

# Record Breaking Women

Womens' performances are approaching those of men in some areas of athletic competition. Physical and social factors are involved that might change the face of sports.

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Crash. Bang. Another broken record. Competition in many athletic events is marked by almost constant record breaking, with the end still not in sight. For what appear to be mainly psychological reasons, the physiological limits of the human body have not yet been approached by even the best athletes. But a closer look at athletic records reveals another interesting trend—in many athletic events women's achievements are rapidly approaching those of men. Recognition of these trends may cause a profound change in the nature of sports.

Athletic competition today has not entirely escaped the prejudices of its Victorian origins, best expressed in the charter of Britain's Amateur Athletic Club, which provided "gentlemen amateurs the means of practicing and competing against one another, without being compelled to mix with professional runners." No women. No cash. No lower classes. (In 1920, an Olympic champion rower was banned from the prestigious Henley regatta because he was a bricklayer, and thus not a "gentleman.")

The burden fell heavy on women athletes, who for many years were excluded from Olympic competition and even today must often fight for gym and locker room space. The Victorian attitude still persists in some athletic circles—sports are "manly" and women wouldn't be good at them anyway.

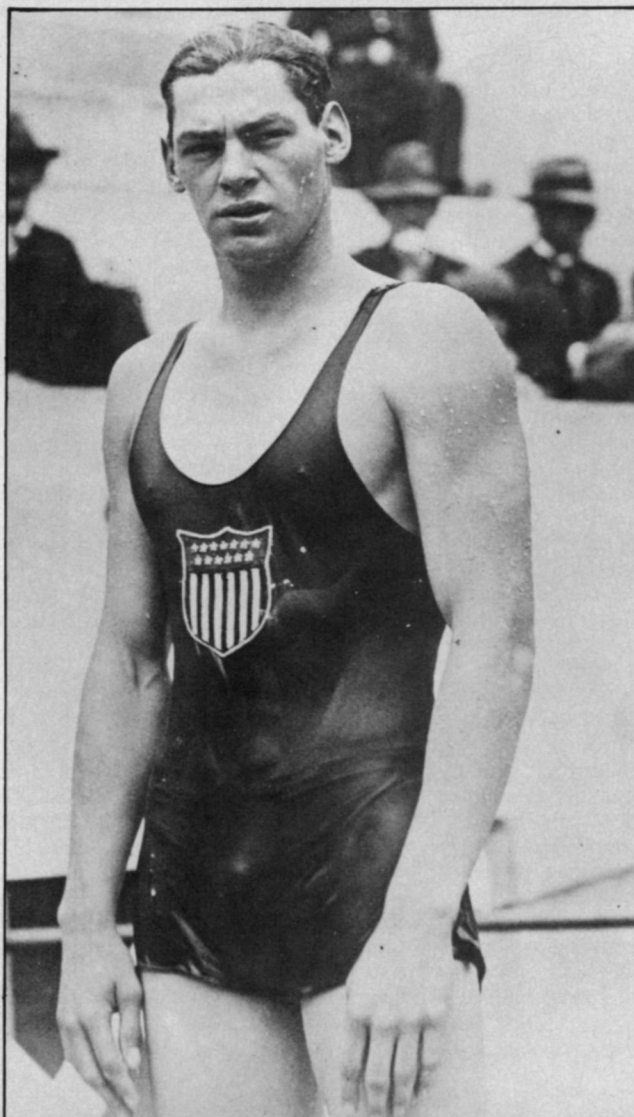
Recent research into athletic abilities and the unquestioned popularity of some women sports stars are helping change attitudes about women as weaklings—attitudes which reflect a bias that was never universal anyway. (To take an extreme case, ancient Sarmatian women were not allowed to marry until they had killed an enemy in battle.)

Among the recent gains in women's sport performance, perhaps the most spectacular have come in swimming. Today almost all the world-class women



Photos: UPI

*Female athletes are catching up with and may even surpass male athletes in some events. Swimmers, like Diana Nyad (above), who swam around Manhattan Island last year, are breaking the male-held records of athletic superstars of the past. Watch out, Johnny Weismuller.*



competitors routinely break men's records of a few years ago. The gap between men and women's records has shrunk from 19 percent in 1924, when the legendary Johnny Weissmuller set an Olympic record by swimming the 400-meter freestyle in 5:04.2 minutes, to 8 percent in 1976, when Petra Thumer of East Germany swam it in 4:09.8 minutes, close to the men's record of 1968. The gap in track records has also declined, especially for the long-distance races.

Field events requiring more strength than speed or endurance are harder to compare. Although women's shot put distances have increased faster than the men's, direct comparison is impossible since the shots in question have different weights. Women are throwing the javelin distances about the same as those achieving in the 1920s, but the two sets of records are now increasing at about the same rate.

Men and women appear to be more equally matched in some sports than in others. In at least one activity, long-distance swimming, women hold most of the records. Diana Nyad, who recently swam around Manhattan Island, beat the men's best time by about 2 hours.

Some of the explanation for male domination of most sports may be custom—women have participated for a shorter period and are trained less effectively. Support for a cultural influence comes from the observation that the difference between men's and women's national records varies among countries. The gap in the records for the 1,500-meter track event, for example, ranges from 10.84 percent in the Soviet Union to 22.47 percent in France. Australian scientist K. F. Dyer points out that in swimming events the national women's records in Australia, East Germany and Italy exceed the same-year men's record in at least one other of the countries he studied, which included New Zealand, the United States, Canada and the European nations.

Another reason why men and women perform unequally in various sports may be that requirements of one activity better suit the build of a man as opposed to that of a woman, with her (on the average) wider pelvis, lower center of gravity, shorter stride, and higher fat content. Perhaps even the prominence of certain sports has been historically biased to what males do well. Jack H. Wilmore, head of the physical education department at the University of Arizona, suggests that bicycling is one sport where men and women may be well-matched, since leg strength relative to body weight is roughly equal between the sexes.

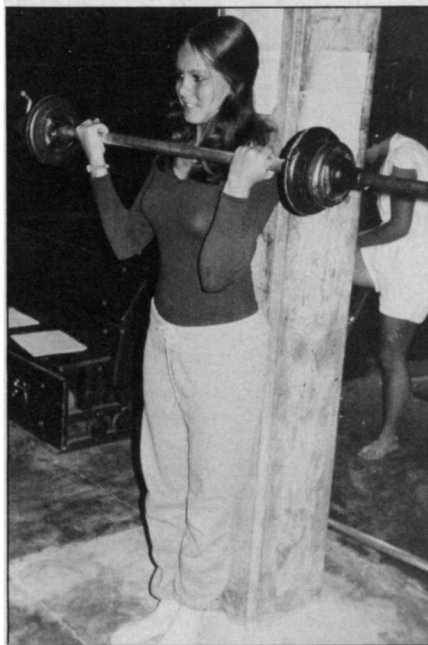
Strength and endurance are primary factors that enter into how well an athlete performs. Linda Bunker, director of the motor learning laboratory at the University of Virginia, suggests the list should also include balance, reaction time, accuracy, achievement drive and need for team affiliation. Sports physician Joan

Ullyot, from the Institute of Health Research in San Francisco, would add persistence and resistance to pain. Other physiologists suggest women's success in channel swimming results from their greater buoyancy and resistance to cold.

But strength first comes to mind in describing the successful athlete. When one compares nonathletic men and women, the strength difference between the sexes is pronounced. One study involving several thousand subjects in the town of Tecumseh, Mich., found that a man in his late 20s had more than twice the arm strength of a woman of the same



Women show increased levels of strength and endurance after participating in a Univ. of Ariz. training program.



age. Several researchers have concluded that much of this difference is the result of society's encouraging the average man to be more active than the average woman. They feel that the social influences are so great that inherent physiological differences in strength cannot yet be estimated.

Perhaps the strongest evidence for women's limits being in lifestyle, rather than in biology, comes from observed increases in ability with training. Even women athletes have traditionally not trained with weights, probably the most

effective way to build strength, for fear of developing a muscular, unfeminine appearance. (Recent research indicates that this worry is groundless.) Wilmore and his associates have worked with college-age men and women to find what effect even a brief period of weight training would have on an average young population. In 10 weeks, women increased their leg strength 29.5 percent and men increased their leg strength 26.0 percent. There was a much greater difference in the effect of training on arm and shoulder strength, demonstrated by the bench press. Women's strength increased 28.6 percent, while men's increased only 16.5 percent. "This is probably due to the fact that, in daily life, most women make relatively little use of their upper bodies, but even the most unathletic woman exercises her lower body almost as frequently as a male: walking, climbing stairs, bicycling," Wilmore says. However at the end of the brief training period, the women still lagged, able to bench press only 60.9 pounds compared with the men's 170.3 pounds.

If a sedentary lifestyle contributes to women's now limited strength, physically active women should be closer in strength to the average man. Wilmore found that women athletes competing in throwing events increased their bench press strength by 15 to 44 percent during a six-month weight-lifting program. At the end they were able to press weights of 150 pounds, "considerably higher than the average values for untrained males of similar age, but well below values reported for male weight lifters."

Since most of the women were considerably smaller and had a higher fat content than most of the men, Wilmore compared the strength gains to lean body weight and found that *relative* strengths of the sexes were closer than the raw data suggested. (Many exercise physiologists believe lean body weight is a more accurate estimate than overall weight of total muscle mass in use during exercise.) Wilmore found that untrained men were still able to bench press about 1.7 times as much as untrained women, relative to their lean body weight, but that in the leg press, women were able to press slightly *more* than men, relative to lean body weight. Such calculations have little significance, however, in considering athletic competition today. "Unfortunately, a woman can't remove her fat and leave it at the starting line," Bunker laments.

These and similar findings by other researchers have led to an hypothesis that would probably have shocked Victorian sports-gentlemen: "It is postulated," Wilmore says, "that the female has the same potential for strength development as the male of comparable size."

But what about those bulging muscles? The hormonal differences between men and women play a role there. According to Anne Briscoe of Columbia University, men daily secrete 30 to 200

micrograms of testosterone, a male sex hormone, compared with 5 to 20 micrograms secreted by women. Testosterone seems to be required for extensive growth of muscle tissue in response to training. Wilmore found that for the female athletes, six months of weight lifting increased their flexed biceps circumference only about a quarter inch, although their upper arm strength increased considerably. Among the untrained college students, women gained more strength than men in their 10-week program, but the men gained almost twice as much in muscle size.

Nobody yet knows the relationship between exercise, muscle mass and strength, Wilmore says. He postulates that athletes probably use no more than 20 percent of their muscle potential, so the size of a woman's muscles should not prevent her from approaching the strength of a man.

While some events emphasize simple strength, many also require endurance. The single best measure of endurance, according to Wilmore, is the maximum amount of oxygen a person can use while running at full speed on a treadmill. Like strength measurements, the average untrained man has a substantially greater maximum oxygen uptake (about 30 percent more) than the average woman of the same age. Similarly, male athletes average 15 to 30 percent higher than female athletes. But the values for female athletes are greater than those for untrained males, and the differences between female athletes and untrained women are greater than those between male athletes and untrained men. "What this demonstrates, we believe, is that the

sedentary female is further from her potential than is the sedentary male," Wilmore says. When the top long-distance runners are compared relative to their lean body weights, the difference between the men and women shrinks to 3.4 percent.

Marathon runner and sports physician Joan Ulyot believes that in long-term endurance women have a natural advantage over men. That advantage relates to the extra fat women carry around. "If a man and a woman run six miles in the same time, then if you have them run a mile, the man will always win; if you have them run a marathon [26.2 miles], the woman will always win—almost always, anyway," Ulyot explains. "Females tend to do much better in long-distance events relative to their own ability." Ulyot finds the best explanation of this phenomenon in an hypothesis by a German sports physician, Ernst van Aaken. His idea is that women's bodies are better at metabolizing fat as a source of energy after they've run out of the usual fuels, carbohydrates and glycogen. So far this hypothesis has been neither supported nor disproved by data.

Ulyot was recently furious at the Olympic International Committee's refusal to admit a 3,000-meter women's track event on the grounds it is too strenuous for women. "They definitely have it backwards," Ulyot says. "Actually it's not strength you need, it's endurance."

Other factors that influence athletic ability, besides strength and endurance, are more difficult to define and to compare. Would you measure balance by skill in standing on one foot or walking on a narrow beam (girls do those better), balancing a stick on one finger (no sex difference), keeping a teeter-totter level while straddling its axis (no initial difference, but girls learn faster) or climbing a free-standing ladder (boys do better)? Reaction time is another characteristic in which sometimes males, sometimes females score higher, depending on the design of the test. Although some studies have shown men and women differ in psychological factors, such as achievement drive and need for affiliation, studies last year by Bunker and colleagues found no perceptible difference in these traits between male and female varsity athletes.

The origins of male-female differences are still open to speculation. One approach to that question has been to test the abilities of youngsters of different ages. The most recent studies show no significant difference in athletic ability between boys and girls under the age of 12, except those that can be directly attributed to their different experiences. (For example, boys can throw a ball farther than girls can when using their preferred arm, but both groups throw the same distance with the other, inexperienced arm.) In the 50-yard dash, pre-teenagers run essentially the same speed, Bunker says, but after age 13 boys

continue to improve while females seem to regress. In the standing broad jump and in doing sit-ups, the female's ability tends to level off after puberty, while the male's is still rising. Some researchers attribute the widening disparity in athletic skills to physiological differences after puberty; others attribute it to the increased difference in social expectations for teenage females and males.

Although differences do exist, there is a significant overlap between the curves representing strength, endurance and performance on any task between populations of men and women. There are women who can hit a ball farther than many men can, and there are men who cannot swim as fast as most women can. Height, weight and age are often more important predictors of athletic ability than is sex.

Implications of the recent research on athletic ability go far beyond predicting new accomplishments of women athletes. Physical educators must reflect on the very justification for sports. Is the point really to find out the very fastest any human being can run? If so, perhaps there should be more cross-cultural interest, surveying African tribesmen and mountain villagers. *Ripley's Believe It or Not* reports that a Pawnee Indian in 1876 ran the mile in 3 minutes 58 seconds, a record not equalled in formal competition until 1954.

Or are sports supposed to encourage large numbers of people to exercise, strive to reach the limits of their ability and get satisfaction out of winning a strenuous match? If so, perhaps there should be more classifications, such as the weight divisions in wrestling, to allow more people to compete.

Whether sex should remain a dividing factor in all sports is unclear. Women athletes themselves vary in attitudes toward competing with men. Some are already doing so; others oppose the whole idea. "In the Boston marathon I didn't care about all the sort of anonymous men running around; I only cared where the other women were," Ulyot recalls. "The physical capabilities I think are quite different between the sexes and it makes sense to compete with your peers." However, Ulyot does note with some satisfaction, "In competing with my peers it turns out I beat about two-thirds of the men."

The implications for physical education seem to be that children should not be separated by sex, and possibly not even adults should be so separated. Two studies, one of school children and the other of college students, have indicated that females do better in athletic tasks in coed groups than in same-sex groups.

Whatever the eventual outcome, it is clear that athletes need to feel that they can compete and win according to their determination and acquired skill. Introducing different divisions in competition might be one way to encourage both men and women to develop their athletic potential. □



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