

# Muscular Vegetarianism: The Debate Over Diet and Athletic Performance in the Progressive Era

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Milo of Croton, the ancient Greek wrestler who won the laurel wreath at seven consecutive Olympiads, is reputed to have built his prodigious strength with a daily training diet which included twenty pounds of meat as its *pièce de résistance*. The longevity and popularity of Milo legends (there is another which credits him with celebrating a victory by killing a bull with a single blow of his fist and eating the animal completely in one day) dramatizes the continuing appeal of the assumption that exceptional performance is possible only for those athletes who consume liberal quantities of flesh food. The notion is deep-seated, an intuitive response to the strength and ferocity of carnivorous animals, but its hold on the minds of competitors and fans alike has been loosened in recent years by a more sophisticated public awareness of the facts of nutrition, the resurgence of vegetarianism, and the success of vegetarian athletes such as Bill Walton. The resultant brouhaha over whether bean-sprouts are better than beefsteaks, however, is only a renewal of hostilities between vegetarian and meat-eating athletes. The issue was first joined (and contested with considerably more spirit than presently) during the closing years of the nineteenth century, just as American society's fascination with competitive athletics was first blossoming.<sup>1</sup>

Treatises on athletic training during the Progressive years gave a good deal of attention to diet. The rather spectacular growth of sophistication of biochemistry over the last quarter of the nineteenth century had generated almost unbounded confidence in a "chemical machine" model of human functioning. The machinery was complex, to be sure, but progress in nutrition theory suggested the operating needs of the machine were quite simple and easily met. Adequate protein was required for maintenance of the tissues (or parts of the machine), and carbohydrates and fats were needed as fuel for movement.<sup>2</sup>

Nutritionists were in fact quite smug about their understanding of the physio-

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logical roles of the major food groups, for they had recently corrected erroneous early attempts to define those roles. The trailblazer among the early metabolic theorists, the brilliant German organic chemist Justus von Liebig, had relied on educated speculation rather than experiment to formulate the first correlations of food composition with physiological use. His 1842 *Animal Chemistry*, the seminal work in modern biochemistry, separated food components into two classes: plastic (protein) and respiratory (fat and carbohydrate). The latter was presumed to supply, through molecular oxidation, all the heat needed to maintain body temperature. Plastic food, as the name implies, was regarded as the substance of growth and repair, *but* it was also supposed to be the source of all energy (Liebig called it “force” [*Kraft*]) used for muscular motion. In the Liebig scheme, therefore, there was an assumed direct proportion between the amount of muscular work accomplished and the quantity of protein oxidized; athletic effort demanded a high protein diet.<sup>3</sup>

Liebig’s facile system of nutrition was soon challenged, and several experiments carried out during the second half of the century disproved the notion that protein was the source of muscular energy. But though it was supplanted by carbohydrate as an energy source, protein continued to enjoy undeserved status for its plastic properties. The large quantities of protein consumed by athletes and heavy workers (who earned hearty appetites and found protein-rich foods to be especially palatable) were rationalized by the assumption that the protein appetite was a physiological craving representing the body’s demand for repair of muscle worn down by exercise. The high protein diet of athletes, which was actually a custom, was thus accepted by nutrition scientists as a physical necessity. The very same dietitians who scoffed at Liebig for having recommended superfluous protein for energy, in the next breath recommended superfluous protein for tissue maintenance. Turn-of-the-century dietary allowances, based on surveys of actual consumption by healthy adults who could afford to eat as much as they wanted, proposed 118 to 127 grams of protein per day for average-size sedentary males, and up to 150 grams per day for hard laborers (the present recommendation for a 70 kilogram man is 56 grams; athletes are advised to take somewhat more protein, but nothing like the 150 grams of 1900.)<sup>4</sup>

Early twentieth century studies of the diets of competing athletes revealed that the majority exceeded the most liberal standard. W. O. Atwater, America’s premier nutritionist and a man who was adamant that a training diet should include “especially large amounts of protein,” performed careful investigations of the food taken by the Yale and Harvard crews and found 150 to 170 grams of protein to be the daily average. Other inquiries showed college football players often consumed more than 200 grams per day, the University of California squad averaging a robustious 270 grams. Sandow, the most celebrated strongman of the day (he was a blockbuster attraction with Ziegfeld)

ate nearly 250 grams of protein, and an English prize fighter approached 280 on his regimen of one pound of mutton three times daily, and a bit of bread and ale.<sup>5</sup>

The latter's predilection for animal protein was common. Training guides suggested that two kinds of meat be served at all three meals, supplemented with "a moderate quantity" of fruits and vegetables. Atwater calculated that generally more than two-thirds of the protein eaten by his rowers was taken in the form of meat products. Most training manuals, furthermore, made a point of advising that beef be served rare or "underdone," seemingly agreeing with the ancient vegetarian charge that carnivorous eating habits created an aggressive carnivorous behavior. According to one observer, meat was so rare at some training tables the athletes referred to it as "red rags." When the popular medical writer Woods Hutchinson taunted vegetarians for being repelled by "Meat! R-r-red meat, dr-r-r-ripping with b-l-llood, r-r-reeking of the shambles," he was playing on the primitive suspicion that one needs blood to make blood, and muscle to make muscle; a diet devoid of red rags could never build full manly strength and energy.<sup>6</sup>

Those presumptuous vegetarians who ignored this elemental precept had been butts of ridicule for years before Hutchinson's jibes. Vegetable or Pythagorean diet (named for Pythagoras, the ancient Greek vegetarian-natural philosopher) had been introduced to the United States by the Reverend William Metcalfe in 1817, but did not spread beyond the confines of his small sectarian Bible Christian Church until the 1830s. During that decade, however, Sylvester Graham and William Alcott, the leaders of the Jacksonian popular health reform movement, carried the Pythagorean message to a larger public audience and gave vegetarianism solid footing in American culture. Graham and Alcott were also significant for initiating the project of establishing a physiological rationale for the superiority of vegetable to ordinary diet. Their simplistic and premature interpretations of nascent biochemistry were founded upon the premiss that flesh food is overly stimulating to physiological processes and thus erodes vital power.<sup>7</sup>

The principle implied a physical (athletic) advantage for Pythagoreans, and Graham, Alcott, and their comrades were not reticent about citing examples of vegetarian muscularity. Graham was awed by the ancient Roman legions who had conquered their world on rations of bread. Although he normally agreed with the time-honored vegetarian metaphysics which made fleshless diet the precursor of a kindly and peaceful temperament, he celebrated those ancient soldiers "whose success depended . . . on bodily strength and personal prowess, in wielding warclubs and in grappling man with man in the fierce exercise of muscular power, and dashing each other furiously to the earth, mangled and crushed and killed." Alcott preferred modern examples,

and in his 1838 *Vegetable Diet* presented cases of numerous living vegetarians noteworthy for their physical preeminence, including the amazing Amos Townsend, a graminivorous bank cashier who could “dictate a letter, count money, and hold conversation with an individual, all at the same time, with no embarrassment.”<sup>8</sup>

But while Alcott often ran the mile between his home and the post office, and was a capable pedestrian, once walking 78 miles in a bit over two days, he and his fellow health reformers rarely offered testimonials of genuine athletes. It was not until the final third of the century and the post-Civil War explosion of public interest in sports and games, that athleticism became a meaningful ideal for vegetarian propagandists. It was not, however, an easy ideal to promote, for “vegetarian athlete” seemed an obvious contradiction in terms to most people. Jacksonian vegetarians had already been subjected to much derisive commentary on their physical condition: “Emasculation is the first fruit of Grahamism,” sneered one critic, while another laughed at Graham’s “lean-visaged, cadaverous disciples” and a third described Alcott’s followers as “gaunt, wry-faced, lantern-jawed, ghostly-looking invalids.” And as vegetarians’ athletic ambitions climbed during the second half of the century, so did the contempt with which they were showered by cynical meat eaters. That immensely popular philosopher of evolution Herber Spencer tried vegetable diet for six months, but abandoned the experiment because it lowered his “energy of both body and mind.” He afterwards dismissed vegetable-built muscles as “soft and flabby.” The respected New York physician George Beard lamented the fate of a vegetarian hiker he had met, a young man of “pale and feminine features, tinged with an unnatural flush,” whose attempt to maintain a mere twenty mile a day pace had killed him within a year.<sup>9</sup> And when London’s Vegetarian Society announced the formation of an athletic and cycling club, flesh eating sportsmen could scarce contain their merriment:

we shall hear of the vegetarian “scorcher” [racing cyclist] and gymnast, of the athlete who is trained on artichokes, and the pacemaker who is built up with asparagus. It is a dangerous competition, into which the vegetarians are urged by overweening ambition. Evidently there are men amongst them who are not content with a spiritual mission, who say, “let us produce a record-breaking cyclist; let us have our own strong man; only by such prodigies can the world be converted.” This challenge to the eater of beef must cause some misgiving amongst the orthodox. Suppose the vegetarian athlete should be tempted from the faith by the success of his carnivorous compeers? He may forget that it was vegetarianism he was appointed to vindicate, and not the egotism of his thews and sinews.<sup>10</sup>

But vegetarians did not forget their purpose, and so strong was their desire to vindicate their diet that carnivorous compeers were soon covered in their dust. In 1896, for example, the aptly named James Parsley led the Vegetarian Cycling Club to easy victory over two regular clubs. A week later, he won the most prestigious hill-climbing race in England, breaking the hill record by nearly a minute. Before the summer was out, Parsley had set a new fifty mile

record, as well as several records for shorter distances on a tandem, and for London to Brighton and back on a tricycle. Other members of the club (numbering altogether about ninety, including thirteen ladies) also turned in remarkable performances, and none gave any evidence of being "soft and flabby." Their competitors were having to eat crow with their beef.<sup>11</sup>

American vegetarian cyclists were soon in hot pursuit of the English. Will Brown, who in the 1890's switched to vegetable diet to save himself from an early death from tuberculosis, gained so much strength in just three years as to better all records for the 2000 mile ride. And Margarita Gast established a women's record for 1000 miles on a diet of fruit, zwieback, raw potatoes, and, shockingly, "sometimes a little claret."<sup>12</sup>

Cycling, moreover, was only one sport in which vegetarians were trouncing the opposition. Long distance walking races were also very popular in the 1890s, and were regarded as an ultimate test of endurance. In the 1893 race from Berlin to Vienna, the first two competitors to cover the 372 mile course were vegetarians. They required 155 and 156 hours respectively; the next finisher, a meat eater, arrived 22 hours later. A 100 kilometer race held several years later in Germany also attracted much attention, for of the first 14 finishers, 11 were vegetarians. A similar outcome attended a 70 mile walking match in which contestants were required to complete the course within 14 hours. Six of the eight vegetarian entrants met the standard, and the other two failed only for having gotten lost and travelled an extra five miles. Not a single flesh eater could meet the 14 hour limit, and only one finished the race.<sup>13</sup>

Runners thrive on vegetarian diet too. To consider only one example, Jonathan Barclay, secretary of the Scottish Vegetarian Society, in 1896 competed in twenty some races at distances from the half mile to 10 miles, and won 11 while never finishing lower than third (some years later, in 1912, the vegetarian Kohlemainen became one of the first men to complete the marathon under 2:30). Comparable records were compiled by vegetarian swimmers, tennis players, and other athletes, including the West Ham Vegetarian Society's undefeated tug-of-war team. So impressive did the vegetarian athletic record become, that when Berlin's Wilhelm Caspari published his unprecedentedly thorough studies of vegetarianism and physiology (1905), he devoted a lengthy concluding section to the analysis of vegetarian athletic success. The focus of his discussion was the 1902 walking race from Dresden to Berlin, a contest which drew 32 competitors. Prior to the race, Caspari selected the leading vegetarian and flesh eating contenders, and subjected each to thorough physical evaluation. The vegetarian champion was a 28 year old man who had adopted the vegetable diet eight years before, and had since developed, in Caspari's judgment, a "physique like Sandow." He also had the highest oxygen capacity per kilogram of body weight that Caspari had yet

measured. The vegetarian subject went on to capture the race handily, in record time (26 hours, 58 minutes for the 125 mile course), while the meat eating co-favorite Caspari had tested failed to finish. Places two through five, incidentally, were also won by flesh abstainers.<sup>14</sup>

Caspari nevertheless refused to credit vegetable diet “in itself as decisive” for the humiliation of the carnivorous walkers. Since vegetarians were more self-conscious about health, he reasoned, they were more likely to live regular, hygienic lives year-round, and particularly to refrain from the use of alcohol (the meat eater who had dropped out had refreshed himself during the race with wine). But the physical advantage from healthful living was minor, in Caspari’s estimation, to the psychological advantage of vegetarians. Having already called attention to the importance of will power for the completion of feats of endurance, he now presented the vegetarian life as a daily training ground for perseverance and determination. Not only was the diet itself painful to adhere to, but the frequent social embarrassment accompanying refusal to eat meat demanded psychological firmness of practitioners. When to these considerations were added the regular necessity of defending unusual principles, one could easily see vegetarian strength of will becoming fanaticism. And it was this *Fanatismus*, Caspari insisted, which carried so many vegetarians to victory. Athletes on ordinary diet saw the contest solely as a sporting event, but vegetarians approached it as a struggle to justify their life ideals and demonstrate physical and moral superiority to their adversaries.<sup>15</sup>

The vegetarian’s zeal for vindication, it might be argued, was even more important during training than in the competition itself. Any veteran of endurance contests knows that will power may hold one up to the end, but by itself cannot produce respectable, let alone winning, times. Rigorous training is the difference between running well instead of merely finishing, and vegetarians undoubtedly benefitted from the relatively lenient attitudes toward training in the early 1900s. The training programs recommended for young and serious distance runners at that time, for example, were considerably less demanding than the schedules followed by thousands of middle-aged marathoners today. The vegetarian’s desire to win for his philosophy was a spur that could goad him beyond the accepted boundaries of training, give him the fortitude to put in the extra miles at extra effort. The high oxygen consumption rate of the Dresden to Berlin winner suggests a rigorous training regimen.<sup>16</sup>

But stiffer training was perhaps not all. Despite Caspari’s certainty that there was no *dietary* advantage to vegetarianism, there probably was. Numerous studies in recent years have documented the value of a high carbohydrate diet for endurance performance. Athletes engaged in competition extended over several days (such as the distance walkers) are especially likely to benefit from the ability of a carbohydrate heavy diet to restore depleted muscle glyco-

gen to high levels after each day's contest. There surely was a significant difference in the carbohydrate content of the vegetarian athlete's training diet and that of the conventional athlete who followed the standard advice to maintain himself on a high protein diet. Vegetarian temperance was an advantage too. Athletes at the turn of the century made free use of alcohol as a stimulant. Several marathoners at the 1906 Olympics drank cognac during the competition to keep up their strength, and a walker in a 100 kilometer contest in Germany the same year was reported to have consumed 22 glasses of beer and half a bottle of wine. These dietary factors combined with more serious training and fanatical will power to resist fatigue to give vegetarians the competitive edge needed to win.<sup>17</sup>

Pythagoreans were as awesome in the gymnasium as on the roads. During the first decade of this century there were several experimental comparisons of endurance in vegetarians and in flesh eaters, and in every instance the vegetarians won. The most thorough study was carried out by Irving Fisher, the respected Yale economist and a tireless (though not vegetarian) health reformer. Fisher collected 47 subjects whom he divided into three groups—Yale athletes trained on a full flesh regimen, athletes who abstained from meat, and sedentary vegetarians (nurses and physicians from the Battle Creek [Michigan] Sanitarium). Each was tested to determine the maximum length of time he could hold his arms out horizontally, and the maximum number of deep knee bends and leg raises he could perform. The final tally—"much to my surprise," Fisher avowed—was heavily in favor of the flesh abstainers. Only 2 of the 15 meat eaters, for example, were able to maintain the arm hold for more than 15 minutes; none achieved half an hour. Of the vegetarians, however, 22 (of 32) exceeded a quarter-hour, and 15 broke the 30 minute barrier. In fact 9 doubled that time, and 1 surpassed 3 hours. But the final touch to the carnivores' embarrassment was supplied by the six year old son of one of the Sanitarium volunteers, who, curiously imitating his father, "held his little arms out, and did not drop them until 43 minutes had elapsed."<sup>18</sup>

The meat eaters were similarly humiliated in the other tests, and the results could not, Fisher believed, be explained by Caspari's hypothesis. While a few of the vegetarians had exhibited some degree of "fanatical desire," it had not been evident in the majority. Most of the subjects were clearly moved by pure competitive drive, by the determination to break the records set by others, whatever their dietary persuasion. Fisher even warned his flesh eaters that their performances would be recorded as evidence of Yale athletic ability, confident that "Yale spirit" would prove "as great a stimulus as any 'vegetarian' spirit could possibly be." In one case, Fisher reported in a letter to his wife, he stood in front of a Yale track man and continually urged him to hold out his arms for the glory of his school; the spiritless lad gave out in less than ten minutes.<sup>19</sup>

Other factors—training, amount of sleep, work load, use of alcohol and tobacco, etc.—were considered, but Fisher could find nothing to reasonably account for the vegetarians’ performance except diet. The similar studies noted above reached like conclusions, but they were not given serious attention by scientists, and the subject seems to have been pursued no further. Nutritionists had long before become jaded by vegetarian exaggerations, and neither Fisher nor his colleagues could be regarded as disinterested or accomplished physiologists. Their investigations are still occasionally cited in discussions of diet and fitness, but are dismissed as “dated” and not credible.<sup>20</sup>

Vegetarians of the Progressive era accepted and were heartened by those researches, however, and set forth elaborate physiological mechanisms to explain their superiority in experiment and in competition. The leading theoretician among their number was John Harvey Kellogg, director of the Battle Creek Sanitarium (and father of the pre-cooked breakfast cereal industry). Kellogg practiced vegetarianism at the “San,” as his institution was familiarly known, and preached it in his countless books, lectures, and articles in his own popular health periodical *Good Health*. His case against meat eating was built from arguments taken from evolution (the human race had descended from frugivorous ancestors), bacteriology (meat was commonly contaminated with the germs of a host of diseases), and biochemistry (an animal’s struggles before death, Kellogg asserted, produced “fatigue poisons” in its tissues, and these would be ingested by people who ate its flesh). Those last two areas were the source of yet another objection to meat, the menace of “autointoxication.” The most villainous of all microbes, in his opinion, were the various species responsible for putrefaction, the decomposition of protein into a variety of compounds, some of which are extremely malodorous (e.g., indole, skatole) or toxic (e.g., neurine, putrescine). These putrefaction products are generally present in human feces as a result of the bacterial decomposition of residual dietary protein in the intestines, but are not absorbed in sufficient amount to be a health hazard. Nevertheless, their isolation in the 1880s and the demonstration of their toxicity when injected directly into the blood gave rise to an unfounded fear of autointoxication, or self-poisoning, from these “ptomaines.” While medical leaders made a concerted effort to dispel this bugaboo, many physicians accepted it as a definite pathological entity into the 1920s. The recommended therapies included yogurt, whose fermentative bacilli would displace the putrefactive bacteria in the colon, and surgical shortening of the intestines. Kellogg’s remedy was the elimination of meat from the diet. By his analysis, the ordinary diet was so high in protein as to greatly encourage the growth and activity of proteolytic (putrefactive) bacteria in the colon. As the microbes operated on undigested flesh food, the body would be “flooded with the most horrible and loathsome poisons,” and brought to suffer headache, depression, skin problems, damage to the liver,

kidneys, and blood vessels, and chronic fatigue (i.e., lack of strength and endurance), as well as other injuries totalling up to “enormous mischief.” Anyone who read to the end of Kellogg’s baleful list must have been ready to agree that “the marvel is not that human life is so short and so full of miseries, mental, moral, and physical, but that civilized human beings are able to live at all.” It was certainly no marvel that flesh eating athletes so often went down to defeat at the hands of vegetarians.<sup>21</sup>

But according to Alexander Haig, even vegetarians were far from realizing their full athletic powers. Haig was the expositor of the “uric-acid-free diet,” a refined brand of vegetarianism which was promoted with special attention to athletic performance. A London physician, he had discovered in the 1880s that elimination of animal food from his table brought relief from the migraine he had suffered for years. With further experimentation and reflection he arrived (through a process too intricate and esoteric to be recounted here) at the conviction that the cause of his headaches, and virtually every other ill known to man, was uric acid. That compound, the metabolic end-product of the purines present in all meat, was already implicated in the ailments of gout and kidney and bladder stones. Haig proceeded to demonstrate to his own satisfaction, and that of many other biochemical novices in the medical profession, that uric acid deposits were also responsible for eczema, jaundice, gastritis, and even flatulence. Still more numerous were the problems associated with uric acid suspensions, or colloids, in the blood. This “uricacidemia” or “col-laemia” was believed responsible for a pathological spectrum which ran from anemia to atherosclerosis, and included sub-maximal athletic performance.<sup>22</sup>

Haig had been a rower in college, in spite of his uricacidemia-induced headaches, and was determined that athletes of the future should not suffer the deprivation he had. His contribution to that cause was *Diet and Food*, a book which went through six editions in the years from 1898 to 1906, and seems to have been as popular in America as in England. Its theory of strength and endurance, however, was outmoded even by Haig’s quaint standards. The premise on which the entire book was built was the idea that the energy for muscular motion was derived from the oxidation of protein to urea. That idea, originally offered by Liebig half a century earlier, had long since been discredited and was no longer taken seriously—except by Haig. Yet he seems to have been unaware of his loneliness on this position, presenting the theory as if it were generally accepted, and even using his inimitable analytical skills to find a direct correlation between quantity of exercise and excreted urea. If the energy for exertion came from protein, Haig hypothesized, maximum strength and endurance required a free flow of protein-rich blood to the muscles. But vessels clogged with colloidal uric acid would not be able to supply a full complement of protein molecules to the tissues, nor to remove the waste of protein oxidation. The more uric acid food an individual consumed, there-

fore, the more physiological “friction” he would have, and the lower would be his achievement in contests of endurance. That was undoubtedly why meat eaters usually succumbed to vegetarian rivals, but vegetarians, he continued, had no reason to rejoice. Their vessels too were contaminated, for beans, asparagus, and mushrooms contained purines and thus produced uric acid. Ordinary vegetarianism granted a relative advantage, but uric-acid-free vegetarianism was required for absolute superiority. Support for this point was provided by the history of Karl Mann, the vegetarian walker studied by Caspari at the Dresden to Berlin contest. Mann had been converted to vegetable diet in 1894, then switched to Haig’s improved version in 1898. Within the year he won an important 70 mile race, but it was the 1902 Dresden-Berlin triumph which catapulted him into the international spotlight. Haig rushed to Berlin immediately, personally examined Mann just a few days after the race, and was pleased (but hardly surprised) to find him free of the cardiac hypertrophy which was supposedly epidemic among carnivorous competitors. “Athlete’s heart,” he concluded, was still another uric acid ailment.<sup>23</sup>

The uric-acid-free (purine free) diet was limited to milk, cheese, some vegetables, fruits, nuts, and—a unique position for a food reformer—white bread. Additional blandness was imposed by the prohibition of coffee, tea, and cocoa on the grounds that they contained methyl xanthines (it was later found that caffeine and similar compounds are not metabolized into uric acid). And any solace that at least alcoholic beverages were free of uric acid-producing substances was quickly squelched by Haig’s promise that his diet removed any need for stimulation and thus destroyed the taste for strong drink. Hence even though the theory was widely circulated, and clearly captured the support of a number of physicians in the United States, there were probably few athletes who permanently converted to Haig’s diet. One who did at least try it for a while was another major participant in the debate over nutrition and athletics. Eustace Miles’ life was miserable for his first 27 years. He did, to be sure, achieve a certain level of success as a classical honors coach at Cambridge and a skilled tennis player, but he was often restless and depressed, slept poorly, suffered headaches, colds, constipation, and had a “great liking for any form of alcohol.” About 1896, though, he chanced to encounter Haig’s writings, took up the uric-acid-free diet, and before long found himself feeling and looking better. His muscular flexibility and endurance improved, and even his memory grew stronger. Not least important, his thirst for alcohol disappeared.<sup>24</sup>

Miles’ alcohol-free, uric-acid-free regimen allowed him to become one of muscular vegetarianism’s best advertisements. He captured the British national tennis championship in 1897, as well as a number of other major titles. By the time some of those victories were recorded, though, Miles was no longer an advocate of the Haig diet. He learned through experience that

pulses—anathema to Haig—did not injure, but actually aided his vitality, and he soon ignored the uric acid theory's restrictions on certain vegetables. He became, in effect, an ordinary vegetarian, but he refused to be known by the name because he thought it had been sullied by mistaken practice. One of his many books, in fact, was dedicated wholly to the *Failures of Vegetarianism*, though those failures were hardly so numerous and complex as to require a separate volume. Most could be reduced to a simple ignorance of the nutritional needs of the body which, Miles believed, left too many vegetarians content with “an idiotic Potato-Cabbage Diet” which was woefully lacking in protein. His own diet, emphasizing legumes, grains, milk products, and high protein meat substitutes, he preferred to call “Simpler Food.”

Choose the cheaper, Simpler Food  
cheese and Protene [meat substitute], milk (if good),  
Gluten, Hovis [a health bread], macaroni;  
oats and other grains, and honey;  
orange, apple, other fruits;  
vegetables, pulses, roots.<sup>25</sup>

This poetic doctrine was pushed in Miles' monthly *Healthward Ho!*; it was the teaching imparted to boarders at “The Old House,” his health retreat in the English countryside with a “delightfully home-like atmosphere.” One suspects that the same dogma was somehow served with the bread at his restaurant, which hosted more than a thousand diners daily and marked menu items to identify uric acid-containing dishes (apparently the quality of all the dishes was well above the vegetarian standard; American gastronome James Beard has cited Miles' restaurant as the only good vegetarian restaurant in his experience, and Miles himself rejected most vegetarians' meals as “execrably cooked”). But it was primarily through his actions on the court that Miles drew international attention to the possibility that the simple vegetable diet might improve one's playing skills, as well as overall health.<sup>26</sup>

The ranks of muscular vegetarians were enlarged still further by the addition of Russell Chittenden and Horace Fletcher. Although neither was a vegetarian in theory, both approached a meatless diet in practice and each espoused a doctrine which was most attractive to pure vegetarians. It was a doctrine which promised to free them from the criticism they had had to endure ever since the publication of Liebig's *Animal Chemistry*. That work's assignment of a major energy, as well as plastic, function to protein had forced vegetarians to scramble to justify their relatively low protein diet. Some of the attempts to rationalize working power with a low protein intake were embarrassing. The English Pythagorean John Smith, for example, struggled to prove that vegetarians manufactured much of their tissue protein from the nitrogen inhaled from the air—why else, he asked, would nature have put so much of that gas in the atmosphere? He also suspected atmospheric nitrogen might be swallowed with food and get into the blood from the stomach.<sup>27</sup>

As has been noted, Liebig's theory was soon repudiated, but the dietary protein recommendation remained high through the rest of the 1800s. It was finally challenged early in the twentieth century by Chittenden, professor of physiology chemistry at Yale and the ranking scientist in his field in the United States. Intrigued by several recent reports of individuals maintaining health on daily protein intakes as low as 15 to 30 grams, Chittenden brushed aside the warnings of physician friends and dropped his own protein consumption to 35 to 40 grams a day. And far from experiencing the predicted deterioration, he found himself suffering less from a rheumatic ailment of his knee, indigestion, and "sick headaches," and actually growing in strength and endurance (while losing about sixteen pounds weight). He was soon taking long daily rowing workouts, something which had been beyond his capacity when on the old diet.<sup>28</sup>

Convinced of the safety and efficacy of the low protein regimen in his own case, Chittenden procured funds to support an elaborate study of the effects of low protein on sedentary workers (Yale professors), moderate workers (U. S. Army volunteers), and heavy workers (Yale athletes). Between autumn, 1903 and summer, 1904, each group lived, for periods ranging from five to eight months, on a diet containing less than half the orthodox protein recommendation. There was no medical evidence of decline in health among the participants, and their performance of calisthenic exercises and on strength-testing machines indicated a significant rise in strength over the course of the experiment. One of the athlete volunteers even won two national gymnastic championships while on the diet. Such results persuaded Chittenden that the average person consumed much more protein than his body needed, and that the excess was a burdensome tax which lowered physiological efficiency. The mechanism by which redundant protein inhibited strength and endurance could not yet be explained with certainty, but Chittenden was clearly quite comfortable in his own mind with the theory that the products of protein catabolism inhibit muscular function. He also feared these metabolites might injure the nervous system, and was sure they must overload the liver and kidneys.<sup>29</sup>

Chittenden's data and interpretations were presented in 1904 in *Physiological Economy in Nutrition*, a hefty treatise which was perhaps the most talked about scientific publication of the Progressive era. Much of that talk was deprecatory, it becoming quickly apparent that one man's economy is another man's parsimony. The initial reaction of the majority of physiologists was that such limited protein ingestion must be eventually murderous; Chittenden's experiments simply had not been conducted long enough to allow the damage to become obvious. The supposed improvement in health which had been observed, if accepted at all, was attributed to the general temperance and regular schedule associated with the experiment. In the end, of course, the reevalua-

tion of the protein requirement which was forced by Chittenden's experiments led to a steady lowering of the recommendation until today it is essentially the same as the figure he established.<sup>30</sup>

Vegetarians of the early 1900s predicted as much, for they had already learned through experience that massive protein consumption was unnecessary for health, and their athletic conquests suggested it actually depressed physical functioning. Praise for Chittenden's work was thus obligatory in expositions of muscular vegetarianism, and even athletes who balked at giving up meat altogether were willing to reduce their protein intake to Chittenden levels. And there were other examples to encourage that reduction. The Swedish physiologist V. O. Sivéén claimed to maintain himself on 25 to 30 grams of protein, and the Copenhagen physiologist Mikkel Hindhede lived on a largely potato diet containing only 15 to 20 grams of protein. But none of these, Chittenden included, gave such a dramatic demonstration of the compatibility of low protein with athletic excellence as did Horace Fletcher.<sup>31</sup>

Born in Massachusetts in 1849, Fletcher won local fame as an all-around athlete in his youth, then moved on to success as a San Francisco businessman. Unfortunately, as his wealth increased, so did his waistline, until by the age of 40 his once graceful five foot seven inch frame had swollen to an unwieldy 217 pounds. Overweight, dyspeptic, constantly plagued by "that tired feeling," and subject to frequent attacks of influenza, he came to feel like "a thing fit but to be thrown upon the scrap-heap." When his application for a life insurance policy was denied, Fletcher resolved to regain his health, and his transformation from *bon vivant* to health reformer began. Reading and self-experimentation led him, through too circuitous a route to be traced here, to the adoption of extremely thorough mastication of all food as *the* method of health recovery and maintenance. Once outfitted with an elaborate, if juvenile, theory, Fletcherism became a health fad which was popular into the 1910s and ultimately helped break Americans of their "gobble, gulp and go" table manners.<sup>32</sup>

The more immediate impact of Fletcherism, however, was to strengthen the case for the low protein diet for athletes. Fletcher asserted that the extraordinary vitality which he recovered through careful chewing was due to his reduction of all food to a pulp which could be completely digested and absorbed, and thereby used much more efficiently by the body. As proof of his more thorough utilization of food, he unblushingly reported the remarkable decrease in defecation frequency and stool volume which he experienced after taking up conscientious mastication. But thorough chewing had also led him, for reasons of time, to eat considerably less food than before, including less protein. It was Fletcher's unusually low protein consumption, in fact, which inspired Chittenden to undertake his investigations.<sup>33</sup>

Chittenden was particularly struck by Fletcher's ability for rigorous exercise on such a limited diet, an ability its owner himself had discovered by accident. In 1899, just before his fiftieth birthday and after only a year of devoted mastication, Fletcher celebrated the Fourth of July with a bicycle ride. Losing himself in the fun of the sport, he cycled more than 100 miles before stopping, and was astounded to find he was still not tired and did not suffer from muscle soreness the next day. Such a claim would ordinarily invite denunciation, except in subsequent, documented trials he demonstrated an almost incredible power to move easily from long periods of inactivity to the performance of demanding feats of endurance. Four years later, to cite the most notable example, Fletcher was tested by William Anderson, M.D., director of the Yale Gymnasium and a commanding figure in the period's physical education revival. Just two years earlier, Anderson had published in a popular magazine his views on "the making of a perfect man," in which he had insisted on the possibility of maintaining strength and endurance in advanced years. He must have felt fully vindicated as a prophet by the time Fletcher left his gymnasium. Putting the now 54 year old subject through four days of the Yale University Crew exercises (Anderson regarded rowing and football as the most demanding and effective programs of physical conditioning), he was, as he modestly phrased it, "surprised."

Mr. Fletcher has taken these movements with an ease that is unlooked for. He gives evidence of no soreness or lameness and the large groups of muscles respond the second day without evidence of being poisoned by carbon dioxide. . . . Mr. Fletcher performs this work with greater ease and with fewer noticeable bad results than any man of his age and condition I have ever worked with.<sup>34</sup>

In another four years Anderson's surprise turned to amazement, for Fletcher came back for a second battery of tests and surpassed his previous performance. In one measurement of the endurance of his calf muscles, he actually doubled a Yale student record! (though Fletcher's record was soon broken by the famous pedestrian Karl Mann). Fletcher apparently had an exceptional natural athletic prowess, freely exercised in his youth, then submerged by middle-aged obesity. As the fat receded after careful mastication was adopted, however, his genius for endurance returned to the surface and, coupled with zeal for demonstrating the benefits of chewing, enabled him to shatter the conventions of physical training. Yet this explanation is still not entirely satisfying, and one eventually has to agree with vegetarian Kellogg that Fletcher was a "physiological puzzle."<sup>35</sup>

The puzzle was complicated by experiments with volunteer Fletcherizers which also indicated a gain in endurance through thorough mastication of a low protein diet. Fisher, for example, recruited nine of his own students to test the effects of Fletcherism on endurance. Beginning in January, 1906, this "eating club" devoted 19 weeks to "thorough mastication and implicit obedi-

ence to appetite.” During the second half of the study the subjects were also actively encouraged to eat less protein, and as might by now be predicted, the subjects soon found themselves wanting less food and voiding less offensive feces. And they all the while grew in endurance. Tests requiring repetitive exercises, such as calf-raises, knee-bends, and dumbbell lifts, were administered at the beginning, middle, and end of the test. All but one of the volunteers improved drastically (from 50 to more than 200 percent) between January and June, and it seemed more than coincidence that the exception was the student who had failed to reduce his protein consumption until near the end of the experiment, and whose fecal improvement rating was one of the lowest. Fisher carefully analyzed the experiment to be certain the improvement could only have come from diet, and he concluded by giving roughly equal credit to Fletcher and Chittenden—chewing and low protein together built endurance.<sup>36</sup>

A lesser-known investigator, YMCA trainer Elmer Berry, announced similar findings three years later, while the issue of diet and athletics was made cloudier still by the claims of yet other special dieters, such as the apyrotrophes (as the proponents of eating only uncooked foods pretentiously called themselves). This essentially vegetarian system (though some practitioners ate oysters and steak tartare) also affected a healthier than thou attitude toward conventional dietetics, offering as its chief exhibit the record of apyrotropher Gilman Low, one of Sandow’s rivals for weight-lifting supremacy.<sup>37</sup>

The feats of Low and Mann could not be denied, but they could be explained. The consensus position among orthodox nutritionists was that while vegetarian, uric-acid-free, low protein, and apyrotrophic dieters were “more than likely to be obsessed” with a complete program of temperate hygiene, “the heavy eater . . . , reveling in protein and total calories, is likely to be hygienically delinquent in many other ways and to flaunt and glory in his hygienic lawlessness.” And even if sometimes lawless, carnivorous competitors were not always outclassed. Apologists for flesh food delighted in confounding vegetarians with such examples of meat-built stamina as Johnnie Hayes, the winner of the marathon at the 1908 Olympics. Hayes’ workouts were punctuated by two meat meals daily, and he was confident that “plenty of meat such as steaks, chops and roast beef and lamb are beneficial while training.”<sup>38</sup>

The controversy continued to be waged, but never advanced beyond the stage already outlined, and was considerably more subdued after the 1910s. Those years witnessed a waning of enthusiasm for vegetarianism (and indeed of public interest in all radical health reform movements) which reflected the subsiding of the buoyant optimism which had so animated Progressive society in general. Extremist systems of personal improvement through hygiene are, after all, also optimistic, and typically anticipate that mental and moral eleva-

tion will necessarily follow physical purification. They are actually hygienic ideologies which exist in a symbiotic relationship with their cultural *milieu*, both drawing from contemporary hopes for human betterment and feeding those hopes with specific recipes for perfection. Thus while hygienic ideologies have been a constant feature of American life since the early 1800s, they have naturally flourished in periods of general reformist ferment and social optimism, when an expanding public spirit has enlarged the constituency for perfectionist campaigns. The Progressive decades were in fact richer in unconventional systems of nutrition than any other period of American history, and each system presented its own plan for realizing the aspirations, and quelling the anxieties, which preoccupied society at large. Progressivism's commitment to renew the nation's vitality and remedy the abuses of unbridled industrialism, its Arcadian longing for a life more attuned with nature, its trust in the power of science, reverence for worldly success, and determination to direct evolution so as to reverse the trends towards "race suicide" all found ready expression in crusades for reformed personal hygiene. The Progressive gospel of "efficiency"—in business, government, or any public endeavor—was particularly amenable to hygienic interpretation. Initially a financial concept, efficiency was easily translated from fiscal to physical meaning by health accountants who analyzed body functions in terms of deposits of food and rest, and withdrawals of exertion and self-neglect. The quantity, and quality, of the deposits and withdrawals determined the degree of physiological wealth, and wise management yielded efficiency of operation—maximum production with minimum waste. And what was athletic success except a demonstration of physiological (and mental-moral) efficiency? Unconventional dietary schemes such as vegetarianism were inextricably entwined with Progressive social philosophy and public fascination with competitive sports.<sup>39</sup>

The fascination with athletics continued into the post-war years, but early century zeal for social reform gave way to the complacency of the "return to normalcy." Muscular vegetarianism inevitably suffered a decline as well. A sad sign of the changed times was Kellogg's venture at fielding a football team. In 1923 he opened Battle Creek College, a four year program in physical education and home economics which soon enlarged its program to include a football squad. It was the director's hope that players nourished at a meatless training table would so overwhelm opponents as to win them, and the rest of the public, to vegetable diet. The team was disbanded after its inaugural season, though. The college administration's official reason was that the game was too violent, but the team's poor won-lost record was undoubtedly a consideration. It was not a shining denouement for muscular vegetarianism.<sup>40</sup>

# Notes

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