emphasis through the early articles until it transitioned to “space age training” in the 1960s.<sup>153</sup> As noted by sport historian Roberta Park, “the term ‘scientific’ has powerful appeal, suggesting rational control over nature, predictive certainties, and other features that resonate with modernity.”<sup>154</sup> Hoffman tended to frame his

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<sup>152</sup> Weider specifically attempts to sell the idea in a 1943 editorial. Joe Weider, “Here’s Why You Need Scientific Exercise,” *Your Physique* 3, no. 1 (1943): 18-19, 32. For additional examples, see: G. Malcolm Smith, “You Can Build a Powerful Physique,” *Your Physique* 2, no. 2 (1942): 12-13; Floyd Page, “Why Exercise?” *Muscle Power* 7, no. 2 (1949): 20-31, 37; Chuck Sipes, “Misconceptions about Weight Training,” *Mr. America* 4, no. 11 (1962): 36-37, 64; E.M. Orlick and Joe Weider, “Barbells and Baseball,” *Mr. America* 5, no. 1 (1962): 38-39, 75-77, 79.

<sup>153</sup> See, for example: Armand Tanny, “George Frenn – Power Lifter,” *Muscle Builder* 8, no. 5 (1966): 40-41, 58-9.

<sup>154</sup> Park, “Athletes and Their Training,” 88.

system of training as “modern” rather than “scientific,” but the goal was the same.<sup>155</sup> What made the methods scientific or modern was their rationality; they called for planned, progressive application of an overload stimulus. Writers for the muscle magazines repeatedly explained that, in order for muscles to grow, they must be challenged. Hoffman pointed out in 1933 that one rarely sees a really well built day laborer because, while their work was physically demanding, it was essentially the same day after day.<sup>156</sup> “The man who earns his living through hard labor will acquire hard muscles,” explained former Olympic weightlifting team coach Mark Berry in 1940, “but such a type of work is not an ideal means of enlarging or developing the muscles.”<sup>157</sup> The repetitive contractions required by manual labor were not sufficient to produce large muscles because they did not provide progressively increasing stimulus. Once the worker had adapted to the demands of the job, no further adaptations were required and thus hypertrophy acquired by this type of activity was limited. In Weider’s first specific discussion of “scientific training,” he explicitly made this connection and pointed out that, “most of the world’s greatest Strong Men are ‘pen-pusher men.’”<sup>158</sup> These men were able to build impressive physiques and strength because they weren’t tired by repetitive manual labor but could, instead, apply all of their energy to progressive training. Moreover, the adjustable barbell allowed them to apply greater loads to the muscle, consistently providing an overload stimulus. This idea was discussed in a sport context by Earle Liederman, writing in *Muscle Power*, who pointed out that boxers and a variety of other athletes have excellent physiques but lack the size of men who have trained with

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<sup>155</sup> For example, he asserted that high repetition, light weight exercises were “as old fashioned or out of date as oil lamps and the horse and buggy.” Hoffman, “How I Learned,” 4; Bob Hoffman, “Editorial,” *Strength & Health* 2, no. 9 (August 1934): 3.

<sup>156</sup> Hoffman, “Super Strength,” 6.

<sup>157</sup> Mark Berry, “The Old Standard Methods are Best,” *Your Physique* 1, no. 2 (1940): 4.

<sup>158</sup> Joe Weider, “Here’s Why You Need Scientific Training,” 18.

barbells.<sup>159</sup> The lack of size, resulting from the absence of a progressive overload, meant that the non-weight trained athletes necessarily lacked the strength of their barbell-trained counterparts.

In spite of the emphasis on the scientific basis of weight training, both Weider and Hoffman were so eager to extol the benefits of strength training that the exercise, as Karpovich had observed in 1940, had become a panacea. In one of Hoffman's more outlandish examples he claimed that strength training even made one more likely to survive a plane or car crash.<sup>160</sup> *Your Physique* writer Earle Liederman made a similar claim, recounting a time when he had fallen out a window but was able to catch himself. "How thankful I was then that I had strong muscles," he informed readers, "for then, if I did not actually save my life, I avoided broken bones."<sup>161</sup> In addition to spectacular stories in which strength training paid dividends in the form of saved lives, weight training was also purported to have a variety of other benefits including: improved functioning of the "internal organs," improved digestive and respiratory systems, relief of constipation, and a more magnetic personality.<sup>162</sup> Considering the context in which Weider and Hoffman railed against the mainstream medical community for believing that strength training was harmful in spite of the dearth of confirming evidence, such claims reeked of hypocrisy. Both barbell men undermined their own credibility through their overzealousness in proclaiming the merits of strength training. At times, this occurred in the same article which declared the

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<sup>159</sup> Earle Liederman, "Editorial," *Muscle Power* 11, no. 5 (1951): 3.

<sup>160</sup> Hoffman speculated, "I wonder how many [car crash fatalities] would be alive today if they were barbell men and women. A great many of those victims died from shock, through internal injuries which would not have happened if their shielding corset of muscle was strong enough to protect the organs...The survivors [of plane crashes often] live because they are strong enough to stand the shock of an airplane crash." Bob Hoffman, "Muscles May Save Your Life!" *Strength & Health*, May 1952, 21; See also: Adrian I. Gregor, "Despite My Burns – Exercise Won," *Strength & Health* 1, no. 4 (March 1933): 26. Gregor credits his training and "clean living" with helping him survive burns over much of his body.

<sup>161</sup> Earle Liederman, "What Good are Muscles Anyway?" *Your Physique* 6, no. 1 (1946): 47.

<sup>162</sup> Leo Gaudreau, "Barbells for Exercise and Sport," *Muscle Power* 2, no. 1 (1946): 96-97; Earle Liederman, "Are Large Muscles Useful?" *Muscle Power* 2, no. 2 (1946): 31-35, 121; Floyd Page, "Why Exercise?" *Muscle Power* 7, no. 2 (1949): 20-21, 37.

scientific basis of strength training.<sup>163</sup> The medical community took notice of these unfounded claims and rightly criticized the muscle builders for them. Physiologist Arthur Steinhaus asserted that large muscles were not necessarily related to optimal function of the organs or rapid digestion. In response, Weider author Herbert Shelton, criticized the professor with overtones of conspiracy theory saying that, “weight training [has] met and exploded all of the objections of the medical profession against it...its [weightlifting’s] recent growth may look like an epidemic to the pill-rollers and serum-squirters – against which they have, as yet, developed no preventive serum.”<sup>164</sup> Steinhaus’ criticism was well-placed, though he similarly undermined his own authority when he contended that weight training resulted in a smaller heart which beat more rapidly. Each side condemned the other while asserting with equal certainty effects of strength training which were similarly dubious.

In spite of the minor dent in credibility that resulted from claiming unsubstantiated benefits of weight training, both the Hoffman and Weider camps were able to make an impact on the application of strength training to sport. Due to Weider’s introduction to strength training, he tended to view bodybuilding as its own sport and of primary importance in the sport hierarchy.<sup>165</sup> Many of the early articles about strength training and sport did not involve how strength training could improve sport performance. Rather, they were intended to encourage bodybuilders to take up “second choice” sports.<sup>166</sup> In this way, bodybuilders were encouraged to be ambassadors of physique development and to show that the muscles they had developed were “useful.”

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<sup>163</sup> See G. Malcolm Smith, “You Can Build a Powerful Physique,” 12. Smith rightly points out that muscles must be developed by “SCIENTIFIC EXERCISE” [emphasis in original] and then goes on to assert that hypertrophied muscles signify “sound internal organs” and “a magnetic, forceful personality.”

<sup>164</sup> Herbert Shelton, “Medicine Discovers Weight Lifting,” 14.

<sup>165</sup> In the July 1950 issue of *Your Physique*, Weider outlined ten predictions for the future of bodybuilding, fitness, and health in the United States in succeeding decades. Among his predictions was that, “bodybuilding will become a stepping stone to every other sport and physical activity.” The statement encapsulated how Weider viewed the hierarchy of sport – bodybuilding as the base, with all other activities as adjuncts. Joe Weider, “Editorial – I Predict,” *Your Physique* 13, no. 4 (1950): 5.

<sup>166</sup> Dan Lurie, “Heavy Exercise and Sports,” *Muscle Power* 1, no. 3 (1946): 61-64.

Summarizing this view, Bob Leigh urged readers to “Build the bodies and then take them to other activities.”<sup>167</sup> This desire to show the utility of the muscles created by bodybuilding was due in part to attacks from the Hoffman camp. Hoffman portrayed the “lumps” created by the bodybuilders as useless muscles.<sup>168</sup> In his view they were created through deliberate high-repetition, moderate-weight exercises, intended primarily to cause muscle growth. To Hoffman, the physiques of bodybuilders were not useful, they were simply mirror-muscles, bred by vanity. This was opposed to the York lifters who competed in weight lifting and therefore specialized in the competitive lifts. In contrast to the bodybuilders, the competitive lifters specialized in three lifts and trained with very heavy weights. As previously discussed, the physiques they acquired were more of a byproduct of their training, rather than the overarching goal.

It should be noted that the philosophies of both men have been incorporated into modern sport training. In the contemporary model of periodization, strength training for sport begins with the “anatomical adaptation” or “hypertrophy” phase.<sup>169</sup> This phase is essentially bodybuilding training. The rationale for this type of training is that larger muscles are stronger muscles.<sup>170</sup> The third phase of the periodization model is intended to improve the rate of muscular force production and often includes two of the three Olympic lifts contested during Hoffman’s time, the snatch and the clean-and-jerk. These lifts are included because they mimic

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<sup>167</sup> Bob Leigh, “Barbells, A Springboard to Sports,” *Muscle Power* 2, no. 2 (1946): 129.

<sup>168</sup> Negative caricatures of Weider and bodybuilders in *Strength & Health* included “Abysmal Q. Multiflex,” a cartoon character whose unnatural muscles served only to impress women. In contrast, cartoonist Harry Paschall presented Bosco, an old-time strongman whose square musculature appeared to be carved from stone. Bosco’s physique accompanied his tremendous strength, which was occasionally used to abuse the representation of the Weider men. In response to Hoffman’s criticism and Paschall’s cartoons, the Weider writers stressed the usefulness of muscles built through bodybuilding-style training. They insisted that the training would improve conditioning in preparation for sport. Harry Paschall, “Bosco,” *Strength & Health*, March 1949; Jack LaLane, “Do You Want Strength Plus Endurance?” *Your Physique* 10, no. 5 (1949): 37; I.J. MacQueen, “Recent Advances in the Technique of Progressive Resistance Exercise,” *Muscle Builder* 4, no. 3 (1955): 36.

<sup>169</sup> Tudor Bompa and Gregory Haff, *Periodization: Theory and Methodology of Training* (Champaign, IL: Human Kinetics, 2009): 140.

<sup>170</sup> Mel Siff, *Supertraining: A Scientific Teaching Method for Strength, Endurance, and Weight Training* (Denver, CO: Supertraining Institute, 2004): 33-34.

the powerful hip, knee, and ankle extension required in explosive jumping and running movements.

While both philosophies have been vindicated, Weider's discussion of strength training for sport differed from Hoffman's in a key respect. Hoffman essentially claimed that the practice of strength training alone would improve an athlete's sport performance.<sup>171</sup> Writers for the Weider magazines consistently stressed that one must also spend a great deal of time practicing their sport. Bob Leigh went a step farther and took a jab at Hoffman's outsized claims for the utility of weight training. "Certain publications...proclaim, 'Lift and be a Champion in all sports.' That is ridiculous because no one ever becomes a champion in any sport without specialization and concentrated training."<sup>172</sup> Some of these articles began to betray what would become a slight shift in the philosophy of the Weider publications. Beginning in the mid-1950s, bodybuilding was no longer consistently portrayed as the primary activity with all other sports as secondary endeavors. Rather, the activities went "hand in hand" with "the balance between them hing[ing] on whether the individual is interested in a sports career or a bodybuilding one."<sup>173</sup>

This was an important development because, in addition to progression and overload, the third tenet of contemporary training for sport is specificity.<sup>174</sup> Contemporary training programs are designed to mimic the energy systems and movements performed in the sport for which the individual is preparing. In doing so, they are attempting to overload the muscles used, in a similar pattern and, occasionally at similar speeds, to movements performed in game situations.

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<sup>171</sup> Bob Hoffman, "How to Become an Athletic Star," *Strength & Health* 1, no. 2 (1933): 8-9.

<sup>172</sup> Leigh, "Barbells, A Springboard to Sports," 54-55.

<sup>173</sup> Ross, "The Secret of Speed and Endurance," 55; George Eiferman also stressed that, "it doesn't follow that if you build a high degree of muscularity and strength, you will automatically become a good athlete. To become proficient at any sport, you have to practice faithfully until you master the techniques of the game." Eiferman, "Weight Training – The Key to Greater Athletic Ability," 65; Also see: E.M. Orlick, "How Bodybuilding Can Make You a Better Athlete," 34-35, 61-62.

<sup>174</sup> Baechle and Earle, *Essentials of Strength Training and Conditioning*, 379-380.

This should lead to an enhanced ability to perform those movements. Additionally by stressing the specific energy system utilized in the sport, the body adapts by improving the efficiency of that system.<sup>175</sup>

*Strength & Health* articles on strength training for sport were largely aimed at disproving the notion that weight training would harm athletic performance for the first two decades. Little guidance was provided for how weight training for football might differ from weight training for golf or pole vault. In lauding the success of shot putter Otis Chandler, Hoffman claimed that he had simply followed the general program of the York barbell courses exactly.<sup>176</sup> This would change in the early and mid-1950s as athlete profiles began to more specifically discuss their programs.<sup>177</sup> Most 1950s training regimens still largely resembled the total body programs of the general York courses but readers could see, for example, that the program employed by the Istrouma (LA) high school football team differed from the program Harry Paschall suggested for basketball which, among other alterations, omitted the bench press and included a plyometric lunge jump.<sup>178</sup>

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<sup>175</sup> “Energy systems” refers to whether the adenosine triphosphate (ATP), the molecule that actually “fuels” muscle contraction, is produced with or without oxygen. Specific training can increase the enzymes and substrates, as well as facilitate structural changes which make the body more efficient at producing energy aerobically or anaerobically. From a physiological standpoint, this means that the strength or sprint trained athlete can perform the movements of their sport more rapidly and for a longer period of time than if they were untrained. An endurance-trained athlete will be able to perform their sport at a higher intensity and for a longer period of time because they have more of the substrates to derive ATP, more of the enzymes to utilize those substrates, and they rely less on anaerobic metabolism, which generates lactate and plays a key role in inducing fatigue. For specific information, see: McArdle, Katch, and Katch, *Exercise Physiology*, 134-169, 458-469, 521-523.

<sup>176</sup> Hoffman, “Weightlifting Builds Better Athletes,” 30. The 1946 “York Barbell and Dumbbell System” included two courses which provided a total-body program of barbell and dumbbell exercises. By 1951, Hoffman had published an “Advanced Methods of Weight Training” booklet which included twenty-four separate courses, including one for football. Interestingly, the football program consists exclusively of lower body exercises and omits variations of the Olympic lifts. Bob Hoffman, *York Barbell and Dumbbell System* (York, PA: Strength & Health Publishing, 1946); Bob Hoffman, *York Advanced Methods of Weight Training* (York, PA: Strength & Health Publishing, 1951), 44-45.

<sup>177</sup> Murray, “Summer Training for Football,” 10, 44; Murray, “Too Small for Football?” 10-11; Goellner, “Aggie Weight Star,” 36-37.

<sup>178</sup> Williams, “Barbells Build Winning Football Team,” 39; Harry Paschall, “Barbells and Basketball,” *Strength & Health*, December 1956, 15.

### ***ALL-AMERICAN ATHLETE: BRIDGING THE GAP***<sup>179</sup>:

In the late 1950s and early 1960s both Hoffman and Weider began increasing the amount of coverage they devoted to strength training for sport in their magazines. In 1959, Hoffman added a new column, called “Barbells on Campus” which helped to demonstrate the growing use of barbells by athletes at various American universities.<sup>180</sup> Each article featured a different college or university and discussed young men who competed in Olympic weightlifting, trained for sport, or both.<sup>181</sup> The previous year, Weider had shuffled magazine titles and changed *Muscle Power* to *Mr. America: The Magazine of Champions*.<sup>182</sup> This title change accompanied a gradual increase in the number of articles stressing strength training for sport that culminated, in 1962, with the launch of a special series of sport-specific instructional articles.<sup>183</sup>

Weider’s “Barbells and ...” series was a particularly important development in the evolution of weight training for sports as it marked the first time a mainstream magazine began to systematically address the important concept of sport specificity.<sup>184</sup> In our modern era the

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<sup>179</sup> Portions of this section of the chapter also appeared in: Jason Shurley and Jan Todd, ““Joe Weider, All American Athlete, and the Promotion of Strength Training for Sport: 1940-1969,” *Iron Game History* 12, no. 1 (August 2012): 4-26.

<sup>180</sup> Jan Todd, Matt Bowers, Peter Ullmann, and Terry Todd, “The Quest for Victory: A History of Weight Training for Sports” (H.J. Lutchter Stark Center for Physical Culture and Sports, n.d.) <http://www.starkcenter.org/research/web/questforvictory/> (accessed August 8, 2012).

<sup>181</sup> See, for example: James Tuppeny, “Barbells on Campus: Weight Training for Track and Field Men at Villanova,” *Strength & Health*, March 1959, 28-29, 54-56; Wesley Ruff, “Barbells on Campus: Stanford University,” *Strength & Health*, March 1960, 24-25, 59; Roy McLean and Karl Klein, “Barbells on Campus: The University of Texas,” *Strength & Health*, January 1960, 34-35, 53 – 57; William Hottinger, “Barbells on Campus: The University of Illinois,” *Strength & Health*, January 1961, 36-37, 50-52.

<sup>182</sup> Weider’s earlier *Mr. America* ceased publication in 1953. Todd, et al., “Selected Bibliography,” 31.

<sup>183</sup> Charles Sipes, “How I Use Weider Power Methods to Build Championship Football Teams,” *Mr. America* 2, no. 10 (February 1960): 32-33, 64-65; E.M. Orlick and Joe Weider, “Barbells and Baseball,” *Mr. America* 5, no. 1 (June 1962): 38-39, 75-77; Joe Weider, “Barbells and Swimming,” *Mr. America* 5, no. 3 (July 1962): 24-25, 62, 64, 67; Ed Theriault, “Barbells and Running,” *Mr. America* 5, no. 3 (August-September 1962): 38-39, 76, 78-79; Joe Weider, “Barbells and Football,” *Mr. America* 5, no. 4 (October 1962): 22-23, 53, 55; Joe Weider, “Barbells and Shot-Putting,” *Mr. America* 5, no. 5 (November 1962): 42-43, 88, 90; Joe Weider, “Barbells and Basketball,” *Mr. America* 3, no. 7 (December 1962): 40-41, 86, 88; Joe Weider, “Barbells and Boxing,” *Mr. America* 5, no. 7 (January 1963): 18-19, 86-87; Joe Weider, “Barbells and Bowling,” *Mr. America* 5, no. 8 (February 1963): 30-31, 73, 76; Joe Weider, “Barbells and Wrestling,” *Mr. America* 5, no. 9 (March 1963): 28-29, 75; Ben Weider, “Barbells and the Decathlon,” *Mr. America* 5, no. 10 (April 1963): 24-25, 67-68, 72; Jim Murray, “Weight Training for the Shot Put,” *Mr. America* 5, no. 12 (July 1963): 30-31, 86-88.

<sup>184</sup> Baechle and Earle, *Essentials of Strength Training and Conditioning*, 379-380.

idea that sport training must mimic the energy systems used while playing as well as the movements of the sport itself, is well understood and considered by most authorities to be fundamental to successful training. However, until Jim Murray and Peter Karpovich published their landmark book, *Weight Training in Athletics*, in 1956, little attention was paid to the fact that different sports needed different kinds of strength training regimens. In their work, Murray and Karpovich included individualized routines for football, baseball, and track and field, and provided limited advice for what they called the “minor sports” of wrestling, swimming, boxing, rowing, tennis, golf, and fencing.<sup>185</sup>

This Weider series began with a jointly published article by E.M. Orlick and Joe Weider called “Barbells and Baseball” in June of 1962.<sup>186</sup> It was followed the next month by “Barbells and Swimming,” and in succeeding months with articles on running, football, shot-putting, basketball, bowling, boxing, wrestling, and decathlon.<sup>187</sup> The article on bowling, one of America’s most popular recreational sports in the 1960s, is a good example of the level of detail to be found in these articles. The cover graphic showed a bowler, covered in numbers, releasing the ball. The numbers corresponded to the exercises pictured at the left of the page, exercises which strengthened all aspects of the movement. The article even included instructions for practicing the actual bowling motion with a dumbbell.<sup>188</sup> Similarly, a running workout incorporated such novel resistance movements as running in the water, running with ankle

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<sup>185</sup> Jim Murray and Peter Karpovich, *Weight Training in Athletics* (Englewood Cliffs, N.J.: Prentice Hall, 1956), 114-153.

<sup>186</sup> Orlick and Weider, “Barbells and Baseball.”

<sup>187</sup> Theriault, “Barbells and Running,” 38-39, 76, 78-79; Weider, “Barbells and Football,” 22-23, 53, 55; Weider, “Barbells and Shot-Putting,” 42-43, 88, 90; Weider “Barbells and Basketball,” 40-41, 86; 88; Weider, “Barbells and Boxing,” 18-19, 86-87; Weider, “Barbells and Wrestling,” 28-29, 75; Weider, “Barbells and the Decathlon,” 24-25, 67-68, 72; Murray, “Weight Training for the Shot Put,” 30-31, 86-88.

<sup>188</sup> Weider, “Barbells and Bowling,” 30-31, 73, 76.

weights, and running stadium steps. These were performed in addition to more traditional bodybuilding movements such as squats, calf raises, and leg presses.<sup>189</sup>

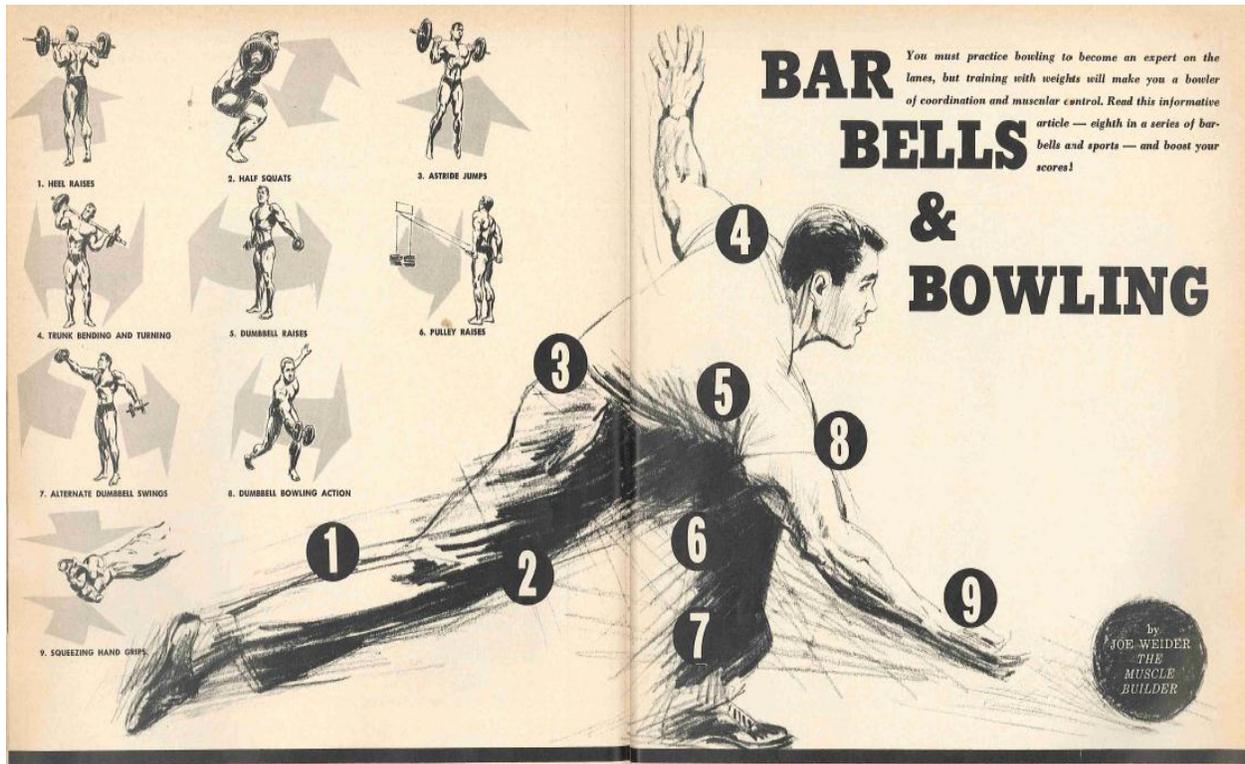


Figure 21. Muscles involved in bowling and their corresponding strengthening exercises, from pages thirty and thirty-one of the February 1963 issue of *Mr. America*.

By August of 1963, *Mr. America* featured the subtitle “All-American Athlete,” and the number of sport training articles inside the magazine dramatically increased. Surviving letters between E.M. Orlick and both Joe and Ben Weider, now in the collection of Reuben Weaver, demonstrate that plans were being laid in the summer of 1963 to start a new kind of magazine. Orlick, who had been a university faculty member and had affiliations with professional coaching and physical education associations, wrote to Ben Weider outlining steps that needed to

<sup>189</sup> Theriault, “Barbells and Running,” 38-39, 76, 78-79.

be taken to assure that the new magazine would reach the right hands. “Canada is ripe for our new magazine and all that goes with it,” he explained, before cautioning that the readership for *All American Athlete* will be different than for other Weider publications. “The ‘intellectuals’ will have to be treated a little different than the musclemen,” he explained to Ben. “We’ve got to reach them thru their own thinking and language.” Orlick then told Ben to get the addresses of high school coaches, college coaches, and physical educators by contacting their professional associations and asking for a list of members so that they could be informed of the new magazine. They also needed, he told Ben, to write all YMCAs, YMHAs, the Canadian Olympic Committee, and the National Fitness Council and to get the word out. “Mention my name,” wrote Orlick, “and some of the Universities I was at—McMaster, Western, Sir George Williams, McGill—it might still help to open up some sticky doors. Also, I was on the Olympic Committee, Pan Am Games Committee, British Empire Games Committee, was Vice President of the AAU of C(anada).”<sup>190</sup> Ben Weider wrote back the following week reporting that he was “following through with this immediately.” He added that he felt “All American Athlete will be a smashing success, and we will do everything we can in Canada to promote it.”<sup>191</sup>

*All-American Athlete: The Magazine that Builds Champions* was finally launched in November of 1963 with E.M. Orlick as editor.<sup>192</sup> The first issue included two lengthy articles on strength training for football, an article by Orlick on dietary advice for athletes, a feature story on sprinter Frank Budd—described as the world’s fastest human—a biomechanical analysis of the football punt, several medical and scientific reports gleaned from a variety of research

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<sup>190</sup> E.M. Orlick to Ben Weider, July 19, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>191</sup> Ben Weider to E.M. Orlick, July 26, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>192</sup> In keeping with his tradition of not always changing volume and issue numbers when titles change, the first issue is designated Volume 6, Number 4, a continuation of the *Mr. America* numbering system.

publications, and an article by former *Strength & Health* editor Jim Murray, entitled “Added Resistance for Overload.”<sup>193</sup>

In the months that followed, *All American Athlete* continued to feature strength programs for various sports, as well as coaching and technique tips, discussions of strategy, and nutrition. The second issue of the magazine, for example, was primarily dedicated to training for track and field and included another Jim Murray article, this one detailing a step by step strength training article for the decathlon, along with six articles discussing coaching techniques for different track and field events written by prominent coaches.<sup>194</sup> The early issues of the magazine were more than one hundred pages in length and the expansive format created room for training programs for a wider variety of sports (even surfing, Olympic paddling, and other non-traditional sports were covered) and in these and other articles the concept of sport-specific training was increasingly refined.<sup>195</sup>

In addition to recommending exercises based on the actual muscles used during various sporting activities, Weider’s new magazine also addressed the need to think about speed of movement as an aspect of barbell training. An important aspect of the application of strength training to sport is that it has to require the athlete to contract certain muscles quickly and simultaneously. Consistent heavy training does not necessarily do this because maximal lifts

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<sup>193</sup> More than twenty articles appear in *All American Athlete* 6, no. 4(November 1963). Those mentioned above are: E.M. Orlick, “Athletic Diets—Fads or Facts,” 5-7; The Editors, “Mr. America Salutes Frank Budd,” 1- 15; Elvan George and Ralph Evans, “Weight Training for Football,” 23-28; Murray Warmuth, “Conditioning Football Players,” 28-32; Jim Murray, “Added Resistance for Overload,” 38-42; Weider Research Clinic, “What’s New on the Medical/Sports Front,” 7-9; and Weider Research Clinic, “Monthly Report on Nutrition/Sports,” 51-53.

<sup>194</sup> The articles were taken from a 1961 book: Tom Ecker, ed., *Championship Track and Field by 12 Great Coaches* (Englewood Cliffs, NJ: Prentice Hall, 1961). Printed in *All American Athlete* 6, no. 4 (December 1963) were: Oliver Jackson, “The Sprint,” 38-39; Jim “Jumbo Elliott, “The Quarter-Mile,” 40-41, 100; Brutus Hamilton, “The Distance Races,” 42-43, 101; Larry Snyder, “The Hurdles,” 44-45, 101; Ed Flanagan, “The High Jump,” 46-47; 102; Gordon Fisher, “The Broad Jump,” 48-49, 104.

<sup>195</sup> Armand Tanny, “The Man on the Surfboard,” *All American Athlete* 6, no. 4(November 1963): 53-56, 98. Ronald James, “Olympic Paddlers Swing to Scientific Weight Training,” *All-American Athlete* 6, no. 9 (October 1964): 20-25, 60-62.

require incredibly forceful but slow contractions. It is generally agreed that to teach the rapid muscle recruitment required in quick sport movements the movements must periodically be performed rapidly.<sup>196</sup> This is an adaptation on the part of the nervous system, not the muscular system per se, but it is, nonetheless, an important training adaptation. George Jowett, had recognized this basic idea at least as early as the 1930s when he wrote about it in *Strength & Health*.<sup>197</sup> He advocated a similar program in 1962 in *Muscle Builder* which called for light weight, low repetition exercises performed as rapidly as possible to “coordinat[e] the nervous forces with the muscular.”<sup>198</sup> In 1965, Ben Weider also advised a fast training program which called for first using heavy weight, then reducing it twenty percent and deliberately attempting to move it faster in *All American Athlete*.<sup>199</sup>

On the opposite end of the speed-of-movement spectrum, Jim Murray consistently advised against the practice of isometric exercise. Isometrics involve maximum contractions without producing any change in a joint’s angle. This type of training gained immense popularity in the early 1960s when three York lifters made tremendous gains in size and strength which Bob Hoffman credited to their isometric training. What Hoffman did not reveal was that these men were among the very first strength athletes to use anabolic steroids in the United States. This was kept secret.<sup>200</sup> Murray recognized that isometrics were not a “normal expression of strength” due to their static nature and he speculated that such static training would likely only

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<sup>196</sup> Siff, *Supertraining*, 265-271.

<sup>197</sup> George Jowett, “Speedy Muscles,” *Strength & Health* 1, no. 10 (September 1933): 3-5.

<sup>198</sup> George Jowett, “How You Can Build Super Speed in Your Muscles,” *Muscle Builder* 12, no. 7 (October 1962): 29. Specifically, he called for using 50% of 1RM for sets of three to four repetitions. Quite similar to contemporary programs which often call for 20-40% 1RM and the same repetition range.

<sup>199</sup> Ben Weider, “Helpful Hints for Athletes,” *All-American Athlete* 7, no. 2 (February 1965): 66. It is highly likely that Ben did not write this article as he told E.M. Orlick on July 26, 1963, “Do not forget to insert my name to at least one article in each edition of the *All American Athlete*.” Ben Weider to E.M. Orlick, July 26, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>200</sup> Terry Todd, “Anabolic Steroids: The Gremlins of Sport,” *Journal of Sport History* 14, no. 1 (1987): 93-94.

adversely affect sport performance.<sup>201</sup> To help debunk the fascination of many coaches and athletes with isometric contraction—and to highlight Hoffman’s misplaced enthusiasm—Weider published “Top University Scientists Blast Isometric Faddism: Researchers who Started Craze Warn Against Its Improper Use” in *All American Athlete* in February of 1964. The article, written by four scientists from Southern Illinois University, labeled the unwarranted claims being made for isometrics as “pseudo-science propaganda” and told readers that in this case the “scientific literature has often been exploited, misquoted, and removed from proper context in order to substantiate such claims.”<sup>202</sup> Orlick had earlier advised Joe Weider to be careful in taking on the isometrics issue, “if you were writing just to the muscle heads it would be different but in *All American Athlete* you are reaching top physiologists, researchers, etc. and would look pretty stupid making statements you can’t back up with solid facts.”<sup>203</sup>

Throughout 1964, *All American Athlete* appeared on a monthly basis and continued to bring science and sport into the homes of thousands of individuals around the globe.<sup>204</sup> In that Olympic year, the magazine was, to no one’s surprise, filled with Cold War concerns that begin with Orlick’s “Let’s Answer the Communist Sports Challenge,” in March of 1964. That article was followed by cover stories in May and June discussing the need for America to adopt a national sport program in order to combat the rise of communist sport.<sup>205</sup> In October of 1964, editor Orlick announced that *All American Athlete* was taking on an even larger role in the

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<sup>201</sup> Jim Murray, “Isometric Exercise,” *Muscle Builder* 12, no. 9 (February 1963): 85; Jim Murray, “More About Isometric Contractions,” *Muscle Builder* 13, no. 5 (March 1963): 26-27, 74-75, 78.

<sup>202</sup> Jay Bender, Harold Kaplan, Alex Johnson and Hoy Rogers, “Top University Scientists Blast Isometric Faddism: Researchers Who Started Craze and Warn Against Its Improper Use,” *All American Athlete*, 6 no. 6 (February 1964): 38-39, 82-88.

<sup>203</sup> E.M. Orlick to Joe Weider, June 25, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>204</sup> In March of 1964, a note explains that original editions of the magazine are being published in German, French, Spanish and Italian and that it is also being “reprinted in: Russian, Chinese, Bulgarian, Hungarian, Polish and Yugoslavian “For the Athlete in Action,” *All American Athlete* 6, no. 7 (March 1964): 98.

<sup>205</sup> Irving Jaffee, “We Deserve to Lose the Olympics,” *All American Athlete* 6, no. 9 (May 1964): 20-21, 51-55; Elliot Denman, “Russia Wins the Olympics,” *All American Athlete* 6, no. 10 (June 1964): 14-17, 52-61.

Olympic movement and that the magazine was actually helping to design strength training programs for some of America's Olympic teams. According to Orlick, at the request of the Olympic canoeing coach he and other experts "took into consideration the anatomy, physiology and kinesiology involved. And, after weeks of intensive study, backed by a lifetime of training and experience . . . we developed a scientific strength building program. . .one of the first such scientific programs for USA athletes in any sport.<sup>206</sup> Wrote Orlick, "There exists a big gap between scientific knowledge and its practical application, especially with respect to sports . . . we have taken a big step to bridge this gap."<sup>207</sup>

Despite the important role *All American Athlete* apparently hoped to play in advancing the cause of sport training, the magazine ultimately failed to catch on as Weider and Orlick hoped. In an appeal to advertisers in 1963, advertising manager Ronald J. Orlick, son of editor E.M. Orlick, claimed that the magazine had a circulation of more than 81,000 made up of 26,000 coaches, 1200 gym owners, 48,000 individual athletes, 1700 department of recreation officials, 1800 athletic directors and 3200 athletic trainers.<sup>208</sup>

E.M. Orlick's correspondence files reveal that the magazine's decline might also be attributed to people not receiving the magazine as promised. In November of 1963, for example, Orlick wrote Joe Weider to tell him that "I have already had letters from people who have not yet received *All American Athlete* . . . This definitely hurts our image and business," he continued, "and the negative experience of one or two can definitely influence the many others who might

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<sup>206</sup> E.M. Orlick, "Introducing a New Scientific Strength Building Service," *All American Athlete* 6, no. 9 (October 1964): 54.

<sup>207</sup> *Ibid.*, 5.

<sup>208</sup> "Why You Should Advertise in *All American Athlete*," *All American Athlete* 6, no. 4 (November 1963): 114. Because *All-American Athlete* split off from *Mr. America*, this 81,000 figure probably represents that publication's circulation. In a "Publisher's Sworn Statement" dated June 14, 1963, Weider reported a circulation of 82,300 for "All American Athlete – Mr. America." E.M. Orlick Papers, Collection of Reuben Weaver. In a letter to "Elliott," last name unknown, Weider claimed in January of 1965 that *All American Athlete* had only 23,000 subscribers. Joe Weider to Elliott (no last name), January 5, 1965, E.M. Orlick Papers, Collection of Reuben Weaver.

subscribe.”<sup>209</sup> In December, Orlick wrote again to tell Joe that “things are worse . . . 18 complaints today.” Continuing, Orlick again warned Joe that *All American Athlete* had a different readership than his other magazines and that high schools and colleges, “have organizations at all levels from local, through district, state, to national and such things will be brought up at conventions, etc. and we’ll find ourselves black-balled, but good.”<sup>210</sup>

Orlick’s concerns had not diminished by February of 1964 when he wrote to Joe again about the subscription problem, closing the letter with, “I am very much concerned not only for you but also for me as I will be destroyed along with you. . .”<sup>211</sup> One week later, Orlick wrote again, asking Joe to read two enclosed letters from dissatisfied coaches who had not received their magazines. “These people are not dumb muscle heads,” wrote Orlick, “they hold positions of prominence and some wield lots of power.”<sup>212</sup>

Another reason for the decline of the magazine may well have been a lack of outside advertisers. Orlick’s son, Ron, listed as advertising manager in the magazine, wrote Weider at one point about \$600 worth of advertising he had sold that never appeared in *All American Athlete*. “It is absolutely ridiculous to work our guts off getting orders, and then not filling them,” he wrote.<sup>213</sup> In any case, by April of 1965, the magazine fell to only sixty-six pages in length and Weider stopped producing it as a stand-alone magazine. He’d apparently been thinking about stopping it for several months, having written in January of 1965 that although

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<sup>209</sup> E.M. Orlick to Joe Weider, November 27, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>210</sup> E.M. Orlick to Joe Weider, December 4, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>211</sup> E.M. Orlick to Joe Weider, February 4, 1964. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>212</sup> E.M. Orlick to Joe Weider, February 11, 1963. E.M. Orlick Papers, Collection of Reuben Weaver.

<sup>213</sup> (Ron?) Orlick to Joe Weider, Undated, E.M. Orlick Papers, Collection of Reuben Weaver. This letter is not signed but Reuben Weaver believes it came from Ron Orlick.

“we all want to keep AAA going,” he’d already lost \$50,000 on the magazine and that it had only developed a circulation of 23,000 subscribers.<sup>214</sup>

Although the first iteration of *All American Athlete* was over, Weider’s interest in marketing a sport training magazine remained. According to writer Jim Murray, Weider even approached him about coming to work for him on a full-time basis in the late 1960s so that he could run a new version of the magazine. Murray, who played football and threw javelin at Rutgers University at the same time he lifted weights, always believed that a magazine such as *All American Athlete* was needed and could succeed. However, he reported, “by the time Joe approached me, I was working for Johnson and Johnson, and I really didn’t want to give up the security that that job offered.”<sup>215</sup> So, Murray explained, he worked for Joe as a freelancer and helped during 1968 and 1969 when *All American Athlete* once again appeared on American newsstands. The last two issues list Murray as the editor.<sup>216</sup> Said Murray, “After writing the book with Dr. Karpovich, I knew how important it was to bring science and sport together.”<sup>217</sup>

The 1960s also saw the publication of another magazine which included articles on weight training for sport in nearly every issue. Walter Marcyan’s *Physical Power* attempted to appeal to a variety of constituencies, with regular articles on bodybuilding, weightlifting, training for women, and weight training for sport. Like Hoffman and Weider, Marcyan sold barbells, but he also sold an innovative multi-station “universal” gym which historian Terry Todd credited

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<sup>214</sup> Joe Weider to Elliott\_\_\_\_, January 5, 1965. E.M. Orlick Papers, Collection of Reuben Weaver. No last name is given in this letter.

<sup>215</sup> Jan Todd interview with Jim Murray, August 11, 2012. Quoted in Shurley and Todd, “Joe Weider, All American Athlete, and the Promotion of Strength Training for Sport: 1940-1969.”

<sup>216</sup> After the April 1965 issue of *All American Athlete*, the magazine essentially disappears until July 1967, when the title of *Mr. America* adds the subhead *All American Athlete* once again. Then, in August 1968 it appears again as a stand-alone magazine numbered vol. 10, no. 1, and that is followed by: November 1968, vol. 10, no. 2; March 1969, vol. 10, no 3; July 1969, vol. 10, no 4; and October 1969, vol. 10, no. 5.

<sup>217</sup> Jan Todd interview with Jim Murray, August 11, 2012. Quoted in Shurley and Todd, “Joe Weider, *All American Athlete*, and the Promotion of Strength Training for Sport: 1940-1969.”

with making gyms friendlier to the average person who wanted to take up weight training.<sup>218</sup> Also like Hoffman and Weider, Marcyan was a competitive lifter and bodybuilder himself who intended to use his magazine to promote his products and his California gyms. Among *Physical Power's* regular contributors were Stan Burnham and Jim Murray.<sup>219</sup> Burnham was a professor of physical education at the University of Texas and has been credited with playing a key role in bringing strength training to the Texas Longhorns football team.<sup>220</sup> In his articles, Burnham discussed research related to strength training for sport and sport-specific strength training programs.<sup>221</sup> The training articles covered a variety of sports, though as in the magazines of Hoffman and Weider, football, shot put, and discus were the most heavily featured.<sup>222</sup> Like Weider's *All-American Athlete*, Marcyan's *Physical Power* failed to attract advertisers. The publication peaked at fifty pages in late 1963 before dropping to twenty-eight shortly before it ceased publication in 1965.

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<sup>218</sup> "Obituary: Walter Marcyan, 94; Bodybuilder Sold Fitness Equipment, Owned Gyms," *Los Angeles Times*, 22 September 2007, <http://articles.latimes.com/2007/sep/22/local/me-passings22> (accessed September 27, 2012).

<sup>219</sup> Jim Murray, "Weight Training and Football," *Physical Power* 2, no. 11 (October 1961): 6-7, 26-7; Jim Murray, "Taking a Look at Isometric Exercise," *Physical Power* 3, no. 2 (March-April 1962): 18-21, 25, 28; Jim Murray, "Pre-Season Football Training," *Physical Power* 3, no. 4 (July-August 1962): 6-7; Jim Murray, "Weight Training for Wrestlers," *Physical Power* 3, no. 1 (January-February 1962): 6-7.

<sup>220</sup> "Howard Payne University Hall of Honor," Official Website of Howard Payne University (Brownwood, TX: 2006); Stan Burnham, "Football Conditioning at the University of Texas," *Physical Power* (Fall 1965): 8-11, 23-4; Terry Todd, "Progressive Resistance for Football at the University of Texas," *Strength & Health*, September 1964, 18-19, 52, 54, 56.

<sup>221</sup> Stan Burnham, "Strength for Fitness and Competition," *Physical Power* 5, no. 2 (March-April 1964):10-13, 38-9; Stan Burnham, "Better Rebounding Through Weight Training," *Physical Power* 2, no. 11 (October 1961): 10-12, 29; Stan Burnham, "The Value of Combined Isometric and Isotonic Exercise," *Physical Power*, May-June 1963, 14-15, 35; Stan Burnham, "A Conditioning Program for Football Players," *Physical Power* 2, no. 10 (July-August 1961): 16-17.

<sup>222</sup> For examples of a variety of sports featured, see: Bud Hanson, "In-Season Basketball Conditioning," *Physical Power* 4, no. 6 (November-December 1963): 12-13, 36, 43; John P. Jesse, "Weight Training for Middle-Distance Runners," *Physical Power* 4, no. 6 (November-December 1963):26-7, 32-3, 39, 42; Howard Benioff, "Track and Field Special Feature: The Story of Bob Humphreys," *Physical Power* 3, no. 1 (January-February 1962): 14-17; Richard Gilberg, "How High School Football Champions Train," *Physical Power* 3, no. 4 (July-August 1962): 13, 33; Gene Mozee, "Weight Training for Baseball: How Jim Winn Became a Pro Through the Use of Weights," *Physical Power* 3, no. 3 (May-June 1962): 8-10; John Nelson, "Summer Football Training," *Physical Power* 3, no. 3 (May-June 1962): 12, 29; Gene Mozee, "L. Jay Silvester," *Physical Power* 3, no. 2 (March-April 1962): 4-6, 28; Howard Benioff, "The Mike Connelly Story," *Physical Power* 3, no. 5 (September-October 1962):12-13, 32.

## CONCLUSION

By the mid-1960s, most of the seeds for the modern sport training environment had been sown. Training for sport had its own magazine, *All-American Athlete*, and the magazines of Bob Hoffman, the Weiders, and Walt Marcyan had recognized and discussed in some capacity all of the aspects of a modern sport conditioning program. These included notions of overload, progression, and sport specificity. Only two elements were lacking: specialists in strength and conditioning and a concerted effort to use laboratory research to improve performance. Weider editor Emmanuel Orlick would call for the latter in a 1965 article.<sup>223</sup> He noted that research of tremendous value to sport performance was being performed at colleges across the country, yet there was no “clearing house” to get that information to the coaches who could use it to maximize performance.

In light of these developments, it is clear that Bob Hoffman and Joe Weider played a key role in the development of strength training for sport. The efforts of both men to dispel the myths of the damaging effects of weight training proved crucial in convincing many to take up barbell training. Once they had been converted, the new lifters often excelled in sports and became strength training’s best salesmen. While anecdotal evidence for the benefits of strength training was valuable, what was truly needed was scientific proof of the effectiveness of strength training in order to dissuade its detractors. As will be seen in Chapter Three, this proof would begin to emerge in the mid-1940s and early 1950s, in part, as a result of the Second World War.

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<sup>223</sup> E.M. Orlick, “Editorial – Let’s Close the Scientific Sports Gap!” *All-American Athlete* 7, no. 2 (1965): 5, 46.

### CHAPTER THREE: THE SCIENCE OF STRENGTH: SYSTEMATIC RESEARCH ON STRENGTH TRAINING, 1945-1969

According to surveys sent to Young Men's Christian Association (YMCA) program directors, interest in weight training increased dramatically in the 1930s, thanks to Bob Hoffman and other strength promoters. Knowing little about the effects or practice of weight training, however, some physical educators continued to fret about its popularity in their professional publications. In a 1937 article in the *Journal of Physical Education*, Harvey Allen polled forty-five YMCAs by mail regarding whether they permitted the activity.<sup>1</sup> Of thirty-nine replies, thirty-six permitted weightlifting, though seventeen physical directors said they felt "coerced" into allowing it and eight said they did not favor the activity. One of the physical directors wrote that he had consulted doctors and other physical directors and "was not surprised upon finding that the unanimous opinion in regard to the activity was decidedly unfavorable."<sup>2</sup> Others commented that it had "no place in our program" and was "the finest builder of athletic glass arms I know of." The end of the article, however, quoted an anonymous director who said he had "never heard a sound physiological argument against it" and that most of the criticisms were hearsay.<sup>3</sup>

Two issues later, Howard Wilson of the Boston YMCA came to the defense of weightlifting. Wilson pointed out that large muscles were openly admired and that replicas of muscular Greek statuary were included on medals and plaques awarded by some YMCAs. He pointed to the illogic of venerating the physique but deriding the most efficient way to build it. Wilson went on to discuss the most prominent arguments against lifting: that large muscles were "unnecessary in this day and age," even citing the plow horse and race horse examples, and that

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<sup>1</sup> Harvey Allen, "Weight Lifting in the Association," *Journal of Physical Education* 34, no. 3 (January-February 1937): 48-9.

<sup>2</sup> *Ibid.*, 48.

<sup>3</sup> *Ibid.*, 49.

weight training was likely to be injurious. The argument that muscles were not necessary was fallacious, he argued, because “so are a great many other things unnecessary which are included in a program of physical education.”<sup>4</sup> Moreover, if there was so much hand wringing over the injuries caused by weightlifting, what about other activities sponsored by YMCAs, such as football, basketball, and wrestling? Wilson suggested that they were at least equally injurious, if not more so. If physical directors were against weightlifting, he asserted, they must develop “scientific reasons” for their objection to the activity. Otherwise, the physical directors would not be able to “offset the quackery of magazine articles written attractively by men with little or no training in physical education; but who themselves are good business men and build muscles for commercial [emphasis in original] gain.”<sup>5</sup> In closing Wilson rhetorically posited, if a boy wanted to gain recognition by way of a powerfully developed physique, “who are you, who am I, or who is anyone else that we should discourage him?”<sup>6</sup>

The July 1938 issue included a letter from C.F. Benninghoff, associate physical director of the New Haven, Connecticut YMCA. Benninghoff advocated a “sane” approach to weightlifting, and stated that if young men were going to lift weights, YMCAs should do everything they could to obtain “scientific” information to advise them how to perform the activity properly.<sup>7</sup> Regardless of how much physical directors knew about weight lifting, there was a great deal of enthusiasm for the exercise in the late 1930s. A survey by Ted Krause from the Northeastern branch of the Detroit YMCA showed that, of 297 respondents, nearly two-

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<sup>4</sup> Howard Wilson, “Uplifting Weight-Lifting” *Journal of Physical Education* 34, no. 5 (May-June 1937): 86.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid., 87.

<sup>7</sup> C.F. Benninghoff, “Weight Lifting,” *Journal of Physical Education* 35, no. 6 (July-August 1938), 96.

thirds reported “much interest” in weight lifting, while another seventeen percent reported “moderate” interest.<sup>8</sup>

In spite of burgeoning interest in weightlifting, there was still little appeal in studying the activity on the part of most physiologists or physical educators. A case in point can be found in the text published the same year as Krause’s study by professors James McCurdy and Leonard Larsen, of the YMCA-sponsored Springfield (Massachusetts) College. The book was directed at students of physical education but contained scant discussion of weight training. It included one section (of three) dedicated to discussing the effects of various games and activities on the body. Included among the sports and activities were gymnastics, track, American football, basketball, golf, rowing, swimming, and even marathon running. Strength training was not specifically mentioned in this section and, what discussion there was of strength training in the book, mentioned the relationship between a muscle’s size and its force development but little else. There was no mention of the implications of force development on other activities or how to train to increase a muscle’s size.<sup>9</sup>

The lack of interest from the academic community in the development of strength would change during the Second World War. Hoffman, Weider, and other prominent strength entrepreneurs helped to create substantial interest in strength training by the 1930s and early 1940s. As weight-trained athletes joined the service, they proselytized about the advantages of strength training and were able to make new converts. Owing to advances in the understanding of physiology by the early 1930s, physical educators, physiologists, and medical doctors became less obstinate in their opposition to strength training. Some, like physical educator C.H. McCloy, were exposed to weight training through the military training facilities set up at

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<sup>8</sup> Ted Krause, “Trends in ‘Y’ Weight Lifting,” *Journal of Physical Education* 36, no. 5 (May-June 1939), 94.

<sup>9</sup> James H. McCurdy and Leonard A. Larson, *The Physiology of Exercise: A Text-Book for Students of Physical Education* (Philadelphia: Lea & Febiger, 1939), 39-40, 97.

universities across the country. Finally, when the War Manpower Commission limited the army's access to men through the draft in 1943, the army began to search for more efficient and effective methods to return injured soldiers to the battlefield. The confluence of these factors precipitated a growing academic interest in strength training beginning in the 1940s.

### **WORLD WAR II, THOMAS L. DELORME, C.H. MCCLOY, AND INITIAL INVESTIGATIONS OF STRENGTH TRAINING IN THE POST-WAR YEARS<sup>10</sup>**

The Second World War would prove to be pivotal in shifting the perception of weight training. Many had previously argued that strength was unnecessary in modern civilization but the brutal reality of combat prompted calls to promote strength training. While the United States did not officially enter the war until December of 1941, the country had been mobilizing and preparing for conflict since at least the summer of 1940.<sup>11</sup> Bob Hoffman took advantage of the early stages of the European war to urge his readers to be fit for their role in the impending struggle. He pointed to America's official neutrality, saying, "Our leaders will struggle hard to keep us out...[but] it will be hard to avoid...It will be more than difficult not to be pushed in." He continued, "When they need you, and I hope they won't, they'll come for you and you'll have to carry a rifle." As a result, Hoffman advised, "You have a far better chance of surviving the fighting of the war and recovering from wounds, should it be your fate to receive them, if you are physically fit than if you are not."<sup>12</sup>

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<sup>10</sup> Portions of this section of the chapter also appeared in: Jan Todd, Jason Shurley, and Terry Todd, "Thomas L. DeLorme and the Science of Progressive Resistance Exercise," *Journal of Strength and Conditioning Research* 26, no. 11 (2012): 2913-2923.

<sup>11</sup> In June of 1940, General George C. Marshall, then the Army Chief of Staff, told a congressional panel, "For the first time in our history we are actually trying to prepare for war before becoming involved." "America on Guard – Mobilizing Our Might," *New York Times*, June 9, 1940 <http://query.nytimes.com/mem/archive/pdf?res=F60611F6355D10728DDDA00894DE405B8088F1D3> (accessed February 6, 2013).

<sup>12</sup> Bob Hoffman, "Should We Prepare for War?" *Strength & Health*, November 1939, 43.

The call to physically prepare for war with strength training was also taken up by physical educators. As an example, Robert Edwards, a physical educator at the University of Illinois declared in a 1940 article in the *Journal of Health and Physical Education*, “We have been living too luxurious lives. To survive, we must turn our energies toward strength and away from comfort.”<sup>13</sup> Edwards advised performing lifts for the regions of the body “heavily taxed by the rigid army life,” which included four lifts: arm curls, deep-knee bends, prone presses, and abdominal raises. He advised that the exercises must be progressive and, closely following the progression recommended by Bob Hoffman and other weight training advocates, directed readers to increase the weight once ten repetitions could be performed.<sup>14</sup>

In March of 1941, Wilbur McCandless of the Saint Paul (MN) YMCA also alluded to a soft life, which necessitated strength training. “Modern civilization as a rule does not demand vigorous physical activity,” he asserted, “quite generally, therefore, we are deprived of the opportunity of developing a reserve of vitality and strength which is so valuable in times of physical and mental crisis.”<sup>15</sup> McCandless went on to dispute the idea that strength training would damage the heart and advocated “progressive weight lifting” that worked the muscles to near their capacity.<sup>16</sup> He advised the lifter to choose a weight that could be lifted without undue strain for eight to twelve repetitions for the arms and fourteen to twenty for the trunk. Once the maximal number was performed, the weight was increased and the repetitions decreased accordingly.

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<sup>13</sup> Robert Edwards, “Physical Fitness through Weight-Lifting,” *Journal of Physical Education* 11, no. 10 (December 1940): 606.

<sup>14</sup> *Ibid.*, 606-607, 635.

<sup>15</sup> Wilbur McCandless, “Body-Building and Weightlifting” *Journal of Physical Education* 38, no. 4 (March-April 1941), 64.

<sup>16</sup> *Ibid.*, 64-5, 75-76.

The utility of heavy strength training was not fully embraced, however, until the latter stages of World War Two, as injured soldiers began to stack up at military hospitals. The backlog was created by the confluence of the sheer number of fighting men involved in the war effort, advances in surgery and medicine that allowed more men to survive increasingly severe injuries, and rehabilitation protocols that often required six to nine months of post-operative therapy.<sup>17</sup> Rehabilitative programs at the time emphasized rest, and when they called for resistive exercise, incorporated a high number of repetitions with little weight.<sup>18</sup> According to army physical therapist Dorothy Hoag, “good results have been obtained [following that program], usually over a long period of time, but often the patient left the hospital with considerably less muscle bulk in the affected extremity than in the normal one.”<sup>19</sup> The light weight program was a cautious, seemingly common sense approach, that in a system already taxed by debility, further stress should be minimized. This idea was rooted in first law notions of a depletion of vitality. For example, the 1923 edition of R. Tait McKenzie’s *Exercise in Education and Medicine* warned that “if the entire muscular system be developed to its physiological limit a very considerable drain on vitality is inevitable.”<sup>20</sup> In light of this, in the 1917 edition, McKenzie advised that exercises should include maximum contractions but

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<sup>17</sup> Sanders Marble, *Rehabilitating the Wounded: A Historical Perspective on Army Policy* (Falls Church, VA: Office of the Surgeon General, Office of Medical History, 2008), 35, 56; E.E. Vogel, M.S. Lawrence, and P.R. Strobel, “Professional Service of Physical Therapists in World War II,” in *AMEDD History: Army Medical Specialist Corps* (Washington, D.C.: Department of the Army, Office of the Surgeon General, 1968), [http://history.amedd.army.mil/corps/medical\\_spec/chapterviii.html](http://history.amedd.army.mil/corps/medical_spec/chapterviii.html) (accessed September 19, 2012).

<sup>18</sup> In a 1947 article, University of Minnesota professor Ralph Piper noted, “Many doctors have traditionally prescribed bed rest indiscriminately as a conservative treatment for practically all medical disorders.” Ralph A. Piper, “Values of Early Ambulation and Exercise in Surgical and Medical Treatment,” *Journal of Health and Physical Education* 18, no. 5 (May 1947): 297-299, 349-353; regarding prolonged bed rest see also: Alfred Fleishman, “Exercise to Recovery,” *Strength & Health*, February 1944, 18-19, 37; Regarding the previous exercise protocols see: Dorothy G. Hoag, “Physical Therapy in Orthopedics with Special Reference to Heavy Resistance, Low Repetition Exercise Program,” *Physiotherapy Review* 26, no. 6 (November-December 1946): 291; Thomas L. DeLorme, “Restoration of Muscle Power by Heavy Resistance Exercises,” *Journal of Bone and Joint Surgery* 27, no. 4 (1945): 645.

<sup>19</sup> Hoag, “Physical Therapy in Orthopedics,” 291.

<sup>20</sup> R. Tait McKenzie, *Exercise in Education and Medicine* (Philadelphia: W.B. Saunders, 1923), 368-369.

“should never be continued beyond the point of moderate fatigue, and some of them should be given with resistance,” though this advice was dropped by the 1923 edition.<sup>21</sup> Most exercises, however were range-of-motion and isometric contractions performed up to twenty-three times, three times daily.<sup>22</sup> A program that included such little resistance and so many repetitions is more likely to produce muscular endurance than strength or hypertrophy. Similarly, a text by Frank Butler Granger who once served as director of physical therapy for the U.S. Army, included only the most cursory discussion of therapeutic exercise in his 1932 *Physical Therapeutic Technic*. The vast majority of the text was focused on therapeutic modalities such as electrical stimulating currents, hydrotherapy, and diathermy. When muscle contractions were discussed, they were often electrically induced, presumably to limit the pain caused by volitional muscle contraction. Butler warned practitioners that, “in all treatment, care should be taken not to overtire weakened muscles.”<sup>23</sup> Into the early 1940s, physicians warned that asking patients to lift weights that were too heavy could result in “chronic sprains,” especially in the knees.<sup>24</sup> As a result of these protocols, patients gained little strength and, when they were advanced to the next phase of their rehabilitation, games, they tended to be reinjured.<sup>25</sup> To solve this problem, “the

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<sup>21</sup> R. Tait McKenzie, *Exercise in Education and Medicine* (Philadelphia: W.B. Saunders, 1917), 321-322.

<sup>22</sup> *Ibid.*, 321-322.

<sup>23</sup> Frank Butler Granger, *Physical Therapeutic Technic* (Philadelphia: W.B. Saunders, 1932), 244.

<sup>24</sup> Ernest Nicoll, “Principles of Exercise Therapy,” *British Medical Journal* 1, no. 4302 (June 19, 1943): 747-750.

<sup>25</sup> For a discussion of this type of program, see: C.H. McCloy, “Physical Reconditioning in the Army Service Forces,” *Journal of Health and Physical Education* 15, no. 7 (September 1944): 365-67, 412. The rapid progression to games skips several steps which have been incorporated into contemporary rehabilitation programs. By performing basic strengthening exercises and emphasizing muscular endurance, the patient still would not have gained enough strength to stabilize the damaged joint. Moreover, they would not have regained joint position sense or the ability to perform basic athletic tasks like changes of direction. As a result, patients with unstable joints, who lacked position sense, were rapidly put into the unpredictable environment of team games, making re-injury somewhat likely. For examples of the contemporary rehabilitation plan of care, see: Craig R. Denegar, Ethan Saliba, and Susan Saliba, *Therapeutic Modalities for Musculoskeletal Injuries* (Champaign, IL: Human Kinetics, 2010), 6-11; William E. Prentice, *Rehabilitation Technique for Sports Medicine and Athletic Training* (New York: McGraw-Hill, 2011), 4-17, 340-363.

literature was thoroughly combed; the brains of the best visiting dignitaries, who were many, were picked dry with disappointing results.”<sup>26</sup>

A backlog of patients, then, welcomed Dr. Thomas DeLorme at Chicago’s Gardiner General Hospital when he began there in February of 1944. By the time he joined the army, DeLorme had been an avid weight trainer for many years. As a teen he had been stricken with rheumatic fever, a bacterial infection that could lead to permanent heart damage.<sup>27</sup> After proffering the diagnosis, the physician attending him recommended only rest and advised that he avoid strenuous activity in perpetuity. While he lay wasting away in bed, DeLorme read about medicine and Bob Hoffman’s *Strength & Health* magazine. He became convinced that he would “prove the medicos wrong” by building a strong, powerful and healthy body through weight training.<sup>28</sup> To that end, DeLorme crafted his own weight set from train wheels and other small mechanical parts he was able to scrounge. He lifted the makeshift weight set regularly and even competed in weightlifting contests, registering a personal best 250 pound clean and jerk. By the age of twenty-two he had deadlifted 503 pounds and even performed a lifting demonstration at half-time of a University of Alabama football game, lifting the front end of a truck off of the ground.<sup>29</sup> After completing his medical degree at New York University, DeLorme joined the Army in January of 1944.<sup>30</sup>

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<sup>26</sup> E.H. Anderson, “Heavy Resistance, Low Repetition Exercises in the Restoration of Function in the Knee Joint,” *Nova Scotia Medical Bulletin* 25, no. 12 (December 1946): 397.

<sup>27</sup> Eleanor P. DeLorme, interview by Terry Todd, Telephone, July 6, 2010, Thomas DeLorme Collection, H.J. Lutchter Stark Center for Physical Culture and Sports, The University of Texas at Austin.

<sup>28</sup> Jack Finkelstein, “Bama’s Hercules Displays Weight-Lifting Abilities,” *Crimson White*, undated clipping, Thomas DeLorme Collection, H.J. Lutchter Stark Center for Physical Culture and Sports, The University of Texas at Austin.

<sup>29</sup> *Ibid.*; Owen Lake, “Pioneer of Physical Medicine: Dr. Thomas DeLorme,” *Strength & Health*, June 1959, 22-23, 48, 50-51

<sup>30</sup> Todd, Shurley, and Todd, “Thomas L. DeLorme,” 2913.

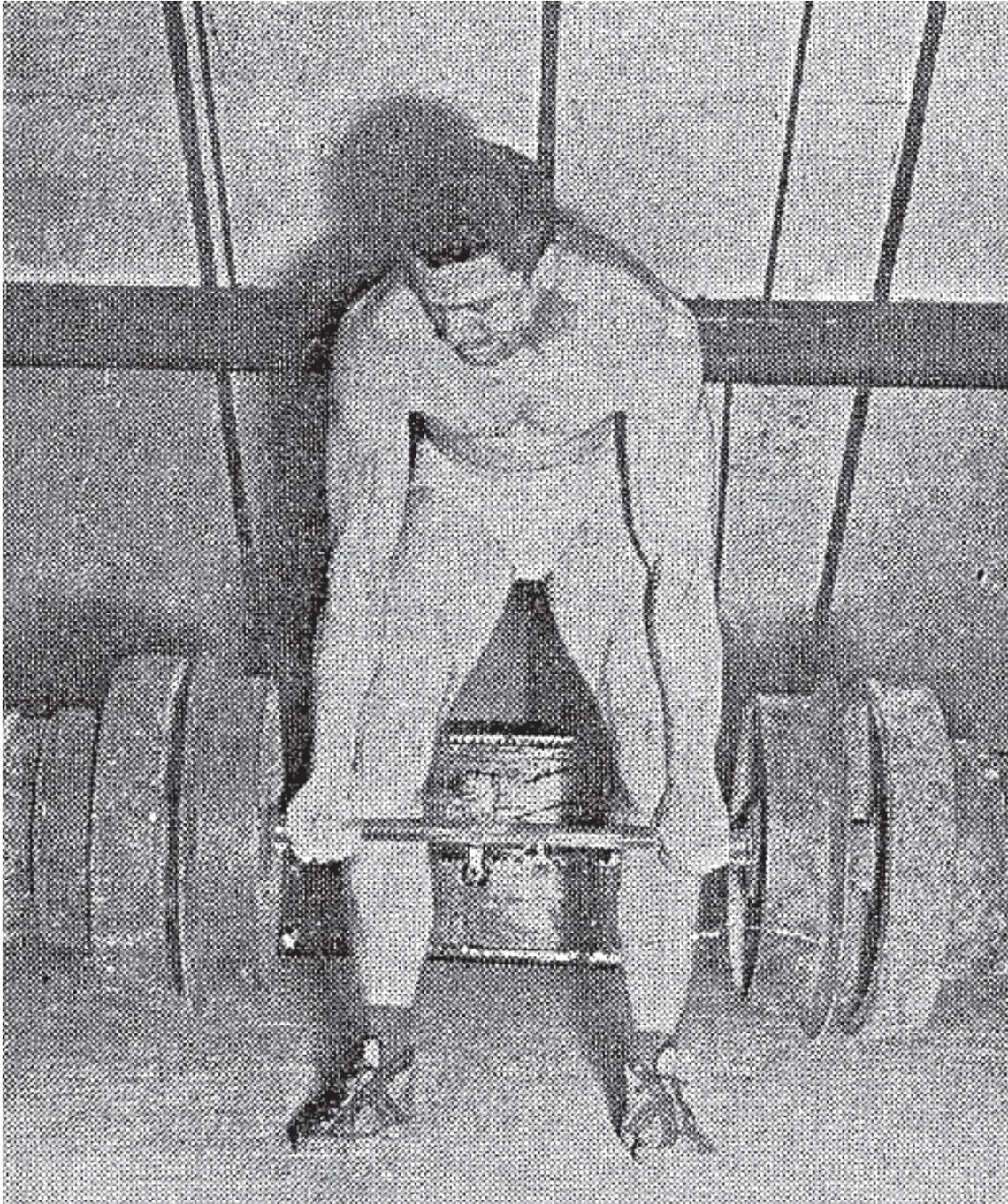


Figure 22. Thomas DeLorme lifting his homemade weight set. Image from undated clipping of the *Crimson White*, the University of Alabama's student newspaper. The clipping is part of the Thomas L. DeLorme collection at the H.J. Lucher Stark Center for Physical Culture and Sports at the University of Texas at Austin.

Shortly after his arrival at Gardiner, DeLorme ran into Sergeant Thaddeus Kawalek, who had suffered a non-combat knee injury. Kawalek had also lifted weights extensively before the war, which he credited with allowing him to throw the shot-put, wrestle, and run track in college.<sup>31</sup> During their conversations the men discussed their histories with strength training, causing DeLorme to speculate that a lack of strength was a major factor in the length of convalescence and frequent recurrence of injury. After mulling over DeLorme's theory, Kawalek volunteered to let DeLorme try a program of heavy resistance exercises on his injured knee. The improvised program of heavy knee extensions with a weighted iron boot and a series of lighter pulley exercises proved successful, as Kawalek recovered more quickly than typical Gardiner patients and had better function.<sup>32</sup> Shortly thereafter, a paratrooper from Louisiana sought DeLorme's help. The patient, Walter Easley, had torn both the anterior cruciate and medial (tibial) collateral ligaments in one of his knees during an awkward landing from a parachute jump. Easley had been at Gardiner for six months but still had swelling and pain in the knee after following the standard rehabilitation protocol. A farmer by trade who had been told he would have to wear a restrictive brace to stabilize the knee for the foreseeable future, Easley came to DeLorme out of desperation. DeLorme noted Easley's still severely atrophied quadriceps muscles and offered Easley the opportunity to perform a program of heavy knee extension and flexion exercises. The program was a sort of middle ground between the standard protocols and the programs employed by competitive lifters. DeLorme supervised Easley as he performed seven sets of ten repetitions with the maximum weight he could lift for each set. In less than a month, the paratrooper's quadriceps had grown substantially as had the function of

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<sup>31</sup> Thaddeus Kawalek, interview by Terry Todd, Telephone, December 5, 2003, Thomas DeLorme Collection, H.J. Lutzer Stark Center for Physical Culture and Sports, The University of Texas at Austin.

<sup>32</sup> Ibid.

the knee. The pain and swelling had resolved and “for all activities, even ‘jitterbugging,’ the knee was normal.”<sup>33</sup>

The tremendous gains made by Kawalek and Easley were noted both by other patients and DeLorme’s commanding officer, Colonel John Hall. The clamor of patients wanting to try the new program allowed DeLorme to set up a true clinical trial of his method. The resulting findings of the trial were published in a 1945 article in the *Journal of Bone and Joint Surgery*.<sup>34</sup> The article discussed the application of the seven sets of ten protocol to a variety of knee injuries, including sprains, fractures of the femur or patella, and meniscus injuries. The cases of instability produced by ligament sprains produced the most dramatic results, with patients acquiring sufficient stability even to return to demanding sports. Though less dramatic, patients with a variety of other knee injuries also improved more than their counterparts who performed the standard protocol. DeLorme asserted that the weakness of the standard protocol was its focus on muscular endurance, rather than power. The heavy resistance program induced hypertrophy, which was well-known at the time to be associated with strength. Moreover, since hypertrophy was related to the loading of the muscle, it was important that muscles be exercised intensely. As DeLorme put it, “in order to obtain rapid hypertrophy in weakened, atrophied muscle, the muscle should be subjected to strenuous exercise and, at regular intervals, to the point of maximum exertion.”<sup>35</sup> DeLorme reiterated this point the following year in an article in *Archives of Physical Medicine*, saying that, “on the basis of 300 cases in which this program of exercise

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<sup>33</sup> Thomas L. DeLorme and Arthur L. Watkins, *Progressive Resistance Exercise: Technic and Medical Application* (New York: Appleton, Century, and Crofts, 1951), 1-3.

<sup>34</sup> Thomas L. DeLorme, “Restoration of Muscle Power by Heavy Resistance Exercises,” *Journal of Bone and Joint Surgery* 27, no. 4 (1945): 645-667.

<sup>35</sup> *Ibid.*, 667.

was used, I firmly believe that even extremely atrophied muscles should exert their maximum effort at regular intervals.”<sup>36</sup>

News of the success of the new heavy resistance program spread quickly. Medical doctor E.H. Anderson explained late in 1946 that since the publication of DeLorme’s “brilliant” article, “the answer to the knee problem has been solved, and all our previous mistakes have become crystal clear.”<sup>37</sup> Other investigators tested the high intensity method and found similar impressive results including doubling of strength in as little as four weeks.<sup>38</sup> By late 1945, representatives of the Surgeon’s General Office issued an order for all therapists to use the new protocol with their orthopedic patients, with naval hospitals quickly following suit.<sup>39</sup> So significant was DeLorme’s method that he was awarded the Army’s Legion of Merit award.<sup>40</sup>

Thomas DeLorme left Gardiner Hospital on 28 August 1945 but continued to publish important articles on strength training into the early 1950s before his research interests shifted to arm and spine injuries and the survivability of amputated limbs.<sup>41</sup> The articles included “Technics of Progressive Resistance Exercise” (PRE) in 1948, in which the program assumed both the moniker and form more recognizable today. The new program called for only three sets

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<sup>36</sup> Thomas L. DeLorme, “Heavy Resistance Exercises,” *Archives of Physical Medicine* 27, no. 10 (1946): 607-630.

<sup>37</sup> Anderson, “Heavy Resistance, Low Repetition Exercises,” 397.

<sup>38</sup> Sarah J. Houtz, Annie M. Parrish, and F.A. Hellebrandt, “The Influence of Heavy Resistance Exercises on Strength,” *Physiotherapy Review* 26, no. 6 (November-December 1946): 299-304.

<sup>39</sup> Todd, Shurley, and Todd, “Thomas L. DeLorme,” 2916-2917; Marcia T. Keith, “Emphasis on Exercise as a Therapeutic Agent: in a Naval Physical Therapy Department,” *Physiotherapy Review* 27, no. 1 (January-February 1947): 10-13.

<sup>40</sup> John R. Hall, “Citation for Legion of Merit,” December 4, 1945; “Captain Thomas L. DeLorme Receives Legion of Merit,” *Pulse*, undated clipping, Thomas DeLorme Collection, H.J. Lucher Stark Center for Physical Culture and Sports, The University of Texas at Austin.

<sup>41</sup> J.S. Barr, W.A. Eilliston, H Musnick, Thomas DeLorme, J. Hanelin, and A.A. Thibodeau, “Fracture of the Carpal Navicular (Scaphoid) Bone; An End-Results Study in Military Personnel,” *Journal of Bone and Joint Surgery – American Volume* 35A, no. 3 (1953): 609-625; Thomas L. DeLorme, R.S. Shaw and W.G. Austen, “Musculoskeletal Functions in the Amputated Perfused Human Being Limb,” *Surgical Forum* 15 (1964): 450-52; Thomas L. DeLorme, R.S. Shaw, and W.G. Austen, “A Method of Studying ‘Normal’ Function in the Amputated Human Limb Using Perfusion,” *Journal of Bone and Joint Surgery – American Volume* 46, no. 1 (1964): 161-64; Thomas L. DeLorme, “Treatment of Congenital Absence of the Radius by Transepiphyseal Fixation,” *Journal of Bone and Joint Surgery – American Volume* 51, no. 1 (1969): 117-129.

of ten repetitions, with fifty, seventy-five, and one-hundred percent of an individual's ten-repetition maximum (10RM) lifted in each set, respectively. The change was made because fewer sets were more conducive to lifting a heavier weight, thereby producing more extensive and rapid hypertrophy than did the seven-set program. Additionally, the name was changed to reflect the idea that muscles must simply be increasingly challenged, not required to lift a weight that was "heavy."<sup>42</sup>



Figure 23. Thomas DeLorme demonstrating a manual strength evaluation. Image from *Progressive Resistance Exercise; Technic and Medical Application* (1951).

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<sup>42</sup> The article included a discussion of "counterbalancing" in which the injured limb, if unable to move through the full range of motion, was assisted with weighted pulleys. Just enough weight was provided to allow completion of the full range of motion. The assisting weight was progressively decreased, in this way, the muscle was overloaded in spite of the fact that assistance was provided. Thomas L. DeLorme and Arthur L. Watkins, "Technics of Progressive Resistance Exercise," *Archives of Physical Medicine and Rehabilitation* 29, no. 5 (1948): 263-73.

The progressive resistance program was also applied to polio patients with good results.<sup>43</sup> In a 1949 article, DeLorme and J. Roswell Gallagher reported on the gains made by applying the PRE program to adolescents with knee, lower back, or shoulder injuries.<sup>44</sup> The description of the twenty-five knee patients included six case reports about the injuries sustained and their previous treatments. Half of the patients had been told simply to rest, in spite of their significant injuries which compromised the stability of the joint. Those who were given exercises were typically prescribed only quad-setting and straight leg raises, both of which involved isometric contractions unlikely to induce significant hypertrophy or strength in the injured limb. Several of the boys had attempted to return to sports only to reinjure the previously damaged knee. The PRE protocol for this study included eight weeks of strength training on knee extension and a combination knee and hip extension exercise. At the end of the program, the boys reported much more confidence in the stability of their knees and, in a six month follow-up, none had incurred additional knee injuries in spite of their return to athletic competition. As a result, DeLorme and Gallagher emphasized to the importance of strength in injury prevention, as well as rehabilitation. Moreover, they pointed out that stronger muscles would fatigue later because each individual contraction represented a lower percentage of the muscle's maximum capacity.

The same observation had been made by Charles H. McCloy in *The Physical Educator* the previous year. McCloy, was an influential physical educator who had served as president of the American Association for Health and Physical Education and would be a charter member of

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<sup>43</sup> Thomas L. DeLorme, R.S. Schwab, and Arthur L. Watkins, "The Response of the Quadriceps Femoris to Progressive-Resistance Exercise in Polio Patients," *Journal of Bone and Joint Surgery – American Volume* 30A, no. 4 (1948): 834-847.

<sup>44</sup> J. Roswell Gallagher and Thomas L. DeLorme, "The Use of the Technique of Progressive Resistance Exercise in Adolescence," *Journal of Bone and Joint Surgery – American Volume* 31A, no. 4: 847-858.

the American College of Sports Medicine (ACSM).<sup>45</sup> In the early years of his career, McCloy had not been one of weightlifting's detractors, but he had not been particularly interested in the activity either. During World War Two a Naval Pre-Flight school moved into the field house at the University of Iowa, where McCloy served on the faculty. McCloy's students watched as the servicemen lifted weights and inquired whether he thought it would be bad for athletes. Not familiar with the impact of weight training on sport performance, McCloy sought out academic literature on the subject and quickly found that there was "almost nothing." Since he could not accept popular literature as scientific evidence, McCloy decided that experimentation was necessary. Like A.V. Hill and other exercise scientists, McCloy used himself as a test subject, reasoning that if he became "muscle bound" it would not hamper his athletic prospects as he was already fifty-five years old. Quite the contrary, after his training program McCloy found that he was stronger than he had been at twenty-one, using the same tests, and was no slower than when he had initiated his training.<sup>46</sup>

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<sup>45</sup> Jack W. Berryman, *Out of Many, One: A History of the American College of Sports Medicine* (Champaign, IL: Human Kinetics, 1995), 6, 33.

<sup>46</sup> C.H. McCloy, "Weight Training for Athletes?" *Strength & Health*, July 1955, 8-11, 39-40, 44.



Figure 24. C.H. McCloy. Image from [aahperd.org](http://aahperd.org), the official website of the American Alliance for Health, Physical Education, Recreation, and Dance.

The experiment led McCloy to encourage several master's theses on the effects of strength training. McCloy's 1948 "Endurance" article was heavily cited due to his observation, like DeLorme's, that a muscle made stronger by strength training must exert a lower percentage of its force with each contraction, enabling it to work for longer periods of time before fatiguing. As such, he recommended, "it would seem wise for physical educators to promote the development of more than 'just enough' strength."<sup>47</sup> In order to develop significant strength, McCloy advocated barbell training because, "contrary to popular physical education opinion, exercises such as pull-ups, push-ups, sit-ups and squat jumps, and some of the stiffer callisthenic drills do not develop really large amounts of strength."<sup>48</sup>

Graduate students at the University of Iowa in the late 1940s and early 1950s, thanks to McCloy's influence, became keenly interested in the production of strength and its effect on athletic performance. Edward Chui's 1948 master's thesis compared the effects of a total body strength training program, using each individual's eight to twelve repetition maximum, with the traditional physical education program required at the University of Iowa on muscular power. Chui's introduction specifically mentioned the belief that strength training would produce "muscle boundness" in spite of the fact that there was "no scientific evidence" to support that belief. Muscular power was measured by performance on vertical and broad jumps, shot put throws, and a sixty yard dash. The results showed that the weight trained group consistently increased power output, while the physical education group did not.<sup>49</sup>

Similarly, the introduction to Edward Capen's thesis mentioned the claims of Hoffman, the notions of deleterious effects of strength training, and the lack of scientific studies to validate

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<sup>47</sup> C.H. McCloy, "Endurance," *The Physical Educator* 5, no. 2 (March 1948): 9-10, 23.

<sup>48</sup> C.H. McCloy, "Adequate Overload," *Journal of Physical Education* 42, no. 4 (March-April 1945): 69.

<sup>49</sup> Edward C. Chui, "The Effect of Systematic Weight Training on Athletic Power" (MS thesis, University of Iowa, 1948).

either position. Capen's study compared the effects of a total body weight training course with those of a conditioning course that included sprints, bodyweight exercises, and gymnastics, on muscular strength, endurance, power, and cardiorespiratory endurance. The weight trained group out-performed the conditioning group in all of the performance measures, leading Capen to conclude that strength training likely did not result in muscular tightness or reduce speed.<sup>50</sup> Bernard Walters' 1949 master's thesis examined the effects of performing a set of ten to twelve repetitions or a set of twenty to twenty-two repetitions on muscular strength and endurance. Walters found that the lower repetition and higher intensity program was more effective at producing both muscular strength and endurance.<sup>51</sup> Clayton Henry compared DeLorme's PRE method to a slightly altered variation calling for use for 10RM for one set of ten, one set to fatigue, and a third set utilizing seventy-five percent of 10RM for twenty repetitions. No difference was found between the two methods in the development of strength.<sup>52</sup> Everett Faulkner tested the effects of altering the order of the sets in the PRE program, performing the first set with fifty percent 10RM, the second with 100 percent and the final set with seventy-five percent. The results were similar, regardless of the order of the sets.<sup>53</sup> McCloy student, William Teufel, compared the PRE program with five sets of ten repetitions at 10RM and found that DeLorme's program produced better strength gains.<sup>54</sup>

In addition to the growing research interest in strength training, physical educators and medical doctors increasingly came to the defense of weights by the late 1940s. For his part,

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<sup>50</sup> Edward K. Capen, "The Effect of Systematic Weight Training on Power, Strength, and Endurance" (MS thesis, University of Iowa, 1949).

<sup>51</sup> Bernard Ross Walters, "The Relative Effectiveness of High and Low Repetitions in Weight Training Exercises on Strength and Endurance of the Arms" (MS thesis, University of Iowa, 1949).

<sup>52</sup> Clayton G. Henry, "Comparison of the Effectiveness of Two Methods of Exercise for the Development of Muscular Strength" (MS thesis, University of Iowa, 1949).

<sup>53</sup> Everett W. Faulkner, "A Comparison of the Effectiveness of Two Methods of Exercise for the Development of Muscular Strength" (MS thesis, University of Iowa, 1949).

<sup>54</sup> William F. Teufel, "A Comparison of the Effectiveness of Two Methods of Exercise for the Development of Muscular Strength" (MS thesis, University of Iowa, 1952).

Arthur Steinhaus began to advocate strength training that was “much harder” than required by daily activities, although only for men.<sup>55</sup> John Thune, physical director of the central Oakland (CA) YMCA disputed the idea that strength training was bad for athletes saying, “some weight men have the finest bodily flexibility I have ever seen.”<sup>56</sup> D.E. Strain, physical director at the Winnipeg (Canada) YMCA documented an increase in membership of the bodybuilding group at his branch from twenty to 127 lifters between 1943 and 1945. Strain went on to describe the program followed by the club, which utilized the same progression scheme advocated by Hoffman.<sup>57</sup> Medical doctor J.L. Rudd authored two 1949 articles in the *Journal of Physical Education* which defended weightlifting. The first lamented the “loose talk” about weightlifting on the part of “empiricists, theorists, and not infrequently by faddists.”<sup>58</sup> In spite of all of the unfounded theories on the subject, Rudd assured readers that muscle-boundness need not develop if knowledge of the muscles and methods of proper development were utilized. Though he was an advocate of strength training, Rudd mocked the stories of Hoffman and others who claimed that weights had allowed them to overcome a physician’s prognosis that they had little time to live. “It appears that such a prognosis lengthens the life of the patient and shortens the life of the doctor,” he joked.<sup>59</sup> Rudd’s second article asserted that weightlifting was no more injurious than football, basketball, or running and specifically cited DeLorme’s work as evidence

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<sup>55</sup> The training manual depicted men lifting weights, while the women’s strength training program involved only bodyweight exercises. Arthur Steinhaus, Alma Hawkins, Charles Giaouque, and Edward Thomas, *How to Keep Fit and Like It: A Manual for Civilians and a Plan for a Community Approach to Physical Fitness* (Chicago: Consolidated Book Publishers, 1943): 6, 28-9.

<sup>56</sup> Thune also studied the personality of weightlifters to determine why some men might gravitate toward the activity. He described the weightlifters as shy, lacking confidence, and with clear desires to be strong and dominant. John B. Thune, “Defense of Weight Training,” *Journal of Physical Education* 44, no. 3 (January-February 1945): 58; John B. Thune, “Personality of Weightlifters,” *Research Quarterly* 20, no. 3 (October 1949): 296-306.

<sup>57</sup> D.E. Strain, “Body Building with Weights,” *Journal of Physical Education* 42, no. 4 (March-April 1945): 76-7.

<sup>58</sup> J.L. Rudd, “Medical Aspects of Weight Lifting – Its Use in Rehabilitation,” *Journal of Physical Education* 46, no. 3 (March-April 1949): 53-54.

<sup>59</sup> *Ibid.*, 54.

for its utility even in the infirm.<sup>60</sup> Similarly, medical doctor Joseph Wolffe published two journal articles in 1949 refuting the existence of athlete's heart. Wolffe and his co-authors suggested that no relationship was observed between sport participation and an increased risk of heart disease. They suggested that the term caught on when doctors "guess-o-metrically" recorded heart size by auscultation and percussion and that it was a relic from the time when doctors treated all heart conditions with "the three Rs: rest, more rest, and more rest."<sup>61</sup> The athlete's heart and muscle binding were not the only performance-related myths to begin to receive scientific treatment in the late 1940s – the effect of water ingestion on exercise was also investigated.<sup>62</sup>

As heavy strength training gained legitimacy in the eyes of the medical and physical education communities, competitive American weightlifting was enjoying its "Golden Age."<sup>63</sup> Owing in part to the devastation throughout Europe following the war, the United States won the World Championships every year between 1946 and 1952, with the exception of 1949, which was won by Egypt.<sup>64</sup> In their first foray into international competition in 1946, a full Russian team of ten men was bested by a short-handed American team consisting of only six lifters.<sup>65</sup> So embarrassed were the Russians by this defeat that they "bought a duplicate [trophy] from a

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<sup>60</sup> J.L. Rudd, "Weight Lifting – Healthful – Harmful?" *Journal of Physical Education* 46, no. 6 (July-August 1946): 90-91.

<sup>61</sup> Joseph Wolffe and Grover Mueller, "The Heart of the Athlete," *The Physical Educator* 6, no. 2 (May 1949): 3-5; Joseph Wolffe and Victor A. Diglio, "The Heart in the Athlete: A Study of the Effects of Vigorous Physical Activity on the Heart," *Journal of Health, Physical Education, and Recreation* 20, no. 1 (January 1949): 8-9, 62-3.

<sup>62</sup> It was believed by many coaches of this era that drinking too much water during athletics would hamper performance. Moreover, coaches often withheld water from practicing athletes to make them "tougher." This fits well with what Donald Mrozek has called a cold war "cult of toughness" which will be discussed in greater detail in Chapter Four. C. Little, H. Strayhorn, and A.T. Miller, "Effect of Water Ingestion on Capacity for Exercise," *Research Quarterly* 20, no. 4 (December 1949): 398-401.

<sup>63</sup> John Fair, "Bob Hoffman, the York Barbell Company, and the Golden Age of American Weightlifting, 1945-1960," *Journal of Sport History* 14, no. 2 (Summer 1987): 164-188.

<sup>64</sup> Bob Hoffman, "If You Want to Beat the Russians," *Strength and Health*, July 1958, 16-18; Arthur Daley, "The Musclemen," *New York Times*, May 15, 1958, 38.

<sup>65</sup> Bob Hoffman, "Results of the World Championships," *Strength & Health*, January 1947, 49.

Parisian silversmith to take home as proof of their ‘victory.’<sup>66</sup> The Russians did not compete in the World Championships again until 1950 and also declined to enter a team for the 1948 London Olympics.<sup>67</sup>

Though the initial meetings had gone well for the Americans, the Soviets started to allocate significant resources toward dominance in international athletics shortly after the end of the war.<sup>68</sup> According to James Riordan, the Soviets began offering cash incentives in late 1945 for the top three places at national championship meets, as well as broken records.<sup>69</sup> The Soviet government also established “sport schools” to facilitate the training of promising young talent. After receiving pressure on their monetary inducements for athletic performance, the government officially awarded medals instead of cash. In another step taken to make it appear that they were abiding by the formal code of amateurism, “proficient sportsmen” were assigned one of three jobs: “student, servicemen, or physical education instructor, under the sponsorship of a trade union or other (such as the army) sports society.”<sup>70</sup> The assigned employment status allowed the athletes to train as de-facto professionals, without the need to actually perform any job duties, and allowed the Soviet sports program to maintain a façade of amateurism. In addition to

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<sup>66</sup> Daley, “Musclemen,” 38.

<sup>67</sup> Bob Hoffman, “If You Want to Beat the Russians,” 16-18.

<sup>68</sup> In 1948, the Central Committee of the Communist Party began the “mobilization of vast resources in a nationwide search for sporting talent and the systematic development of athletes necessary to attain world sporting domination.” Nicholas Bourne, “Fast Science: A History of Training Theory and Methods for Elite Runners Through 1975” (PhD diss., University of Texas – Austin, 2008), 363; See also Allen Guttman, “The Cold War and the Olympics,” *International Journal of Sport History* 43, no. 4 (1988): 554-568; “Muscle Pop Through Iron Curtain,” *Life*, July 28, 1952, 15-19; James Riordan, *Soviet Sport: Background to the Olympics* (New York: New York University Press, 1980), 45-46.

<sup>69</sup> Riordan cited the Russian newspaper *Pravda* from 22 October 1945 as saying, “To stimulate greater sports proficiency, the Council of People’s Commissars of the USSR has permitted the All-Union Committee on Physical Culture and Sports Affairs to award monetary prizes for outstanding sports results. An award ranging from 15,000 to 25,000 rubles will be given for setting an All-Union record that betters the world record, and from 5,000 to 15,000 rubles will be given for setting an All-Union record; 1,000 to 3,000 (in the form of valuable gifts) for setting an All-Union junior record. Those who come first, second, or third in USSR championships will be awarded prizes to value from 2,000 to 5,000 rubles.” James Riordan, *Sport in Soviet Society: The Development of Sport and Physical Education in Russia and the U.S.S.R.* (London: Cambridge University Press, 1977), 162.

<sup>70</sup> *Ibid.*, 163.

recruiting and training athletes beginning in childhood, the government sponsored research on training programs and athletic performance and employed researchers who worked “hand-in-hand” with sport coaches.<sup>71</sup> This effort to dominate the Olympic Games and other forms of international competition began to pay off when Russia re-entered the world athletic stage in 1952.

### **THE 1950s: INVESTIGATING THE CHARGES AGAINST WEIGHT LIFTING**

Whereas the Soviets focused on melding sport training and research, there was no such connection in the United States. According to Nicholas Bourne, American coaches “often had to *extrapolate* how certain conditions would affect training from articles on military fitness or medical rehabilitation” which caused significant lag time between discoveries which could enhance sport performance and their actual implementation in sport programs. Researchers were only beginning to disprove the criticisms of weight lifting by 1950 and, as a result, professional journals read largely by coaches and physical educators still featured articles on sport training that did not suggest weight training. Dale Lewis’ article on conditioning for collegiate tennis emphasized the importance of training outside of the playing season, but only recommended calisthenics and running to prepare for playing.<sup>72</sup> Evelyn Loewendahl highlighted the importance of strength on the lower leg musculature in the powerful takeoff required for basketball, hockey, and track, among others. In order to condition the muscles to produce that power, however, Loewendahl only recommended bodyweight exercises or running and walking barefoot in sand or grass.<sup>73</sup> By May of 1950, Edward Capen had published the results of his thesis, showing that weights increased muscular strength, power, and endurance in *Research*

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<sup>71</sup> Bourne, “Fast Science,” 361.

<sup>72</sup> Dale A. Lewis, “Collegiate Tennis Conditioning,” *The Physical Educator* 7, no. 3 (October 1950): 78

<sup>73</sup> Evelyn Loewendahl, “Muscle Development in Athletic Training,” *Journal of Health, Physical Education, and Recreation* 21, no. 6 (June 1950): 331-32.

*Quarterly*.<sup>74</sup> Edward Chui's findings of increased power with strength training were published in the same journal in October.<sup>75</sup> Thomas DeLorme continued to emphasize that "passive and light resistance exercises are of little or no value" in maximizing muscle strength and hypertrophy and George Wackenhut re-emphasized that training produced a stronger heart, not a pathological one, though he did allege that strength training actually did not tax the heart enough.<sup>76</sup>

As researchers began to investigate the charges against weight lifting more systematically, there was also a growing mainstream interest in strength in the United States. The warnings about soft living and weak citizens appeared not to come to fruition during World War Two as American soldiers held their own in barbaric face-to-face combat. When the North Korean forces invaded South Korea, however, the fear of a citizenry made soft by decadence returned to the fore as the ill-prepared and poorly equipped American forces were nearly pushed off of the peninsula by communist forces.<sup>77</sup> The poor performance of American troops in the early stages of the Korean War seemed to substantiate the softness of the soldiers and those eligible to serve. To make matters worse, writer Eugene Kinkaid reported that one-third of American prisoners of war had collaborated with the enemy in some way. Combined with the

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<sup>74</sup> Edward Capen, "The Effect of Systematic Weight Training on Power, Strength, and Endurance," *Research Quarterly* 21, no. 2 (May 1950): 83-93.

<sup>75</sup> Edward Chui, "The Effect of Systematic Weight Training on Athletic Power," *Research Quarterly* 21, no. 3 (October 1950): 188-194.

<sup>76</sup> Thomas L. DeLorme, F.E. West, and W.J. Shriber, "The Influence of Progressive Resistance Exercise on Knee Function Following Femoral Fractures," *Journal of Bone and Joint Surgery – American Volume* 32, no. 4 (1950): 910-924; George Wackenhut, "The Cardiovascular System – What You Should Know About It," *Journal of Health, Physical Education, and Recreation* 21, no. 7 (September 1950): 41-2; A 1954 study would show that a season of training required by intercollegiate middle-distance running, boxing, wrestling, baseball, or water polo resulted in improved cardiovascular function. Franklin M. Henry, "Influence of Athletic Training on the Resting Cardiovascular System," *Research Quarterly* 25, no. 1 (March 1954): 28-41.

<sup>77</sup> David Halberstam, *The Fifties* (New York: Villard Books, 1993), 62-77.

fact that more than thirty-eight percent of American prisoners died during the war, more than in any previous conflict, it was charged that Americans were both physically and mentally soft.<sup>78</sup>

The physical weakness of American children was confirmed in a 1953 study by Hans Kraus and Ruth Hirschland.<sup>79</sup> The researchers administered a series of flexibility and strength tests that included examination of back and abdominal muscular endurance and hamstring and back flexibility. Kraus and Hirschland noted that nearly fifty-seven percent of American children between the ages of six and nineteen years failed at least one of the tests, while only eight percent of European children did. The reason for this disparity, they asserted, was that “European children do not have the benefit of a highly mechanized society.”<sup>80</sup> Not only were American servicemen weak, then, but the testing of children provided little hope of the situation reversing course in the near future. Concern over the fitness of American youth reached President Eisenhower, who established the President’s Council on Youth Fitness in 1956. The Council had little funding but maintained a high media presence in the late 1950s and early 1960s, working to portray fitness as a civic duty to children and their parents.<sup>81</sup>

In this context, researchers sought to determine the safety and efficacy of strength training. One of the most important studies of the early 1950s was published in the May 1951 issue of *Research Quarterly*. This frequently-cited study was authored by William Zorbas and Peter Karpovich and investigated the impact of strength training on the speed of limb movement.<sup>82</sup> In their introduction Zorbas and Karpovich noted, like Chui, that coaches and

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<sup>78</sup> Shelly McKenzie, “Mass Movements: A Cultural History of Physical Fitness and Exercise, 1953-1989” (PhD diss, George Washington University, 2008), 69.

<sup>79</sup> Hans Kraus and Ruth P. Hirschland, “Muscular Fitness and Health,” *Journal of the American Association for Health, Physical Education, and Recreation* 24, no. 10 (1953): 17-19.

<sup>80</sup> *Ibid.*, 18.

<sup>81</sup> McKenzie, “Mass Movements,” 29-40.

<sup>82</sup> Williams S. Zorbas and Peter V. Karpovich, “The Effect of Weight Lifting Upon the Speed of Muscular Contractions,” *Research Quarterly* 22, no. 2 (May 1951): 145-48. For additional information on the life and contributions of Peter Karpovich see: Jan Todd and Terry Todd, “The Conversion of Dr. Peter Karpovich,” *Iron*

physical educators often believed that strength training would slow the athlete down, while barbell enthusiasts claimed the opposite and neither had any scientific proof for their claim. The study compared the speed of three hundred non-weight lifters to three hundred men who had lifted for at least six months and were still actively doing so. In order to assess speed of movement, each group was asked to attempt two trials of twenty-four clockwise revolutions with an arm crank. Time to complete the revolutions was recorded with the result that the weightlifters were, on average, nearly two-tenths of a second faster. Zorbas and Karpovich concluded, “the findings of this study appear contrary to the common opinion of coaches, trainers, and others associated with physical education who believe that weight lifting will slow down the athlete.”<sup>83</sup>

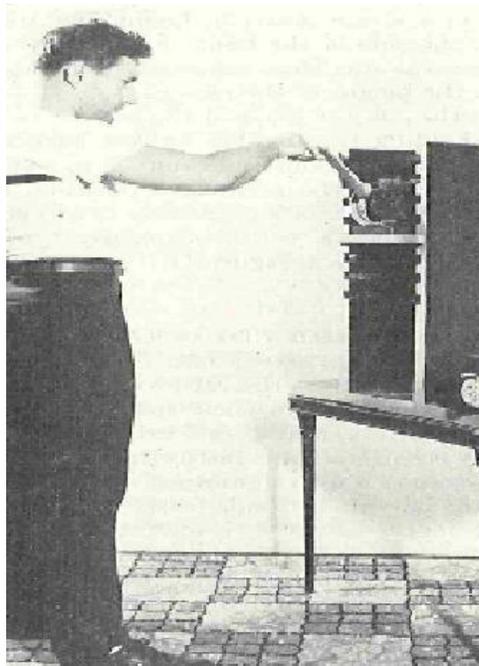


Figure 25. A picture of the arm crank apparatus employed by Zorbas and Karpovich to determine the speed of arm motion.

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*Game History* 8, no. 4 (March 2005): 4-12; Jim Murray, “Weightlifting’s Non-Lifting Patron Saint,” *Iron Game History* 4, nos. 5 and 6 (August 1997): 3-5.

<sup>83</sup> Zorbas and Krapovich, “Effect of Weight Lifting,” 148.

Earlier in the same year Karpovich had published a study on the incidence of injuries suffered by weightlifters.<sup>84</sup> The impetus for the study being the “common belief among physical educators and physicians what weightlifting is a harmful sport.”<sup>85</sup> The belief, Karpovich remarked, was one that he had shared until very recently. Data for his study included surveys of over 31,702 participants in regular, but not necessarily competitive, weight lifting. Of those surveyed, there were no cases of injury to the heart reported and the prevalence of hernias was actually lower than the population average. The most frequently cited injuries were bruises and muscle strains, the trivial nature of which led Karpovich to conclude “weight lifting is a safe sport.”<sup>86</sup>



Figure 26. Peter V. Karpovich. Image from Jack Berryman’s *Out of Many, One* (1995) page 9.

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<sup>84</sup> Peter V. Karpovich, “Incidence of Injuries in Weight Lifting,” *Journal of Physical Education* 48, no. 4 (March-April 1951): 71-2.

<sup>85</sup> *Ibid.*, 71.

<sup>86</sup> *Ibid.*, 72.

Thomas DeLorme and Arthur Watkins' important text, *Progressive Resistance Exercise: Technic and Medical Application*, intended for use by physicians and physical therapists was also published in 1951. In the foreword the chief of the orthopedic department at Massachusetts General Hospital, Joseph Barr, described the significance of their work saying that rehabilitation had been transformed from an art into a system which rested on a "sound physiological basis."<sup>87</sup> Another text, Lawrence Morehouse and John Cooper's *Kinesiology*, was targeted toward physical educators and, like DeLorme's work emphasized the importance of overload. Morehouse and Cooper stressed that simply practicing a sport would have little effect on maximizing the strength or endurance which would allow for optimal performance in the sport. Instead of repetitive practice, the coach must find a way to incorporate overload, whether that was through weighted implements or specific sprint or endurance training. The physical education professors from the University of Southern California also instructed readers that specific sport skills had little crossover between sports. To maximize performance, then, one needed to emphasize both the movements and physiological systems required by the primary sport.<sup>88</sup>

Research into the charges against weight training continued appearing in physical education journals, most notably *Research Quarterly*, throughout the 1950s. Bruce Wilkin found, in 1952, that weight training did not result in decreased speed of arm movement on a similar apparatus to that employed by Zorbas and Karpovich. It is important to note, however, that he also concluded that weight training did not result in any faster movement in untrained

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<sup>87</sup> DeLorme and Watkins, *Progressive Resistance Exercise*, xi.

<sup>88</sup> Laurence E. Morehouse and John M. Cooper, *Kinesiology* (St Louis, MO: CV Mosby, 1950): 213-16.

college students than did a semester-long swimming or golf class.<sup>89</sup> DeLorme also investigated the effect of the PRE program on muscle contraction time saying that the work was of interest to coaches and trainers who believed that “heavy exercise ‘slows down,’ ‘throws timing off,’ and makes athletes ‘muscle bound.’” After already having shown that the PRE program produced an increase in range of motion in a 1950 study, he was able to demonstrate that the program did not adversely affect the speed of contraction.<sup>90</sup> Physical educators John Masley, Ara Hairabedian, and Donald Donaldson investigated the effects of six weeks of strength training on muscular speed and coordination. Speed was assessed using the same protocol as the Zorbas and Karpovich study, while muscular coordination was measured by accuracy of hitting a target with a fencing foil. After six weeks of training, the group that lifted weights had increased both their speed of movement and coordination more than a group that had participated in a volleyball course.<sup>91</sup> Physiologist Phil Rasch, however, was unable to establish a relationship between arm strength and speed of movement. In Rasch’s study it is important to note that strength was measured using a dynamometer.<sup>92</sup> Due to different motor recruitment patterns, studies in the 1950s and 1960s which compared strength measured isometrically with speed of movement

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<sup>89</sup> The study was Wilkin’s master’s thesis at the University of California. Bruce M. Wilkin, “The Effect of Weight Training on Speed of Movement,” *Research Quarterly* 23, no. 3 (October 1952): 361-369; Bruce M. Wilkin, “The Effect of Weight Training on Speed of Movement,” (MA thesis, University of California, 1951).

<sup>90</sup> DeLorme, West, and Shriber, “Influence of PRE on Knee Function Following Femoral Fractures;” Thomas L. DeLorme, B.G. Ferris, and J.R. Gallagher, “The Effect of Progressive Resistance Exercise on Muscle Contraction Time,” *Archives of Physical Medicine* 33, no. 2 (1952): 86-92.

<sup>91</sup> This article built upon the master’s theses of Hairabedian and Donaldson. John W. Masley, Ara Hairabedian, and Donald Donaldson, “Weight Training in Relation to Strength, Speed, and Coordination,” *Research Quarterly* 24, no. 3 (October 1953): 308-315; Ara Hairabedian, “Weight Training in Relation to Strength and Speed of Movement,” (M.Ed Thesis, Pennsylvania State College, 1952); Donald Donaldson, “Weight Training in Relation to Strength and Muscular Coordination,” (M.Ed thesis, Pennsylvania State College, 1952).

<sup>92</sup> Philip Rasch, “Relationship of Arm Strength, Weight, and Length to Speed of Arm Movement,” *Research Quarterly* 25, no. 3 (October 1954): 328-32.

often found no relationship. Studies which examined the association between isotonic strength and speed of movement typically concluded that the two were related.<sup>93</sup>

Based on the favorable results of previous studies in using weight training to improve speed and power, University of Iowa graduate student Richard Garth was able to convince athletic administrators to allow him to implement a strength program for the basketball team prior to the 1954-1955 season as part of his research for his master's thesis. The Hawkeyes had finished second in the Big Ten conference in 1953-1954 and were looking to compete for the title. Garth put the players through a series of exercises that included walking squats, the clean and press, shoulder raises, and arm curls for six weeks prior to the season. After completion of the program the players were fifteen to twenty-five percent stronger and their vertical jump increased an average of two and two-thirds inches. The Hawkeyes went on to win the Big Ten title that year and continued their weight training prior to the 1955-56 season, after which they were again conference champions.<sup>94</sup> Another 1954 master's thesis evaluated the effect of six weights of upper-body strength training on fine motor skills including, picking up toothpicks, assembling nuts and bolts, threading small beads, and placing washers on pegs. At the end of his study, Frank Buckiewicz concluded that the weight program improved grip strength and performance of the fine motor tasks.<sup>95</sup>

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<sup>93</sup> Isometric exercises are those in which there is no change in muscle length. Isotonic exercises are those in which the degree of muscle tension remains constant. Free-weight and resistance-band exercises are typically considered to be isotonic exercises. For additional information, see: Nancy Hamilton, Wendi Weimar, and Kathryn Luttgens, *Kinesiology: The Scientific Basis of Human Motion* (New York: McGraw-Hill, 2012), 50-51.

<sup>94</sup> Richard L. Garth, "A Study of the Effect of Weight Training on the Jumping Ability of Basketball Players," (MS thesis, University of Iowa, 1954); C.H. McCloy, "Weight Training Routine Used by State University of Iowa Basketball Team in the Training Season Preceding the Competitive Schedule in 1954," *Journal of Physical Education* 53, no. 2 (November-December 1955): 50; McCloy, "Weight Training for Athletes?" 8-11, 39-40, 44; "Iowa Basketball Yearly Record," *2011-2012 University of Iowa Men's Basketball Media Guide*, 196, [http://grfx.cstv.com/photos/schools/iowa/sports/m-baskbl/auto\\_pdf/2011-12/misc\\_non\\_event/mediaguide-12.pdf](http://grfx.cstv.com/photos/schools/iowa/sports/m-baskbl/auto_pdf/2011-12/misc_non_event/mediaguide-12.pdf) (accessed September 22, 2012).

<sup>95</sup> Frank A. Buckiewicz, "An Experimental Study of the Effects of Weight Training on Fine Motor Skills" (MS thesis, Pennsylvania State University, 1954).

Owing largely to the validity granted to it by DeLorme's work, the techniques of strength training received closer examination by the medical community in a 1954 article in the *British Medical Journal*. University of Sheffield anatomy researcher I.J. MacQueen detailed the typical programs performed by those interested in maximizing strength or hypertrophy. The "bulk" program, he noted, involved more sets and higher repetitions than the power program, which entailed the use of maximal weights and lower repetitions. Both programs nonetheless had their place in rehabilitation as the muscles could only regain their former strength if they returned to their pre-injury size, and strength could only be maximized with heavy training. Importantly, MacQueen also mentioned, almost in passing, that weight training improves performance in other sports and that the nations which had performed the best at the most recent Olympic Games were those which "widely and intensely" practiced strength training.<sup>96</sup>

The following year, in 1955, renowned physical educator James Counsilman posed a question in the *Journal of Health, Physical Education, and Recreation*: "Does weight training belong in the program?"<sup>97</sup> "Most persons will readily agree that weight training is the fastest way to build strength and muscle size," Counsilman explained, continuing, "the question seems to be whether the person can use these muscles as well."<sup>98</sup> To address the issue of muscle-binding, Counsilman cited the recently published literature on strength training as well as an investigation he had performed at Cortland (NY) State Teachers' College. Weightlifters including Jim Parks, 1952 "Mr. America," proved to be above average in flexibility. Furthermore, he cited the work of Zorbas and Karpovich, Chui, Capen, and Wilkin to prove that strength training did not result in decreased speed of movement. DeLorme's work on atrophied

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<sup>96</sup> I.J. MacQueen, "Recent Advances in the Technique of Progressive Resistance Exercise," *British Medical Journal* 2, no. 4898 (November 20, 1954): 1193-1198.

<sup>97</sup> James E. Counsilman, "Does Weight Training Belong in the Program?" *Journal of Health, Physical Education, and Recreation* 26, no. 1 (January 1955): 17-18, 20.

<sup>98</sup> *Ibid.*, 17.

muscles was also mentioned. In conclusion, Counsilman asserted that there was “little evidence to show that weight training causes muscle boundness or slows the athlete.” As a result, “weight training has a place in the physical education program.”<sup>99</sup>

While most of the research in the mid to late-1950s was still focused on determining whether there were any deleterious effects of weight training, some researchers began to explore the best method to maximize strength, a trend that would pick up in the 1960s. Edward Capen’s 1956 “Study of Four Programs of Heavy Resistance Exercises for Development of Muscular Strength” attempted to determine the optimal number of sets and repetitions to produce strength gains. His experimental groups included one to three sets performed with loads of one to eight repetition maximums with groups further subdivided into those lifting three or five times weekly. Capen concluded that heavier loads (five repetition maximum or less) performed three times weekly appeared to optimize strength gains.<sup>100</sup>

Other researchers were not satisfied that the case could be closed on the possibility of detrimental effects of weight training. Benjamin Massey and Norman Chaudet studied the effects of six months of strength training on muscular size, strength, and flexibility. Their results showed that while both strength and size of the muscles had improved, range of motion was not reduced.<sup>101</sup> A 1957 literature review by the University of Michigan’s Paul Hunsicker and George Greey concluded that increased strength did not necessarily slow down the motion of the joint.<sup>102</sup> Ivan Kusnitz and Clifford Keeney compared the effects of a two-month weight training

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<sup>99</sup> *Ibid.*, 20.

<sup>100</sup> Edward K. Capen, “Study of Four Programs of Heavy Resistance Exercises for Muscular Strength,” *Research Quarterly* 27, no. 2 (May 1956): 132-142.

<sup>101</sup> The weight trained group did show a reduction in one of the seven flexibility measures, shoulder extension, but the authors still concluded that weight training did not adversely affect “overall” range of motion. Benjamin H. Massey and Norman L. Chaudet, “Effects of Systematic, Heavy Resistive Exercise on Range of Joint Movement in Young Male Adults,” *Research Quarterly* 27, no. 1 (March 1956): 41-51.

<sup>102</sup> Paul Hunsicker and George Greey, “Studies in Human Strength,” *Research Quarterly* 28, no. 2 (May 1957): 109-122.

program to those produced by an equivalent period in a regular physical education class. The groups were evaluated before and after for muscular size, strength, endurance, and flexibility as well as overall agility and cardiorespiratory endurance. While both groups improved after the training, the weight trained boys exceeded the physical education group in every testing category. Additionally, medical examination showed that the weight group did not experience any negative health consequences as a result of their training.<sup>103</sup> A similar study performed by Sidney Calvin on high school boys in Baltimore showed that four months of weight training not only did not decrease coordination, but actually appeared to enhance it when compared to the results of a standard physical education program. Calvin commented that, in spite of weight training's "controversial" standing, it was becoming increasingly popular and more prevalent as a conditioning tool for other sports by "leading universities and numerous high schools."<sup>104</sup> Researchers Hugh Thompson and G. Alan Stull substantiated this claim by examining the effect of a combination of swimming and weight training, or either performed in isolation, on sprint swim performance. Of the groups tested, the exclusively weight trained group was the only one which did not show an improved performance. The rest of the groups improved similarly, which included the combination swim and strength training group.<sup>105</sup>

In *The Physical Educator* Stratton Caldwell cited the work of Steinhaus, Capen, Morehouse and Cooper, and Counsilman as he asserted that strength training should enhance performance in track and field. Connecting the dots he pointed out that muscular strength was related to muscular size and, with speed dependent upon the ability to produce force, an

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<sup>103</sup> Ivan Kusinitz and Clifford E. Keeney, "Effects of Progressive Weight Training on Health and Physical Fitness of Adolescent Boys," *Research Quarterly* 29, no. 3 (October 1958): 294-301.

<sup>104</sup> Sidney Calvin, "Effects of Progressive Resistance Exercises on the Motor Coordination of Boys," *Research Quarterly* 30, no. 4 (December 1959): 387-398.

<sup>105</sup> Hugh L. Thompson and G. Alan Stull, "Effects of Various Training Programs on Speed of Swimming," *Research Quarterly* 30, no. 4 (December 1959): 479-485.

“increase in strength should bring about an increase in speed.”<sup>106</sup> YMCA program director Rembert Garris more explicitly refuted the idea of muscle-binding, saying the “misconception is formed by persons who know nothing about sport.” Garris, like Hoffman and Weider, discussed successful athletes, such as Frank Stranahan and Bob Richards, who trained with weights as validation for his claim. He also asserted that Bud Wilkerson, head football coach at the University of Oklahoma had “required bar bell exercises for his football team for years.” Regardless of one’s opinion on muscle binding he suggested that “weightlifting is taking the country by storm” as evidenced by the dramatic rise in participation in the activity at several YMCAs in the Carolinas.<sup>107</sup> Writing in *The Physical Educator*, F.A. Schmidt reaffirmed that exercise made the heart stronger and more efficient. Admonitions to stay away from sports or exercise were “well-intended but wholly unfounded warnings.”<sup>108</sup>

The middle and late 1950s also saw the publication of three important texts regarding the application of strength training to sport. *Weight Training in Athletics*, authored by Jim Murray and Peter Karpovich refuted the existence of the muscle-bound condition and cited the different adaptations made to endurance and strength training as rationale for the necessity of training programs specific to the demands of a particular sport. They pointed out a common fallacy in the muscle-bound argument, that when discussing the impact of weights on speed and flexibility, men of the heavyweight classes were most commonly used as examples of the potentially negative effects of strength training. Dr. Karpovich explained how he had come to believe in muscle-binding, saying that he had been told as a boy that a professional wrestler or strongman could not reach between his shoulder blades to scratch and had to pay a boy pennies to do his

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<sup>106</sup> Stratton F. Caldwell, “Weight Training,” *The Physical Educator* 14, no. 1 (March 1957): 17-18.

<sup>107</sup> Rembert Garris, “The Rise of Weightlifting in the YMCA,” *Journal of Physical Education* 53, no. 3 (January-February 1956): 77-8.

<sup>108</sup> F.A. Schmidt, “Opinions on Heart Exercise and Acute Heart Dilation,” *The Physical Educator* 14, no. 1 (March 1957): 10-13.

scratching for him. After seeing champion lifters and physique stars John Davis and John Grimek perform feats of strength and agility at Springfield College in the Spring of 1940, however, his mind was changed. “Both men had huge muscles and therefore should have been muscle-bound,” Karpovich explained, “but they were like the bumblebee who flies, although expert aviation engineers have proved mathematically that a bumblebee cannot fly.”<sup>109</sup> After reaffirming the positive adaptations made to strength training and emphasizing the importance of overload in eliciting those adaptations, the text concluded with a series of sport-specific strength programs. In the preface to the football program Murray pointed out the logical inconsistency of coaches who panned weight training.

There are probably many football coaches who insist that their players not use weight training, because to work against heavy resistance would make their charges ‘muscle-bound.’ These same coaches are probably the ones who work their boys hardest on the charging sled, with their heaviest line coach along for the ride. No, they wouldn’t want their men practicing resistance exercises!<sup>110</sup>

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<sup>109</sup> Murray and Karpovich, *Weight Training in Athletics*, 48.

<sup>110</sup> *Ibid.*, 114.

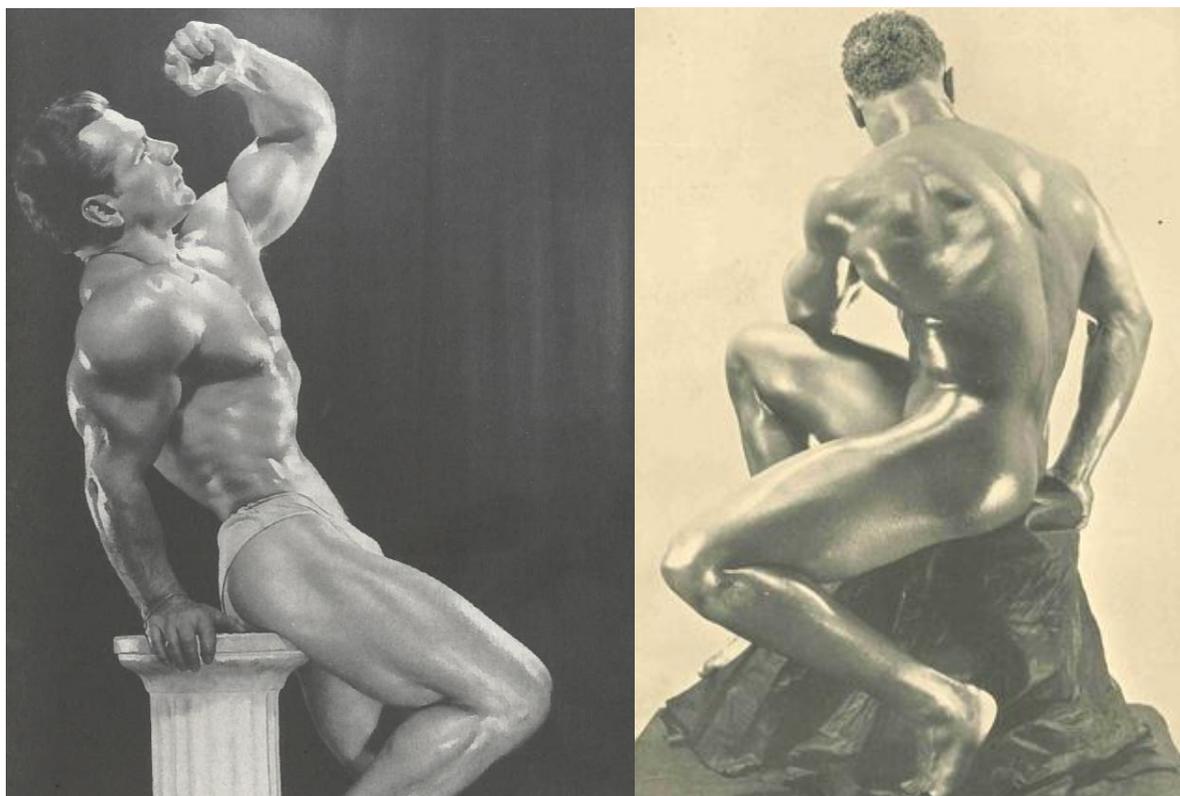


Figure 27. John Grimek (left) and John Davis. Grimek was a member of the 1936 Olympic weightlifting team and an unparalleled bodybuilder. As a bodybuilder he was so far ahead of the competition that, after he won his second Amateur Athletic Union (AAU) Mr. America title in 1941 the organization passed a rule, known colloquially as the “Grimek rule,” that competitors could not win more than once. John Davis was also in a class by himself among Olympic weightlifters. Davis won his first world championship at the age of seventeen in 1938 and would not be defeated until 1953.

Physical educators Benjamin Massey, Harold Freeman, Frank Manson, and Janet Wessel were no less dismissive in their assessment of muscle-binding, which they described as a prejudice that resulted from ignorance.<sup>111</sup> They pointed to the work of Karpovich, Capen, Chui, Masley, Murray, Wilkin and others as evidence that no such condition could be shown to exist. More importantly, Massey and his co-authors described eight principles of athletic conditioning which are still largely adhered to in designing weight programs for sports. The principles included the idea that a conditioning program should be based on an analysis of the sport and tailored to the physiological demands of that sport. Moreover, it should be based on a yearly cycle and incorporate progressive overload. “A good conditioning program,” they asserted, “like a suit, must be tailored to the situation.”<sup>112</sup> Peter Karpovich’s *Physiology of Muscular Exercise*, also published in 1959, included less applied information regarding strength training than did the earlier text he co-authored with Murray. It did, however, go into more detail regarding specific adaptations to different training stimuli including muscular hypertrophy, capillarization, changes in intramuscular fuel stores, and motor unit recruitment with training.<sup>113</sup>

At the close of the 1950s, then, the opinion of most scientific researchers was nearly unanimous that weight training did not decrease range of motion, coordination, or muscle contraction time. For their part, coaches were slow to embrace this information. A primary reason for this was that few would have taken the time to read journals like *Research Quarterly* and, if they were not made aware of the new consensus during their college coursework, they would not likely have been exposed to it. Additionally, dating back to the late nineteenth century,

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<sup>111</sup> Benjamin H. Massey, Harold W. Freeman, Frank R. Manson, and Janet A. Wessel, *The Kinesiology of Weight Lifting* (Dubuque, IA: WM. C. Brown Co., 1959), 9.

<sup>112</sup> Their eight principles included: Exercise is only one phase of the conditioning program, Physical condition is specific to a sport, Muscles may differ in kinds of condition, The conditioning program must be based on an analysis of the sport, General overall physical fitness is basic to athletic performance, The off-season conditioning program is just as important as the on-season program, Overload is essential to all development, and Boredom and laziness are the chief obstacles to “getting into shape.” Ibid., 132-133.

<sup>113</sup> Peter K. Karpovich, *Physiology of Muscular Exercise* (Philadelphia: W.B. Saunders, 1959).

coaches had been creating their own programs based on personal experience and discussions with other coaches.<sup>114</sup> With no governmental or sport authority to sponsor or translate research, many coaches viewed their profession as much an art as a science. The reticence to embrace the new research was exemplified in a satirical 1958 article for *The Physical Educator*.<sup>115</sup> The article's author, Walter Kroll, caricatured the attitude of many coaches toward more scientific sport. In "Putting Science into Coaching: A Dilemma," Kroll's fictional coach explained, "after coaching for a number of years I thought I was doing a pretty good job in my chosen profession." He continued, "after returning to do advanced graduate work, I saw the error of my ways." The coach then told a fanciful story in which he worked a host of scientific terminology into a half-time speech to a basketball team. After his jargon-laced pep talk, he declared that he now understood the true meaning of the relationship of science and philosophy. He closed, saying "P.S. Any school needing such a coach please contact me. I lost my job."

Kroll's work exemplifies Kuhn's paradigm shift. As discussed in the first chapter, physicians trained under the physiological model of limited capacities continued to warn of the dangers of over-exertion, even as newer research showed the fears were unfounded. Similarly, coaches who had crafted their training programs through experience were hesitant to embrace research as the basis for their programs.

### **THE 1960S: THE SPECIFICS OF STRENGTH TRAINING AND APPLYING STRENGTH TO SPORT**

The Russians, of course, did not share the reticence of coaches who thought like Kroll's caricature, they were more than willing to conflate science with sport. By 1960, the combination produced dramatic results. The Soviets sent observers to the 1948 Olympic Games in London

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<sup>114</sup> Andrea Johnson, "Human Performance: An Ethnographic and Historical Account of Exercise Physiology" (PhD diss., University of Pennsylvania, 2009), 54.

<sup>115</sup> Walter Kroll, "Putting Science into Coaching: A Dilemma," *Physical Educator* 15, no. 1 (March 1958): 13.

and made their Olympic debut at the 1952 Games in Helsinki, Finland. Though few of the Russian athletes had competed against world class competition prior to the Helsinki Games, one could not see their inexperience in the medal count. While they won only twenty-two gold medals to the United States' forty, the Soviets captured thirty silver medals and nineteen bronze, more than the Americans' nineteen and seventeen, respectively. According to one scoring system which allocated points for top six finishes, the Russians and Americans tied in their first Olympic contest.<sup>116</sup> In the 1956 Games in Melbourne, Australia and the 1960 Games in Rome, Italy the Russians proceeded to "trounce" the United States, in the words of an article in the *Saturday Evening Post*.<sup>117</sup>

At the Rome Games, both countries attempted to send a political message through their choice of flag-bearer for the opening ceremony. The United States chose Rafer Johnson, an African-American decathlete who attended and was the student-body president at the University of California – Los Angeles (UCLA). Johnson was the first African-American to carry the American flag and lead the team into the stadium during an opening ceremony. Respected and well-liked by his teammates his selection was due, in part, to the official desire to counteract propaganda from the Soviets about racial inequality in the United States.<sup>118</sup> The Russian delegation was headed by heavyweight lifter Yuri Vlasov, "a national hero in a culture that

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<sup>116</sup> Bourne, "Fast Science," 364; Riordan, *Soviet Sport*, 146-147.

<sup>117</sup> In the 1956 Summer Games, the Soviets amassed ninety-eight total medals which were comprised of thirty-seven golds, twenty-nine silvers, and thirty two bronze. The U.S. won seventy-four medals and second place overall with thirty-two golds, twenty-five silver, and seventeen bronze. By 1960, the gap widened to a total medal count of 103 for the Soviets (forty-three gold, twenty-nine silver, and thirty-one bronze) to seventy-one medals for the U.S. (thirty-four gold, twenty-one silver, and sixteen bronze). Donald Mrozek, "The Cult and Ritual of Toughness in Cold War America," in *Sport in America: From Wicked Amusement to National Obsession*, ed. David Wiggins (Champaign, IL: Human Kinetics, 1995), 263; "Map of Olympic Medals," *New York Times*, August 4, 2008, [http://www.nytimes.com/interactive/2008/08/04/sports/olympics/20080804\\_MEDALCOUNT\\_MAP.html](http://www.nytimes.com/interactive/2008/08/04/sports/olympics/20080804_MEDALCOUNT_MAP.html) (accessed February 7, 2013); David Maraniss, *Rome 1960: The Olympics That Changed the World* (New York: Simon and Schuster, 2008), 426; Riordan, *Soviet Sport*, 147.

<sup>118</sup> Maraniss, *Rome 1960*, 100, 10.

worshipped strength above other physical attributes.” To underscore his tremendous strength, Vlasov carried the hammer and sickle around the track using only one arm.<sup>119</sup>

America’s disappointing Olympic performances coupled with the losses in the early stages of the Korean War and the results of the physical ability tests administered by Kraus and Hirschland caused a great deal of concern among American policy-makers. In December of 1960, John F. Kennedy specifically referenced the latter two factors, as well as a high rate of Selective Service rejections when he warned that “softness on the part of individual citizens can help destroy the vitality of a nation.”<sup>120</sup> Other allegations of “soft” Americans, following the poor Olympic showing, came from Arthur Daily at the *New York Times*, International Olympic Committee President Avery Brundage, and Australian Olympic miler Herb Elliott.<sup>121</sup> In the months before the 1964 Tokyo Games, Robert Kennedy explicitly stated, “Part of a nation’s prestige in the cold war is won in the Olympic Games.” He continued, “In this quadrennial conflict the U.S. has skidded steadily for 16 years.”<sup>122</sup> As a result, Robert, like his brother John before him, called for a concerted effort to enhance youth fitness and athletic skill.

Physical educators and coaches who viewed their profession as much an art as a science were shaken not only by the dominating performances of the Russians but also by two stinging criticisms about a lack of academic rigor in the early 1960s. The first and more damning

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<sup>119</sup> It is worth noting that Johnson lifted weights as part of his preparation for the Games. Following an automobile accident in 1959, his track coach at UCLA, Craig Dixon, recommended he use weights to speed his recovery. The weights “substantially” improved his performance in the shot put, discus, and javelin throw. For his part, Vlasov easily won gold, out-totalling James Bradford and Norbert Schemansky of the United States by fifty-five and eighty-two pounds, respectively. *Ibid.*, 36-37, 108; “Rome 1960 – Weightlifting,” Olympic.org – The Official Site of the Olympic Movement <http://www.olympic.org/content/results-and-medalists/gamesandsportsummary/?sport=31728&games=1960%2f1&event=121594> (accessed February 7, 2013).

<sup>120</sup> John F. Kennedy, “The Soft American,” *Sports Illustrated*, December 26, 1960 <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1134750/index.htm> (accessed February 7, 2013).

<sup>121</sup> Maraniss, *Rome 1960*, 383-386; David W. Zang, *Sports Wars: Athletes in the Age of Aquarius* (Fayetteville, AR: University of Arkansas Press, 2001), 74.

<sup>122</sup> Robert F. Kennedy, “A Bold Proposal for American Sport,” *Sports Illustrated*, July 27, 1964 <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1076164/index.htm> (accessed February 7, 2013).

criticism was leveled by James B. Conant who, as president of Harvard University, shuttered the Harvard Fatigue Lab in 1946 after failing to see any value in it.<sup>123</sup> In 1961, Conant was hired by the Carnegie Foundation to evaluate teacher education in the United States. His 1963 book *The Education of American Teachers* contained a scathing indictment of physical education, which Conant said left him “far from impressed.” Continuing, he said that if he “wished to portray the education of teachers in the worst terms,” he would “quote from some graduate courses in physical education.” He closed by asserting that, to his mind, “a university should cancel graduate programs in this area.”<sup>124</sup> Conant’s assessment was buttressed by Franklin Henry, a physical educator at the University of California at Berkeley who voiced doubt about the academic merit of many of the courses in the physical education curriculum at his school. In the face of this public criticism, physical educators and university administrators pushed for a reorganization of the field and more emphasis on scientific research.<sup>125</sup> Strength training was one beneficiary of this new effort to “scientize” physical education, as research on strength training methodology blossomed in the 1960s.

With consensus largely achieved regarding the non-existence of muscle-binding, researchers in the 1960s shifted their attention to the application of strength training. The three primary themes of strength training research in the 1960s included: examining the effect of

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<sup>123</sup> The Harvard Fatigue Laboratory has been called the “cornerstone of exercise physiology in the U.S.” because it fostered collaboration between scientists with diverse backgrounds who were interested in the study of the effects of a variety of stressors on human physiology. The lab helped solidify exercise physiology as a separate discipline. Over the course of its twenty years of operation, the lab published “at least 352 research papers, numerous monographs, and a book.” When the lab closed, scientists interested in exercise physiology spread to universities across the country and established a host of new laboratories. As noted by Andrea Johnson, “almost all exercise physiologists inevitably trace their lineage to the Fatigue Laboratory in only one or two academic generations.” Johnson, “Human Performance,” 78; William McArdle, Frank Katch, and Victor Katch, *Exercise Physiology: Nutrition, Energy, and Human Performance* (Philadelphia: Lippincott, Williams, and Wilkins, 2010), 1-1ii; See also: Steven M. Horvath and Elizabeth Horvath, *The Harvard Fatigue Laboratory: Its History and Contributions* (Englewood Cliffs, NJ: Prentice-Hall, 1973); Carleton B. Chapman, “The Long Reach of the Harvard Fatigue Laboratory, 1926-1947,” *Perspectives in Biology and Medicine* 34, no. 1 (1990): 17-33.

<sup>124</sup> Johnson, “Human Performance,” 112-13.

<sup>125</sup> *Ibid.*, 113-14.

strength training on the speed of movement, comparing the effects of different strength training programs, and applying strength training to sport preparation.

The focus on the effect of strength training upon speed was largely the result of studies which showed an inconsistent relationship between speed of movement and muscular strength. As previously discussed, the primary reason for this disparity was the method of measurement of muscular strength. Studies commonly employed a static measure of muscle strength with a necessarily dynamic measure of speed. Due to the different motor recruitment patterns and joint angles involved in isometric and concentric muscle actions, the relationship was often low between strength and speed. Follow-up studies by the same authors produced different results.<sup>126</sup> By altering the testing position, from lying to standing or moving the measured joint to the beginning of its range of motion rather than the middle, researchers in the middle of the decade concluded that there was a relationship between muscular strength and speed of movement.<sup>127</sup> Physical educators Jim Whitley and Leon Smith concluded in 1966 that “it now seems quite apparent that, regardless of the type of strength increase program employed, a faster movement will be affected.”<sup>128</sup> It seems that other researchers agreed that the relationship was apparent, as the interaction between strength and speed was simply a component of other studies, not the focus, in the latter part of the decade.

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<sup>126</sup> David H. Clarke, “Correlation Between Strength/Mass Ratio and the Speed of Arm Movement,” *Research Quarterly* 31, no. 4 (December 1960): 570-574; David H. Clarke and Franklin M. Henry, “Neuromuscular Specificity and Increased Speed from Strength Development,” *Research Quarterly* 32, no. 3 (October 1961): 315-325; Leon E. Smith and Jim D. Whitley, “Relation Between Muscular Force of a Limb, Under Different Starting Conditions, and Speed of Movement,” *Research Quarterly* 34, no. 4 (December 1963): 489-496; Leon E. Smith, “Influence of Strength Training on Pre-Tensed and Free-Arm Speed,” *Research Quarterly* 35, no. 4 (December 1964): 554-561.

<sup>127</sup> *Ibid.*; Richard C. Nelson and Richard A. Fahrney, “Relationship Between Strength and Speed of Elbow Flexion,” *Research Quarterly* 36, no. 4 (December 1965): 455-463; John A. Colgate, “Arm Strength Relative to Arm Speed,” *Research Quarterly* 37, no. 1 (March 1966): 14-22; Jim D. Whitley and Leon E. Smith, “Influence of Three Different Training Programs on Strength and Speed of Limb Movement,” *Research Quarterly* 37, no. 1 (March 1966): 132-142; Edward F. Chui, “Effect of Isometric and Dynamic Weight-Training Exercises Upon Strength and Speed of Movement,” *Research Quarterly* 35, no. 3 (October 1964): 246-257.

<sup>128</sup> *Ibid.*, 141.

One of the most influential researchers with regard to the specific sets and repetitions to maximize strength was Richard A. Berger. He had been introduced to weight training by a high school friend, John Hagen, following their service as Marines. The two men began to train together in an old chicken coop on the Hagen family farm, in order to prepare to try-out for the Michigan State University football team. Berger made the team as a running back and continued to train with weights when football was out of season. Upon hearing that Berger had been seen lifting weights, head coach Biggie Munn advised him, "I don't want to hear about you doing any of that lifting. It's bad for you. I want you to get a summer job doing heavy construction work. That's what you need, not those weights."<sup>129</sup> Berger left the team after his second year for reasons unrelated to Munn's suggestion. He continued to lift weights and was an able competitor at the National Weightlifting Championships in the late 1950s and early 1960s. Following completion of his master's degree at Michigan State and doctorate at the University of Illinois, Berger took a position at Texas Technological Institute in Lubbock, Texas, where he performed much of his research.<sup>130</sup> Using weight training classes at Illinois and Texas Tech for his subjects, Berger put the men through a variety of programs which altered sets and repetitions to determine the optimal means of producing strength. Subjects performed one to three sets of two, six, or ten repetitions; they performed single sets of two, four, six, eight, or ten repetitions, they performed six sets with their two-repetition maximum or three sets with their ten repetition maximum, or they performed one repetition with various percentages of their one repetition maximum.<sup>131</sup> The results of each program indicated that, for optimizing strength, the most effective program

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<sup>129</sup> Terry Todd and Jan Todd, "Pioneers of Strength Research: The Legacy of Dr. Richard A. Berger," *Journal of Strength and Conditioning Research* 15, no. 3 (2001): 275.

<sup>130</sup> *Ibid.*, 275-278.

<sup>131</sup> Richard A. Berger, "Effect of Varied Weight Training Programs on Strength," *Research Quarterly* 33, no. 2 (May 1962): 168-81; Richard Berger, "Optimum Repetitions for the Development of Strength," *Research Quarterly* 33, no. 3 (October 1962): 334-38; Richard Berger, "Comparative Effects of Three Weight Training Programs," *Research Quarterly* 34, no. 3 (October 1963): 396-98; Richard Berger, "Comparison of the Effect of Various Weight Training Loads on Strength," *Research Quarterly* 36, no. 2 (May 1965): 141-146.

included multiple sets with repetitions between four and eight. Another study compared the effects of performing a set with a person's ten-repetition maximum to performing ten consecutive maximal contractions with a constantly decreasing load. Although, from a practical standpoint, it would be nearly impossible to implement such a protocol, the ten consecutive maximal contractions were found to be superior at maximizing strength.<sup>132</sup> Berger also studied the effects of isometric and isotonic strength programs on vertical jump, finding that isotonic programs were superior at improving jump height.<sup>133</sup> His other work in the 1960s included creation of a formula to compare weightlifting ability between lifters in different weight classes, description and effects of isometric training, and describing the relationship between static and dynamic leg strength and leg power.<sup>134</sup>

While Richard Berger was the most prolific researcher in the area of determining the programmatic specifics that would maximize strength gains, he was not the only researcher investigating the matter. Patrick O'Shea, an exercise physiologist and fellow competitive weightlifter also examined the effect of different set and repetition plans on strength finding, like Berger, that multiple sets performed with five to six repetitions appeared to maximize strength.<sup>135</sup> Vernon Barney and Blauer Bangerter of Brigham Young University compared two iterations of DeLorme's PRE program with two groups performing a hypertrophy or strength

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<sup>132</sup> Richard A. Berger and Billy Hardage, "Effect of Maximum Loads for Each of Ten Repetitions on Strength Improvement," *Research Quarterly* 38, no. 4 (December 1967): 715-18.

<sup>133</sup> Richard A. Berger, "Effect of Static and Dynamic Training on Vertical Jumping Ability," *Research Quarterly* 34, no. 4 (December 1963): 419-24.

<sup>134</sup> Richard Berger, "Comparison of Weight Lifting Ability Between Lifters," *The Physical Educator* 20, no. 2 (May 1963): 59-60; Richard Berger, "Effects of Isometric Training," *The Physical Educator* 22, no. 2 (May 1965): 81; Richard A. Berger and Joe M. Henderson, "Relationship of Power to Static and Dynamic Strength," *Research Quarterly* 37, no. 1 (March 1966): 9-13; A similar study was conducted by Lawrence McClements in the same issue, which examined the interplay between increased strength and muscular power. Though strength was related to power, McClements concluded that gains in strength were not related to gains in power. Lawrence E. McClements, "Power Relative to Strength of Leg and Thigh Muscles," *Research Quarterly* 37, no. 1 (March 1966): 71-78.

<sup>135</sup> Patrick O'Shea, "Effects of Selected Weight Training Programs on the Development of Strength and Muscle Hypertrophy," *Research Quarterly* 37, no. 1 (March 1966): 95-102; See also: Terry Todd and Jan Todd, "Dr. Patrick O'Shea: A Man for All Seasons," *Journal of Strength and Conditioning Research* 15, no. 4 (2001): 401-404.

program, respectively.<sup>136</sup> The authors concluded that the PRE program which incorporated fifty, seventy-five, and one-hundred percent of an individual's 10RM spread over three sets was superior for producing both hypertrophy and strength. The most significant aspect of their study, however, was the recommendation that, "all athletic teams such as football, basketball, track, etc., could benefit greatly from specifically organized programs of PRE for increased performance and the prevention of athletic injuries."<sup>137</sup> Another group of researchers from the University of British Columbia, led by J.D. Dennison, compared the effect of an eight-week program of isometric or isotonic exercises. While both increased muscular endurance and strength, isotonic exercises produced better results.<sup>138</sup> Two of the same researchers, M.L. Howell and W.R. Morford performed a similar study the following year which yielded no significant differences in muscular endurance between the isotonic and isometric groups.<sup>139</sup> Jerry Ball, George Rich, and Earl Wallis found, in 1964, like Berger had the previous year, that isometric training was not effective at improving vertical jump performance.<sup>140</sup> When comparing isometric to traditional isotonic or high-velocity isotonic training Lynn McCraw and Stan Burnham of the University of Texas found that isometric and isotonic training produced similar strength gains, while repeated high-velocity contractions improved endurance.<sup>141</sup>

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<sup>136</sup> Vermon S. Barney and Blauer L. Bangerter, "Comparison of Three Programs of Heavy Resistance Exercise," *Research Quarterly* 32, no. 2 (May 1961): 138-46.

<sup>137</sup> *Ibid.*, 146.

<sup>138</sup> J.D. Dennison, M.L. Howell, and W.R. Morford, "Effect of Isometric and Isotonic Exercise Programs on Muscular Endurance," *Research Quarterly* 32, no. 3 (October 1961): 348-52; There was quite a bit of research into isometric training in the early 1960s after three York lifters had dramatically improved their performance, purportedly because of an isometric program. In reality, their increased performance was due to the addition of the first anabolic steroid as part of their training regimen. Terry Todd, "A History of the Use of Anabolic Steroids in Sport," in: *Sport and Exercise Science: Essays in the History of Sports Medicine*, eds. Jack W. Berryman and Roberta J. Park (Urbana, IL: University of Illinois Press, 1992), 319-350.

<sup>139</sup> Maxwell L. Howell, Ray Kimoto, and W.R. Morford, "Effect of Isometric and Isotonic Exercise Programs Upon Muscular Endurance," *Research Quarterly* 33, no. 4 (December 1962): 536-40.

<sup>140</sup> Jerry R. Ball, George O. Rich, and Earl L. Wallis, "Effect of Isometric Training on Vertical Jump Ability," *Research Quarterly* 35, no. 3 (October 1964): 231-35.

<sup>141</sup> Lynn W. McCraw and Stan Burnham, "Resistive Exercises in the Development of Muscular Strength and Endurance," *Research Quarterly* 37, no. 1 (March 1966): 79-88.

A final group of studies in the 1960s sought to scrutinize more directly the impact of strength training on sport performance. Robert Campbell of Winona (MN) State University studied the effects of strength training in the first or second half of the competitive season on muscular strength, endurance and power.<sup>142</sup> His subjects included collegiate football, basketball, and track athletes. The rationale for Campbell's study design was that when coaches employed weight training, they tended to utilize it in the pre-season and then discontinue it once the season had started. He found, not surprisingly, that the group that trained early in the season and then stopped showed a decline in their fitness scores. As a result, Campbell stated that, "weight training should be started well before the competitive season and continued throughout the season."<sup>143</sup> Clayne Jensen of Utah State University investigated the impact of five different combinations of swimming and weight training on sprint swim times. Jensen found no significant differences between the groups and all improved their times.<sup>144</sup> Similarly, George Dintiman assessed the outcomes of different combinations of sprint, strength, and flexibility training on running speed, finding that the addition of strength and flexibility training increased sprint speed more than running alone.<sup>145</sup> John Alexander and his colleagues found that five weeks of isometric training increased the speed of both slap shots and wrist shots in collegiate hockey players.<sup>146</sup> Donald Brose and Dale Hanson utilized weighted baseballs and pulley-weights to investigate the impact of overloaded pitching movements on throwing velocity. Following six weeks of overload training, both groups improved throwing velocity with no

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<sup>142</sup> Robert L. Campbell, "Effects of Supplemental Weight Training on the Physical Fitness of Athletic Squads," *Research Quarterly* 33, no. 3 (October 1962): 343-48.

<sup>143</sup> *Ibid.*, 348.

<sup>144</sup> Clayne R. Jensen, "Effect of Five Training Combinations of Swimming and Weight Training on Swimming the Front Crawl," *Research Quarterly* 34, no. 4 (December 1963): 471-477.

<sup>145</sup> George B. Dintiman, "Effects of Various Training Programs on Running Speed," *Research Quarterly* 35, no. 4 (December 1964): 456-463.

<sup>146</sup> John F. Alexander, Clare J. Drake, Peter J. Reichenbach, and James B. Haddow, "Effect of Strength Development on Speed of Shooting of Varsity Ice Hockey Players," *Research Quarterly* 35, no. 2 (May 1964): 101-106.

decrease in accuracy.<sup>147</sup> Gordon Schultz analyzed the results of six different training programs on sprinting and jumping ability, shot put distance, and a timed zig-zag. The training programs included a combination of direct practice of the skills, weights, and sprinting, or each in isolation. The results indicated that strength training only improved performance when combined with direct practice.<sup>148</sup> Weight training, then, clearly had to be a component of a larger overall program in order to enhance performance.

## CONCLUSION

In 1967 John Piscapo, writing in *The Physical Educator*, declared “research evidence is abundant to advocate the desirability of strength improvement as one essential for many activities and sport skills.”<sup>149</sup> Writing in the same publication two years earlier, John Jessie quoted Gene O’Connell of the University of California – Los Angeles (UCLA) as saying, “most coaches and trainers are in favor of a weight training program, but knowledge of appropriate programs is not readily available.”<sup>150</sup> Some of the information, of course, was available. Thanks to the work of Thomas DeLorme, Richard Berger, Patrick O’Shea and others, pioneering coaches had access to experimental evidence on the most effective methods to improve strength. Unfortunately the “clearing house,” called for by Weider editor Emmanuel Orlick, to disseminate that research to the coaches who might use it did not yet exist.<sup>151</sup> Moreover, where the information was lacking was in overall program design - how to best incorporate strength training into a *comprehensive, year-round* training program for sport, that included both resistance training and conditioning.

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<sup>147</sup> It is important to note that, while both overload groups improved velocity, their improvement was not significantly greater than the traditionally trained group. Donald E. Brose and Dale E. Hanson, “Effects of Overload Training on Velocity and Accuracy of Throwing,” *Research Quarterly* 38, no. 4 (December 1967): 528-533.

<sup>148</sup> Gordon W. Schultz, “Effect of Direct Practice, Repetitive Sprinting, and Weight Training on Selected Motor Performance Tests,” *Research Quarterly* 38, no. 1 (March 1967):108-18.

<sup>149</sup> John Piscapo, “Strength,” *The Physical Educator* 24, no. 2 (May 1967): 66-68.

<sup>150</sup> John P. Jesse, “A New Look at Strength Development in Track and Field Athletes,” *The Physical Educator* 22, no. 2 (May 1965): 72-75.

<sup>151</sup> E.M. Orlick, “Editorial – Let’s Close the Scientific Sports Gap!” *All-American Athlete* 7, no. 2 (1965): 5, 46.

It can be seen from Robert Campbell's 1962 study that when coaches did include weight training, they tended to discard it during the actual season.<sup>152</sup> This is consistent with Nicholas Bourne's discussion of the different training approaches taken by western and Soviet bloc countries in the 1960s. Whereas American and other western coaches tended to break training periods into fairly simplistic preparation and competition phases, the Soviets developed training cycles which ran the course of several years with smaller cycles built in. The multi-year programs accounted for all aspects of training and allowed athletes to peak for a handful of events annually, or at the end of the macrocycle. This sophisticated program development resulted from the combined efforts of coaches, athletes, physicians and scientists. The more simplistic western approach was usually the result of planning only by coaches and athletes. A few articles on the mechanics of multi-year programs began to filter into American coaching literature in the early sixties, but many more appeared in the closing years of the decade. It was not until 1975 when Frank Dick published "Periodization: An Approach to the Training Year," that the mechanics of a year-round, multi-phase program were fully explained in the United States.<sup>153</sup> In the interim, a few coaches began to embrace weightlifting in the 1950s, but the practice did not really catch on until the 1960s. Often, the sport programs which included weight training during this era were initiated by athletes, younger coaches, or younger faculty members who had trained on their own and served as evidence of the effects of strength training.

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<sup>152</sup> Campbell, "Effects of Supplemental Weight Training," 343-48.

<sup>153</sup> Bourne, "Fast Science," 348, 387-393.

## CHAPTER FOUR: BARBELLS ON CAMPUS: WEIGHT TRAINING ON COLLEGE CAMPUSES, 1919-1969

Following passage of the Servicemen's Readjustment Act in 1944, known more informally as the G.I. Bill, millions of former servicemen flooded America's colleges. By 1947, veterans comprised forty-nine percent of college admissions and by 1956 nearly eight million of the sixteen million World War II veterans had attended college or occupational programs.<sup>1</sup> The influx strained college facilities and caused a rapid expansion of building on campuses across the country. For example, San Jose State College grew from a student population of 10,000 in the early 1950s to nearly 20,000 by 1963. The college's weight room, created by moving lockers out of an old dressing room, was used by both the physical education and athletics departments and consisted of less than 500 square feet. Similarly, the physical education facilities at Michigan State University were designed when enrollment lingered around 8,000. By 1959 enrollment stood at 20,000. As a result of the lack of facilities, the earliest weight trainers at Michigan State lifted a barbell brought by forestry student Jim Newman in a basement alcove behind the gymnasium swimming pool.<sup>2</sup> Weight training at Eastern Carolina College began when an undergraduate student asked if he could bring his weight set to the gym so that others could join him in training. Hoping interest in the activity would quickly wane, the Director of Physical Education gave permission to use a corner of a storage room for weightlifting.<sup>3</sup>

Many of the new college men were interested in weight training after being introduced to it by fellow soldiers, as part of their military training, or by enthusiastic teammates or young

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<sup>1</sup> United States Department of Veterans' Affairs, "The G.I. Bill's History," (Washington, D.C.: U.S. Department of Veterans' Affairs, n.d.), [http://www.gibill.va.gov/benefits/history\\_timeline/index.html](http://www.gibill.va.gov/benefits/history_timeline/index.html) (accessed October 9, 2012).

<sup>2</sup> Gordon C. Smith, "Barbells on Campus – Michigan State U.," *Strength & Health*, May 1959, 36.

<sup>3</sup> Neither the undergraduate student nor the "Director of Physical Education" were named in the article. N.M. Jorgensen, "The Development of Weight Training at East Carolina College," *Physical Power* 2, no. 12 (November 1961), 6.

coaches during their high school careers.<sup>4</sup> Regardless of their introduction to the iron game, the men fully intended to continue their lifting while they attended school. At Louisiana State University (LSU) students often lifted their own weight sets in their dorm rooms when the facilities or hours proved insufficient at the campus weight room. The hefting of weights in such a confined space regularly resulted in dented floors and broken furniture in the dorm rooms and led to fines for damaging university property. The practice and fines became so widespread that graduate student Sam Lyle suggested that each dormitory set aside some space for a weight room. For one dollar each semester students would be allowed to lift in the weight room of their residence hall and avoid the fees associated with damaged furniture or floors.<sup>5</sup> At the University of Iowa, the weight room was available for recreational use from 3:30 to 5:30 p.m. on three days and from 7:30 to 9:30 two evenings each week. The students apparently found the hours insufficient, however, as the weight room door was smashed from its hinges twice after hours during the 1959-1960 academic year.<sup>6</sup>

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<sup>4</sup> For example, physical educator Richard Berger was introduced to weight training by a friend who had also served in the Marines. Exercise physiologist Patrick O'Shea started training at the YMCA after encountering Junior National Champion lifter Al Kornke in high school. Many of the members of the University of Maryland's barbell club had begun lifting in high school. Terry Todd and Jan Todd, "Pioneers of Strength Research: The Legacy of Dr. Richard A. Berger," *Journal of Strength and Conditioning Research* 15, no. 3 (2001): 275; Terry Todd and Jan Todd, "Dr. Patrick O'Shea: A Man for All Seasons," *Journal of Strength and Conditioning Research* 15, no. 4 (2001): 401; Larry Walsh, "Barbells on Campus – The University of Maryland," *Strength & Health*, April 1966, 20.

<sup>5</sup> George W. Ritchey, "Barbells on Campus – L.S.U.," *Strength & Health*, July 1960, 59.

<sup>6</sup> Louise E. Alley, "Barbells on Campus – State University of Iowa," *Strength & Health*, June 1960, 25, 52.

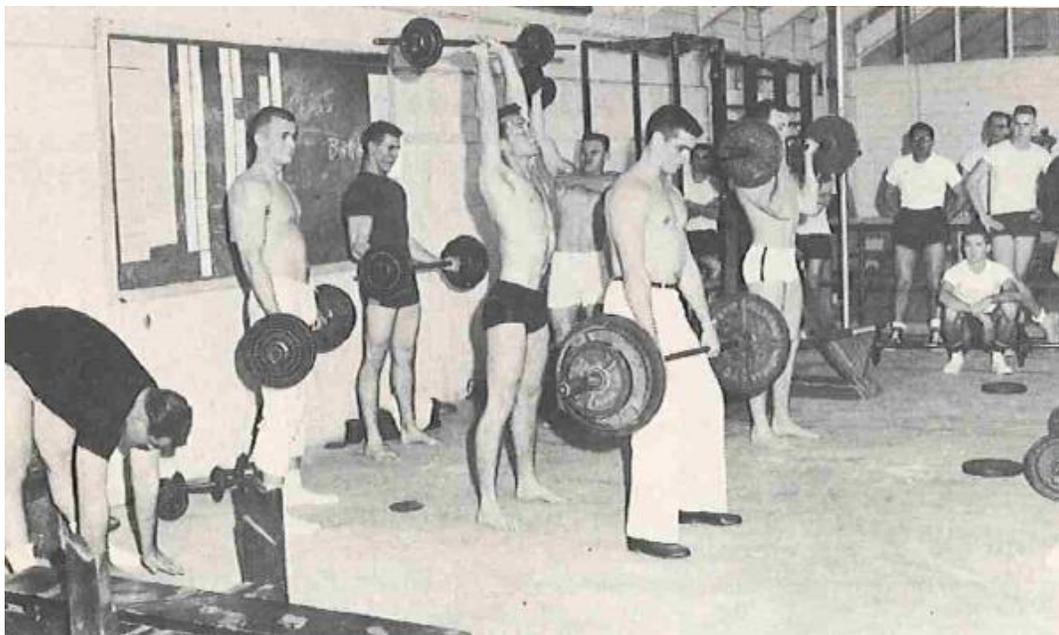


Figure 28. The “all-campus” weight room at Louisiana State University. Image from page thirty-six of the July 1960 issue of *Strength & Health*.

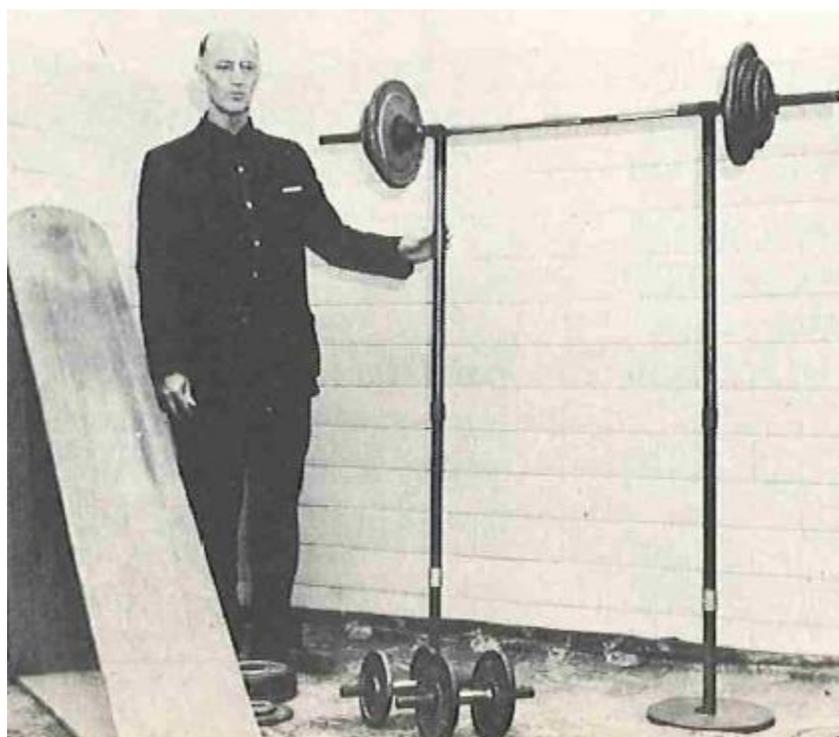


Figure 29. Weight equipment in one of the dormitories at Louisiana State University.

The passion for weight lifting displayed by the students at LSU and Iowa was at odds with the persistent fear of softness of American youth in the 1950s. Concerns about “soft” Americans fostered what historian Donald Mrozek has called a “cult of toughness” during the Cold War.<sup>7</sup> According to Mrozek, “various figures in government, organized athletics, and physical education used sport and physical training in increasingly ritualized forms to generate a tough and winning attitude in the Cold War.” Distinct from fitness, toughness was more “aggressive” and “action-oriented.” Football was a primary conduit of toughness as it was the sport most prominently associated with physical punishment, suffering, discipline and aggression. According to President Eisenhower, “football, almost more than any other sport, tends to instill in men the feeling that victory comes through hard – almost slavish – work.”<sup>8</sup> This drive for toughness altered training programs for a variety of sports and many became tests of mental as much as physical strength.<sup>9</sup>

Some of the most venerated coaches of this era were men associated with “almost slavish” work. Immortalized in the book *The Junction Boys*, “Bear” Bryant took one-hundred Texas A&M football players through a hellish 1954 pre-season camp in a desolate west Texas town.<sup>10</sup> When the camp ended only twenty-seven players had not quit. In 1962, University of Kentucky coach Charlie Bradshaw winnowed a group of eighty-eight players down to a “thin thirty” by the start of the season. University of Texas coach Darrell Royal utilized brutal drills,

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<sup>7</sup> Donald Mrozek, “The Cult and Ritual of Toughness in Cold War America,” in *Sport in America: From Wicked Amusement to National Obsession*, ed. David K. Wiggins (Champaign, IL: Human Kinetics, 1995), 257-267.

<sup>8</sup> Kurt E. Kempner, *College Football and American Culture in the Cold War Era* (Urbana, IL: University of Illinois Press, 2009), 22.

<sup>9</sup> As an example, Mrozek pointed to a 1964 *Life* magazine portrayal of swimming training at the University of Indiana which emphasized the “agony” and “training by torture” aspects of the program. “Pain was portrayed not as an accident of training,” asserted Mrozek, “but at its very core.” Mrozek, “Cult and Ritual of Toughness,” 263-264.

<sup>10</sup> Jim Dent, *The Junction Boys: How Ten Days in Hell with Bear Bryant Forged a Championship Team*, (New York: Thomas Dunne Books, 2000); Michael Oriard, *Bowled Over: Big-Time College Football from the Sixties to the BCS Era* (Chapel Hill, NC: University of North Carolina Press, 2009), 37-39.

referred to by the players as “shit drills,” as well as grueling conditioning to run off less talented players.<sup>11</sup>

The “cult of toughness,” the Second World War, the commercial promotion of barbell training, and the burgeoning research on strength training all played integral roles in facilitating the massive expansion of weight training on college campuses, which reached its stride in the 1950s. From an athletic standpoint, weight training for sport was facilitated not only by fears of falling behind the Soviets, but also the increasingly competitive environment of college sports during the 1950s and 60s.

While colleges had utilized the services of “tramp” athletes, clandestine payments, and “jobs” which compensated athletes for doing little or no work, since the earliest days of intercollegiate athletics, college students became de facto professionals in 1956.<sup>12</sup> That year the National Collegiate Athletic Association (NCAA) officially sanctioned athletic scholarships. By doing so, the major governing body for intercollegiate sport tacitly acknowledged that the players were enrolled in school for their athletic, not necessarily scholastic, abilities. By the end of the 1960s, *Sports Illustrated* writer John Underwood claimed, “from the moment the

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<sup>11</sup> It should be noted that one reason coaches used such tactics was to open up scholarships. After schools were permitted to give a limited number of scholarships based on athletic ability, coaches like Royal used harsh drills and conditioning to coerce less skilled players into quitting. Gary Shaw, *Meat on the Hoof: The Hidden World of Texas Football* (New York: St. Martin’s Press, 1972), 122-34.

<sup>12</sup> As noted by Michael Oriard, “No Golden Age of fleet and brawny dean’s-list scholars ever reigned in college football. Numerous gridiron heroes since the 1920s have undoubtedly been football players who enrolled in classes rather than students who played football, but until 1956 the colleges and universities belonging to the NCAA could claim otherwise.” Oriard, *Bowled Over*, 129. See also: Randy Roberts and James Olsen, *Winning is the Only Thing: Sports in American Since 1945* (Baltimore, MD: Johns Hopkins University Press, 1989), 73-94; Murray Sperber, *Onward to Victory: The Crises that Shaped College Sports* (New York: Henry Holt, 1998), 285-357; John Watterson, *College Football, History, Spectacle, Controversy* (Baltimore, MD: Johns Hopkins University Press, 2000), 158-176, 201-240; Michael Oriard, *King Football: Sport and Spectacle in the Golden Age of Radio and Newsreels, Movies and Magazines, the Weekly and Daily Press* (Chapel Hill, NC: University of North Carolina Press, 2001), 101-125.

outstanding athlete arrives on campus there is an unspoken understanding that he is majoring in professional sport.”<sup>13</sup>

The stage was set, then, for a massive expansion of weight training on college campuses in the decades after the Second World War. The growth was documented in a series of articles in *Strength & Health* beginning in 1959 called, “Barbells on Campus.” A few articles in the series were written by *Strength & Health* staff writers, but most were authored by a student, coach, or faculty member at the universities described. The articles detailed participation in strength training at the time of writing, as well as the history of weight training at many of the schools. While most of the articles discussed strength training programs with relatively short histories, a handful of colleges were early adopters of strength training.

#### **STRENGTH TRAINING AT COLLEGES 1919 - 1945**

One of the first colleges to embrace weight training was the University of Texas at Austin. In 1913, a wealthy Texas alumnus, former football business manager, and later Board of Regents member H.J. Lucher Stark traveled to Philadelphia to learn about weight training. Stark had enjoyed too much food and too little activity since graduating in 1910 and weighed a soft 230 pounds at the height of five feet and seven inches. To slim down, he traveled to Philadelphia to train with weights under the tutelage of Alan Calvert of the Milo Barbell Company. After two months, he had trimmed down to a muscular 180 pounds and become a fervent advocate of heavy strength training. The following year Stark convinced Houston YMCA director Theo Bellmont to take a position as the University of Texas’ first athletic director. Bellmont had been introduced to weights while working at the YMCA and was also a believer in heavy weight training. Stark traveled to Austin almost weekly and brought his Milo

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<sup>13</sup> John Underwood, “The Desperate Coach,” *Sports Illustrated*, August 25, 1969, <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1082749/index.htm> (accessed February 12, 2013).

set with him when he traveled and together the two men would lift the barbell and some dumbbells Belmont had brought from Houston. They were joined in 1914 by a freshman Roy J. McLean who used the weights to augment his wrestling. After graduating in 1919, McLean was hired by Belmont as an instructor of Physical Training and secured permission to teach what may be the first exclusive weight training class in a United States college.<sup>14</sup> McLean also coached cross country and wrestling in the 1920s and 1930s, encouraging many of those athletes to lift weights. In spite of the success of weight trained athletes under McLean's tutelage, other coaches at Texas were slow to incorporate weight training because of the entrenched fear of muscle-binding.<sup>15</sup> Heavy weight training would not become accepted at Texas until the 1960s and 1970s for most teams.

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<sup>14</sup> Roy J. McLean and Karl K. Klein, "Barbells on Campus – The University of Texas," *Strength & Health*, January 1960, 34-5, 53-7; Terry Todd, "The History of Strength Training for Athletes at The University of Texas," *Iron Game History* 2, no. 5 (January 1993): 6-13; "The Early Years," Longhorn Power: The History of Strength Training at The University of Texas, The H.J. Lutcher Stark Center for Physical Culture and Sports, <http://projects.starkcenter.org/exhibits/show/longhornpower/section2/mclean> (Accessed March 23, 2013).

<sup>15</sup> In thirteen seasons as cross-country coach, McLean's men captured thirteen conference titles. He also coached some outstanding wrestlers, including Ralph Hammond who placed fourth in the 174 pound class in the 1928 Olympic Games and lettered in football at Texas. Todd, "History of Strength Training for Athletes," 6-8.

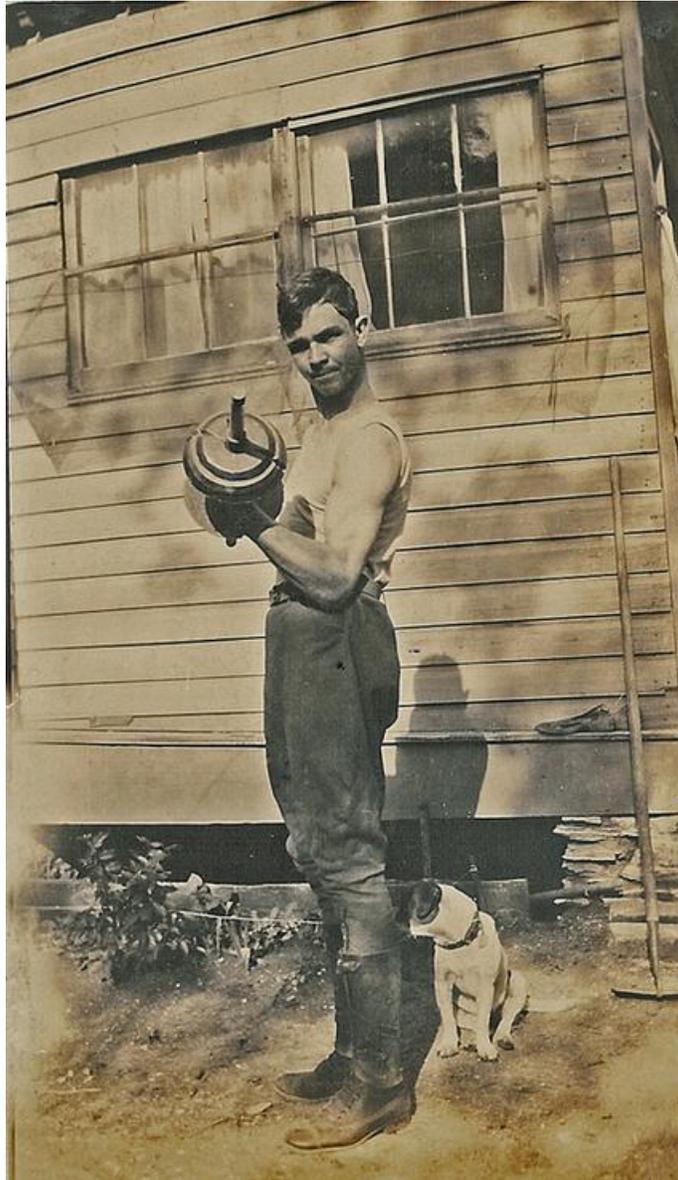


Figure 30. Roy McLean. Image from the H.J. Lutch Stark Center's online exhibit "Longhorn Power: The History of Strength Training at Texas."  
<http://projects.starkcenter.org/exhibits/show/longhornpower>

At the University of Notre Dame, Father Bernard Lange began operating a weight room in the school's old natatorium in 1935.<sup>16</sup> The door to the renowned strongman priest's sanctum was adorned with a "KEEP OUT" sign in order to ward off all but the most serious of trainees. Few were dissuaded by the sign, however, and by 1960 Lange claimed to have trained over 6,000 students in a twenty-five year span. The number is particularly impressive when one considers that Lange's gym had no official connection with either the departments of physical education or athletics. Without school support, weights for the facility were purchased by or donated to Lange. The priest even built much of the equipment, including platforms, benches and a variety of lifting machines. In spite of the lack of any official connection to the athletic department, many of Lange's trainees included Notre Dame athletes, who lifted on a voluntary basis. Some athletes were encouraged by coaches to work with Lange. Legendary coach Knute Rockne purportedly recommended weight lifting for some of his track and football men in the early 1920s. Like the situation in Texas, however, lifting would not truly be embraced until the 1960s when football coach Ara Parseghian sought Lange's advice in creating a team-wide strength program for the 1966 football season. That year the Irish would finish with nine wins, one tie, and no losses to win their first national championship since 1949.<sup>17</sup>

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<sup>16</sup> Lange served as Physical Director at the University of Notre Dame in the early 1920s before moving to Austin, Texas to pursue his Ph.D. in biology. While at Saint Edward's College in Austin he served as the Director of the Department of Physical Education before returning to Notre Dame in late 1923. After returning to Notre Dame, he no longer claimed the title of "Physical Director," but taught science courses until poor vision, a complication of diabetes, caused him to retire from the classroom in 1935. Paul Gill, "The Strength of His Convictions: Strongman Priest Bernard Lange Forged His Boys into Men of Iron," *Notre Dame News*, Spring 1987. Lange was also a regular contributor to *Strength* magazine in the early 1920s. See, for example: B.H.B. Lange, "How to Use the Gymnasium," *Strength* 6, no. 6 (February 1922):26-9, 50; B.H.B. Lange, "How to Use the Gymnasium," *Strength* 6, no. 7 (March 1922): 21-24, 62-3; B.H.B. Lange, "How to Use the Gymnasium," *Strength* 6, no. 8 (April 1922): 23-6, 58-9; B.H.B. Lange, "Football as a Bodybuilder," *Strength* 7, no. 2 (October 1922): 37-41, 66-9; B.H.B. Lange, "Football as a Bodybuilder," *Strength* 7 no. 4 (December 1922): 25-29, 72, 74, 76; B.H.B. Lange, "The Neck and How to Develop It," *Strength* 7, no. 9 (May 1923): 42-9; B.H.B. Lange, "Build up Your Back," *Strength* 8, no. 2 (October 1923):53-5, 82.

<sup>17</sup> George Otott, "Barbells on Campus – Notre Dame," *Strength & Health*, April 1960, 36-7, 55-7; R.J. Mahoney, "Barbells on Campus – Notre Dame," *Strength & Health*, October 1967, 46-8, 59; Gill, "The Strength of His

On the west coast, University of Southern California (USC) quarterback and tailback Russ Saunders used barbells to improve his football performance between 1927 and 1929. Owing to the weights, Saunders stood at five feet, seven inches and a stout 180 pounds. The versatile and hard-nosed player was a key member of USC's 1928 national championship team and was named an All-American in 1929 as well as the player of the game in the 1930 Rose Bowl. So impressive was Saunders' weight trained physique that he served as the primary model for USC's famous Tommy Trojan statue, which was unveiled in 1930. Southern California's head football coach, Howard Jones, was sufficiently impressed with the effects of weight training that he recommended it to his players throughout the 1930s as an excellent conditioner for football.<sup>18</sup> In a similar fashion to Texas and Notre Dame, however, weightlifting was not systematically employed until the early 1960s at USC.<sup>19</sup>

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Convictions;" Notre Dame Football Archives, "Year by Year Records," (South Bend, IN: University of Notre Dame Athletics, n.d.), <http://www.und.com/sports/m-footbl/archive/nd-m-footbl-archive.html> (accessed October 10, 2012).

<sup>18</sup> Gene Mozee, "The Mighty Trojans – How they Use Weights in Training," *Physical Power* 4, no. 3 (May-June 1963): 18-19; University of Southern California Athletics, "Tommy Trojan," (Los Angeles, CA: USC Athletics, n.d.), <http://www.usctrojans.com/trads/usc-tommy.html> (accessed October 10, 2012); San Diego Hall of Champions, "Russ Saunders," (San Diego, CA: Hall of Champions, n.d.) <http://www.sdhoc.com/sport/football/russ-saunders> (accessed October 10, 2012).

<sup>19</sup> Gene Mozee, "University of Southern California – National Football Champions," *Physical Power* 4, no. 2 (March-April 1963): 6-8.



Figure 31. Tommy Trojan. Image from The University of Southern California

Closer to “muscle town” and following a demonstration by Bob Hoffman and some of the York lifters, Pennsylvania State College began including weight training as part of their required physical education program for all students by 1942. The program consisted of having the boys perform the “York Simplified System of Barbell Training” during class meetings, though many would lift the weights after hours as well. Writing in January of 1943, Alan Carse asserted that the weights were responsible for the Penn State football team’s success in 1942.<sup>20</sup>

### **THE POST-WAR YEARS AND AL ROY**

After World War II, weight training began to expand at colleges and universities, but the expansion did not hit full stride until the mid-1950s. Most schools that initiated weight training classes quickly found them filled to capacity. At the University of Georgia, for example, the first weight training course was offered in the fall quarter of 1948 and by the next quarter enrollment had more than doubled and students had to be turned away. The course was introduced following the work of physical education major and former merchant marine Richard Burks, a competitive bodybuilder who had begun lifting weights in high school. After discovering there was no weight room on campus Burks put on a strength show in order to generate interest in weight lifting and to raise funds for a facility. The show included strongman acts, tumbling, muscle control, and competitive weightlifting and drummed up sufficient interest and money for the university to set aside a room for weight training. Moreover, Burks was offered a position teaching a new weight training course in the physical education department. Following the

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<sup>20</sup> During the 1942 season, Penn State went 6-1-1, defeating the Universities of Pennsylvania and Pittsburgh to claim the top spot in the state. The record was not a dramatic improvement over the previous seasons when Penn State had gone 7-2, 6-1-1, and 5-1-2. Alan Carse, “Barbell Training in Universities,” *Strength & Health*, January 1943, 24, 36-9; Pennsylvania State University Athletics, “Football Game by Game Results: 1887-1965,” (State College, PA: Pennsylvania State University, 2008), [http://www.gopsusports.com/auto\\_pdf/p\\_hotos/s\\_chools/psu/sports/m-footbl/auto\\_pdf/GamebyGame\\_2008Records](http://www.gopsusports.com/auto_pdf/p_hotos/s_chools/psu/sports/m-footbl/auto_pdf/GamebyGame_2008Records) (accessed October 11, 2012).

courses' initial success, the university appropriated funding for an additional 2,000 pounds of weights to accommodate larger classes.<sup>21</sup>

Weight training at Stanford and Michigan State universities began in 1948 and 1949, respectively. Both programs, like Georgia's, were the result of student-led initiatives. The Stanford program began following the efforts of shot putter and weight lifter Otis Chandler, with help from two other lifters, Charles Coker and John Nourse. Chandler would captain the Stanford track team in 1950, winning the Pacific Coast Conference championship that year and placing second at the national meet. An heir to a publishing fortune, Chandler found an identity in sports when he was sent far from his Los Angeles home to the Phillips Academy in Andover, Massachusetts. Highly competitive and desirous of more strength and size, he had taken up weight training after graduating from high school and bulked up from 155 pounds to 220 in his senior year of college. His achievements in the shot put were crucial to dispelling the myth of muscle-binding as many later track stars would point to his success as proof of the efficacy of strength training.<sup>22</sup> By 1956, the track team at Stanford had its own weight room. Barbell training was adopted by the Cardinal basketball team in 1958 with baseball following suit in 1959, though by 1960 weight training was still optional for football players. Due to a lack of space, physical education classes were limited to thirteen students in 1960. With seven sections offered, only ninety-one students could take weight training in a given semester, though the

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<sup>21</sup> H.T. Meaders, "Iron Men of Georgia," *Strength & Health*, April 1949, 22-3, 31-2.

<sup>22</sup> See, for example: Jim Scott, "Who Are America's Weight Trained Athletes?" *Strength & Health*, September 1960, 30-31, 59-60; Bob Hoffman, "Editorial - Barbells Build Better Athletes," *Strength & Health*, April 1955, 63; James P. Tuppeny, "Barbells on Campus - Weight Training for Track and Field Men at Villanova," *Strength & Health*, March 1959, 28-9, 54-6.

weight room was kept open extra hours three days each week to accommodate recreational training.<sup>23</sup>

The weight lifters at Michigan State were not discouraged by a lack of facilities and lifted in an alcove behind the school's swimming pool from the barbell club's inception in 1949 until a new facility was provided in the Men's Intramural Building in 1959. The facility was fashioned with input from former head football coach, then athletic director, Clarence "Biggie" Munn. After construction, Munn mentioned the 1,400 square foot weight room with pride, citing his membership in President Eisenhower's Physical Fitness Program and his understanding of the importance of strength in total fitness. The new weight room had so much space allotted for strength training, that it was subdivided into space for beginners' weight training classes, bodybuilding, and competitive weightlifting. The room was kept open seven days each week for recreational or competitive lifting. By 1959, the Spartan swim team had begun lifting as part of their regular workouts, though weight training for other sports continued to be voluntary and unsupervised through 1962.<sup>24</sup>

The year before Michigan State unveiled their new facility, weight training at Louisiana State University received a spark when its weight trained football team captured the 1958 national championship. The prior season the Tigers had garnered the pedestrian record of five wins and five losses, having lost four in a row and only salvaging a .500 record by beating Tulane in the final game. Prior to the Tulane game, LSU coach Paul Dietzel told a friend, "If I

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<sup>23</sup> Wesley Ruff, "Barbells on Campus – Stanford University," *Strength & Health*, March 1960, 24-5, 59; David Shaw and Mitchell Landsberg, "L.A. Icon Otis Chandler Dies at 78," *Los Angeles Times*, February 27, 2006, Monday, <http://www.latimes.com/la-me-chandler-obit,0,3386861.story?page=1> (Accessed October 10, 2012); Jim Scott, "Who Are America's Weight Trained Athletes?" *Strength & Health*, September 1960, 30-31, 59-60.

<sup>24</sup> Gordon C. Smith, "Barbells on Campus – Weightlifting at Michigan State U.," *Strength & Health*, May 1959, 36-7, 60-1; Pat O'Shea and G.I. Strahl, "Barbells on Campus – Michigan State," *Strength & Health*, January 1962, 36-7, 51-3, 55.

don't win this game, I'm through as a football coach.”<sup>25</sup> He had good reason to fear for his job, having finished with just three wins and losing records in the 1955 and 1956 seasons.<sup>26</sup> Shortly after the 1957 season, Dietzel was paid a visit by Baton Rouge gym owner Alvin Roy, who offered to set up a weight training program for the team. Dietzel was hesitant because he had been taught that large muscles were synonymous with slowness, but after disappointing results in his only three seasons at LSU, he was willing to listen to Roy's offer. Roy was not completely unknown to Dietzel as his two star running backs, Billy Cannon and Jimmy Taylor, both trained under Roy's tutelage. For his part, Roy had shared Dietzel's belief that weight training caused muscle-binding before being assigned to work as the *aide de camp* for the American weightlifting team while he was serving in the Army in 1946. After witnessing the speed and power of the world champion weightlifting team and visiting with Bob Hoffman, Roy was no longer concerned that weights would slow down athletes.<sup>27</sup> He was doubly confident in what he was proposing to Dietzel because this was not the first time he had made this type of offer to a desperate football coach.

In November of 1954, Roy had visited the coach of the Istrouma Indians, James “Big Fuzzy” Brown, under similar circumstances. Istrouma High School, located in Baton Rouge, was Roy's alma mater and had closed out the 1954 season with a crushing defeat by cross-town rival Baton Rouge High School. Though the Indians had a respectable 9-2 record, the loss had kept them out of the state playoffs. Roy had made a similar pitch to Brown several years earlier, but after the 1954 setback, Brown was finally willing to listen. Roy brought weight equipment to

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<sup>25</sup> Louisiana Sports Hall of Fame, “Jimmy Taylor,” (Natchitoches, LA: Louisiana Sports Hall of Fame, n.d.) <http://www.lasportshall.com/inductees/football/jimmy-taylor/?back=inductee> (accessed October 11, 2012).

<sup>26</sup> “Year by Year Results,” *Louisiana State University Football Media Guide* (Baton Rouge, LA: Louisiana State University Athletics, 2011), 157  
[http://www.lsusports.net/ViewArticle.dbml?DB\\_OEM\\_ID=5200&ATCLID=205181481](http://www.lsusports.net/ViewArticle.dbml?DB_OEM_ID=5200&ATCLID=205181481) (accessed October 11, 2012).

<sup>27</sup> Terry Todd, “Al Roy: The First Modern Strength Coach,” *Journal of Physical Education, Recreation, and Dance* 79, no. 8 (2008): 14; Terry Todd, “Al Roy: Mythbreaker,” *Iron Game History* 2, no. 1 (January 1992): 12-16.

the school and the team began required weight workouts during spring football practice, beginning in the first week of January. Though only required to lift during spring practice, most of the team continued to lift three times each week throughout the spring and into the summer. When fall football practice started, only one member of the forty man roster had failed to gain at least nine pounds. Fullback Billy Cannon had increased his size from 172 to 196 pounds, while tackle Luther Fortenberry and tight end Billy Castilaw had added fifteen and thirty-two pounds, respectively. In addition to size, many of the players had increased their strength two to three fold after eight months of training. The results were remarkable as Istrouma went undefeated in 1955, scored more points than any team in Louisiana history, and easily outpaced Fair Park High School of Shreveport in the championship game 40-6. This margin of victory was the largest ever in a championship game. Additionally, the Indians placed four players, including Cannon and Fortenberry, on the “all-state” team, the first time a school had ever done so. After his stellar football season, Cannon went on to excel in track where he won three gold medals at the state meet between the 100 and 220 yard dashes and the shot put.<sup>28</sup> Cannon was recruited heavily by Dietzel and chose to attend LSU that fall.

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<sup>28</sup> Bob Hoffman, “Barbells Build Winning Football Team,” *Strength & Health*, May 1956, 8-9, 39-40, 42; Ace Higgins, “Football’s Weightlifting All-American – Billy Cannon,” *Strength & Health*, November 1959, 34-5, 57.

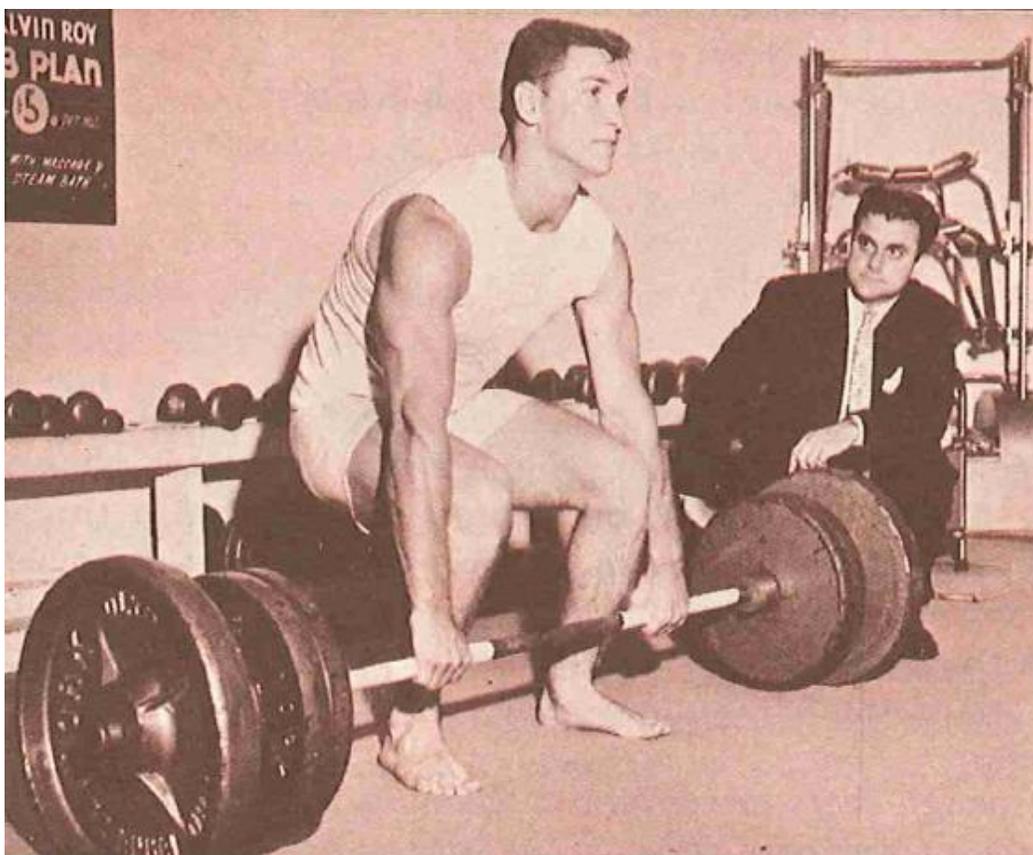


Figure 32. Billy Cannon deadlifting under the watchful eye of Al Roy. Image from page thirty-five of the November 1959 issue of *Strength & Health*.

The results of Roy's handiwork, then, were not completely unknown to Dietzel. In addition to Cannon, halfback and weight trainer Jimmy Taylor also excelled for the Tigers. Dietzel described Taylor as "bull strong" and "hard as a rock" but still possessing soft hands. In describing how he overcame his trepidation about weight training, Dietzel explained, "all I can say is that after seeing what Taylor and Cannon could do and after listening to Al, I was sold."<sup>29</sup> As he had done for Istrouma three years earlier, Roy brought weights to campus and put the team through a weight lifting program. The program was a basic one, consisting of ten to fifteen repetitions and two sets of seven exercises. The exercises included squats, rows, deadlifts, stiff-

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<sup>29</sup> Todd, "Al Roy: Mythbreaker," 15.

legged deadlifts, calf raises, bench presses, and overhead dumbbell presses. The players lifted throughout the spring and summer of 1958. Prior to the season, the Tigers had been picked to finish ninth in their conference. By season's end, however, they were the only major untied and undefeated team in the country.<sup>30</sup> Billy Cannon led the way finishing as a unanimous "All-America" selection and the Southeastern Conference's (SEC) player of the year. He was joined on the All-American list by two-way lineman Max Fugler and two other backs, Johnny Robinson and Warren Rabb, were named to the All-Conference team. The national championship was LSU's first and garnered SEC "Coach of the Year" honors for Paul Dietzel. Billy Cannon would go on to win the Heisman trophy in 1959 and is still hailed as "the greatest football player ever to don the purple and gold."<sup>31</sup> By 1960, all athletic teams at LSU were training with weights in a dedicated weight room at Tiger Stadium, while the rest of the student body had access to a physical education weight room as well as facilities in the dormitories.<sup>32</sup> For his part, Al Roy moved on to helping the San Diego Chargers of the American Football League (AFL) in 1963. His program produced similar results in professional football, where the Chargers captured the 1963 AFL championship after having gone 4-10 the prior season.<sup>33</sup> Roy's work as a coach who oversaw only the strength training aspect of the players' development led historian Terry Todd to label him as the "first modern strength coach."<sup>34</sup>

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<sup>30</sup> Higgins, "Billy Cannon," 35.

<sup>31</sup>"All Americans," *Louisiana State University Football Media Guide* (Baton Rouge, LA: Louisiana State University Athletics, 2011), 164.

<sup>32</sup> Ritchey, "Barbells on Campus – LSU," 36-7, 59-60.

<sup>33</sup> Matt Chaney, *Spiral of Denial: Muscle Doping in American Football* (Missouri: Four Walls Publishing, 2009): 46-7; Alvin Roy, "The Strength Program of the San Diego Chargers," *Strength & Health*, January 1965, 14-17, 62-6.

<sup>34</sup> Todd, "Al Roy: The First Modern Strength Coach," 14-16.

## A “DISTINCT ADVANTAGE” IN THE MID AND LATE 1950s

Louisiana teams were not the only teams to experience dramatic turnarounds in the mid and late 1950s after including strength training. The University of Washington Huskies experienced a similar turnaround the following year after coach Jim Owens mandated weight training before the 1959 season. The 1958 Husky squad had gone 3-7. The weight-trained 1959 group went 10-1 and smashed Wisconsin in the Rose bowl 44-8, finishing as the eighth ranked team in the country by the Associated Press.<sup>35</sup> The “Flying L’s” of Fort Lauderdale, Florida participated in a weight training program in preparation for the 1955 high school football season. Twenty-eight boys took part in a voluntary training program created by local gym owner Al Christensen. He offered to train the boys at the high school some afternoons and during the evenings at his gym three times each week for eight weeks. The training program was similar to Roy’s, employing two sets of ten to fifteen repetitions on eleven different exercises. The team’s coach, Bill Armstrong, commented that they boys reported for fall camp with more confidence and a new attitude. Both were on display that season as the L’s went 9-1, winning their conference championship and recording the best record in school history.<sup>36</sup> After the season coach Armstrong commented that he was “sold on weight training.”<sup>37</sup>

At Southeastern Missouri State University (SEMO), weight training for football started after one of the team’s best players petitioned the coach, Kenneth Knox, to make the training team-wide and mandatory. The player, Marvin Rosengarten, was an outstanding lineman and competitive weightlifter who would go on to be a Missouri state champion in weightlifting. Rosengarten crafted the weight program with assistance from line coach Jim Hamby, a former

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<sup>35</sup> Scott, “Who are America’s Weight Trained Athletes?” 30; University of Washington Athletic Department, “All-Time Football Results,” (Seattle, WA: University of Washington Athletics, n.d.), <http://www.gohuskies.com/sports/m-footbl/archive-1950-1959.html> (accessed October 12, 2012).

<sup>36</sup> Joe Kolb, “Weight Training for Football – The Fort Lauderdale Story,” *Strength & Health*, May 1956, 10, 42, 44.

<sup>37</sup> *Ibid.*, 42.

Notre Dame football player, and physical education instructor Joe Uhls. The program consisted of two sets of seven exercises with the first set performed for twelve repetitions and the other for five. The program was performed in the off-season and utilized two to three days weekly. Following implementation of the weight program prior to the 1955 season, the SEMO Indians went on to smashing success, winning five conference championships in the following eight years and twice placing second.<sup>38</sup> The basketball players at SEMO also began training with weights in 1959, although their results were less dramatic than their football counterparts.<sup>39</sup>

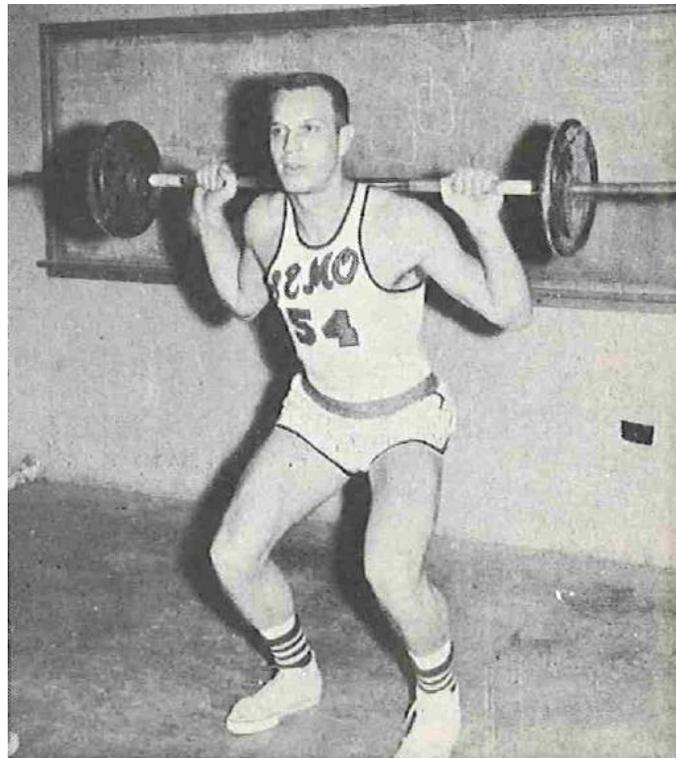


Figure 33. SEMO basketball player Les Hammer added four inches to his vertical jump following implementation of the strength program. Image from page twenty-eight of the November 1960 issue of *Strength & Health*.

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<sup>38</sup> Joe Uhls, "Football + F.I.C. = Stronger Football Players," *Strength & Health*, October 1963, 28-9, 50, 53.

<sup>39</sup> In the three seasons preceding the introduction of the weight program, the SEMO basketball team had gone 5-13, 11-9, and 11-9. In the three seasons after the introduction of strength training, the team went 13-9, 25-3, and 18-7. "Year by Year Records," *Southeast Missouri State University Men's Basketball Guide* (Cape Girardeau, MO: Southeast Missouri State University Athletics, 2012), 102 [http://www.gosoutheast.com/news/2012/10/19/MBB\\_1019121007.aspx](http://www.gosoutheast.com/news/2012/10/19/MBB_1019121007.aspx) (accessed February 13, 2013); Uhls, "Weight Training for Basketball," 28-9, 47-8.

Not every team could boast a dramatic turnaround, but the increase in the number athletes training with weights in the mid-1950s was dramatic. At tiny Catholic Stonehill College in Easton, Massachusetts, many of the varsity athletes began to train with weights after Brother Joseph Faul established a weightlifting club in 1952.<sup>40</sup> Similarly, athletes at Eastern Washington College began to lift as members of the barbell club after physical education professor Jack Leighton brought his own weights to the school in 1954.<sup>41</sup> At Temple University in Philadelphia, the weight program started when physical education professor Joseph Carroll was able to secure funding for barbells in 1955. The new facility was used for physical education classes, general recreation, and athletic teams. By 1960, all Temple athletes were encouraged to lift.<sup>42</sup> The track team at another Philadelphia-area school, Villanova University, also began to lift weights in the mid-1950s. Assistant track coach James Tuppeny admitted to having been biased against weights in his younger years, but after seeing the results of Otis Chandler, Irving Mondschein, Bob Richards, and others, he could no longer believe that strength training would hamper performance. By 1959, all of the Villanova track men went through a three-phase weight workout leading up to the competitive season. The first phase was performed by all athletes and included training three times each week. The second phase tapered lifting for runners, while increasing volume for field events. By the third phase, all athletes had decreased the frequency and volume of their training in preparation for the season.<sup>43</sup> Springfield (MA) College's track coach, Vern Cox, similarly recommended progressive weight training for all of

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<sup>40</sup> Founded in 1948, Stonehill enrolled just six hundred students by 1961. Joseph Faul, "Barbells on Campus – Stonehill College," *Strength & Health*, March 1961, 34-5, 61.

<sup>41</sup> Jack R. Leighton, "Barbells on Campus – Eastern Washington College of Education," *Strength & Health*, December 1961, 34-5, 50-2.

<sup>42</sup> Sidney Glauser, "Barbells on Campus – Temple University," *Strength & Health*, May 1960, 28-9, 52-4.

<sup>43</sup> According to David Maraniss, Villanova's track program was "renowned" and widely respected in the late 1950s and early 1960s. David Maraniss, *Rome 1960: The Olympics that Changed the World* (New York: Simon and Schuster, 2008), 178; Tuppeny, "Barbells on Campus," 28-9, 54-6; Norm Harvey, "Barbells on Campus – Villanova University," *Strength & Health*, October 1968, 24-5, 76-9.

his athletes, with particular emphasis on its importance for shot putters and other throwers. The basketball team at Springfield began team-wide pre-season training in 1957 and by 1959, the football and wrestling teams were also spending time in the weight room to prepare for their seasons.<sup>44</sup> The first athletes to train with weights at New York University (NYU) were the “weight men” of the track team. Shot putter Jerry Monkofsky convinced coach Joe Haley of the value of the exercises and they were soon used by men in a variety of events. Within two years, weight lifting was recommended by coaches of the NYU baseball, basketball, wrestling, and swimming teams.<sup>45</sup> The athletic department at the University of Illinois also supported weight training, though on a voluntary basis, for all athletes by 1960.<sup>46</sup>

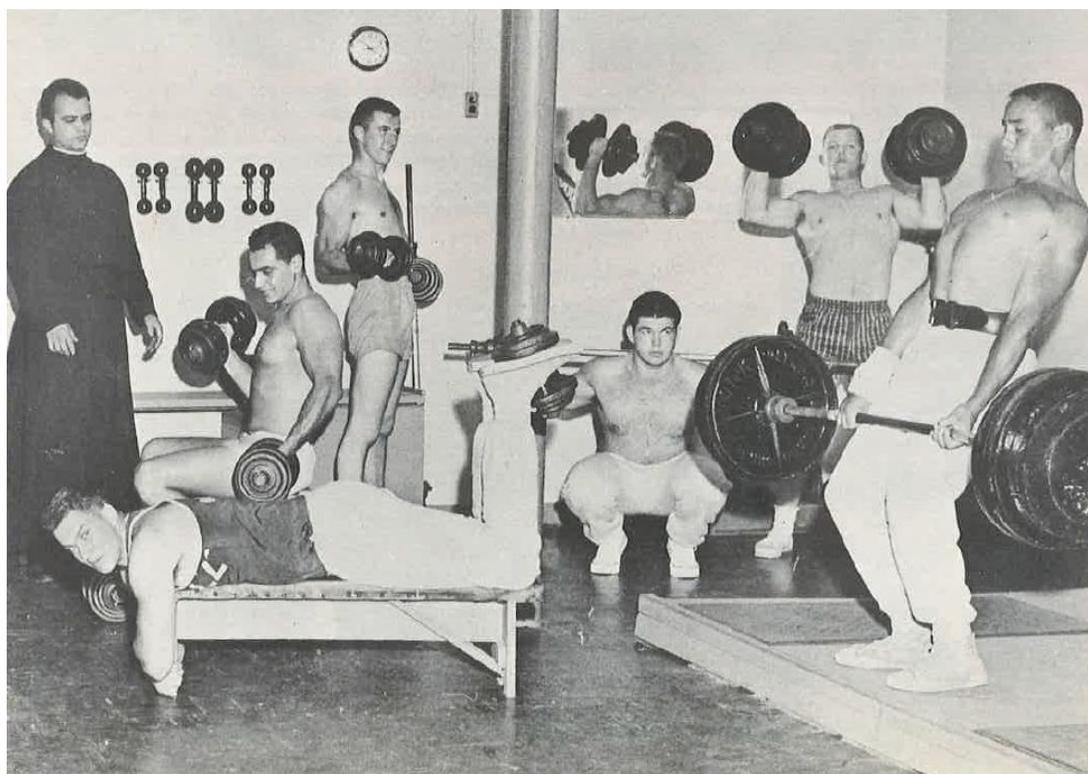


Figure 34. A weight training session at Stonehill College, supervised by Brother Joseph Faul (at left). Image from March 1961 issue of *Strength & Health*, page 34.

<sup>44</sup> Dave Baillie, “Barbells on Campus – Springfield College,” *Strength & Health*, December 1959, 34-5, 51-4.

<sup>45</sup> Goldenberg, “Barbells on Campus – New York University,” 30-31, 55-7.

<sup>46</sup> William Hottinger, “Barbells on Campus – University of Illinois,” *Strength & Health*, January 1961, 36-7, 51-2.

## A “NECESSITY” BY THE 1960s

In 1962, football line coach for the California Golden Bears, John Neumann, declared that, “up until a short time ago, it was a distinct advantage for a coach to utilize weight training methods in conditioning and developing his athletes.” In the early sixties, things had changed, however, and strength training became “absolutely necessary if a team is to compete on par with its opponents.”<sup>47</sup> Required, rather than encouraged, weight training became more prevalent at many major college programs. Neumann went on to assert, “almost without exception, every track and football team on the West Coast makes use of weight training in one form or another in its total program. The school that does not is rare indeed.”<sup>48</sup> Neumann’s Golden Bears trained with weights in the off-season. The program included testing to evaluate players’ specific strengths and weaknesses, such as muscular power, strength, or endurance and individual lifting programs would be tailored accordingly, based on those results. Neumann stressed the importance of specificity both in training the muscles used in football and in training them to contract either forcefully or quickly depending on the goals of a training session. The thrice weekly training program consisted of light, medium, and heavy days with the medium day modeled after DeLorme’s PRE protocol.<sup>49</sup> The strength program for football players at California started in 1960 when new head coach Marv Levy hired Neumann away from the University of New Mexico. Unfortunately for the Golden Bears, the results of the weight program were not the same as those experienced by LSU or Washington. After having gone 2-8

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<sup>47</sup> John Neumann, “Barbells on Campus – The University of California,” *Strength & Health*, February 1962, 40-41.

<sup>48</sup> *Ibid.*, 41.

<sup>49</sup> *Ibid.*, 40-41, 56-7; John Neumann, “Weight Training for Football Players,” *Strength & Health*, October 1959, 28-9, 50, 53-6.

prior to Levy's hiring, California proceeded to go 2-7-1, 1-8-1, 1-9, and 4-5 in Levy's four seasons as head coach.<sup>50</sup>

Newly appointed Wake Forest head football coach, Bill Hildebrand, implemented team-wide weight training in the spring of 1960. The program was crafted with significant input from baseball coach Gene Hooks. Hooks was chosen because he had implemented weight training for all of the baseball players the previous season with great success, splitting the Atlantic Coast Conference championship in 1959. Additionally, Hooks was a professor in the physical education department and had done research for his doctoral dissertation on the impact of strength on baseball skills.<sup>51</sup> The spring weight program for football resulted in "probably one of the best springs in the school's history." The results would not translate to the fall season, however, as many players did not continue their training over the summer and the "Demon Deacons" managed to win only two games, while losing eight. Hildebrand's record at Wake Forest was not unlike Levy's at California, and the team won only seven games out of forty played in his four-season tenure in Winston-Salem. In spite of football's lack of success, other coaches at the school adopted off-season strength training, including swimming coach Leo Ellison and track coach Bill Jordan. The basketball team still trained on a voluntary basis in the early 1960s but coach "Bones" McKinney had gone from a "die-hard opposer of weight training," to heartily endorsing it.<sup>52</sup>

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<sup>50</sup> "History of Cal Football, Year-by-Year," *University of California Football Media Guide* (Berkeley, CA: University of California Athletics, 2007), 153, [http://www.cstv.com/auto\\_pdf/p\\_hotos/s\\_chools/cal/sports/m-footbl/auto\\_pdf/pdf-07FB151to190-072007](http://www.cstv.com/auto_pdf/p_hotos/s_chools/cal/sports/m-footbl/auto_pdf/pdf-07FB151to190-072007) (accessed October 12, 2012).

<sup>51</sup> Eugene G. Hooks, "The Prediction of Baseball Ability Through an Analysis of Selected Measures of Structure and Strength" (PhD diss., Vanderbilt University, 1957).

<sup>52</sup> Gene Hooks, "Barbells on Campus – Wake Forest University," *Strength & Health*, November 1961, 28-9, 49-51; "All-Time Results," *Wake Forest University Football Media Guide* (Winston-Salem, NC: Wake Forest University Athletics, 2008), 192, [http://www.wakeforestsports.com/auto\\_pdf/p\\_hotos/s\\_chools/wake/sports/m-footbl/auto\\_pdf/08-mg-sec12](http://www.wakeforestsports.com/auto_pdf/p_hotos/s_chools/wake/sports/m-footbl/auto_pdf/08-mg-sec12) (accessed October 12, 2012).

While weight training did not work out for the California or Wake Forest football teams, its success at LSU forced at least one other football powerhouse to adopt off-season weight training. After being shut-out by the weight-trained Tigers in the 1963 Cotton Bowl, coach Darrell Royal instructed his staff to implement a program of heavy weight training.<sup>53</sup> The Longhorns had done quite well under Royal, never finishing with a losing record in his first six seasons in Austin. In fact, they had been ranked as the top team in the country by the Associated Press during both the 1961 and 1962 seasons, but were unable to finish the seasons unblemished and fell out of the top spot both years. The Longhorns had done some weight training during those seasons, following a program designed by athletic trainer Frank Medina. Medina's view of weight training was shaped by a film of the training employed by the Northwestern University football team, which used light weights and high-repetitions in the 1950s. "A pair of twenty or twenty-five pound dumbbells is enough for anybody, no matter how big and strong he is," Medina claimed.<sup>54</sup> In keeping with this philosophy, Medina put the players through grueling workouts with ankle weights, wrist weights, weighted vests, and dumbbells. The players referred to the workouts as "Medina sessions" and they regularly performed hundreds of repetitions in a heated locker room. In keeping with the "cult of toughness," the goal of the training was as much mental toughness as it was physical performance. To truly enhance the players' physical strength, however, a four-phase program was designed and implemented by physical education professor Stan Burnham in the spring of 1963. The first phase consisted of circuit training with progressively heavier weights performed in less time. This type of lifting was done in the lead-up to spring football. After spring football ended, the players lifted heavy

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<sup>53</sup> Terry Todd, "Progressive Resistance for Football at The University of Texas," *Strength & Health*, September 1964, 18-19, 52, 54, 56; University of Texas Football Official Website, "All-Time Results," (Austin, TX: University of Texas Athletics, n.d.) <http://www.mackbrown-texasfootball.com/sports/m-footbl/spec-rel/all-time-results.html> (accessed October 12, 2012).

<sup>54</sup> Todd, "A History of Strength Training for Athletes at the University of Texas," 9.

weights for two sets of five to ten repetitions until school ended. Over the summer the players trained on their own with heavy weights, if available, or by doing various body-weight drills if they were not. As the summer proceeded, more and more running was performed to prepare for the season. During the season, only a handful of players deemed to have “special needs” were required to lift, and then only once weekly.<sup>55</sup> Burnham’s program apparently succeeded in getting the Longhorns over the hump as they went undefeated in 1963, handily defeated second-ranked Navy in the Cotton Bowl 28-6, and claimed the school’s first football national championship.<sup>56</sup>

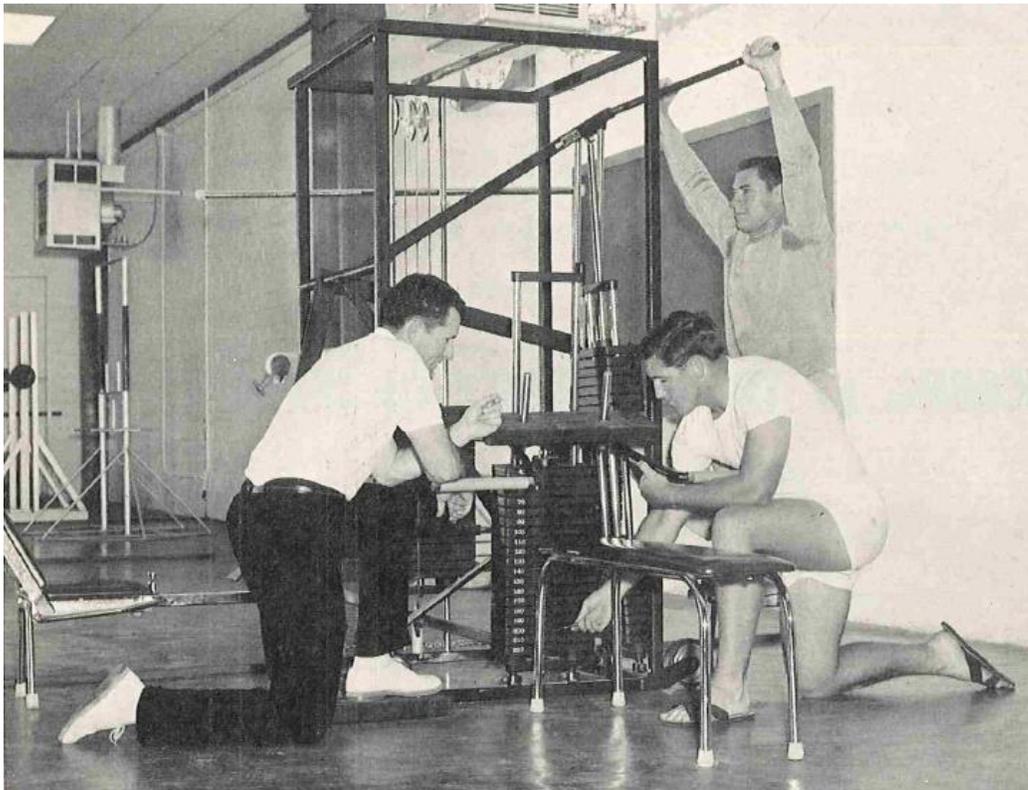


Figure 35. Stan Burnham (at left) supervising a weight training session for fullback Tom Stockton (kneeling) and tackle Danny Kaderka. Image from page ten of the Fall 1965 issue of *Physical Power*.

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<sup>55</sup> Todd, “Progressive Resistance,” 52, 54, 56; Stan Burnham, “Football Conditioning at the University of Texas,” *Physical Power*, Fall 1965, 8-11, 23-4.

<sup>56</sup> University of Texas Football Official Website, “All-Time Results.”

Many of the Navy's midshipmen in that Cotton Bowl were also weight trained, though weight training had been implemented at the Naval Academy for a very different reason. According to Lieutenant Joe Fournier, "with the advent of Presidents Eisenhower and Kennedy's report on the unfavorable condition of American youth and subsequent Navy Fitness Program, the weight training program and facilities were given closer and much needed attention."<sup>57</sup> In the fall of 1961, Fournier instituted "Operation Shape Up," a voluntary weight program performed by thirty midshipmen. Prior to this trial, weight training had been limited at the Academy because of the presumed negative effects. After six weeks, the strength gains made by Fournier's charges were dramatic and sufficient enough to convince the administration to purchase several thousand pounds of additional weights and bars. The small Academy weight room was quickly overcrowded and the track team was given their own training space shortly thereafter. By 1964, all midshipmen were required to take part in weight training as a component of a required "personal conditioning" course.<sup>58</sup>

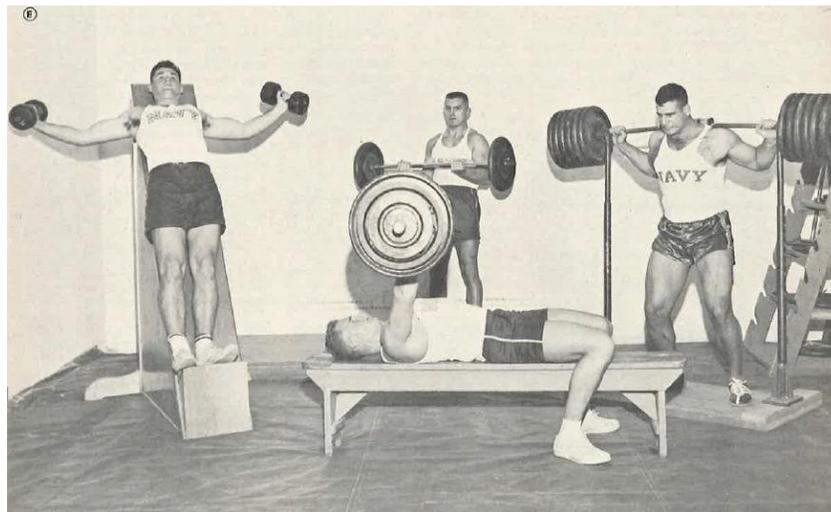


Figure 36. Weight training at the Naval Academy. Image from March 1964 issue of *Strength & Health*, page nineteen.

<sup>57</sup> Joe Fournier, "Naval Academy Turns to Weightlifting," *Strength & Health*, March 1964, 17.

<sup>58</sup> *Ibid.*, 16-19, 62-63.

In the early 1960s, many small colleges also took up weight training. Marist College, a Catholic school with just over one thousand students, initiated weight training as a competitive venture in 1961. With a tight budget, the administrators of the little school in Poughkeepsie, New York, were trying to increase opportunities for athletic participation with the smallest possible capital outlay. The weightlifting team's coach, Frank Swetz, set up training programs for other sports and kept the weight room open for recreational use seven days each week.<sup>59</sup> Another small Catholic college, Mount Saint Mary's College in Emmitsburg, Maryland, first organized a barbell club at the beginning of the spring semester of 1963. The handful of lifters had grown to well over 150 by the fall and attracted mostly men with little or no previous experience in weight training.<sup>60</sup> At Bloomsburg State College in Pennsylvania, the administration believed that athletic success would lead to increased applications to the rural college. Strength training was strongly supported by the university president, Harvey Andruss, who declared that physical fitness was a requirement for graduation from the school. As a result, all athletic programs lifted weights in the pre-season or off-season at the school.<sup>61</sup> Additionally, in writing about weight lifting at the school, Joseph Figliolino specifically cited John F. Kennedy as having "increased this country's interest in physical fitness" and having "instilled in its citizens the importance of a physically fit America." The interest generated by Kennedy "has spread into our intramural programs, our competitive weightlifting, and affected our varsity teams."<sup>62</sup>

At Gordon Military College in Barnesville, Georgia, weight training was introduced in 1963 by football coach Joe Windham. The coach had trained during his college career at Middle

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<sup>59</sup> Frank Swetz, "Barbells on Campus – Marist College," *Strength & Health*, December 1964, 24-5, 68, 70.

<sup>60</sup> John Grimek, "Barbells on Campus – Mt. Saint Mary's," *Strength & Health*, November 1963, 16-17, 61.

<sup>61</sup> Joseph Filiolino, "Barbells on Campus – Bloomsburg State College," *Strength & Health*, March 1965, 16-18, 62.

<sup>62</sup> *Ibid.*, 62.

Tennessee State and felt that the training was crucial to him having been named a “Little All-American” in football. He introduced weight training to Gordon because the athletes from the small military school regularly took on football powerhouses like the universities of South Carolina and Miami. In order to stay on the field with those teams, the Gordon men would have to maximize any ability they had, and that meant training with weights.<sup>63</sup>

At Wesleyan College in Middletown, Connecticut, all athletes were encouraged to lift by 1965 and many did, including outstanding football, track, baseball, basketball, and soccer players. The workouts performed were largely circuit workouts performed up to three months prior to the competitive season.<sup>64</sup> The track men at Abilene Christian College in Texas began team-wide weight training in 1965, as did the football team at Ithaca College in New York.<sup>65</sup> By 1968, the football, track, and swimming teams at Franklin and Marshall College in Lancaster, Pennsylvania were all encouraged to train with weights, while Kendall College in Chicago became the only college in the mid-west to sponsor weightlifting as a varsity sport.<sup>66</sup>

By the close of the 1960s, strength training had, in Pat O’Shea’s words, “emerged from the dark ages.”<sup>67</sup> Weight training had spread across the country and was used by major college athletic departments as well as departments of physical education at small private colleges. Coaches not only encouraged training, but often mandated it based on the belief that it was necessary to stay competitive.<sup>68</sup> As coaches became more comfortable with weight training, it

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<sup>63</sup> Roy Judy, “Barbells on Campus – Gordon Military College,” *Strength & Health*, June 1966, 24-5, 64.

<sup>64</sup> Stan Plagenhoef, “Barbells on Campus – Wesleyan College of Connecticut,” *Strength & Health*, December 1965, 16-17, 63-4.

<sup>65</sup> Dub Manis, “The Weight Trained Track Team of Abilene Christian College,” *Strength & Health*, May 1965, 14-17, 69; George Colfer, “Barbells on Campus – Ithaca College,” *Strength & Health*, February 1967, 46-7, 75-7.

<sup>66</sup> Jack Weingarten, “Barbells on Campus – Franklin and Marshall College,” *Strength & Health*, May 1968, 22-3, 58, 61; Ken Wyle, “Barbells on Campus – Kendall College,” *Strength & Health*, August 1968, 22-3, 65, 67.

<sup>67</sup> Patrick O’Shea, “Barbells on Campus – Oregon State University,” *Strength & Health*, August 1965, 29.

<sup>68</sup> For example, the University of Texas’ key conference rival, Texas A&M University, adopted weight training for football the year after Texas had. Spec Gammon, “The Texas A&M Weight Program for Football,” *Strength & Health*, September 1968, 28-31.

also began to move from an exclusively off-season activity to one which carried on throughout the year – including during the season.<sup>69</sup> The programs were often monitored by line coaches, like Neumann at California, or athletic trainers, like Medina at Texas. As weight training proliferated and programs became more elaborate, however, a need was created for individuals who specialized in training. Football coaches and athletic trainers oversaw conditioning as a side job, not as their primary responsibility. While Al Roy was the first “modern” strength coach, designing programs for high school, college, and professional teams, it is important to note, that he maintained his gymnasium business as well and was not solely employed as a strength coach. The first true specialist would emerge in 1969 when the University of Nebraska hired Boyd Epley who was exclusively tasked with oversight of strength training for football.

The timing of the hiring was surprising, as it coincided with widespread revolts by athletes across the country. While the 1960s were an era of increasing competitiveness in college and professional sports, sport historian David Zang has noted that they also marked the end of the “consensus that sports built character” era. Further, many began to question “the very nature of that character and the methods used to build it.”<sup>70</sup> Students initiated protests for a variety of reasons; some protested against racial inequality, some for political reasons, but many athletes protested against what they perceived as tyrannical and brutal treatment by their coaches.<sup>71</sup> In early 1969, for example, the University of Maryland football team successfully called for the removal of coach Bob Ward who, they charged, abused them mentally and

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<sup>69</sup> The swimming, track, and football teams at Oregon State trained with weights year-round by the late 1960s, as did the football team at Westminster College in Salt Lake City, Utah. O’Shea, “Barbells on Campus,” 28-9, 76-7; Pat O’Shea, “Oregon State University’s Weight Trained Track Stars,” *Strength & Health*, November 1968, 24-5, 63-5; Ronald Nay, “In-Season Weight Training for Football,” *Strength & Health*, December 1969, 16-18, 61.

<sup>70</sup> David W. Zang, *Sports Wars: Athletes in the Age of Aquarius* (Fayetteville, AR: University of Arkansas Press, 2001), xv.

<sup>71</sup> Athletic protests in the late 1960s affected the prominent Universities of Maryland, Washington, Wyoming, Indiana, and Oregon State. Small colleges, such as Carnegie Tech, Adelbert College, and Providence College, also saw player and team rebellions. For additional information, see: Oriard, *Bowled Over*, 15-56; Underwood, “The Desperate Coach.”

physically. Football players at Oregon State University also initiated a protest in February of 1969. Their grievance was the suspension of black linebacker Fred Milton by head coach Dee Andros. Milton was suspended because he refused to shave a beard and mustache which were against official athletic department policy. As a result of the suspension, members of the football team boycotted classes and games throughout the following semester. In light of this rising resentment against the authority of the coach, it was peculiar timing for head Nebraska football coach Bob Devaney to extend the reach of the athletic department by hiring a conditioning specialist. Nonetheless, the gamble paid off and will be discussed in greater detail in the next chapter.

## CHAPTER FIVE: THE STRENGTH OF NEBRASKA - BOYD EPLEY, HUSKER POWER, AND THE NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

In a 1960 article in *Strength & Health* magazine, Al Roy, the man dubbed “the first modern strength coach,” was asked about his legacy.<sup>1</sup> “In his typical adroit manner, the man responsible for this genesis in training recalls those who inspired him. He acknowledges the fact that the father of American weightlifting, Bob Hoffman, and the brilliant weightlifting technician, John Terpak, laid the foundation for his own system and are exemplars for those who will follow. *And others will follow*, for he emphatically states that the surface has just been scratched in creating a need for vital young men in the field of developing strength for athletics.”<sup>2</sup> These words would prove prophetic, as the Sixties would close with the hiring of a young man who would eventually mold strength coaching into the autonomous profession we recognize today.

As discussed in the preceding chapters, strength training for athletics underwent a cultural and pedagogical shift in the United States in the 1950s and ‘60s. Into the 1950s most athletes and coaches avoided weight training because they had been warned by coaches, doctors, or sports scientists that weight training would make a person “muscle-bound.”<sup>3</sup> By the 1960s, however, many athletes and coaches embraced weight training, though they were still experimenting with program design. By the end of the 1970s, it was much less likely for an athlete to compete for a championship in any sport without having spent the requisite time in the weight room and doing sport-specific conditioning drills. So pervasive had preparation for sports become that, in 1978, Boyd Epley was able to convince others to join him and form a

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<sup>1</sup> Terry Todd, “Al Roy: The First Modern Strength Coach,” *Journal of Physical Education, Recreation, and Dance* 79, no. 8 (2008): 14.

<sup>2</sup> Ken Leistner and Sandy McLeod, “Alvin Roy – Fitness for Football,” *Strength & Health*, November 1960, 51.

<sup>3</sup> Terry Todd, “Al Roy: Mythbreaker,” *Iron Game History* 2, no. 1 (1992): 12.

national association for strength coaches that would be called the National Strength Coaches' Association (NSCA).<sup>4</sup>

**“IF ANYONE GETS SLOWER, YOU’RE FIRED.”**

In September of 1969, Epley, a junior pole-vaulter at the University of Nebraska, was performing his daily rehabilitation exercises in the tiny Schulte Field House “weight room” when he was summoned by an assistant athletic trainer and told, “You’ve got a phone call.” Epley was surprised to be receiving a call; he had only been a student-athlete at Nebraska for less than a year and he certainly didn’t expect to get a call at the athletic complex. His contemplation of who might be on the line was interrupted by the athletic trainer, who impatiently shouted, “Get in here! It’s Tom Osborne.” Osborne, who would later become the most successful head coach in Nebraska history, was at that time coaching the receivers and calling the offensive plays for the team. Epley recalls that he was taken aback when he heard it was Osborne, and wondered if he’d somehow gotten into trouble with the football coaches.<sup>5</sup>

First, some background. As a part of Epley’s rehabilitation program for a back injury, he had chosen to include heavy resistance training. While the meager selection of weights and machines in Schulte Field House made serious weight training somewhat difficult, Epley drew upon his previous exposure to bodybuilding and Olympic weightlifting to craft a program to improve his overall strength while recovering from his training injury. Other injured athletes, also unable to practice, were frequently in the weight room during Epley’s workouts and a number of them became intrigued by his training program and began following him around and performing the same exercises. At the time, none of the Nebraska athletic teams engaged in

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<sup>4</sup> Boyd Epley, “NSCA Timeline” BoydEpley.com, <http://www.boydepley.com/NSCATimeline.pdf> (accessed February 8, 2010).

<sup>5</sup> Boyd Epley, Video-taped interview by Terry Todd, Las Vegas, Nevada, June 2009. Digital video on deposit at the H.J. Lucher Stark Center for Physical Culture and Sports at The University of Texas at Austin.

organized, heavy resistance training. The prevailing belief at Nebraska in this era, according to Epley, was still that heavy strength training would result in decreased speed and range of motion for athletes. Consequently, heavy resistance training was excluded from nearly all sport-training programs. So, as he walked to pick up the telephone receiver, Epley worried that Osborne's call would be a rebuke for allowing some of the injured football players to lift with him. And, at first, his heart sank as Osborne asked, "Are you the guy who's been showing these guys how to lift weights?" Somewhat reluctantly, Epley affirmed that he had been working with the players and that some of them had been following his routine. Then, to his surprise, Osborne said, "I've noticed that they come back to practice healthier and stronger and I'm interested to know what you're doing in there. Would you be interested in coming over and talking to me?"<sup>6</sup> Epley, with a sigh of relief, said he'd be happy to come right over.<sup>7</sup>

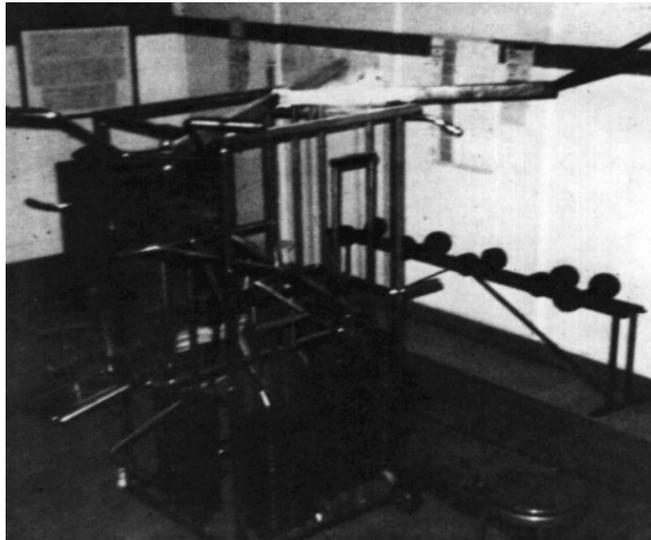


Figure 37. The 416 square-foot Schulte Field House weight room, which consisted of a Universal Gym, a handful of dumbbells and one Olympic barbell set. Image from Boyd Epley's *Path to Athletic Power* (2004).

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<sup>6</sup> Boyd Epley, Telephone interview by Jason Shurley, February 24, 2010.

<sup>7</sup> Interview by Terry Todd.

Osborne and the other Nebraska football coaches had no doubt seen the well-muscled 180-pound Epley around the athletic complex, but they could not have known that along with his athleticism and exceptional muscular development, Epley was already a serious student of strength and conditioning practices. One freshman on the 1972 football team, George Mills, described Epley as looking like “Mr. America, yet he wasn’t bulky; he looked like an athlete.” At 215 pounds Epley could bench press more than 400, “so he really was an example of what weight training could do.”<sup>8</sup> Epley’s physique and strength resulted from the fact that, by the time he arrived at Nebraska, he was familiar with the training methods of bodybuilding, powerlifting, and Olympic weightlifting and had learned to borrow from all three systems for his own training.

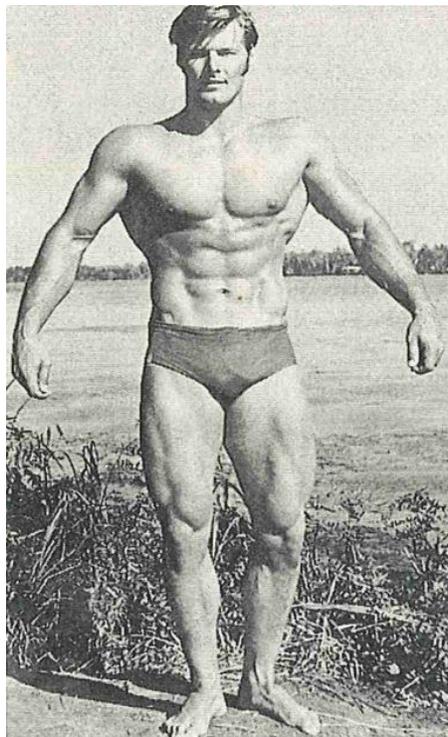


Figure 38. Boyd Epley as a bodybuilder in 1972. Image from page twenty-two of Epley’s *Path to Athletic Power*.

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<sup>8</sup> George R. Mills, *A View from the Bench: The Story of an Ordinary Player on a Big-Time Football Team* (Urbana, IL: University of Illinois Press, 2004), 72.

Boyd's involvement with strength training began in the seventh grade when his father purchased one of Bob Hoffman's York barbell sets for him. The set included a sheet with instructions on how to perform the Olympic lifts and so young Boyd began his career by doing presses, snatches, cleans, and jerks. Although he practiced these lifts faithfully for a time, he gradually lost interest in training at home. When he entered Alhambra High School in Phoenix, Arizona, Epley tried barbell training again, this time as part of a physical education class. Again, however, he didn't stick with it. According to Epley, it just "didn't really make sense" to him at that time. However, following the end of the football season in his junior year in high school he decided he had to be bigger and stronger and so he began training more seriously in order to gain weight.<sup>9</sup> During the summer between his junior and senior years he worked out at a local health club with a classmate, Pat Neve, who would go on to win multiple powerlifting competitions and the Mr. USA bodybuilding title in 1974.<sup>10</sup> Neve, who was already interested in bodybuilding, taught Epley how to train, and by the end of the summer Boyd had gone from 160 pounds to 180 and had learned a great deal about the training methods of bodybuilders and powerlifters. When he reported for football practice in the fall his newly added size was, "kind of a shocker to my coaches."<sup>11</sup> At linebacker, Boyd went from a self-described non-factor his junior year to the defensive player of the year as a senior. His newfound strength also translated well to his spring sport, track, where he garnered track athlete-of-the-year honors as a pole-vaulter. After graduation, he took a track scholarship to attend Phoenix College, the local junior college. There, he continued lifting and soon caught the eye of the Nebraska track coach Dean Brittenham who, in 1968, offered Epley a scholarship to join the track team at the University of

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<sup>9</sup> Ibid.

<sup>10</sup> Pat Neve, "Biography," Official Pat Neve Website, <http://www.patneve.com/bio/index.php> (Accessed May 14, 2010).

<sup>11</sup> Interview by Jason Shurley.

Nebraska. Epley set a new Nebraska record in the indoor pole vault at fifteen feet but then, during his preparation for the spring 1969 track season, he suffered the back injury that inadvertently put him on the path to shaping the future of Nebraska athletics and creating the profession of strength coaching.

One can only imagine what must have been going through Epley's undergraduate mind as he abandoned his workout and walked to Osborne's office following the phone call. To Epley's great surprise, however, when he got there Osborne didn't want to just talk; he had a proposition for Epley. Osborne told Epley that he was interested in having the entire Cornhusker football team begin a weight lifting program and he asked what Epley would need in order to direct such a program.

Epley's response to that question tells a lot about the man he eventually became. Rather than just suggesting that he could get by with just a few extra weights, Epley informed Osborne that the current weight room was too small to accommodate an entire team's workout and that a significant amount of additional equipment would be needed. After talking about space and what would be ordered, Osborne decided to place his faith in the self-assured twenty-two year-old and told him he'd have a wall moved to create a larger space. Osborne then asked Epley to write out a shopping list of new equipment that they'd need for training the entire team.<sup>12</sup>

Epley returned the next day with a list of the basic equipment needed for such a program.<sup>13</sup> The initial list was fairly conservative, owing to the fact that Epley wasn't sure how much Osborne intended to spend on the nascent program.<sup>14</sup> According to Epley, Osborne took

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<sup>12</sup> Ibid.

<sup>13</sup> According to one of Epley's books, *The Path to Athletic Power*, the original equipment list included: two squat racks and bars, lifting plates and racks to hold them, one bench and bar, a light pulley system for shoulder work, dumbbells in pairs from 5 to 100lbs, preacher curl bench and weights, two work benches and two incline benches.

<sup>14</sup> Boyd Epley, *The Path to Athletic Power: The Model Conditioning Program for Championship Performance*. (Champaign, IL: Human Kinetics Publishers, 2004), 27.

the list from him, gave it only the most cursory glance and handed it to the football secretary, instructing her to “order this.” According to Epley, that moment opened his eyes to the power of football on campus, and so he shrewdly said, “Coach! I forgot the second page,” feigning distress. According to Epley, Osborne gave him a wry smile and said, “Alright, bring me the second page tomorrow.”<sup>15</sup>

Osborne then turned to Epley and told him, “Now we’ve got to go in and see Bob.” The comment jolted Epley. Bob Devaney was Nebraska’s head football coach and athletic director and therefore one of the most powerful men in the state of Nebraska. “What do you mean?” Epley asked incredulously. Osborne responded, “We’ve got to go get permission to do what we just did.” And with that the men headed up to Devaney’s office. Epley recalls how unnerved he was to see Devaney sitting behind his massive desk in an imposing red leather chair and claims he has a hard time remembering all he said to convince Devaney to support Osborne’s project.<sup>16</sup> While Devaney was interested in the idea he was not at all sold on it. “Why,” he wanted to know, “should we [lift weights]? No one else is doing it. My good friend Duffy Daugherty at Michigan State isn’t doing it. Why should we?”<sup>17</sup> The only real evidence Epley was aware of for the efficacy of a strength program was anecdotal, in the form of his own success through strength training.<sup>18</sup> He groped for an answer and eventually informed Devaney that weight training would help him win more games because his players would be faster. With that Devaney told Osborne and Epley that they could go ahead, but then looking Epley square in the

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<sup>15</sup> Interview by Terry Todd. Again, according to *The Path to Athletic Power*, the list of additional equipment included: fixed barbells, EZ curl bars, a neck machine, a lat-pulldown machine, and a low lat-pull.

<sup>16</sup> Interview by Terry Todd.

<sup>17</sup> Ibid.

<sup>18</sup> Epley has never mentioned being aware of the work of Karpovich, DeLorme or any other scientists who did pioneering research on the effects of strength training prior to his meeting. In an email to Jan Todd he did, however, mention having been exposed to the magazines of Bob Hoffman, Joe Weider, and Peary Rader and even remarked that he had a picture of bodybuilder Sergio Oliva on his fridge in the late 1960s. As a result, he was almost certainly familiar with the boosterism and logical appeals of the magazines and their promotion of strength training for sport. Boyd Epley, e-mail message to Jan Todd, August 5, 2012.

eye he told the new strength coach, “If anyone gets slower, you’re fired.”<sup>19</sup> Epley’s career as a strength coach had formally begun.



Figure 39. Nebraska football coach and later, athletic director, Bob Devaney. Image from Huskers.com, the official website of The University of Nebraska Athletics.

Devaney’s apprehension was based on received knowledge. He had been told by his coaches that strength training hindered athletic performance and had carried that belief deep into his coaching career. In an interview with sport historian Terry Todd, Epley commented that he believes “People are victims of their coaches. What their coaches did to them is what they know; whether it’s right or wrong.”<sup>20</sup> Given that Bob Devaney played his collegiate football in the 1930s, it seems quite likely that his approach to preparation for football was guided by what his coaches “did to him,” which almost certainly did not include weight training.<sup>21</sup> Additionally,

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<sup>19</sup> Interview by Terry Todd.

<sup>20</sup> Ibid.

<sup>21</sup> Devaney played at Alma College in Alma, Michigan, lettering three years and graduating in 1939 with a bachelor of science degree in social science. Frank Litsky, “Bob DeVaney, 82, Nebraska Coach, Dies,” *The New York Times*,

Devaney's first collegiate coaching job, after coaching at the high school level for fourteen years, was at Michigan State University under Clarence "Biggie" Munn from 1953-1956. Though Munn softened on weight training in his later years, in the mid-1950s he was strongly against weights.<sup>22</sup> Duffy Daugherty, referenced by Devaney, was the head football coach at Michigan State from 1955-1973 and had served with Devaney as an assistant under Munn. Given their coaching lineage, it is hardly surprising that neither man would employ weight training, especially given Munn's success at Michigan State without it.<sup>23</sup> Devaney's sample size that he used to claim that "no one" was lifting weights was, of course, extremely limited but he was not the only coach who felt that way.

The attitude of many coaches who thought like Devaney did at that time was epitomized by Harry Paschall in a 1956 issue of *Strength and Health* magazine: "One Midwestern University Coach, whose teams have played in the Rose Bowl, once told us, 'I don't want any musclebound weightlifters on my team.'" Paschall went on to say, "The coach is no longer with this University because, while he was a smart strategist and knew football, he didn't know men and didn't know proper methods of conditioning. He belonged in the Past and that is where he is now spending his future."<sup>24</sup>

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May 10, 1997, <http://www.nytimes.com/1997/05/10/sports/bob-devaney-82-nebraska-coach-dies.html> (Accessed June 3, 2010).

<sup>22</sup> For example, he told Richard Berger, then a football player for the Spartans "I don't want to hear about you doing any of that lifting. It's bad for you. I want you to get a summer job doing heavy construction work. That's what you need, not those weights." Terry Todd and Jan Todd, "Pioneers of Strength Research: The Legacy of Richard A. Berger," *Journal of Strength & Conditioning Research* 15, no. 3 (2001): 275. While he voiced his support for weight training in a 1959 *Strength & Health* article, it is important to note that the article mentions other athletes training with weights, but no mention is made of strength training for football players. Gordon C. Smith, "Barbells on Campus – Weightlifting at Michigan State U.," *Strength & Health*, May 1959, 36-7, 60-1.

<sup>23</sup> Between 1947 and 1954, Munn's teams went 54-9-2, at one point winning twenty-eight consecutive games. Under Munn the Spartans also won the 1952 national championship and 1954 Rose Bowl. Michigan State University Archives and Historical Collections, "Clarence L. Munn: An Inventory of His Papers," (East Lansing, MI: MSU Archives, n.d.), <http://archives.msu.edu/findaid/ua17-75.html> (accessed October 15, 2012); "Obituary: Duffy Daugherty, Ex-Coach," *New York Times*, September 26, 1987, <http://www.nytimes.com/1987/09/26/obituaries/duffy-daugherty-ex-coach.html> (accessed October 15, 2012).

<sup>24</sup> Harry Paschall, "Weight Training for Athletics: Football," *Strength & Health*, October 1956, 44.

In the fall of 1969, Bob Devaney was in danger of similarly belonging to the past. He'd come to Nebraska in 1962 and, in his first five seasons, finished no worse than 9-2. By the late Sixties, however, his teams had fallen off of the standard that he had helped set, going 6-4 in both the '67 and '68 seasons and failing to reach a post-season bowl game.<sup>25</sup> Making matters worse, the Huskers finished the 1968 season by taking a 47-0 thrashing at the hands of their arch-rival, the Oklahoma Sooners, on national television. At this point, some of the donors and alumni had begun grumbling that it might be time for a coaching change. Some donors in Omaha went so far as to start a petition calling for Devaney's removal.<sup>26</sup> Faced with this reality, Devaney knew that changes had to be made, thus providing the impetus for what later became Husker Power.

In reality, Nebraska had begun experimenting a bit with resistance training before Epley joined the athletic department staff. Weight training had been part of the physical education curriculum at Nebraska since the late 1950s. In fact, the courses were so popular that they were often filled beyond their capacity.<sup>27</sup> Following the 1968 football season, Cletus Fischer, then an assistant offensive line coach, had seen some high school football teams undergoing a station-based, circuit-type conditioning program on a recruiting trip to Texas. He suggested to Devaney that a similar program be implemented at Nebraska.<sup>28</sup> Athletic trainer, George Sullivan, and

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<sup>25</sup> Huskers.com "Nebraska Through the Years," <http://www.huskers.com/pdf5/638597.pdf> (Accessed May 4, 2010).

<sup>26</sup> Interview by Jason Shurley.

<sup>27</sup> Peary Rader, "Weight Training at University of Nebraska for Student Body" *Iron Man*, March-April 1960, 18-19.

<sup>28</sup> Fischer had a good rapport with Devaney, having been one of the few coaches retained from the previous Nebraska coaching regime, largely to assist with recruiting. Devaney and Fischer had traversed the state in a car with no heat or radio and shared hotel rooms on the road in the early 1960s. Litsky, "Nebraska Coach Dies;" It is probable that he witnessed athletes using a Universal machine and a similar circuit program to that employed as one aspect of the Texas Longhorns offseason program, begun in 1963. For specifics of the circuit program, see: Stan Burnham, "Football Conditioning at the University of Texas," *Physical Power*, Fall 1965, 8-11, 23-4.

assistant track coach, Dean Brittenham were tasked with developing the program.<sup>29</sup> And so Nebraska's first winter conditioning program was modeled on the circuit-based workouts seen in Texas, and consisted of eight drills/stations, at which exercises were performed for five minutes each. Because of the high number of repetitions performed at each station, however, no significant strength gains were made by the team from this program.

On August 15, 1969, however, Epley began implementing a more modern program with the Nebraska team in their newly outfitted weight-room.<sup>30</sup> After some initial testing, the Cornhuskers followed a dramatically different kind of weight training program than the circuit work they had been doing the previous winter. Epley's program, which the men did during the football season, was an amalgamation of bodybuilding, powerlifting, and Olympic lifting. As a competitive powerlifter and Olympic lifter himself until 1972, Boyd knew that the heavy-training style of powerlifters, utilizing squats, bench presses and deadlifts, would maximize the players' strength. Similarly, the quick, explosive Olympic lifts required more athleticism and helped to produce power.

The turnaround for the Huskers was immediate. During the 1969 season, they posted a 9-2 record that included a 44-14 thumping of Oklahoma and a 45-6 trouncing of Georgia in the Sun Bowl.<sup>31</sup> In the winter following the 1969 season, Boyd took over control of the winter conditioning program as well. As the Huskers continued to dominate on the football field during the 1970 and 1971 seasons, both of which ended in national championships, Epley grew in stature and power at Nebraska. When Devaney stepped down as head football coach

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<sup>29</sup> Boyd Epley, "Husker Power Timeline - The Schulte Fieldhouse Years," BoydEpley.com, <http://www.boydepley.com/SchuleFieldHouse.pdf> (Accessed February 8, 2010).

<sup>30</sup> University of Nebraska Athletics, "Strength and Conditioning Timeline," (Lincoln, NE: NU Athletics, n.d.), [http://www.huskers.com/ViewArticle.dbml?SPSID=183&SPID=41&DB\\_OEM\\_ID=100&ATCLID=8568](http://www.huskers.com/ViewArticle.dbml?SPSID=183&SPID=41&DB_OEM_ID=100&ATCLID=8568) (Accessed June 29, 2010).

<sup>31</sup> University of Nebraska Athletics, "Year by Year Results," (Lincoln, NE: NU Athletics, n.d.), <http://www.huskers.com/pdf5/638605.pdf> (Accessed May 4, 2010).

following the 1972 season, he became an athletic director and turned over coaching duties to Tom Osborne, his hand-picked successor. Osborne made sure he didn't lose Epley.

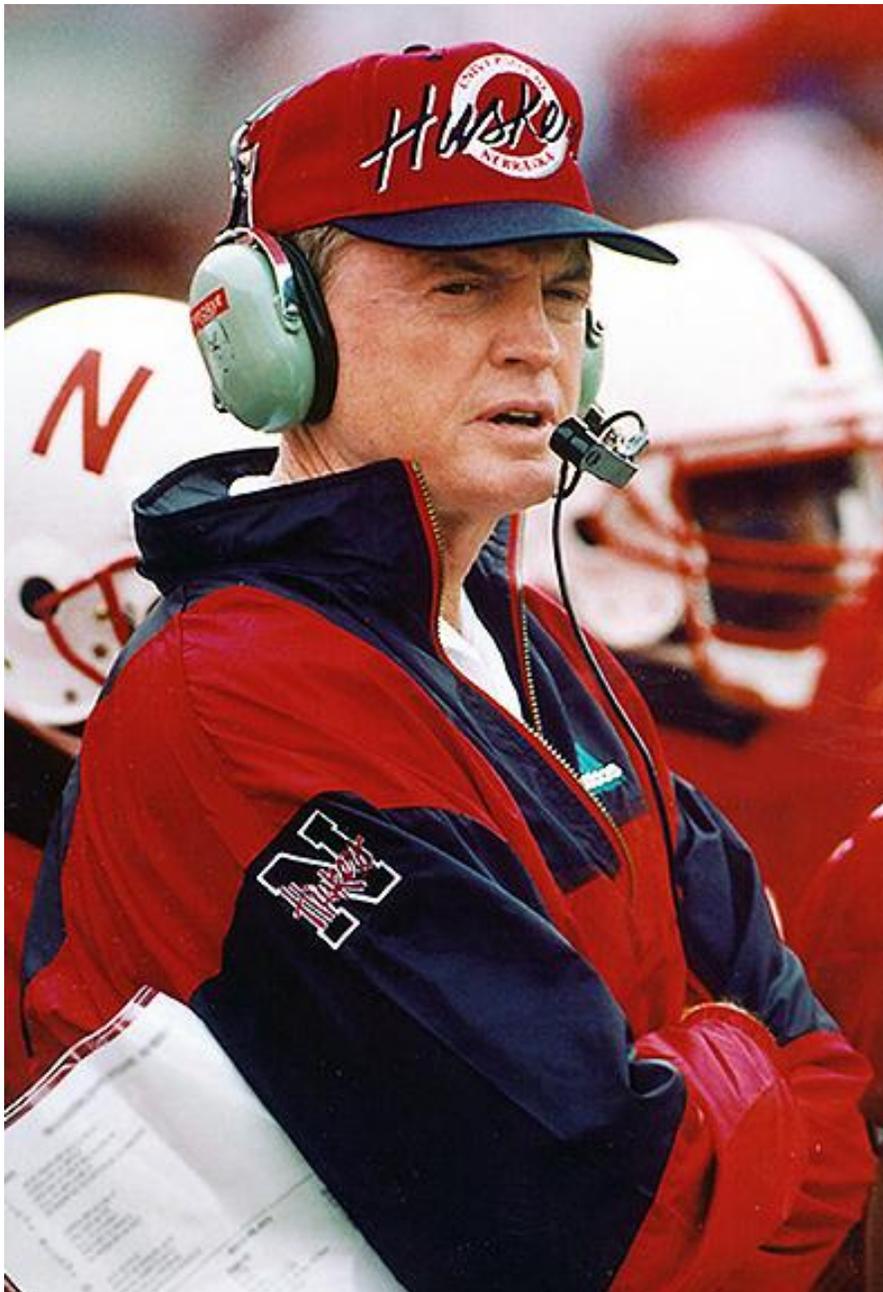


Figure 40. Legendary Nebraska football coach, Tom Osborne. Image from ESPN.com.

## THE EVOLUTION OF HUSKER POWER

Osborne's ascent to head coach ushered in a new era for Husker football as he took a different approach to the game than Devaney had taken. According to Epley, Devaney's preparation for games varied little with respect to the opponent; he simply said "this is how we're going to line up, and we're going to run right here."<sup>32</sup> Under Devaney, the Huskers did what they were going to do, and dared the opponent to stop them. Osborne, on the other hand, was a meticulous planner. He has been called "relentless in his pursuit of information" and "as resourceful as they come."<sup>33</sup> Each week he created a game plan tailored to the upcoming opponent and required all of the Nebraska quarterbacks to pass a written exam on that plan.<sup>34</sup> To Osborne, the process of preparing to play the game was crucial and his emphasis on preparation was part of the secret of his great success.<sup>35</sup> The process of preparing to play is where strength and conditioning comes in, and Epley gives a great deal of credit to Osborne saying, "it [the strength program] was really his idea...he's the one who recognized the need [for the program.]"<sup>36</sup>

For his part, Epley was no less meticulous than Osborne, and every bit the student of his craft that Osborne was. He also credits Devaney's ultimatum with shaping his approach to the profession. Devaney made him realize that the program would need to produce measurable results and do so quickly.<sup>37</sup> To that end, Epley knew he had to devise and employ tests that could objectively demonstrate an improvement in the players' performance. Devaney's biggest fear was that heavy strength training would cause his players to become slower. To prove that this

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<sup>32</sup> Interview by Jason Shurley.

<sup>33</sup> Armen Keteyian, *Big Red Confidential: Inside Nebraska Football* (Chicago: Contemporary Books Inc, 1989), 65.

<sup>34</sup> *Ibid.*, 191.

<sup>35</sup> *Ibid.*, 38.

<sup>36</sup> Interview by Jason Shurley.

<sup>37</sup> Interview by Terry Todd.

was not the case, Epley initially tested players every two weeks on the forty-yard dash.<sup>38</sup> To do these tests in the beginning, however, he had to borrow stopwatches from the physical education department, and while he was there he began making friends with some of the physical education faculty, to whom he could then turn for advice. One bit of advice that revolutionized athletic testing came from the department's chairman, Dr. Carl Weir, who suggested that he include a test he referred to as the "jump reach," or vertical jump test, as a way to measure athletic power. Looking back on some of the early aspects of the program, Epley seemed almost embarrassed when interviewed. The testing of the forty-yard dash at such regular intervals was, in his words, "crazy," but Epley was beginning to realize that his program was always a work in progress and that he, as the developer, would probably always be tinkering. While he tinkered, of course, the Nebraska players got stronger and stronger. In the beginning, Epley says, "I was testing everything I could, because I didn't know any better, trying to find something that could help us win."<sup>39</sup>

The first significant change Epley made was dropping one of the stations which emphasized aerobic conditioning by having the players run continuously for five minutes.<sup>40</sup> Epley understood the concept of specificity and realized that a football game will never require a player to run constantly for that length of time, obviating the need for players to practice doing so. While he may not have categorized it as energy-systems training, he began to tailor his program to sport-specific needs early on. Another early change was in the testing format. Regular testing of the forty-yard dash was dropped because Epley recognized that two-week intervals were insufficient to allow performance improvements and because of the risk of

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<sup>38</sup> Interview by Jason Shurley.

<sup>39</sup> Ibid.

<sup>40</sup> For a detailed discussion of the early 1970s winter program at Nebraska, see: Mills, *A View from the Bench*, 63-75.

hamstring injuries. Owing to his willingness to tailor the program to the demands of the sport, testing of the forty-yard dash was largely replaced by testing of a ten-yard sprint. Again, Epley reasoned that the new test was a better fit for the sport. Rarely will a player ever get the opportunity to get up to full speed, as is evaluated in the “forty.” They *will* be asked to be explosive for a few yards on every play however, so evaluating how quick their first few steps are is probably more relevant to enhancing their football performance. Records are still kept and the “forty” is still tested at Nebraska, although now the rationale for running forty yard sprints is that it remains the measuring stick used by talent evaluators for the National Football League.

Epley was lucky in his choice of assistant strength coach Mike Arthur, who was hired by Epley in 1977, and who, like Boyd, was serious about the scientific aspects of training. One of Arthur’s early contributions was a computer program called “Strength Disk;” it allowed Epley and his assistants to create individualized workouts, with benchmarks, for each athlete, taking account of their performance during the most recent testing session.<sup>41</sup> While they both realized that individualized training was the best approach, Epley and his staff were seriously hampered by the large number of players who came out for the team. It was not unusual for them to have more than 200 athletes trying out for the team, most of whom were Nebraska boys with little strength training background. While the talent pool was wide, it wasn’t always as deep as in other, more densely populated states like Oklahoma and Texas, and so player development became a top priority for Epley and the program. Epley quickly realized that he could not really train all 200+ players who wanted to try to be part of the Nebraska team. He needed a way to determine which athletes were likely to benefit the most from training and which ones were already naturally talented. With the help of assistant coach Mike Arthur and football fan and criminal justice professor Chris Eskridge, Epley developed the “Performance Index,” a system of

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<sup>41</sup> Epley, “Husker Power Timeline – Schulte Fieldhouse.”

ranking athletes. The Index used what they termed a “power curve” to rank each athlete’s performance at a series of specific tasks based on bodyweight, and to measure performance improvements following a set period of training. Athletes with high scores on the initial tests who still improved would be given more weighted points than athletes with low initial scores who improved by the same value. In this way, the performance-adjusted Index was used to quantify who the mediocre, good, and possibly great athletes were within the larger group. Epley and his assistants then focused their efforts on developing the most highly ranked athletes.<sup>42</sup>



Figure 41. Assistant strength coach Mike Arthur working with the “Strength Disk” program to create workouts. Image from Boyd Epley’s official website, [boydepley.com](http://boydepley.com).

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<sup>42</sup> Interview by Jason Shurley.

In his classic 1978 book, *From Ritual to Record: the Nature of Modern Sports*, sport historian Allen Guttman describes what he considers to be the seven characteristics of modern sport: secularism, equality, bureaucratization, specialization, rationalization, quantification and obsession with records.<sup>43</sup> Although Guttman's model is generally thought of in reference to sport itself rather than the process of training for sport, the strength and conditioning program at Nebraska during the Epley years underwent exactly the kind of conceptual shift described by Guttman. Guttman's third characteristic of a modern sport, for example, is an increase in specialization. In his book, he specifically cites football as an example of a sport with a high degree of specialization with twenty-two different positions, not including "special teams." He goes on to point out that such specialization also results in an "intricate system of supportive personnel."<sup>44</sup> Most teams, even at the high school level, have coaches who specialize in coaching one or two positions. Further, there's a sports-medicine staff to keep the players healthy, a sports marketing staff to promote the game, and a variety of people involved in making the whole thing run (referees, equipment managers, ticket-takers, ushers, etc.). So, specialization within the sport leads to specialization of those involved in preparation for the game. By hiring Epley, Bob Devaney took an important step in accelerating this process. On its face, it appears that Epley as the strength coach is just one more specialist on the payroll. After all, conditioning duties had largely been handled previously by the athletic trainer or coaches with an interest in that area. Epley may seem, then, just a more specialized version of those individuals. Closer examination, however, reveals that the hiring of Epley represented an important step in the evolution of the collegiate athlete. Prior to the introduction of the "winter program," Nebraska football players would show up in the fall for pre-season camp and "play

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<sup>43</sup> Allen Guttman, *From Ritual to Record: The Nature of Modern Sports* (New York, Columbia University Press, 1978), 16.

<sup>44</sup> *Ibid.*, 38.

their way into shape.”<sup>45</sup> Then, once the season was over, they were free until spring football, during which time they were football players again for several weeks before becoming free once more during the summer until fall camp started. In this system, when they weren’t playing football, the players were able, if they desired, to focus all of their energy on being students. During football season and spring ball, the players were *de facto* vocational students according to Clark and Trow’s classification of student subcultures.<sup>46</sup> Vocational students are those who are “working anywhere from twenty to forty hours a week...To many of these hard-driven students, ideas and scholarship are...a luxury and distraction.” This “vocation” became more time-consuming with the introduction of Epley’s new year-round conditioning program, and Nebraska football players never stopped being football players. Their vocation was now year-round, and that vocation was football. Former Nebraska player George Mills said as much in his 2004 book, commenting that “the addition of strength coach Boyd Epley to the staff legitimized weight lifting; it had the effect of giving the players another job.”<sup>47</sup> According to Guttman, “...the crucial factor in professionalization is not money but time – how much of a person’s life is dedicated to the achievement of athletic excellence? In other words, to what degree does a person specialize in such excellence?”<sup>48</sup> As such, the addition of a conditioning program was an important step in the evolution away from the notion of “student-athletes” toward collegiate “athletes.”

The heavy focus on player development allowed Nebraska to develop what Epley refers to as an “assembly line” of great players. Development of athletic talent was integral to the success of the Husker program and the expectation of year-round effort became established as

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<sup>45</sup> Interview by Jason Shurley.

<sup>46</sup> Murray Sperber, *Beer and Circus: How Big-Time College Sports is Crippling Undergraduate Education* (New York, Henry Holt and Company, 2000), 7-9.

<sup>47</sup> Mills, *A View from the Bench*, 192.

<sup>48</sup> Guttman, *From Ritual to Record*, 39.

part of the recruitment process. Armen Keteyian remarked in his book, *Big Red Confidential*, that “Without question, no football team in this country – college or pro – takes more pride in its strength and conditioning program than the University of Nebraska. One look at the weight room and its attendant motto printed proudly on a sign – ‘Where the Best Athletes Come to Get Better’ – tells you that.”<sup>49</sup> During their recruitment, players sat through a presentation by Epley, which took place atop the altar-like “records platform,” a central feature of the West Stadium weight room. During these presentations, Epley would emphasize what coming to Nebraska could do for them in terms of their development as athletes. Due to Osborne and Epley’s player-development philosophy, freshmen and sophomores rarely played, particularly at non-skill positions.<sup>50</sup> In contrast, if the players had elected to go to other schools, they might have had the chance to jump right into the mix for playing time. Part of Epley’s recruiting task was convincing players that spending the time in training would be more beneficial for their athletic careers over the long-term. Boyd says, “We would look at the recruit and ask, ‘How much do you weigh? How much do you want to weigh?’ [Then we’d tell them] you might as well go somewhere [like Nebraska] where they know how to help you do that. Here are some examples of athletes at your position that we’ve helped.”<sup>51</sup> The records platform also had a large video screen above it, and it played footage of Nebraska football greats throughout the presentation, allowing prospective players to see the results of the program being sold to them in unmistakable clarity. They could see Neil Smith, who would go on to be selected six times for the NFL’s Pro Bowl, and how he gained fifty pounds in as many weeks and became the fastest defensive lineman in Nebraska history. They could see Dave Rimington, the only back-to-back winner of the Outland Trophy (given to college football’s best interior lineman), using 900+ pounds on the

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<sup>49</sup> Keteyian, *Big Red Confidential*, 170.

<sup>50</sup> *Ibid.*, 46.

<sup>51</sup> Interview by Jason Shurley.

hip sled. Offensive and defensive linemen, in particular, were sold on the notion of what the strength program could do for them. If they chose to play at Nebraska, they were told up front that there was a “no missed-workout” policy. So ingrained was this philosophy, Epley said with pride, that at one point, “We went 15,000 workouts without an offensive lineman missing a workout.”<sup>52</sup> Of his role in the recruiting process, Epley said, “By the end the demonstration, parents and recruits were pretty well convinced that Nebraska was focused on helping athletes improve their performance. Not all schools were. A lot of schools they just recruit you and then they didn’t even have a strength program. They recruit you and you either played well or they’d get someone else and you were done.”<sup>53</sup> The Husker Power program was actually what sold Dave Rimington on playing at Nebraska. Heavily recruited out of high school, the Nebraska native chose to stay in state for his collegiate career because of the strength program. Rimington said, “I was really hooked on the weights by my senior year and I knew Nebraska had a great tradition and a big weight room. The choice was easy.”<sup>54</sup>

While a large portion of the emphasis was placed on player development due to the personal philosophies of both Epley and Osborne, some of this emphasis was a result of necessity. As previously mentioned, with a large supply of athletes willing to work but a relatively small pool of really talented athletes, Nebraska’s success depended on extracting the best from the talent they had. Additionally, as Epley pointed out, in Nebraska they didn’t have mountains like Colorado or beautiful beaches like Miami. As a result, recruiting efforts pitched what Nebraska *did have*: a weight room and a man who knew how to employ it to build bigger and better athletes.<sup>55</sup>

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<sup>52</sup> Ibid.

<sup>53</sup> Ibid.

<sup>54</sup> Terry Todd, “A Man of Heft Who’s Also Deft,” *Sports Illustrated*, November 8, 1982, 44.

<sup>55</sup> Ibid.

Guttman wrote in *Ritual to Record* that if you “combine the impulse to quantification with the desire to win, to excel, to be the best...the result is the concept of a record.”<sup>56</sup> In order to motivate players and show progress, Epley established a school record board in the spring of 1970.<sup>57</sup> Located prominently in the weight room, the record board tallied best lifts in events such as the bench press, squat, hang clean, vertical jump, forty-yard dash, and served as a prominent reminder of what could be achieved with dedication to the Husker Power program. Carrying specialization even further, Epley made sure that records were established for each sport as well as for the entire athletic program. In addition to the overall records, the Performance Index was used to rank records with respect to the size of each athlete by using an elaborate scoring system. They even posted the best overall Performance Index score, a composite of an athlete’s scores on all of the tests factored against their body size. What started as a simple board used to track a handful of best lifts quickly evolved into an elaborate ranking system, which now necessitates statistical software. As the historian John Hoberman noted, our love of records and “quantified sports performances” are part of “a mania for measurement that continues unabated to this day.”<sup>58</sup>

Under Epley’s direction, the preparation methods for all varsity sports at Nebraska began assuming more and more of Guttman’s characteristics of modernity. Keeping track of records allowed athletes to compete against not only their current teammates, but the school’s all-time greats. Using the scaled scores of the Performance Index even allowed athletes to compare themselves to athletes in other sports, regardless of size and gender. Guttman’s principle of rationalization, a prescription of rules with a “logical relationship between means and ends...in

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<sup>56</sup> Ibid., 51

<sup>57</sup> Epley, “Husker Power Timeline – Schulte Fieldhouse.”

<sup>58</sup> John Hoberman, *Mortal Engines: The Science of Performance and the Dehumanization of Sport* (New York: Free Press, 1992), 5.

order to this, we have to do that,”<sup>59</sup> ideally fits the process of physical training. Guttmann suggests that “training implies a rationalization of the whole enterprise, a willingness to experiment, a constant testing of results achieved.”<sup>60</sup> In the case of football, the overarching goal is obviously to get the football into the opponent’s end zone, in accordance with a specified set of rules, but some of the particulars of that process are left up to the players and coaches. Tom Osborne preferred to get the ball into the end zone through the brute force of a Power-I option attack. Barry Switzer, one time coach of the Oklahoma Sooners, said of Nebraska’s rushing attack, “Everyone knows what Nebraska is going to do! The trick is stopping it! You don’t win with schemes or playbooks, you win with players...Other people run the Nebraska offense, but they run the ball on first down and it’s second-and-eight. When Nebraska runs it, it’s second-and-two. They run it again, and it’s first-and-ten.”<sup>61</sup> The prescribed rules of the game allow you to throw the ball over your opponent. The Huskers, however, preferred to run over and through the opponent. The strength program, with its emphasis on explosiveness and sheer strength, is an emblem of rationalization. The original record board included the bench press and did not include the ten-yard dash. Testing of the bench press was dropped because Epley felt it was not an evaluation of football talent.<sup>62</sup> The ten-yard dash was added because a short, explosive burst of speed is. The strength program was a component of rationalization in that it allowed the Huskers to move the ball into the opponent’s end zone more effectively, using a ground attack that conformed to the prescribed rules of the sport. In giving credit to Osborne for starting the program, Epley is quick to point out that it would not have been as successful as it eventually became were it not for Osborne’s football philosophy. Had Osborne sought to spread the field

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<sup>59</sup> Ibid., 40.

<sup>60</sup> Ibid., 43.

<sup>61</sup> Keteyian, *Big Red Confidential*, 57.

<sup>62</sup> Interview by Terry Todd.

and build a speedy passing attack, big, powerful linemen and backs would not have been as necessary. Owing to Osborne's preference for a grinding running game, the strength program became an essential part of Nebraska football.

Another aspect of modernity is the creation of bureaucratic entities to support and administer sports. Epley's first contribution to this characteristic of modern sport was the formation of the Husker Power Club. This club, started by Epley in 1984, served as a booster club specifically for the strength and conditioning program. Membership dues to the club continue to be used to update the facilities and purchase new strength equipment used by Husker athletes.<sup>63</sup> Membership categories range from a \$50 annual donation up to \$5000, with benefits commensurate with the amount donated. The lowest level allows the donor to receive a quarterly newsletter which keeps them up to date on the training progress of Nebraska athletes. A donation of \$5000 or more gets the donor a personal invitation to view training sessions and the opportunity to "become a Husker Strength and Conditioning Coach for a day."<sup>64</sup> Such is the prestige of the program that Epley built, that fans are willing to pay several thousand dollars just to pretend they have his job for a day, and many have done just that. According to Epley, the club has raised more than two million dollars in support of the strength and conditioning program at Nebraska.<sup>65</sup> Thanks in part to the Husker Power Club, Nebraska athletes now train in the palatial Osborne Athletic Complex whose weight room includes twenty-eight multi-racks and

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<sup>63</sup> Husker Power Club, "Welcome," (Lincoln, NE: University of Nebraska Strength Booster Club, n.d.), [http://www.huskerpowerclub.com/hpc\\_welcome.htm](http://www.huskerpowerclub.com/hpc_welcome.htm) (Accessed May 17, 2010).

<sup>64</sup> Ibid.

<sup>65</sup> Boyd Epley, "Husker Power Timeline – The West Stadium Years," BoydEpley.com, <http://www.boydepley.com/WestStadium.pdf> (accessed February 8, 2010).

twenty-three lifting platforms; a far cry from the handful of racks and benches on Epley's initial list in 1969.<sup>66</sup>

Nebraska fans enthusiastically supported the weight program because the work ethic promoted by the Husker Power weight program fit well with their perceptions of the values embodied by their state. As documented by Roger Aden, many Nebraskans believe that they have been instilled with a unique work ethic which results from a combination of the often inhospitable climate and hard agricultural work.<sup>67</sup> Aden points to the state's establishment by homesteaders in the early 1860s, who were awarded 160 acres if they were willing to live on and improve the land for five years, as evidence of the lineage of hard work embraced by Nebraskans. For Nebraskans, a team that was able to dominate others through gritty, hard, physical work both on the field and in the weight room, was a team that many felt embodied the ethos of the state. This perception is also personified in the school's mascot, the Cornhusker, who performs tedious and difficult but necessary work.

#### **THE NATIONAL STRENGTH AND CONDITIONING ASSOCIATION**

Epley's second contribution to the evolution of bureaucracy was to have a much more far-reaching impact. In September of 1977, before the Huskers kicked off a home game against the Alabama Crimson Tide, he was introduced to the commissioner of the Southeastern Conference, Boyd McWhirter.<sup>68</sup> The commissioner inquired about the exact nature of Epley's position at Nebraska and then asked if Alabama had anyone in a similar position. Surprised that a conference commissioner could be unaware of the existence of professional strength coaches

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<sup>66</sup> Mike Arthur - Director of Strength and Conditioning at the University of Nebraska, e-mail message to author, July 12, 2010.

<sup>67</sup> Roger C. Aden, *Huskerville: A Story of Nebraska Football, Fans, and the Power of Place* (Jefferson, NC: McFarland, 2008), 76-92.

<sup>68</sup> Scott A. McQuilkin and Ronald A. Smith, "'The World's Source for Strength and Conditioning Information': A History of the National Strength and Conditioning Association, 1978-1993" (MS thesis, Pennsylvania State University, 1995), 8.

Epley decided that, to ensure the success of his fledgling profession, some kind of unification and professionalization of the field was in order. Consequently, he sent a letter to schools around the country to compile a national directory of strength coaches in 1978.<sup>69</sup> He got back 377 letters and compiled the results into a ninety-page directory titled, *The National Directory of Strength Coaches*.<sup>70</sup>

Following the publication of the directory, a few coaches began discussing the idea of a formal organization for the profession. After discussing the idea with a handful of his colleagues over a series of months, Epley offered to host the first annual meeting of the “National Strength Coaches’ Association” on July 29, 1978. More than seventy-five men made the trip to Lincoln. Most were not then called strength coaches, but they were the men at their schools who directed strength training. At that meeting, Epley was unanimously elected President and Executive Director of the new organization and a mission statement was written stating that the NSCA proposed to “Unify its members and facilitate a professional exchange of ideas in the area of strength development as it relates to the improvement of athletic performance and fitness.”<sup>71</sup> Epley and these early pioneers knew that legitimization of the strength coaching profession rested upon their ability to prove that training really did improve the performance of athletes. And so, like many other professional associations, they used a scientific approach to the sharing of ideas by establishing a national conference each year, a series of regional clinics—the organizing of which was a mandatory part of the job description of the six new regional

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<sup>69</sup> Boyd Epley, “NSCA Timeline,” H.J. Latcher Stark Center for Physical Culture and Sports at the University of Texas (Austin, TX: Stark Center, n.d.), [http://www.starkcenter.org/static/quest\\_for\\_victory/timeline/documents/nscatimeline.pdf](http://www.starkcenter.org/static/quest_for_victory/timeline/documents/nscatimeline.pdf) (accessed February 15, 2013).

<sup>70</sup> Boyd Epley, *The National Directory of Strength Coaches* (Lincoln, NE, University of Nebraska Printing and Duplicating 1978).

<sup>71</sup> *Ibid.*

directors—and, in December of 1978, they began publishing an organizational newsletter.<sup>72</sup> The first newsletter was sent to over eight thousand coaches, YMCA directors, and other “interested people” across the country. The first edition promised, “Each issue will be packed with the latest information on strength and conditioning for football, basketball, baseball, track and field, swimming, wrestling, gymnastics, women’s sports, and more. We’ll investigate and present the latest theories and research in the strength and conditioning field and present it in a fashion that is easily understood...you’ll have the important information necessary to ensure that your athletes are trained at their best.”<sup>73</sup> This first issue satisfied both of the established needs of the emerging organization: increased awareness of strength coaches through the large dissemination of the newsletter and the facilitation of the exchange of best practices in the field.



Figure 42. Bob Devaney, the keynote speaker, addressing the first meeting of the National Strength Coaches’ Association in 1978.

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<sup>72</sup> Ibid.

<sup>73</sup> Boyd Epley, “Join the NSCA!” *National Strength Coaches Association Newsletter* 1, no. 1 (1978): 1.

Epley's impact on collegiate athletics was now being felt on a national scale. By the end of the 1970's, nearly every major university in America had at least one person listed as a "strength coach," and the National Strength Coaches' Association was quickly growing in size and stature. Part of Epley's reach came from the fact that many of these new strength professionals had worked with him as assistant strength coaches and graduate assistants. In fact, more than sixty-four of Epley's former assistants have gone on to direct strength coaching activities for a variety of universities and professional teams. As they moved into their new positions, they continued to use the methods they had learned from Epley. Boyd also actively disseminated information about the Husker Power system. He authored multiple books on strength and conditioning, as well as an entire series on training for a variety of sports (football, swimming, wrestling, baseball, etc.) "the Nebraska way."<sup>74</sup>

The nascent "Strength Coaches'" organization grew quickly; attendance at the second annual convention in 1979 approached three hundred, up from seventy-six the year before. The

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<sup>74</sup> Boyd Epley, *The Strength of Nebraska* (Lincoln, NE: Body Enterprises, 1979); Boyd Epley, *Cardiovascular Fitness...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1980); Boyd Epley and Tom Wilson, *Weight Training Instruction Manual* (Lincoln, NE: Body Enterprises, 1981); Boyd Epley, *Body Composition Assessment: How to Gain or Lose Bodyweight* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Husker Power for '83-'84* (Lincoln, NE: University of Nebraska Press, 1983); Boyd Epley, *Interval Sprints for Football...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Motivate Your Athletes...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Multi-Purpose Machine Exercises...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Neck Exercises...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Basketball...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Baseball and Softball...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Football...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Golf...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Racquet Sports...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Swimming...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Track & Field...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Strength Training for Wrestling...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Stretching...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Survivor Circuit Training...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Test Your Athletes...The Nebraska Way* (Lincoln, NE: AMF American Consulting Service, 1983); Boyd Epley, *When How and Why to Begin Lifting Weights...The Nebraska Way* (Lincoln, NE: Body Enterprises, 1983); Boyd Epley, *Dynamic Strength Training for Athletes* (Dubuque, IA: Wm. C Brown Publishing Company, 1985); Boyd Epley, *Boyd Epley Workout for Football* (Lincoln, NE: Body Enterprises, 1988); Boyd Epley, *Husker Power: Committed to Improving Performance* (Lincoln, NE: Husker Power, 1990).

increased membership brought diverse interests, while the first four issues of the *NSCA Newsletter* had focused largely on strength programs for football. Members clamored for information about other sports, nutrition, and physiology. The feedback led to the enlargement and splitting of NSCA publications into two formats in 1979: the *NSCA Bulletin* and the *NSCA Newsletter*. The *Bulletin* was intended to convey organizational information, while the *Newsletter* would carry articles related to strength training. The *Newsletter* expanded rapidly and by the fifth bi-monthly issue had transitioned to the *NSCA Journal*. The new *Journal* was sent out to seventeen thousand coaches, scientists, and other potentially interested parties in 1980 as a “free look” to generate interest in the organization. Many of those recipients were interested and by May of 1980, the organization had grown to include more than 2,600 members. While the influx of members strengthened the financial base of the organization, it diluted the membership of actual strength coaches. In order to reflect this changing demographic, the organization’s name was changed from the “National Strength Coaches’ Association” to the “National Strength and Conditioning Association” in May of 1981.<sup>75</sup>

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<sup>75</sup> McQuilkin and Smith, “The World’s Source,” 15-16.

From the Profession that  
Builds Great Athletes

 National  
Strength  
Coaches  
Association

Free!  
To you  
at no obligation.  
A copy of the NSCA  
Journal. Featuring the  
latest information on Strength  
training and conditioning for athletes including:

- Programs for all sports
- Stretching and running
- Muscle Research
- Nutrition for athletes
- Women's programs
- Motivational and organizational tips
- Equipment information
- All that you need to know to properly supervise  
the training of your athletes

Figure 43. A promotional brochure sent along with one of the seventeen thousand “free-look” copies of the *NSCA Journal* in 1980.

In May of 1983 Boyd Epley resigned as president of the NSCA after five years of leading the organization, which had then grown to 6,200 members. His departure coincided with a restructuring of the organization. The organization became more democratic, with all members able to vote by mail, as opposed to the previous system in which only certain members who attended the annual convention had a ballot. The result was the election of a physical education professor, Thomas Baechele, to lead the organization in 1983. Baechele, working closely with coach and physical education professor Bill Kraemer, pushed for more awareness and use of scientific research, as well as a formal certification process for strength coaches.<sup>76</sup>

The desire to promote and understand research had been voiced by membership at the 1981 NSCA convention, but the leg-work was done by Bill Kraemer. As an exercise physiologist who completed his doctoral studies at the University of Wyoming in 1984, Kraemer recruited scientists with whom he was acquainted to publish articles in the *NSCA Journal*. By 1985, so many articles were being submitted that there was discussion of the creation of a journal strictly for research related to strength training. That journal would be created in 1987 as the *Journal of Applied Sports Science Research*. Beginning in 1987, then, the NSCA had a strictly research journal as well as one aimed at the more practical aspects of program design, the *NSCA Journal*. To make the research more approachable, the journals featured sections on “Reading and Understanding Research,” so that the diverse membership would not be put off by the statistical information. Moreover, editors actively encouraged scientists to make their findings comprehensible by focusing on application of the information and avoiding unnecessary jargon. In doing so, they reinforced their commitment to “bridging the gap” between sport scientists and those who sought to use their research to enhance sport performance.<sup>77</sup>

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<sup>76</sup> Ibid., 20-21.

<sup>77</sup> Ibid., 34-39.



Figure 44. Bill Kraemer, president of the National Strength and Conditioning Association from 1989-1991 and Professor of Kinesiology, Physiology, Neurobiology, and Medicine at the University of Connecticut. Image from Uconn.edu, the official website of the University of Connecticut.

In 1985, the NSCA took another important step in professionalizing strength coaching by instituting certification. The first exam was offered in June of 1985 and those who passed it would be allowed to call themselves “Certified Strength and Conditioning Specialists (CSCS).” The exam included multiple choice and video-taped questions about the physiology and biomechanics of exercise, as well as exercise technique. In the words of Baechele, it was designed to “assure a minimum level of competence among all practitioners.”<sup>78</sup>

By 1987, just shy of one decade of formal organization, the National Strength and Conditioning Association had grown from seventy-six members to more than six thousand, established two journals, and created a certification process for strength coaches. The journals and certification were both important in the professionalization of strength coaching.

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<sup>78</sup> Ibid., 70.

Certification meant that practitioners had a good understanding of physiology and exercise technique; it ensured prospective employers that there were some brains behind the brawn. Moreover, by publishing research and requiring members to be familiar with it as part of their “continuing education,” the NSCA cemented strength training as a scientific field of endeavor. While Bob Hoffman and Joe Weider assured readers of their magazines that their methods were “scientific,” those methods were largely based on tradition and trial and error. When scientific research on strength training burgeoned in the 1950s and 1960s, few of those who would implement the research actually read it. The NSCA truly bridged the gap by promoting research and making sure it was accessible and utilized by practitioners in the field.

Strength coaches were not the only group profoundly affected by the formation of the NSCA in 1978. The job duties and educational trajectories of athletic trainers were also altered by the formalization of strength coaching as a profession. Athletic trainers first organized in 1938, though the organization fell apart during World War Two. The current iteration of the National Athletic Trainers’ Association (NATA) was formed in 1950.<sup>79</sup> Athletic trainers have always been, and continue to be jacks-of-all-trades.<sup>80</sup> Prior to the formation of the NSCA, one of their major trades was oversight of conditioning. As an example, George Sullivan, an athletic trainer at Nebraska oversaw their winter program before Epley took over. Similarly, athletic trainers Frank Medina and Charles Craven at Texas supervised some aspects of football conditioning even after Stan Burnham introduced his weight training program.<sup>81</sup> During the 1970s, the NATA’s journal, *Athletic Training*, featured stories on how to develop conditioning

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<sup>79</sup> Richard G. Ebel, *Far Beyond the Shoe Box: Fifty Years of the National Athletic Trainers’ Association* (New York: Forbes Custom Publishing, 1999), 7.

<sup>80</sup> As examples, it is not uncommon for athletic trainers to be tasked with oversight of equipment fitting in contact sports or travel arrangements in minor-league professional sports.

<sup>81</sup> A 1958 article in the *Physical Educator* listed oversight of conditioning as one of the primary responsibilities of the athletic trainer. Robert E. Shelton, “Responsibilities of the Athletic Trainer,” *Physical Educator* 15, no. 4 (December 1958): 140-1; See also: George Colfer, “Barbells on Campus – Ithaca College,” *Strength & Health*, February 1967, 47. The article includes a picture of athletic trainer Bob Grant supervising football workouts.

programs, one of which was co-authored by Epley.<sup>82</sup> Initially Epley had intended to work alongside the NATA with strength coaches as a branch of the organization. At the urging of Pennsylvania State University strength coach Dan Riley, Epley abandoned his plan to have a dual meeting with the NATA in 1978 and instead hosted the first NSCA meeting in Lincoln, Nebraska.<sup>83</sup> After the NSCA's formation, *Athletic Training* rarely featured articles on strength training except as related to injury recovery. The NATA still considers conditioning as one of the duties of the athletic trainer, though it is officially listed as a component of injury prevention.<sup>84</sup> Strength and conditioning as it applies to athletic trainers, then, deals with proper conditioning to prevent injuries and strength to recover from them, not the enhancement of performance as in the days before the NSCA.

Boyd Epley was not the first modern strength coach, but he is inarguably the most important. The Roman philosopher Seneca is often credited with saying "Luck is what happens when preparation meets opportunity," and the aphorism certainly appears to apply to Epley's career.<sup>85</sup> His personal experiences with a variety of strength training styles, and the extent to which strength training improved his own athletic ability, allowed him to be a knowledgeable and ardent supporter of strength training for athletes.

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<sup>82</sup> Anthony A. Annarino, "Scientific Foundations for the Development of Conditioning Programs," *Athletic Training* 7, no. 4 (September 1972): 115-17; Robert J. Robertson, et al., "Evaluation of a Year-Round Football Conditioning Program," *Athletic Training* 10, no. 2 (June 1975): 78-83; Paul S. Fardy, "Some Principles of Conditioning: Implications for the Athletic Trainer," *Athletic Training* 11, no. 2 (Summer 1976): 82-85; Michael Rielly and Edmund J. Burke, "A Comparison Between a Conventional and a Field Method in Development of Leg Strength and Power," *Athletic Training* 11, no. 2 (Summer 1976): 75-8; Thomas V. Pipes, "The Acquisition of Muscular Strength Through Constant and Variable Resistance Strength Training," *Athletic Training* 12, no. 3 (Fall 1977): 146-7; Michael Stone, Robert Johnson, and David Carter, "A Short Term Comparison of Two Different Methods of Resistance Training on Leg Strength and Power," *Athletic Training* 14, no. 3 (Fall 1979): 158-160.

<sup>83</sup> McQuilkin and Smith, "The World's Source," 9.

<sup>84</sup> William E. Prentice, *Principles of Athletic Training* (New York: McGraw-Hill, 2011), 14.

<sup>85</sup> Quote typically attributed to Roman philosopher Seneca. <http://www.quotationspage.com/quote/4576.html> (Accessed June 29, 2010).

When a back injury appeared to put his athletic career on hold, he inadvertently made strength training disciples of other injured athletes, particularly football players. His success in doing so was noted by an open-minded coach, Tom Osborne, who was keenly interested in the preparation that went into athletics. Once tasked with improving the performance of the Husker football team, Epley quickly realized that innovation would be key to producing measurable gains for the team. “Early on,” he says, “I decided that we [strength coaches] did not want to be weightlifters, powerlifters, or bodybuilders... I wanted to be seen as a strength coach that was working to improve the performance of an athlete... this was something new; this is strength training. It’s not weight training for physical education, it’s strength coaching that will actually improve performance for athletes.”<sup>86</sup>

Important aspects of Epley’s innovation were his solicitation of advice from professors at Nebraska and other knowledgeable individuals, the application of science to strength coaching by applying emerging theories about sport-specific training, and his willingness to constantly revise the program. In addition to his success as a practitioner of strength coaching, Epley founded the National Strength Coaches’ Association, which rapidly revolutionized the profession and became, in 1981, the National Strength and Conditioning Association. Under his leadership of the organization, strength coaches evolved from a group of disparate individuals interested in improving athletic performance into a unified group of professionals with their own research-based academic literature. From its initial membership of seventy-six strength coaches, the NSCA has grown to a membership of more than thirty-three thousand members in fifty-six countries at the time of this publication.<sup>87</sup> Epley is still an integral part of the NSCA, having taken a full-time position with the organization as “Director of Coaching Performance,” upon his

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<sup>86</sup> Interview by Terry Todd.

<sup>87</sup> Greg Nockleby, NSCA Public Relations Manager, telephone interview by Jason Shurley, July 7, 2010.

retirement from Nebraska in 2006.<sup>88</sup> In the end, Epley's career at Nebraska included an integral role in thirty-five years of Husker football that tallied 356 wins, five national championships, a host of Outland, Lombardi, and Heisman Trophy winners, and an indelible mark on the process of professional preparation for sports.

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<sup>88</sup> Boyd Epley, "Husker Power Timeline – The Osborne Complex Years," BoydEpley.com, <http://www.boydepley.com/OsborneComplex.pdf> (accessed February 8, 2010).

## CONCLUSION

Strength training has changed American sport. As training techniques have improved, incorporating sport-science research, athletes have gotten bigger, faster, and stronger. While other factors, such as improved nutrition, anabolic steroids, human growth hormone, and other ergogenic aids have surely played a role in the increased size of athletes over the last fifty years, strength training's role has arguably been the largest. As an example of how weight training has affected college football, one need only to look at the historical rosters of the Texas Longhorn football teams. In 1960, before the team began officially-sanctioned, team-wide weight training, only twenty-one of forty-eight players (44%) weighed over 200 pounds, with the largest player tipping the scale at 220 pounds. By 1980, three years after Texas hired its first full-time strength coach, sixty-nine players on a roster of ninety-five (72%) weighed more than 200 pounds, with the largest lineman weighing 280 pounds. The 2012 roster has a similar percentage of players over 200 pounds, eighty of 115 players (70%), but also includes twelve players who weigh more than 300 pounds. The heaviest two players are both 320 pounds this season.<sup>1</sup>

Sports journalist Rick Telander discussed the trend toward larger players and how they made the game more dangerous in his 1989 book *The Hundred Yard Lie*. He asserted that the game had become “unplayable” because “weightlifting, steroids, position specialization, and bizarre attitudes that come with any or all of the above have turned the game into a very

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<sup>1</sup> The University of Texas hired Dana LaDuc to serve as their first full-time strength coach in 1977. Terry Todd, “The History of Strength Training for Athletes at The University of Texas,” *Iron Game History* 2, no. 5 (January 1993): 12. Texas Longhorns Football Archives, “1960 Roster,” (Austin, TX: University of Texas Athletics, n.d.), <http://www.mackbrown-texasfootball.com/sports/m-footbl/spec-rel/roster-1960.html> (accessed October 21, 2012); Texas Longhorns Football Archives, “1980 Roster,” (Austin, TX: University of Texas Athletics, n.d.), <http://www.mackbrown-texasfootball.com/sports/m-footbl/spec-rel/roster-1980.html> (accessed October 21, 2012); Texas Longhorns Football Archives, “2012 Roster,” <http://www.mackbrown-texasfootball.com/sports/m-footbl/mtt/tex-m-footbl-mtt.html> (accessed October 21, 2012).

dangerous freak show.”<sup>2</sup> In Telander’s estimation, weight lifting had become problematic because it quickly went beyond strengthening to enhance performance or prevent injuries into a year-round *obsession* to maximize performance. It became an end in itself.<sup>3</sup> The size, strength, and speed of players in the modern game, as opposed to their counterparts who played in the 1960s and earlier, is of particular concern in light of recent evidence of repetitive brain injuries suffered by football players. The traumatic forces endured by modern football players are comparable to those observed in car crashes, owing to the mass and velocity of the players.<sup>4</sup> Telander credits the success of the Nebraska strength program with accelerating the process of making the game more dangerous, as did a former National Football League Players’ Association executive, less directly, who asserted that “the game has become a lot more dangerous and psychologically troublesome since 1970.”<sup>5</sup>

In the span of a few decades, then, strength training has gone from a practice which many physicians, physical educators and coaches regarded as unhealthy and damaging to performance, to something which is so widely practiced and profoundly effective that it has altered the way games are played. This dramatic change in the perceptions and practice of strength training embodies Kuhn’s model of paradigm shift. According to Kuhn’s model, the practice of science requires a set of espoused beliefs or “paradigms.” Paradigms must possess the dual qualities of being “sufficiently unprecedented” to beat out competing explanations for adherents and “open-

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<sup>2</sup> Rick Telander, *The Hundred Yard Lie: The Corruption of College Football and What We Can Do to Stop It* (New York: Fireside, 1989), 148-149.

<sup>3</sup> Coaches at Michigan State decades earlier had feared as much, which partially explained their trepidation about requiring weight training. They felt that athletes had taken up weight training to help another sport but become so focused on strength, that it had taken the place of sport practice and actually proved a detriment to their performance. Gordon C. Smith, “Weightlifting at Michigan State U.,” *Strength & Health*, May 1959, 61

<sup>4</sup> Jason Shurley and Jan Todd, “Boxing Lessons: An Historical Review of Chronic Head Trauma in Boxing and Football,” *Kinesiology Review* 1, no. 3 (August 2012): 170-184; Dennis Dodd, “Head Injuries Take Center Stage Saturday, but What Can be Changed?” CBSsports.com, September 10, 2012, <http://www.cbssports.com/collegefootball/story/20142126/head-injuries-take-center-stage-saturday-but-what-can-be-changed> (accessed October 21, 2012).

<sup>5</sup> The NFLPA executive was Frank Woschitz, director of public relations. Telander, *Hundred Yard Lie*, 150-153.

ended” enough to give researchers a set of questions which must be solved.<sup>6</sup> Theories based on these paradigms become the basis for “normal science,” in which research is based on past scientific achievements and forms the foundation for further practice. As Kuhn goes on to point out, however, “normal science does not aim at novelties of fact or theory and, when successful, finds none.”<sup>7</sup> Instead, normal science “often suppresses fundamental novelties because they are necessarily subversive.”<sup>8</sup> According to Kuhn, then, scientists need an over-arching set of beliefs to explain how things work and then set about finding the minor details to explain the intricacies. In a sense, scientists try to fit discoveries into a conceptual box.

The accepted paradigm of human physiology and human performance in the late nineteenth and early twentieth centuries was that the body had a fixed amount of energy available. This paradigm was derived from the rekindling of Galen’s six “non-naturals,” which called for moderation between extremes, like those of rest and exercise. Trending too far toward one extreme would invite disease. These ideas were seemingly verified by the elucidation of the laws of thermodynamics, specifically, the law of conservation of energy. Physiologists and physicians felt that Galen’s notions were validated by these experiments and set about explaining human health and performance within this paradigm. They warned against “overdevelopment” and participation in strenuous exercise for fear that it would strain the body’s limited resources, starving the brain and other organs of vital nutrients because of the demands made by the muscles. Physicians explained disease within this paradigm, as exemplified by the “muscle man” at the 1892 meeting of the Berlin Medical Society whose breathing difficulties were attributed to what was perceived as muscular overdevelopment, or R. Tait McKenzie’s drowning victim who met his fate because he was too dense to float.

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<sup>6</sup> Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), 10-11.

<sup>7</sup> *Ibid.*, 52.

<sup>8</sup> *Ibid.*, 5.

Once a paradigm has become fully accepted, it is incorporated into academe as a discipline or profession.<sup>9</sup> The paradigm of fixed capacities was entrenched with the hiring of Dudley Allen Sargent as an Assistant Professor of Physical Training by Harvard University. In that role Sargent worked within the paradigm to create an ideal, balanced physique that avoided over-development. His theories related to an ideal physical form were disseminated to other physicians and physical educators through summer institutes he hosted at Harvard. His ideas were also publicized in William Blaikie's widely-read text *How to Get Strong and Stay So*.

Even as Sargent worked to solidify the existing paradigm, other scientists began to point out holes in the theory. Inconsistencies which cannot be explained by the prevailing paradigm Kuhn has labeled "anomalies."<sup>10</sup> In the case of the paradigm of fixed capacities, one of the earliest detractors was medical doctor Austin Flint, who pointed out that a trained man could perform more work than an untrained man with the same nutrient intake. The trained man, then, must have made some adaptations which conferred more efficient functioning. These adaptations were elucidated in the 1920s and 1930s by experiments that showed that intramuscular substrates, the fuel of muscle contraction, increased with training. Additional research showed that the enlargement of the heart in response to exercise actually conferred more efficient functioning, rather than a diseased state.

While researchers, particularly in the 1920s and 1930s, found an ever-increasing number of anomalies, muscle magnates Bob Hoffman and Joe Weider began to trumpet their own sets of anomalies. No serious investigations had been done on the idea of muscle-binding. Physiologists who were willing to speculate on the condition theorized that it was due either to a proliferation of muscle fibers relative to nerve fibers or that it resulted from an over-growth of connective

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<sup>9</sup> Ibid., 18-19.

<sup>10</sup> Ibid., 52-53.

tissue from the repetitive strain of heavy lifting. Both ideas are loosely based on the notion of fixed capacities. In both cases the muscles enlarged, but like the heart, this enlargement was believed to be pathological because it was induced by an arduous training program. Such a difficult program would have to be sufficiently strenuous to borrow resources from the rest of the body and must, therefore, be pathological.

Hoffman and Weider used their magazines to broadcast anomalies which undermined the prevailing paradigm. Hoffman pointed to his own purported athletic success as well as the flexibility and speed of Olympic weightlifters as evidence that the muscle-bound condition did not exist. Both men cited lists of champion athletes who trained with weights and saw only improvements in their performance.

The accumulation of anomalies, according to Kuhn's model, leads to a "crisis." As the prevailing theory fails to account for the sizable or increasing number of anomalies, adherents to the older paradigm begin to lose faith and seek alternative explanations. Not all lose faith of course, some cling tenaciously to the older paradigm and "devise numerous articulations and *ad hoc* modifications of their theory in order to eliminate any apparent conflict."<sup>11</sup> The crisis about the effects and utility of strength training began to appear in professional journals as early as the 1930s. Numerous surveys of physical educators' opinions on strength training began to appear during the latter years of the decade. The majority opinion was "decidedly unfavorable," though the minority position that there had never been "a sound physiological argument against it" began to appear.<sup>12</sup> Some physical educators argued in 1937 and 1938 issues of the *Journal of*

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<sup>11</sup> *Ibid.*, 78.

<sup>12</sup> Harvey Allen, "Weight Lifting in the Association," *Journal of Physical Education* 34, no. 3 (January-February 1937): 48-49.

*Physical Education* that, due to the burgeoning interest in strength training, they owed it to their students to investigate the effects of strength training.<sup>13</sup>

The blooming crisis reached a tipping point in 1945 when Thomas DeLorme compared the effects of a regimen of heavy strength training with the results of the accepted paradigm. Soldiers convalescing from injuries suffered during the Second World War were treated using protocols which adhered to the paradigm of energy conservation. They performed low-weight, high repetition exercises to avoid taxing a body which was already working to repair itself. While the program was more effective than rest alone, recovery took months and relapses were common when the soldiers returned to their job duties. DeLorme's program of heavy strength training actually taxed the damaged muscles and the recovering body and, instead of resulting in further weakness or disease as the old paradigm would have predicted, the soldiers' recovery was quicker and more complete.

By the early 1950s researchers like Peter Karpovich, himself an early adherent to the older paradigm, began to investigate the anomalies. Again and again the research showed that heavy strength training resulted in more efficient movement with none of the deleterious effects that the old paradigm anticipated. When researchers were unable to produce the results that the old paradigm predicted, they began to embrace a new paradigm, one of performance enhancement and expanding capacities. Their acceptance of the new paradigm is demonstrated in the research of the 1960s. After the research of the 1950s had shown that strength training actually increased strength and movement speed without adversely affecting range of motion, research of the 1960s attempted to elucidate the most effective way to increase strength and speed. By the 1960s, investigators were no longer examining *if* strength training should be done,

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<sup>13</sup> Howard Wilson, "Uplifting Weight-Lifting," *Journal of Physical Education* 34, no. 5 (May-June 1937): 86-87; C.F. Benninghoff, "Weight Lifting," *Journal of Physical Education* 35, no. 6 (July-August 1938): 96.

they were attempting to determine *how* it should be done. This acceptance of the effectiveness of strength training demonstrates that the new paradigm gained considerable adherents.

For coaches and physical educators, the crisis resulted from anomalies they had witnessed on the field of play. The success of the weight-trained Soviet Olympians as well as the dramatic turnarounds of football teams at Istrouma (LA) High School, Fort Lauderdale (FL) High School, Southeastern Missouri State University, Louisiana State University, and the University of Washington, convinced many coaches that their apprehension of weight training was unfounded. In the late 1950s and early 1960s, college teams across the country took up weight training. Weights were officially endorsed or required for athletes at universities which included Stanford, Michigan State, Temple, Villanova, the United States Naval Academy and the flagship universities of Illinois, California, and Texas.

The shift to the new paradigm, that weights enhanced athletic performance, was solidified with the employment of Al Roy and cemented by the hiring of Boyd Epley. Both men were specialists in strength training and were hired specifically to deploy a weight program to enhance athletic performance. The emergence of specialists in the new paradigm is emblematic of its acceptance. Epley was integral in bolstering the new paradigm through his work as the driving force to create the National Strength and Conditioning Association. This professional society, dedicated to the exchange of ideas within the new paradigm, also produced its own professional literature in the *Strength and Conditioning Journal* and *Journal of Strength and Conditioning Research*. The widespread acceptance of the new paradigm is also illustrated in the dramatic growth of the NSCA. From an original membership of seventy-five, the group has grown to over thirty-thousand members.

In addition to the size of the NSCA, its certification programs demonstrate the dominance of the new paradigm. The organization offers four specialized certifications in strength training. The oldest, “Certified Strength and Conditioning Specialist (CSCS)” is one carried by many strength coaches. The other certifications include “Certified Personal Trainer,” “Certified Special Population Specialist,” and “Tactical Strength and Conditioning Facilitator.”<sup>14</sup> The certifications demonstrate the pervasiveness of the new paradigm because they are often a prerequisite for employment. For example, to work as a strength and conditioning coach or personal trainer, an individual must have one of these certifications which indicates that they are sufficiently versed in the science of strength training as an enhancer of performance.

In spite of the NSCA’s massive membership, it is no longer the only professional organization which deals with strength training for the enhancement of athletic performance. In 2001, a group of more than one-hundred collegiate strength coaches formed their own separate organization, the Collegiate Strength and Conditioning Coaches’ Association (CSCCA). The group formed, in part, because members felt the NSCA had lost touch with their highly specialized interests and needs. In the decade since its formation, the group has grown to more than one thousand members and also has two of its own certifications: “Strength and Conditioning Coach Certified,” and “Master Strength and Conditioning Coach.”<sup>15</sup>

Founded in 1987, the National Academy of Sports Medicine (NASM) is another group which offers certifications for professionals interested in strength training for the enhancement of athletic performance. The NASM is notable for its highly specialized certifications. The group offers a certification similar to the NSCA’s CSCS, the “Performance Enhancement Specialist

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<sup>14</sup> “Certification,” National Strength and Conditioning Association Official Website, [nscs.com/certification/](http://nscs.com/certification/) (accessed April 20, 2013).

<sup>15</sup> “About the CSCCA,” Collegiate Strength and Conditioning Coaches’ Association Official Website, <http://www.cscsca.org/about> (accessed April 20, 2013).

(PES),” which is a general certification in the methods of strength training to enhance performance. More specialized certifications include “Golf Fitness Specialist” and “Mixed-Martial Arts Conditioning Specialist,” aimed at strength professionals who work with very specific populations.<sup>16</sup>

In addition to the myriad certifications available to strength and conditioning professionals, there has been a concomitant increase in employment settings. Whereas the earliest strength coaches worked largely in university and professional settings, many strength coaches now work in facilities which are not associated with any particular team, but specialize in training athletes. For example, Velocity Sports Performance is a chain of facilities that markets to adolescent athletes (and their parents) hoping to advance their athletic careers. Their facilities commonly include spacious weight rooms, indoor turf fields and tracks, basketball courts and plyometric areas. The company hires individuals with one or more strength coaching certification, such as the CSCS or the NASM’s PES, and boasts forty-five locations in nineteen states.<sup>17</sup> A similar company, Competitive Athletes’ Training Zone (CATZ), also markets its services to adolescents and hires strength coaches. Though not as large as the Velocity chain, CATZ has ten specialized facilities spread over five states from New York to California.<sup>18</sup>

The existence of competing national chains which train youth athletes shows the acceptance of strength training as an integral part of sports performance. Parents pay hundreds and sometimes thousands of dollars for professional guidance to make their aspiring athletes

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<sup>16</sup> “Credentials,” National Academy of Sports Medicine Official Website, <http://www.nasm.org/get-credentialed> (accessed April 20, 2013).

<sup>17</sup> “About Us,” Velocity Sports Performance Official Website, [http://www.velocitysp.com/about\\_us](http://www.velocitysp.com/about_us) (accessed April 20, 2013).

<sup>18</sup> “Locations,” Competitive Athletes’ Training Zone: Sports Performance Centers Official Website, <http://www.catzsports.com/locations/map> (accessed April 20, 2013).

stronger, faster, and more powerful. That children are training shows that the paradigm has unquestionably shifted away from the idea that strength training is harmful.

It is significant that children are training, but it is also significant to note that athletes in nearly every sport are regularly training with weights. Athletes in sports which clearly require great amounts of strength and power, including shot put, hammer throw, discus, and football, were early adopters of strength training. Athletes in sports which relied more on fine motor skills and delicate touch, like golf and tennis were, for the most part, late adopters. By 1985, however, the Professional Golf Association (PGA) developed a mobile weight training facility that traveled along with the PGA tour.<sup>19</sup> The combination of strength training and better equipment in golf has now caused some, including Tiger Woods, to question whether changes in course design or rules are necessary.<sup>20</sup> As with football, the increased strength of the athletes may well trigger changes in the game. In 2012, *ESPN* writer Eli Saslow outlined the workout regimen of professional tennis star Novak Djokovic and asked if he had become “the fittest athlete ever?” Djokovic’s workouts include skills practice, strength training, running, and yoga and he has been known to work out three times a day in some instances.<sup>21</sup>

The paradigm shift from strength training potentially dangerous and deleterious to sport performance, to strength training as an enhancer of athletic performance, has dramatically altered American sports. Athletes are larger, faster, and stronger than they have ever been before. Their improved performance owes largely to their specialized, scientific, year-round training that often begins in early adolescence and continues throughout their careers. Sports have become more of

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<sup>19</sup> Terry Todd, “The PGA Tour’s Traveling Gym – How it Began,” *Iron Game History: The Journal of Physical Culture* 3, no. 3 (April 1994): 14-19.

<sup>20</sup> “Tiger Woods: ‘We’re Too Strong for Many Courses,’” *Golfmagic.com*, <http://www.golfmagic.com/news/tiger-woods-were-too-strong-for-many-courses/6337.html> (accessed April 20, 2013).

<sup>21</sup> Eli Saslow, “Freak of Nature: How Novak Djokovic Harnessed the Untapped Powers of His Body,” *ESPN.com*, [http://espn.go.com/tennis/story/\\_/id/8132800/has-novak-djokovic-become-fittest-athlete-ever-espn-magazine](http://espn.go.com/tennis/story/_/id/8132800/has-novak-djokovic-become-fittest-athlete-ever-espn-magazine) (accessed April 20, 2013).

an occupation and less of a diversion as athletes work on both the physiological parameters of their performance as well as the technical skills of their sport. Ultimately, the games that fostered strength training may themselves be altered because of its implementation.

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