The Rise of the 'Big Red Sports Machine' and the Advent of Modern-Day Periodization

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Abstract: This paper will chronicle the rise of the Soviet "Big Red Sports Machine," associated sport science and most significantly, the advent of modern day periodization. Periodization can be defined as the systematic, cyclical manipulation of training and competitive workload designed to achieve the relative balance between stress and recovery necessary to achieve optimal gains in human sporting performance. The origins of periodization can be traced to ancient Greece where the earliest written histories of athletes were recorded. Following World War II and the battle for world ideological supremacy, the Soviet Union utilised sport as a political tool in an attempt to demonstrate the superiority of its Communist system. Integral to achieving the best sporting results was the application of "cutting edge" sport science and the advent of modern day periodization. Instrumental in the genesis of training theory was Professor Lev Pavlovich Matveyev of the Central State Institute of Physical Culture in Moscow, the so-called "Father" of periodization. After introducing his research in 1962, Matveyev published The Fundamentals of Sports Training in 1965—a book that subsequently was translated into more than forty languages. To help formulate his ideas, Matveyev analysed the athletic performances and training profiles of several thousand top athletes in events that could be easily quantified such as track and field, swimming and weight lifting. From the gathered data he derived the theory of periodization that guided the training process and facilitated peaking at the right time. Periodization would go on to revolutionise athletic training and performance, so much so that by the turn of the 21st-century, periodization formed the foundation of most modern coaching theory and practice and the basis of every serious athlete's training. With the use of primary research including an interview with Professor Matveyev the paper will chronicle the genesis, evolution and impact of periodization.

Keywords: Periodization, Red sport, Matveyev, Soviet Union, Training, Coaching.

1. Introduction

In the decades after World War II, American sport science grew in what might best be described as "fits and starts." With no state support for research, and no Olympic-driven private funding of research, most American track and field coaches continued to rely on 'art' as well as science in their training prescriptions. Times improved, shots and disci were thrown further as the years advanced, but none of the training methods could be regarded as a 'watershed' in track and field training. In truth, most coaches continued to work alone, often even somewhat secretly, creating their own systems and methodologies for training athletes. There was no unified approach. Many American runners continued to do well, but by the late 1950s the USA was no longer dominating the Olympic Games or the large world meets.

Meanwhile, behind the Iron Curtain an entirely different approach to the training of athletes was evolving. There, a systematic,

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nationally funded sport science programme emerged that aimed at increasing Olympic performance in *all* sports. Unlike America where coaches often had to *extrapolate* how certain conditions would affect training from articles on military fitness or medical rehabilitation, Eastern Bloc coaches had researchers working hand-in-hand with them, studying the very athletes who would participate in the Olympic Games. Further, instead of just looking at the physiological responses to exercise, Eastern Bloc researchers took a more holistic view where sport and sports training had to be understood within the wider context of physical culture and society. That broader view and the funding and state support that came with that view, allowed Eastern Bloc nations, particularly the Soviet Union and East Germany, to reach new heights of athletic performance. It also, as the discoveries made in Eastern Bloc laboratories and meeting rooms leaked out, revolutionized sport training around the world.

The role of sport in Soviet society was clearly demonstrated within the context of the Cold War that raged from the early 1950s until the dissolution of the Soviet Union in 1991. Sport symbolized the ideological power struggle between the Soviet Union and the United States, an arena where American athletes could be defeated without fear of immediate military reprisal (Kanin, 1978, pp. 249-262). The desire for increased global power and influence prompted a 1948 Soviet decision by the Central Committee of the Communist Party to divert its emphasis away from co-operative mass physical culture, towards the full-scale mobilization of resources necessary for the attainment of world sporting supremacy (Guttmann, 1988).

The Soviet Union's debut at the 1952 Olympics was dramatic, from which point on the Soviets proceeded in large, to dominate the

Soviet Poster: USSR is a mighty sports power!

winter and summer Olympic Games, amassing a total of 395 gold, 319 silver, and 296 bronze medals (Wallechinsky, 2000, pp. xv-xvi).

With the advent of *Glasnost* and Mikhail Gorbachev's revolutionary reforms in the 1980s, the fall of the Berlin Wall in November 1989, and the disbanding of the Soviet Union in 1991, the Cold War finally came to an end. Fortunately, as James Riordan highlights in *Rewriting Soviet Sports History*, the vast resources that were previously devoted to elite sport in order to promote political aims at the expense of casual sport, handicapped sport, and general social provision are now confined to the annals of history (Riordan, 1993). However, the diaspora of Soviet methods of training—particularly the principle of periodization—would revolutionize athletic performance throughout the world.

2. The impact of Matveyev's theory in the world of sport

To assess the impact of periodization it is necessary to contrast it with the prevailing training theory at the time. Analysis of key American track and field texts around the middle of the twentieth century such as George Breshnahan and Waid Tuttle's 1947 *Track and Field Athletics* and Kenneth Doherty's highly popular 1953 *Modern Track and Field* reveals that the detailed division and composition of an athlete's training attracted little attention (Breshnahan, 1947; Doherty, 1953). Indeed, Doherty failed to include a section on training and how an athlete's work should be divided over the course of the year. Breshnahan and Tuttle allotted no more than three to six months from mid-March to mid-June to specific track and field preparation and competition. The remainder of the year was devoted to complementary sports and activities such as football, basketball, and tennis. Jimmy Pedemonte in his article the *Foundations of Training Periodization* noted that although by the end of the 1950s training for American track and field had extended to the whole year—the theoretical foundations of training were not treated with enough scientific vigour. Furthermore, the most important problem of what factors were necessary to induce the periodical changes associated with training, such

Yuri Verkhoshansky (left) and Lev Pavlovich Matveyev: The "Father" of Periodization

as the optimal training load and the timescale of the adaptive response, had not been solved, identified and applied to sport. (Pedemonte, 2006).

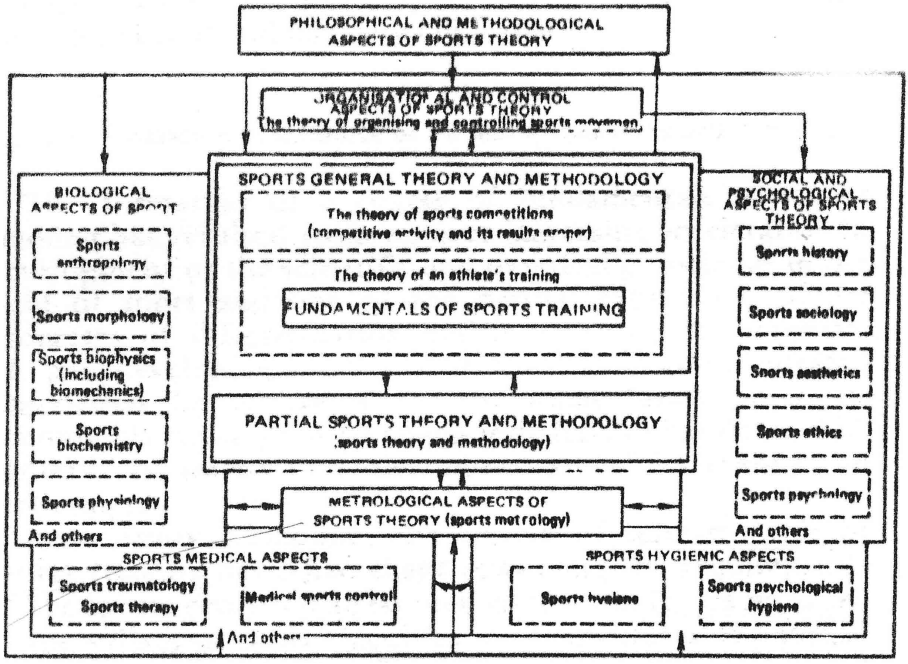
The political milieu in the Soviet Union however, was quite different. With the allocation of vast resources dedicated to the application of science to sport, researchers looked at all aspects of the problem of sport performance. Some focused on basic, applications such as foot placement or the proper position to hold the arms while sprinting. Others, however, wanted to look at the larger story from a theoretical perspective. For track and field, and indeed for sports in general, the most important Soviet training theorist was Lev Pavlovich Matveyev.

After introducing his research in 1962, Matveyev published *The Fundamentals of Sports Training* in 1965—a book that was almost immediately translated into most of the languages used in the Soviet Bloc (Matveyev, 1965). The first Western translation was into German by throwing coach, Peter Tschiene, in 1968, for the West German Sports Federation (Matveyev, 1968). By 2001 *The Fundamentals of Sports Training* had been translated into more than forty languages. The first full edition in English of Matveyev's theory did not appear until 1981 when Albert Zdornykh translated it (Matveyev, 1981). Because the book was published in Russia, and not the United States, it was not widely disseminated and as a result it did not have an immediate impact. Americans for the most part were still learning about periodization from articles published in coaching journals.

3. Matveyev's theory of periodization

To help formulate his ideas, Matveyev analyzed the athletic performances and training profiles of several thousand elite athletes in events that could be easily quantified such as track and field, swimming and weight lifting. From the data he derived a general theory of sport and training that guided the training

Matveyev's General Theory of Sport



process to facilitate ongoing progress and peaking at the right time. Matveyev's general theory of sport was all encompassing. It included the philosophical and methodological aspects of sports theory, the social and psychological aspects of sport incorporating sports history, sociology, aesthetics, and ethics, the biological aspects of sport including anthropometry, morphology, biophysics, biochemistry and physiology, sports medicine, trauma and therapy and the metrological or measurement aspects of sports theory (Matveyev, 1981, p. 24). However, Matveyev's defining contribution or at least how he has been perceived in the West was the concept of periodization. Periodization refers to the division of an athlete's training programme into specific periods or 'cycles' of time.

Specifically, periodization can be defined as a logical, phasic method of manipulating training variables in order to increase the potential for achieving specific performance goals, such as peaking at the right time (Stone, 1998). Matveyev incorporated aspects of Hans Selye's observations on stress and adaptation in his theory, but then went even further, arguing that with planning and proper execution, an athlete could be prepared so that they would be at their maximal best for competition on a particular day (Selye, 1956). The coach or coaching system that could properly manage peaking would have a great advantage in sport competition.

Part Three of *The Fundamentals of Training*, for which Matveyev received the most acclaim, covered the fundamental structure of training, including the use of training cycles and how they were periodized over the course of a year. The smallest of the cycles were referred to as microcycles, typically one week in duration that included individual day-to-day workouts (Matveyev, *1965*, p. 249). Average training cycles, or mesocycles, consisted of three to six small microcycles that commonly lasted one month and the large Annual or Semi-Annual training cycles, were termed macrocycles. Macrocycles were composed of three main periods—a Preparatory Period of fundamental training, a Competitive Period involving the main competitions, and a Transitional Period of 'active rest' that linked the two preceding periods (Matveyev, 1992).

4. The application of Matveyev's theory

This brief synopsis of Matveyev's work focused on the theoretical aspects of training. However, did the theory work in practice, and what clinical reasoning was behind such a detailed approach to training? To help answer this question we need to look no further than the 1960 Rome Olympics. Most expert observers in this era believed the United States had assembled its best ever track and field team and expected them to surpass the previous record of fifteen medals (Ziewacz and Noverr, 1983, p. 289). However, the American track and field favourites failed to live up to expectations. No one under-achieved more than Ray Norton, who finished sixth in both the 100 and 200 hundred meters. Norton was the clear favourite going into the Olympics, after sweeping both sprints at the preceding USA versus the USSR meet, the 1959 Pan-American Games, and the 1960 US Olympic Trials (Wallechinsky, 2000, p. 63). However, it appeared that he peaked too soon, as three of the four world records he broke or tied that year were set in March and April (USA Track and Field, 2009; Mount San Antonio College, 2007). In the high jump, the reigning world record holder, John Thomas who had cleared seven feet thirty-seven times previously, jumped a meagre 7' ¼' finishing third behind two Russians—one of whom had never jumped over seven feet before, and Harold Connolly failed to make the finals of the hammer throw although two weeks earlier he had broken the world record (Ziewacz and Noverr, 1983, p. 289; Wallechinsky, 2000, p. 163). Clearly, the Americans had misjudged and mistimed their readiness for competition.

The precise details of how to increase the chances of peaking at the right time was a

key motivating factor behind Soviet sporting inquiry. In 2001, Professor Matveyev reflected on the results of prior Olympic Games and observed that, despite better season best performances, Americans often failed to peak at the right time. He noted that after analysis, only seven to ten percent of non-Soviet athletes who took part in the Olympic Games were able to produce their best performances when it mattered most, whereas the Soviet Union athletes peaked properly about eighteen percent of the time. L.P. Matveyev (personal communication, November 16, 2001).

For Matveyev, peaking at the right time meant one was able to make winners out of athletes with lesser talent. He noted that the American and the Soviet track and field teams had met many times over the years and he believed the level of talent was actually higher among American athletes. The Soviets were able to win the majority of major meets, however, because they prepared more scientifically (Turrini, 2001). Matveyev stated, 'We were able to win because we were able to guide sporting results. The American record holder came to the meeting and could not win. They could not win because they could not guide.' (L.P. Matveyev, personal communication, November 16, 2001). The ability to control the sporting calendar and guide results via improvements in performances over time is critical to being able to peak for major competitions. By planning the fundamentals of training Matveyev was able to increase the chances of Soviet success at the Olympics by peaking at the right time.

In summary, Matveyev's general theory of sport and in particular his concept of periodization represented the first comprehensive overview of the complete sports training process that could be applied to all sports. While certain coaches such as James 'Doc' Counsilman in the United States developed detailed training programmes for specific sports such as swimming, Matveyev was able to offer a multi-sport blueprint for the construction of training that extended from an individual workout to a four-year Olympic plan (Counsilman, 1968).

Due to a lack of unified training theory in the United States, it immediately became apparent to track and field coaches that Matveyev's work had the potential to offer a more systematic and scientific method of planning an athlete's training. The adoption of a new periodized approach was also helped in large part by the sporting success of the Soviet Union and the East German national teams and by American desires to once again be competitive.

5. Doping and periodization

One aspect of Soviet sport that has clouded the potential benefits of periodization is its association with performance-enhancing substances. Although there has not been an all-revealing exposé of the systematic doping of athletes as occurred in the former East Germany, over time it emerged that doping played a significant role in Soviet high-performance sport (Edelman, 2001). The acknowledged benefits of steroids, raises the question of whether it is possible to distinguish between improvements in performance attributable to periodization and those due to drugs. Unfortunately, because of the multifaceted nature of training for sport it is difficult to categorically answer this question. In a 2001 interview, Matveyev was specifically asked to address the periodization and drugs issue. He unequivocally answered that regardless of whether an athlete was taking drugs, the athlete who was able to guide results using the laws of periodization would always be at an advantage and would always perform better than the athlete who did not know how to 'guide.' L.P. Matveyev (personal communication, November 16, 2001). Thus, despite the scepticism surrounding Soviet information, many US coaches recognized that even without the possible use of performance-enhancing substances periodization could offer a superior and more scientific method of planning an athlete's training.

6. Conclusion

In conclusion, this article has highlighted that periodization supported by Soviet applied sports science had a marked effect on the training of Soviet athletes as they proceeded, in large, to dominate the Summer and Winter Olympic Games from 1956 until 1990. More importantly, the ideas created by the Soviet's approach to training and sport science influenced sport worldwide. Matveyev's theory of periodization resulted in a paradigm shift in the training and preparation of athletes for competition (Kuhn, 1962). Because of his work coaches finally understood that training needed to be carefully planned, needed variety, and needed to be carefully coordinated or 'guided' in order to create optimal performance. Thus, by the turn of the twenty-first century, the periodization of athletic training was a concept that formed the foundation of most modern coaching theory and practice and, as Tudor Bompa, arguably the West's foremost authority on periodization, asserted is, 'the basis of every serious athlete's training' (Bompa, 1999, pp. 499-512). As testimony, the use of periodization has spread from mainstream sports such as track and field, football, and swimming to virtually every conceivable sport seeking to gain a competitive edge including skating, mountain biking, golf, body building, and synchronized swimming (Poe *et al.*, 2000; Willis & Jones, 1999; Fritz, 2001; Flynn, 1993). When interviewed, Matveyev, the 'Father' of periodization, acknowledged that it was never his intention to popularize his methods—however, his research and theory of periodization ensured that the world of training for sport would never be the same again.

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