

## Chapter 8: Munich Olympics

The United States Olympic Trials are held every four years approximately two to three months prior to the beginning date of the Games. The purpose of the trials is to select, based on the best performances of the athletes, the team members who will represent the U.S. in the Olympics. All of the summer sports have these team selection events, but I am most familiar with the track and field trials. Without a doubt, the U.S. Olympic Trials is one of the best national track meets in the world. There is no other athletic meet quite like it as far as performance level and the enthusiasm of the participants and spectators. The Olympic Games and the World Championships may have higher overall standards of performance, but no other na-

tional track championships can compare with the quality of the U.S. It is not just the statistical performance, but also the rather intense competitive process of the sudden-death form of selection that heightens the excitement. Make the top three in your event, and you are on the team. Have an off day, and you become an observer.

My first participation in the U.S. Trials was in 1972 in Eugene, Oregon. The city of Eugene has a fantastic history of sports, especially for track and field. For example, jogging was introduced to the U.S. through Eugene. It was brought from New Zealand by Bill Bowerman, who wrote the best-selling book “Jogging”, and who coached the University



*Munich 1972 Olympic Games Opening Ceremony*

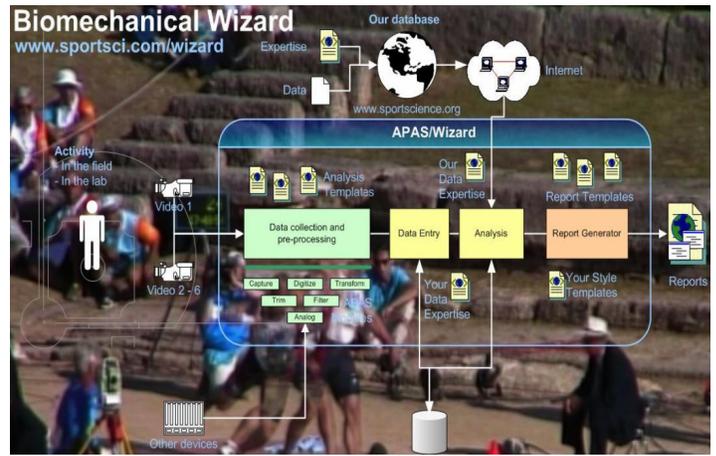
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*Ken Weinbel*

of Oregon champion track and cross country teams. During Bowerman's tenure, his "Men of Oregon" won 24 individual NCAA titles, including titles in 15 out of the 19 events contested. During Bowerman's 24 years at Oregon, his track teams finished in the top ten at the NCAA championships 16 times, including four team titles. Bill Bowerman also invented the waffle sole for running shoes and, with Oregon alumnus Phil Knight, founded the giant shoe company, Nike, Inc.



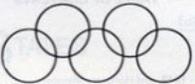
*Setup and analysis protocol "in the field"*

The environment of the Eugene area is rich with knowledgeable fans and supporters of track and field events. There is an excitement in the air that seems to vibrate and communicate to the athletes and coaches almost as soon as they step onto the field. Eugene is home to the University of Oregon's Hayward Field Track. I was lucky enough to be at Hayward Field when the stands were alive with the crowd shouting, "Pre! Pre! Pre!" for their hometown hero, Steve Prefontaine.

*Bill Bowerman*



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*Published results of the Dartmouth US training camp for throwers*  
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Prefontaine was a middle and long distance runner who had both amazing good looks and an exciting style of running. For many members of the track and field world, Prefontaine is one of those legends who gave a magnificent performance every time he stepped onto the track and whose spirit continues to hover over Hayward Field. He was a joy to watch and it is one of my special memories of that time.

It was to this amazing track-crazy town, filled with some of the best athletes, that I arrived in the summer of 1972. My friend, George Dales, had invited me to attend the trials and perform our biomechanical analysis on as many events as possible. He would then publish the results in the Track and Field Quarterly Review where he had printed other articles which I had submitted. One of my most recent articles was about the "Training Camp for Throwers"

Ken Weinbel, one of my CBA partners and the head coach of the Dartmouth College track and field team, and I flew to Eugene with our photographic gear. In addition to the two movie cameras, we also had to take the scale factor, extra film cartridges, and other photographic paraphernalia. At that time, movie cameras used 16mm film since there were

### Computerized Biomechanical Analysis of Track and Field Athletics Utilized by the Olympic Training Camp For Throwing Events

Gideon Ariel  
Assistant Coach  
University of Massachusetts

This past summer (1971) at the Olympic Training Camp conducted at Dartmouth College, a computerized biomechanical analysis was done on the performance of each weight event man in attendance. The results were vividly noticeable by coaches and athletes. Several athletes were able to affect immediate improvement in their performance by making changes as warranted by their computer analysis. Others were able to return to their respective colleges armed with the scientific data and knowledge necessary for an intelligent approach to develop their own personal program for improvements. Events and Athletes: Discus-Michael Hoffman, Larry Kennedy, Stanley McDonald; Hammer-Robert Barcessian, Steve DeAutremont, Lawrence Hart and Alfred Paliwoda; Shot-Put-Samuel Walker, Bruce Wilhelm and Erich Hardaway; Javelin-William Schmidt, Michael Lyngstad and James Stites. All found the program very beneficial. For instance, Hoffman's analysis revealed a flaw, and he immediately uncorked throws 10 feet better than ever before.

This biomechanical analysis provides a new approach to track and field athletics which was made possible by the collective efforts of many scholars and the technological advances of the past decade. Slow motion cinematography is used to record any desired motion and then special tracing equipment enables data to be processed directly by a high speed computer. The appropriate programming results in a segmental breakdown of information of the whole motion. The appropriate includes the total body center of gravity, segment velocities and accelerations, and joint forces and moments of force. A unique feature allows the interpretation of the data to show the significance of contribution of each body segment to the whole motion. Other available information shows 1) the positions of maximum velocities and accelerations, 2) the magnitude of the muscle action at each joint, 3) the vertical and horizontal forces at all joints and at the ground contact points, 4) the timing or coordination of motion between the body segments, and 5) the differences due to body builds. The combination of the moments of force, the interrelated patterns of the body segments, and the task performed give a measure of the efficiency of the motion.

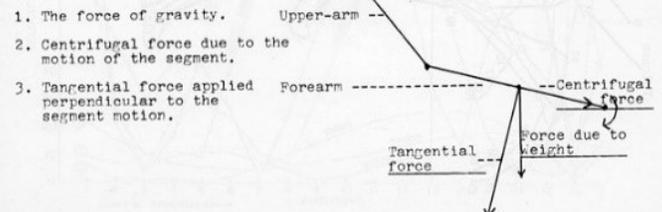
This information may be useful in any track and field event to improve performance and to aid in finding optimization of performance.

#### The scientific principles underlying the analytic technique:

The segments of the human body form a link system. The laws of physics apply to any link system in motion regardless of whether the system is a human or machine. The different segments of this link system in the human body are the foot, shank, thigh, trunk, shoulders, upper arm, forearm and the hand.

When the link system is in motion such as in any track and field event, there are specific forces acting upon each segment of the total link system. For example, if we analyze the forces which acted on a swinging forearm, the following forces would be obtained: (Fig. 1)

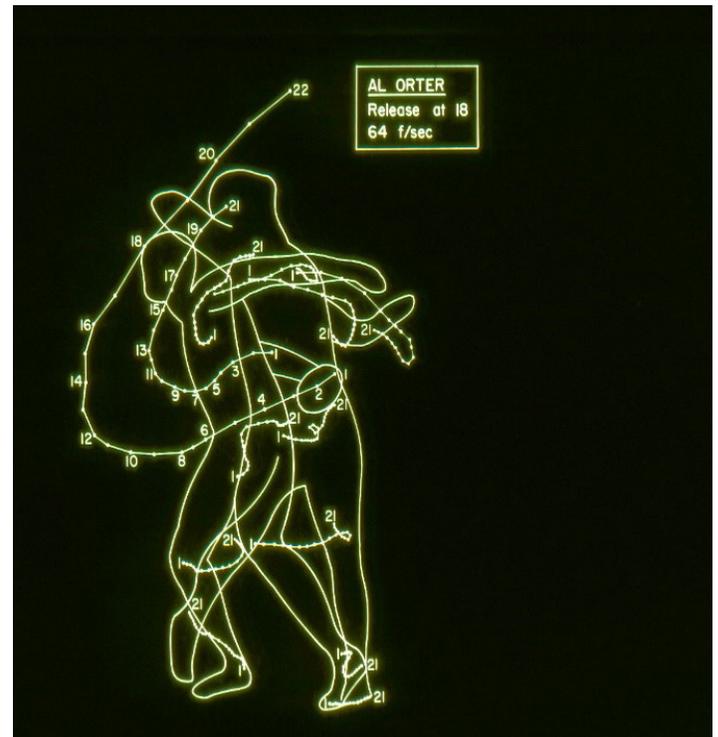
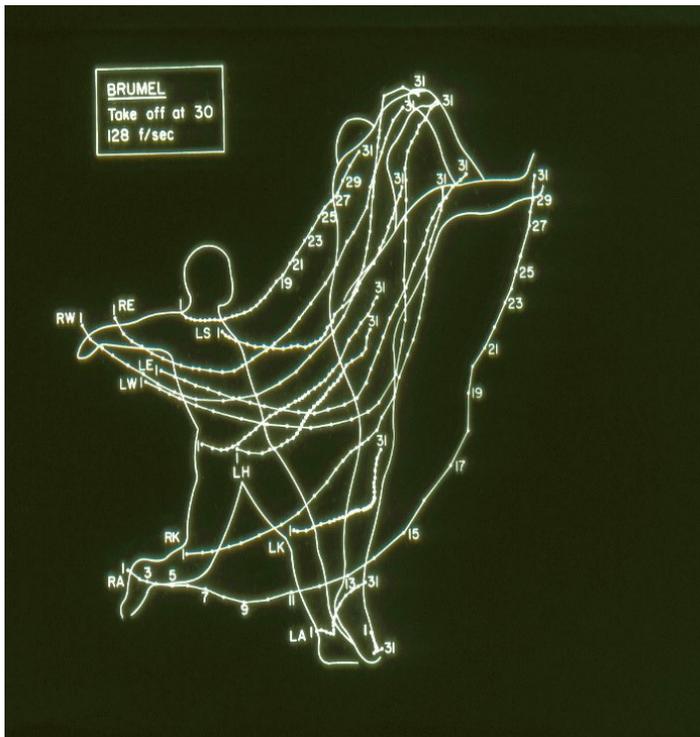
These three forces would act upon any segment in motion whether in the human body or another object.



no digital cameras available. Digital movie cameras were not available in the consumer-level market until 1994. Therefore, in 1972, the entire filming process was quite lengthy and tedious during those early years of biomechanical analysis.

The Olympic Trials follow the same schedule as the Olympic Games, so Ken and I were able to film most of the events. We usually had to wait two or three days for the film to be developed, but, at least, we could check the films to verify that we were capturing the events correctly. We would film the entire activity and record the scale factor for converting athletes to full size. We also kept precise logs of the names, dates, and sequences for identification of each athlete.

We had to arrange different filming positions for each activity. For the 100-meter sprint, we focused the cameras on the start. For the run-up in the javelin, our filming requirements were more complicated. The pole vault was challenging because the pit obscured some of the event. We had to be creative for each event in order to obtain the data while staying out of the way of other events. Track and field meets are like a three-ring circus, so attention had to be given to many activities occurring at the same time.



*Early computer digitizing results—the first in the world from real performances*

<http://arielnet.com/ref/go/3022>

We spent all day, every day, filming each of the Olympic Trial events, so we collected an enormous amount of data. In fact, we had so many reels of film that I had to buy an extra suitcase to take all of them back to the Amherst office. George had requested several specific events that he wanted me to analyze quickly so he could include them in the next issue of the *Track and Field Quarterly Review*. The next issue would be published prior to the start of the Munich 1972 Olympic Games.

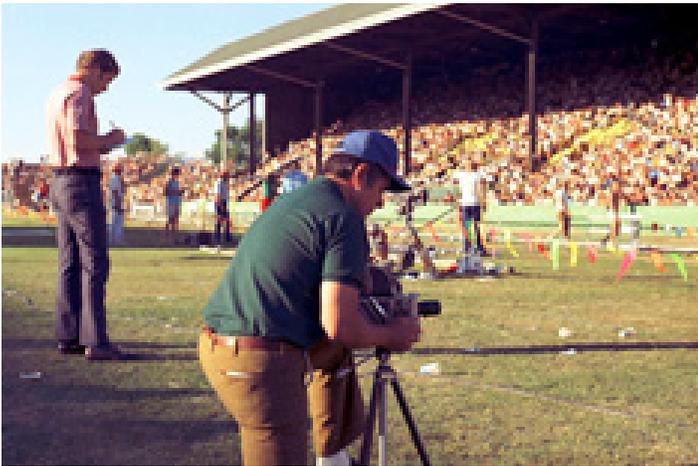
One study I conducted was on the pole vault. The question that we needed to resolve with our technological process was how the fiberglass pole contributed to the jump. The most important characteristics of the pole are strength and flexibility since it must support the athlete, as well as provide a whip to propel the vaulter over the bar. The pole must have the capability to store energy and release it at the proper phase of the jump. Originally, poles had been made of ash and later bamboo, but the modern poles contained different materials, such as aluminum and fiberglass. The poles of the 21st century employ even more sophisticated composites including carbon fiber as well as E-glass and S-glass materials to create poles which are lighter.

In the past, when the poles were made of bamboo, they functioned like the subsequent fiberglass models. As pole materials, both fiberglass and bamboo possess similar characteristics for storing energy during the beginning phase of

the jump and then, like a catapult, the energy is returned to the athlete to pass over the bar. Cornelius Warmerdam used the bamboo pole and held the pole vault world record for seventeen years, from 1940 to 1957. During the 1972 trials, the vaulters used only aluminum and fiberglass for their poles.

Because of these different pole materials, George Dales' question was, "Is there a difference or an advantage between pole materials?" If there were differences, George wanted to know what they were. The biomechanical analysis revealed that fiberglass was similar to bamboo. Both materials exhibited better energy storage during the beginning phase and subsequently whipped or threw the vaulter over the bar. Aluminum was too stiff and lacked the flexibility necessary for reaching extraordinary heights.

Coach Dales published the results of that study in the *Track and Field Quarterly Review*. Additionally, he suggested I submit the same paper to the International Scientific Olympic Congress for presentation in Munich. The Scientific Congress was held every four years, shortly before the beginning of the Games. This scheduling allows many people to attend both the congress as well as the Games. I submitted "The Contribution of the Pole to the Vault," as well as another paper, "Biomechanical Analysis of Javelin Throwing." Both papers were accepted for presentation and would be included in the publication of the scientific congress for that year.



*Ken Weinbel and I filming the pole vault with two cameras for 3D analysis*

In his position as the president of the International Track and Field Association and the editor of *Track and Field Quarterly Review*, George asked if I could collect data on the field at the Munich 1972 Olympic Games for later publication in his journal. Since he had already published my article

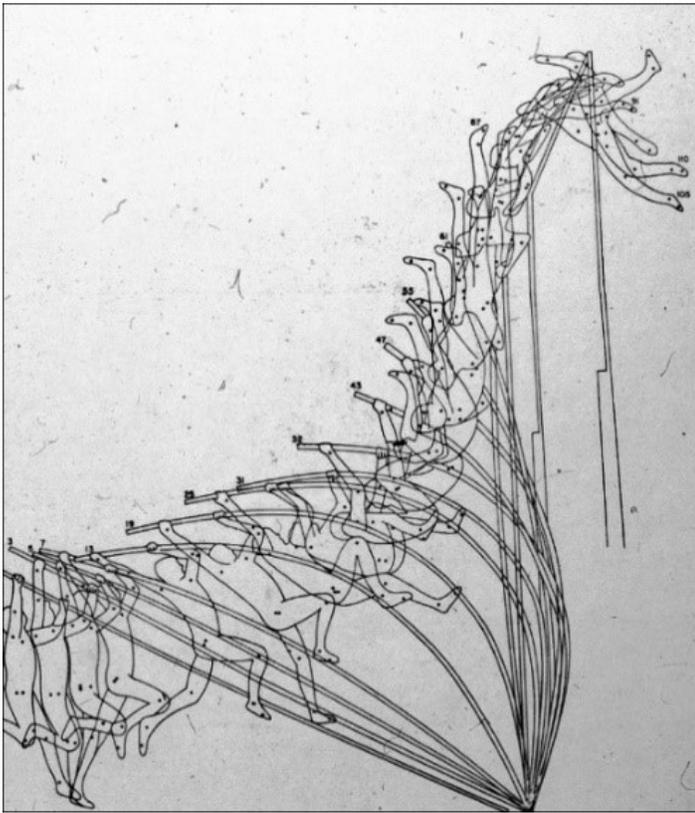
about Bob Beamon's legendary gold medal long jump in the Mexico 1968 Olympic Games, as well as the studies from the 1972 Olympic Trials, I eagerly agreed. Now was a time of intense planning for the equipment that would be needed for this first major overseas event for me and for CBA. George



*Analysis of Frank Shorter, Olympic champion, in the 1972 Olympic Trials*

<http://arielnet.com/ref/go/1106>





*Computerized biomechanical analysis of the world record pole vault. Track and Field Quarterly Review, 72: 217-222, 1972.*

also arranged for housing, participation in the scientific congress, and a special pass to get onto the field in the Olympic stadium for filming.

On August 23, 1972, I left Amherst, and drove to JFK airport in New York City. At this point in my life, JFK did not seem nearly as daunting as it had in 1963 when I had first arrived in America. With several suitcases packed with cameras and film, I boarded the plane for Munich, thrilled by the excitement which accompanies each Olympic Games. In addition to the thrill of attending the Olympics, I was also excited about the anticipated reunion with my friends on the Israeli team.

Most of the Israeli athletes who were participating, as well as their coaches in track and field and weight lifting, were friends of mine from the past. After all, I had trained with many of these people in Israel, such as with track coach Amizure Shapira, and weight lifting coach Yakov Springer. Many of the athletes from my era were now coaches, but old friends nonetheless. Many of us had been together in the 1960 and 1964 Olympic Games in Rome and in Tokyo.

Israelis are extremely gregarious and friendly by nature, and these old friends and colleagues were no exceptions. They insisted that I stay with them in the Olympic Village.

What a grand beginning, with everyone talking at once, all smiles and backslapping. The early stages of every Olympic Games are always filled with anticipation and joy, companionship with other athletes, and hopes for success in the athletic performances. Every athlete dreams of standing on the top of the podium and receiving the gold medal. Even if that dream is beyond what, in your heart you know is unrealistic and unattainable, it is still a dream that everyone has. I was happy for the opportunity to stay with my friends in the village for the first two days. Everyone in the Olympic Village bubbled with excitement amidst the tension and thrill of the upcoming competitions.

My presentation at the scientific congress was scheduled for September 6, 1972. Although I lived with my Israeli friends in the Olympic Village, George Dales suggested that I spend the few nights before the presentation in his hotel in town. From the hotel, we would be able to maneuver about the city more easily, and we would be closer to the conference location. The scientific congress was held in one of the main convention centers in Munich. The Germans had constructed an elaborate, modern subway system to move athletes, coaches, and fans around the city. However, it would be more convenient and practical for George and me to stay in his hotel, rather than in the village, during the congress. I agreed that this was a more logical arrangement for the congress since I had much work to do there. It had been a happy reunion with my old friends and I will always cherish those days I was able to spend with them.

As it transpired, had I not been scheduled to give that presentation on pole-vaulting, I would not be alive today. George's idea of moving to the hotel was a life-saving suggestion for me. The very night that I moved was the night that Arab terrorists broke into the complex where the Israeli athletes were sleeping, and took them hostage.

The German Olympic organizers had planned meticulously for every aspect, except for security. Their goal had been to create a friendly image in an atmosphere of harmony among the participants of so many different countries. They hoped and planned to dispel the old, historical image of Prussian aggression and the militaristic image of the Berlin 1936 Olympic Games exploited by Adolf Hitler. History now knows better that such an idea was a beautiful dream, but failed to anticipate the evil which exists in our world.

Much has been written about that time, and Steven Spielberg produced a movie that accurately showed what happened. But to briefly recap the events, five Palestinian terrorists, calling themselves Black September, wore track sweat suits and climbed the 6-foot 6-inch fence surrounding the Olympic Village. Several people saw them, but no one paid particular attention since athletes had been routinely hop-



ping over the fence. Three more men are presumed to have obtained credentials to enter the village and joined these five.

The terrorists used stolen keys to enter two apartments, one of which was the room where I had stayed only the day before. The Israeli wrestling referee, Yossef Gutfreund, was awakened by a noise at the door and, when he saw the masked men, yelled, “Hevre Tistalku! Guys, get out of here!” He threw his considerable weight against the door to stop the terrorists from coming into the room, but was overpowered. In the meantime, many of the other athletes hid, tried to escape, or looked around for something to use as a defensive weapon. The wrestling coach, Moshe Weinberg, attacked the terrorists and was shot in the face. Moshe was then forced by the intruders to help them find more hostages. He lied to them about the residents of Apartment 2, saying they were not Israelis, and instead led them to Apartment 3 where the larger, stronger wrestlers and weightlifters were sleeping. Unfortunately, the athletes from Apartment 3 were surprised in their sleep and were marched back to the coaches’ room. Again, Moshe Weinberg attacked the terrorists and this act of bravery allowed one of his wrestlers, Gad Tsobari, to escape. Moshe was knocked unconscious by one of the terrorists, slashed with a knife, and then shot to death. Another weightlifter, Yossef Romano, attacked and wounded one of the intruders before he was shot and killed. The Arab terrorists then succeeded in rounding up nine Israelis to hold as hostages.

At 9:30 in the morning, the terrorists announced that they were Palestinians, and demanded that Israel release 200 Arab prisoners and that they be given safe passage out of Germany. Golda Meir, the Prime Minister of Israel, refused to negotiate with the terrorists, and told the German authorities that they should handle the situation.

After a grueling day of tense negotiations, the Palestinians agreed to the plan the Germans had concocted. The terrorists and hostages were to be taken by helicopter to the NATO Fürstenfeldbruck Air Base. From the air base, they and their hostages would fly to Cairo. The world’s press and television coverage had shown in extensive and repetitive details where the hostage takers and German sharpshooters were positioned. Unfortunately, the terrorists in the Israeli’s rooms watched the coverage on the television sets. The perpetrators were aware of everything that was happening outside of the buildings, including the plan expected to be used against them!



### *Palestinian terrorists—Black September*

The Israeli hostages and their Palestinians captors were taken by bus to the helicopters and flown to the airfield. During the transfer, in what was to be a day full of ineptness, the Germans discovered that there were eight terrorists instead of only the five they expected. Suddenly, the Germans realized that they had not assigned enough marksmen to carry out the plan to shoot the terrorists at the airport. In addition, there were no means of communication among their snipers, so the mess became increasingly worse each moment.

When the helicopters landed at the air base, around 10:30 p.m., the German sharpshooters attempted to kill the terrorists, and a bloody firefight ensued. At eleven o’clock in the evening, the media was mistakenly informed that the hostages had been saved and the news was announced to a relieved but anxious Israeli public. However, nearly an hour later, new fighting erupted and a terrorist grenade blew up one of the helicopters holding the Israelis. The remaining nine hostages, restrained in the second helicopter, were shot to death by one of the surviving terrorists.

At three o’clock in the morning, a drawn and teary-eyed Jim McKay, who had been reporting throughout the day as part of ABC’s Olympic coverage, announced: “They’re all gone.” It was a devastating announcement, and it broke the hearts of many of those who had watched the whole episode unfold.

The terrorists had killed eleven Israeli athletes and coaches, and one West German police officer. Five of the eight members of the Black September were killed by



*The murdered Israeli athletes and coaches at the Munich 1972 Olympic Games*

<http://arielnet.com/ref/go/1107>

German police officers during the failed rescue attempt. The three surviving terrorists were captured, but later released by West Germany following a Black September hijacking of a Lufthansa airliner. Israel allegedly responded to the massacre with Operation Spring of Youth and Operation Wrath of God, as well as a series of air-strikes, which resulted in the killing of those suspected of planning the kidnapping. There have been highly placed sources within the government who deny these programs of retaliation, but that remains for future historians to unearth.

Fortunately, or unfortunately, on that day, I awoke completely oblivious to the events underway at the Olympic

Village. George Dales and I joined a tour to visit Salzburg, Austria. It was only when we returned to the hotel that evening that we learned about the terrorist activities which were ongoing.

I was shocked and dismayed about these events. In Israel, we had learned how to cope with such terrorist activities by providing security within the country, and for groups or teams when we travel abroad. For the Olympic Games, Israel had relied on the German security at the athletes' venue and had not provided their own protective measures. This false sense of security had backfired badly for the Israeli athletes and the host country Germany.

As events unfolded during the remaining hours of the tragedy, all of us, within and outside of Israel, crossed our collective fingers, prayed, and clustered in groups for emotional support. Our collective hopes were dashed as the news of the violent, tragic results were transmitted across the airwaves. My own sense of despair deepened as I realized the scope of the massacre. In what seemed like the blink of my eyes, I had gone from the joy of sharing Olympic experiences with my friends, to the loss of many of my good friends and coaches. Perhaps it is a type of survivor's guilt, but I wished that I could have been with them, and done something to help. I do not think I would have surrendered. I think I would have fought. After all, I was big, strong, and very fit. But who knows? Those who tried to fight were shot and the ones who initially fought back were as big and strong as I was.

One of the men who managed to escape was my friend Avraham Melamed. Avraham was the Israeli 200-meter butterfly champion. When the initial shouting began to lock the doors, Avraham did just that, and escaped by climbing out of the window, walking along a small ledge, and jumping to the ground. Many months later, we learned that after Avraham jumped out the window and was creeping along the window ledge, he remembered he left his new camera in the room. He hurried back, scrambled into his room to retrieve his camera, and then exited the window for the second time. Despite this seemingly reckless behavior, his escape was successful. Avraham later became my student at the University of Massachusetts where he received his master's degree.

Other developments from this tragedy surfaced in odd and unrelated ways. One of my friends, in the class below me at Hadassim, worked for Mossad. One of his assignments involved finding and disposing of the remaining living terrorists. Unfortunately, his superiors sent him to Norway. The information provided to him proved to be incorrect, and he killed the wrong person. He became distraught and, at one time, came to stay with Ann and me. Another Hadassim connection was Gila Almagor, the famous actress, who attended the class above me at Hadassim. She played one of the main characters, the mother of one of the Israelis, in Steven Spielberg's film, *Munich*.

After the murders, decisions were made for the Olympic Games and the other conferences to proceed with the scheduled activities. The idea underlying this decision was that violent behavior should not be encouraged by allowing it to interfere with life's activities and events. The decision was made to proceed legally against the terrorists through the courts of law, rather than to give media attention to senseless murders.

From my perspective, I do not know if this was a correct idea or only a pacifier for the times, but it was extremely difficult to go forward with such a heavy weight on the heart. However, there was nothing to do but continue, so I present-

ed my talk at the congress with tears in my eyes. I was hardly able to talk. When I finished giving my presentation, however, I looked up and all the attending members of the hall were giving me a standing ovation. I am sure it was because I was an Israeli, and the participants wanted to show their respect for our athletes and for what I was suffering.

At the Athens 2004 Olympic Games, George Dales and I were interviewed by a television station regarding the events that we had experienced in Munich.

After the congress, as is common at scientific meetings, there were many gatherings and invitations to continue discussions about the topics presented. Not surprisingly, many of the conversations continued with ample lubrication from pitchers of delicious German beer, and friends and foes joined with respect, camaraderie, and shared interests. One meeting I was invited to attend was with the East German and Russian coaches. Some of them I knew through the literature, having read their published studies, and others I had met when I was an Olympic competitor. At that time, the East Germans and the Russians were the most well-regarded sports scientists. This opinion of excellence was based on the athletic results they produced on the playing field, in the gym, and in the swimming pool.

The tiny country of East Germany—and the massive Soviet Union—controlled their athletic training program by providing dedicated locations for the athletes to live, individually prescribed diets, unique training techniques, and, reportedly, specialized pharmaceutical enhancements. These systems and applications were hidden from public view, since they were behind what was known as “the iron curtain.” It was rumored that children were removed from their parents care at a very young age, and raised at these special training camps. Once in these training facilities, their entire day focused on training and practicing their sport, physical fitness, and, presumably, some academic instruction. There was little, or no, media coverage, and few visitors from the outside were ever allowed to see how their athletes were trained. In this way, the myths grew exponentially among those on the outside.

Until a wave of political reform began sweeping across Eastern Europe, East Germany nudged its way into western consciousness about once every four years. In the Olympic Games, this small country of 16 million people and modest means would prove itself a superpower. Indeed, since 1968, the first year it was allowed to compete in the Games on its own—from 1956 it had been part of a mixed team with West Germany—East Germany has won more Olympic medals, 519, than all other countries but superpowers in the more conventional sense, the Soviet Union, with 774 medals to its credit, and the United States, with 624.

Unable to see what was actually occurring on the other side of the opaque wall, the mystery deepened. I was pleasantly surprised to learn how impressed these coaches and scientists were with my method of using high-speed cameras and a computer to analyze events. During our conversations, I learned that they had neither mainframe computers nor the programming skills that I had access to. They were very curious, and our discussions lasted for hours.

The conversations and scientific dialog were fascinating, but I struggled to concentrate since I was unable to forget about my murdered friends. One of the famous East German coaches, Hochmuth, asked if I would be willing to go with him to Leipzig, the East German city where their sports labs were located. I liked the idea of leaving Munich and all the heartbreak. Everyone knew that the East Germans currently dominated world sports, but no one knew how they were able to accomplish it. What were their secrets? It was such a tiny country, and yet such a major athletic power. What were they doing that the rest of the world was not?

One consideration was whether I could enter East Germany on my passport. At that time, I was still an Israeli citizen, even though I was an American Green Card holder. I was informed there would be no problem, since I had the Participant Card. For the Olympics, the East German and West German border was open to anyone with the correct papers, which meant that I could travel to the GDR. George Dales was invited to travel with me, but unfortunately, because he was an American, the U.S. authorities forbade his entry into East Germany. I could only go because I would travel on my Israeli passport.

Although George had to remain in Munich, his time was well spent. It took him two days of persistent dialing to

the U.S., before he finally made a connection to his wife in Kalamazoo, Michigan. George brought her up to date with all of the events that had transpired in Germany. Of course, she had been watching the news coverage from Munich, and had suffered through the agonizing events along with the rest of the world. She was quite relieved to learn that I was safe, since she had been aware of my plans to stay with the Israeli team. George asked her to call Ann in Amherst, and let her know that I was safe. Ann also knew of my plans to stay with my Israeli friends in the Village. Also, during some of our trips to Israel, she had been acquainted with a few of the athletes who had been killed. Needless to say, Ann was a nervous wreck with worry, so it was a tremendous relief for her to hear that I was safe and sound. After hearing the news from George, she could finally breathe.

Ann had been shouldering an additional emotional burden during this time. While I was in Germany, she had been caring for my daughter, Geffen, who was eight years old at the time. It was quite a task to ensure that Geffen remained unaware of the activities occurring in Munich. Fortunately, for all concerned, there was a great sense of relief with the news that George and I were safe. Of course, traveling to East Germany may have been an incredible opportunity for me, but now Ann had something new to worry about.

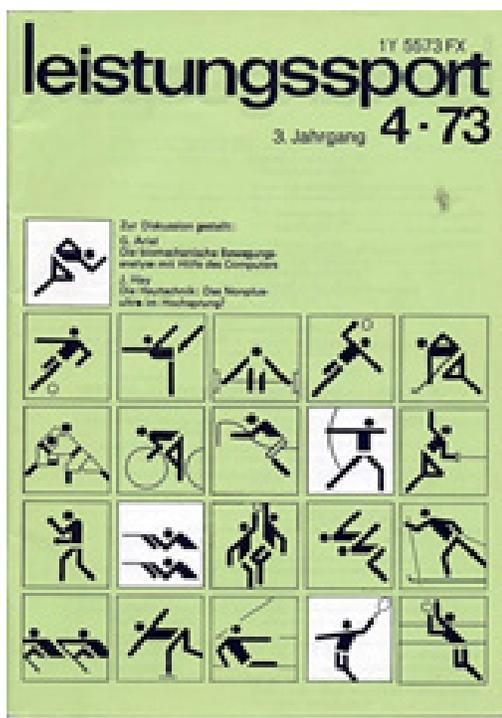
While George remained in Munich, off I went with coach Hochmuth to East Germany. We drove for many hours at night in coach Hochmuth's old Mercedes sedan. I must have fallen asleep in the car since I have no recollection of crossing the border from West to East Germany.

After we had arrived in Leipzig in the morning, I was given a tiny room in a small hotel. Everyone was exhausted, so the first order of business was a long afternoon nap.



*Remembering the terrorist attack at the Munich 1972 Olympic Games many years later*  
<http://arielnet.com/ref/go/1108>





## Gideon Ariel

### Die biomechanische Bewegungsanalyse mit Hilfe des Computers

Dr. Gideon Ariel ist Dozent am Institute für Leibesübungen der University of Massachusetts in Amherst. Er war zweifach in den Olympischen Spielen 1960 und 1964 in Kugelstoßen und Diskuswerfen und hält noch immer die Landesrekorde in diesen Disziplinen. Er arbeitete als israelischer Nationaltrainer und als Assistent Leichtathletik Coach der University von Massachusetts. Dr. William Saville ist Dozent am Department of Exercise Science der University von Massachusetts in Amherst. Eine kritische Stellungnahme zu diesem Beitrag wird in einer der nächsten Nummern erscheinen.

In der Leichtathletik wurde im Olympia-Trainingslager des Dartmouth College eine biomechanische Bewegungsanalyse mit Hilfe eines Computers an der Leistung einer Reihe von dort trainierten Technikern vorgenommen. Die Ergebnisse wurden von Trainern wie Sportlern einhellig begrüßt. Einige der Sportler konnten aufgrund der Computer-Analyse sofort ihre Leistung verbessern. Andere kehrten nach Hause zu ihren Universitäten

bestimmt. Mit einem entsprechenden Computerprogramm können die Daten sofort interpretiert werden, und es ist möglich, die Bedeutung einer Einzelbewegung für die Gesamtbewegung abzuschätzen. Andere Information wird über Maximalgeschwindigkeiten bei einzelnen Positionen, über Beschleunigungen, über die Größe der Muskelkraft an jedem Gelenk, die vertikalen und horizontalen Kräfte an allen Gelenken und an den Bodenkontaktpunkten, Bewegungskoordination zwischen den einzelnen Körperteilen, interindividuelle Unterschiede aufgrund anatomischer Gegebenheiten bestimmt. Die Kombination der Kraftmomente, das miteinander verbundene Bewegungsmuster, Information dieser Art sind für alle leichtathletischen Übungen von großem Interesse und können zur Leistungsoptimierung beitragen.



My presentation in the Olympic Scientific Congress at the Munich 1972 Olympic Games  
<http://arielnet.com/ref/go/1109>

We met later for a quiet dinner in the hotel. Of course, the conversations lasted late into the night, but we were inspired by the subject matter. In the morning, one of the scientists picked me up at the hotel and we went to the sports center complex for breakfast. The food was delicious, well prepared, and beautifully presented.

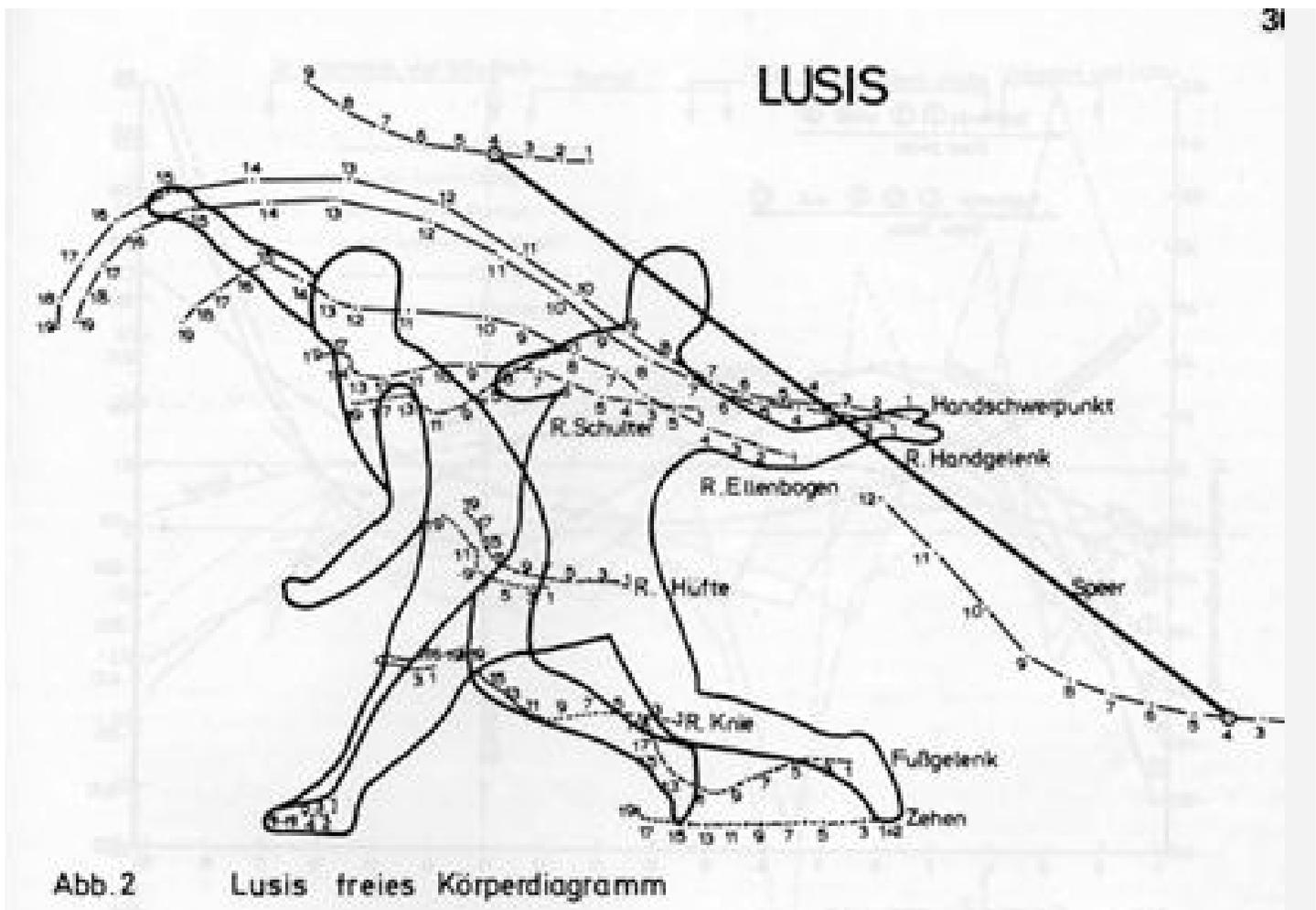
The athletes ate in a dorm-like restaurant, similar to what I remembered from my Wyoming days. The food was plentiful. It was carefully orchestrated to be rich with specific vitamins and appropriately balanced for proteins and carbohydrates. The athletes were seated according to their events, and the girls were separated from the boys. I asked the scientist why they were separated, and he explained that the diet of the females was different from the males. He also said that each sport has its specific diet composition which was specially designed by health and nutritionist scientists. Not only was the nutrition specific for each sport, but also, it was further tailored for each athlete within that activity. For example, if one of the swimmers needed more protein, his or her portions were adjusted accordingly. This was completely different than my Olympic training table in Israel! In my time, our food had been rationed and we only received protein once a week rather than daily as did these East German athletes.

After breakfast, I met one of the scientists, Dr. Schmidt. He told me that he would not be able to reveal all of the se-

crets involved in the German Democratic Republic's (GDR) athletic system. Obviously, he was unwilling to disclose the secrets that had allowed the GDR to excel during the previous ten to fifteen years of athletic competitions. The record number of victories in World Championships and the Olympic Games reflected their successful selection and training of athletes. These successes indicated that they were doing something that the other countries were not.

"Well, what can you tell me?" I asked.

"Okay," he smiled. "First of all, we start training the children at a very young age. All children have physical education in kindergarten. The physical education teachers in elementary and secondary schools have been thoroughly trained in our State Institution for Physical Education in Leipzig. These teachers know how to evaluate young children, as well as how to encourage young, talented athletes. There is also a tremendous emphasis on school sports clubs and athletic associations. It is in these sporting groups that we can identify young adolescents who are particularly suited for sprinting, jumping, flexibility, and other basic skills. From the 9th and 10th grade onwards, the training becomes more focused and intense for their event. Once individual children are selected for training, they are placed in one of our sports centers to live, study, and train. The financial support for these sport training facilities comes from the government."



### *Biomechanical analysis of Lusus' world record javelin throw*

I nodded. So far, I had not heard anything that was different from my experience as a discus and shot put thrower. No magic bullet had been revealed yet!

Dr. Schmidt continued, “By 12 or 13, a child is familiar with the whole range of exercises. The exercise routines are harmonized, of course, with the biological development. As they get older, we add resistive training with weights, squats, presses, and so on. These talented, athletic kids attend school classes until two o’clock in the afternoon. Then they spend the next four or five hours working with a fitness trainer and practice the sport itself with a coach. Success usually results from the enthusiasm with which the trainer can attract these young promising athletes and their dedication to their activity.”

“But this was my story in Israel. I worked every day to increase my strength and I threw the shot and discus every day. I practiced between classes, after classes, and every other moment that I could find,” I told Dr. Schmidt.

He responded to my comment by providing additional insight into the rationale of the system. “But I generated the idea for the GDR’s sporting program based on our Marxist philosophy for children and young people. There is a paragraph from Friedrich Engels’ book which describes ‘the role of work in the humanization of monkeys’ and this is a factor in the implementation of our sports system. In other words, at a young and tender age, we can develop a young person through very specific training methods which are designed to shape and train the body in that particular direction.”

I recall thinking that this was an unusual attitude about children which compared them to monkeys and trying to humanize them. I have often wondered what he felt in his heart about the individual children and their welfare. It certainly diverged from my sensitivities of loving and caring for children. As I reflect on this meeting, now many years later, I wonder what his true feelings were about young people.

Dr. Schmidt believed that training was the key. Thus, enormous attention was focused at every athletic training camp on exercise and fitness. So far, I had not seen anything that was different from my experience of focus and training that was making the GDR athletes so successful. Perhaps there would be some new revelations as the day proceeded.

Dr. Schmidt and I went to the main conference room and, to my surprise, I saw all my published studies in biomechanics and anabolic steroids on the table. Each study had a German translation next to it. This was quite a shock. One of my studies, which was of particular interest to Dr. Schmidt, was the "Analysis of the East German Shot Putters" published in the Track and Field Quarterly Review. East Germany held the world record in this event and I had tried to understand how and why they were so accomplished.

What perplexed these East German scientists was that I had calculated exactly what their throwers were doing which resulted in gold medals. They had developed a technique with no deceleration of the front leg before its initial hitting the toe board. In other words, the front leg continued to accelerate until hitting the toe board stopped it. After the front leg had contacted the toe board, the back leg touched down. This was like driving a car into a wall without applying the brakes. In this case, the driver would be propelled through the windshield. For the shot put, the front leg block was the car hitting the wall and the shot put was the driver. The technique had produced many world records and Olympic medals.

The scientists were impressed with the technique I utilized, since it was so much more advanced than the accurate, but elementary, procedures they employed. Their calculations were accomplished with the use of slide rules, paper and pencil, and hand calculators, but they applied the same basic Newtonian equations which I used. The scientists were amazed that I had discovered what the East German throwers were doing without being there. My technological tools surpassed the more primitive methods that they used. Although we both employed the same Newtonian equations, I could execute them faster, more accurately, and with greater detail. They were extremely impressed by the computerized system.

The tour proceeded to the resistive training facility. As I entered the weight training room, I received another surprise. There, in the center of the room, was the Universal Gym equipment with the cam technology I had developed.

"Wow!" I said. "Where did you purchase this and how did you get it here?" I asked.

The weight coach smiled and answered, "It was made in East Germany."

They had copied the machine precisely in every detail, including the proper cam. It was an exact duplicate with every one of the details described in my patent.

"I see there are no secrets anywhere," I laughed. They laughed too and asked, "What about the secret machine you are working on with Universal Gym which has a computer on it? The intelligent exercise machine?"

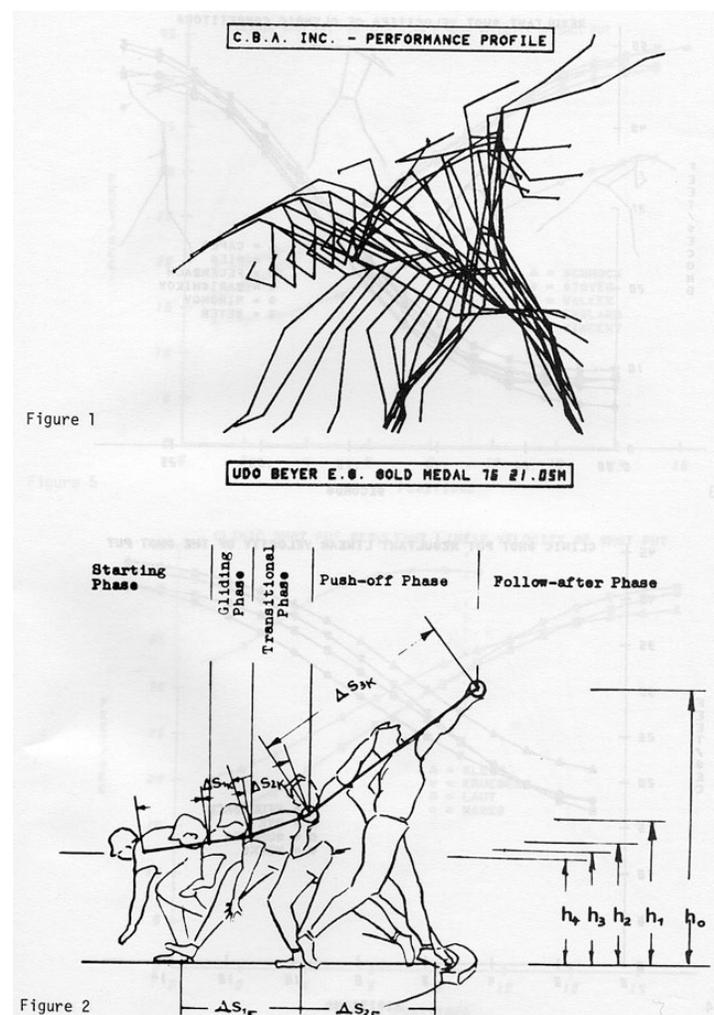
I replied, "You'll have to wait for that." In 1995, one of their scientists, Dr. Zinner, purchased my intelligent Computerized Exercise Machine. By then, there was no longer a division between East and West Germany, since they had reunited after tearing down the Berlin Wall. Until today, they continue to use the Computerized Exercise Machine for research and to train some of their athletes. In 1995, I was invited to the Olympiastützpunkt (OSP) Berlin for a two-day working visit. They published a description of my visit in their newsletter, praising my accomplishment as well as my contributions to their own work at their center.

After they had shown me the duplicate of my Universal Gym exercise machine, the tour of the 1972 facility continued. From the weight room, we walked down the hall, and I



### Analysis of East German shot-putters

<http://arielnet.com/ref/go/2796>





*East German and Russian sports scientists*

<http://arielnet.com/ref/go/1307>

was introduced to a scientist whose name I remember quite clearly, since it was Dr. Israeli.

“Are you Israeli?” I immediately asked.

“No,” he answered.

“Are you a Jew?”

Again, the answer was “No.”

I have always wondered how he happened to have this Hebrew name. Shortly after meeting with Dr. Israeli, I learned he was the head of the pharmaceutical center for all of the training centers. This, I was to learn later, was of significance.

Following the tour of the facility we returned to the room where my articles, in English and German, lay on the table. The discussions with the various scientists, including Dr. Israeli, continued for hours. They were particularly interested in discussing my studies on anabolic steroids which had been published in the *Journal of Applied Physiology*. Their

specific interest was whether anabolic steroids caused augmentation in performance because of the muscular system, or because of the nervous system. My research had shown the effect on muscular strength and the effect on motor integration. The neuromuscular interaction was a function of the nervous system’s effect on increasing the speed of the stimulation of the motor units of the muscles. This finding indicated that the nervous system was able to activate and/or stimulate more of the motor units in the muscle and cause the subsequent contraction of the muscle fibers to be quickened. Thus, the time of muscular contraction following the arrival of the nervous system signals from the spinal cord, or “motor time,” was much faster under the influence of the steroid drug. Strength is important but speed was a more important factor. To generate power, force and velocity are essential but velocity is the most critical.

In 1972, anabolic steroids were legal for athletic usage. The East Germans had been using them in what they believed were scientific methods. The GDR conducted a decades-long program of coercive administration and distribution of performance-enhancing drugs, such as testosterone and other anabolic steroids, to its elite athletes. Its purpose was to bolster the communist state's image and prestige by winning medals in international championships, such as the Olympics. This strategy was known officially as State Plan 14:25. Drug regimens, given either with or without the knowledge of the athletes, resulted in victories in international competitions, including the Olympic Games. East Germany had been a pioneering state in doping, so much so that it was considered to be the inventor of doping.

In the seventies, the Berlin wall was part of a fortified border that split Germany in two. Officially, it kept the West out. But in reality, it kept East German citizens in, while their government sought ways to demonstrate communist superiority to the rest of the world. Rare glimpses of life behind the Wall suggested a sporting revolution. Talented children were handpicked for special sports schools. Coaches and doctors were employed full-time to train them. Sports festivals became highly anticipated national events. Successful athletes enjoyed freedoms not available to their fellow citizens. This was the communist equivalent of fame and fortune—they became the public face of the German Democratic Republic.

In the Montreal 1976 Olympic Games, the world took notice as East Germany, a relatively small country with few previous Olympic wins, triumphed with an impressive 40 gold medals. The women's swim team alone won 11 of 13 swim events, an unprecedented feat. U.S. swimmer Wendy Boglioli describes her opponents performance at the Montreal Olympics, "They were very strong women; they were very fast; we thought they were machines. Here (we) were, four of America's best athletes ever put together on a team, and every single day the East German women were winning every event.

The secret to their success would not come to light for decades: a state-sponsored doping program. Under the auspices of East Germany's elite sports federation, headed by Manfred Ewald and monitored by the Ministry for State Security (known as Stasi), the government used doping as part of a deceptive master plan to secure international prestige through success in sports. Girls as young as 12 were recruited from across the country, and without their knowledge, were regularly administered untested steroids and male hormones as part of their training.

Ultimately, Olympic gold came at a disturbing price for many of the German athletes. There were side effects ranging from male-type hair growth and deepened voices, to liver and heart disease, depression, infertility, miscarriages,

and even death. The systematic doping began in 1974 when party leaders met with the East German sports performance committee to decide how best to guarantee gold medals and international glory. What they came up with was "State Plan 14:25." The protocol was based on the work of chemists and pharmacologists at a secret lab in Leipzig. A pill, known as Oral-Turinabol, was given to the athletes to bolster their hormones. Oral-Turinabol, or O-T, was an anabolic steroid derived from testosterone.

More than 3,000 Stasi moles within the sport system monitored scientists, coaches, and even athletes who secretly reported every move they and their colleagues made. The web of informers meant the athletes had to be wary of what they said—probing questions or dissent were immediately and harshly punished.

Produced by the state-run pharmaceutical company, Jenapharm, it was given to the most promising athletes. O-T and other anabolic steroids increase muscle mass and hasten recovery time, allowing athletes to train harder and build up more strength. And because they are similar to testosterone, they have a greater impact on women, who have less real testosterone in their bodies to begin with.

Many of the girls had barely reached puberty when they began receiving the hormone pills. Their parents, too, were kept in the dark. East German swimmer Katharina Bullin describes the before and after of the drug use, "Drips, injections, pills, it was all normal (during training). Nothing strange about it and I wouldn't have known what to ask because I wasn't skeptical at all. I didn't start to look like a man overnight, it happened gradually. I wasn't really aware of it myself, but it was obvious to everyone else. And whether I wore a dress or a skirt, make up or jewelry, it got worse and worse. They called me a transvestite or gay, and it shocked me."

By the 1980s, steroid use was growing throughout the sports world, and scientists were fighting a constant battle to catch up with ever-more-sophisticated doping techniques. At the Pan American games in 1983, organizers asked West German scientists to set up a lab to test for illegal drug use. It was the first time a large number of positive tests became public. Steroids were becoming pervasive, and all athletes were affected. But while the opportunity to use performance-enhancing drugs was present, there were differences between the East German methods and everybody else's. Doping in the GDR was different from the doping in the West of the world but it was also different from the doping in other parts of the East.

This desire to promote left wing ideologies mixed with advancements in medicine also led the GDR to use their athletes as propaganda tool. The politicization of sport became a central theme for world powers following the end of

the Second World War. International competitions like the Olympics, World Cups, and such began to lose its athletic reputation. Incredible media attention, financial support, and national reputations were all at stake. The origin for sports culture in the GDR can be found following the war when its people were poor, malnourished, unhealthy, and in need of guidance. With most fitness centers destroyed in the air bombing campaigns and any remaining equipment taken by the Soviets during their invasion of Germany, the government of the GDR decided to create the DSA (Deutsche Sportausschuß) which translates to the German sports committee. The left-wing policies of East Germany meant that every citizen was equal and expected to give back to the state. The results of the GDR were an immense success. In the Tokyo 1964 Olympic Games, East German participants won more medals than their West German colleagues. In the Mexico 1968 Olympic Games, the GDR, entering for the first time as a separate team, surpassed the Federal Republic of Germany (FRG) medal count. This was repeated on “enemy

territory” at the Munich 1972 Olympic Games. Subsequently, the GDR never fell below third in the unofficial rankings. The total medal count of GDR participants at the Winter and Summer Olympics from 1956 to 1988 amounted to 203 gold, 192 silver and 177 bronze.

Most East German children would compete in youth sport centers and be scouted by the government which resulted in the best prospects being taken for intense Olympic training. These children were expected to deliver great victories and the state was willing to use anything at its disposal to ensure that. Advances in medicine and science meant that use of steroids, amphetamines, human growth hormones, and blood boosting were common practice behind the scenes in training centers for the athletes.

The results were fantastic for the country of East Germany, but absolutely devastating for the athletes involved. While figures cannot be precise, the state-inspired doping program affected perhaps as many as 10,000 athletes.

*Dr. Zinner and I at the Berlin Clinic*



**Olympiasportpunkt Berlin**  
The Olympiasportpunkt (OSP) assists more than 500 Berlin athletes in their preparation for international championships. The three main fields of activity are:

**Training science - sports medicine - personal assistance**

**Training science - performance based on know - how**

- Drawing-up of tactical and technique analyses
- Diagnosis and development of strength, speed, endurance and mobility
- Documentation of training and competition data
- Rehabilitation

**Medicine and physiotherapy - fair-play also behind the scenes**

- Sport-medical performance diagnostics for the individual timing of training and competition
- Clinical and medical follow-up
- Physio-prophylactic and therapeutic assistance

**Personal and psychological assistance - more than just sport**

- Career guidance
- Psychological performance diagnostics and therapy
- Competition-oriented psychological and psycho-regulative training

The Olympiasportpunkt Berlin is part of a Germany-wide system which is financed mainly by the Government. To acquire further finances the Olympiasportpunkt Berlin has developed an effective marketing-concept which offers business partners useful components to integrate top-athletes in their communication. One important part of this concept is the team **"TOP 100 Berlin"** which consists of more than 100 Berlin athletes which have the best chances to qualify for the Olympics '96 in Atlanta.

For detailed informations please contact:  
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Not only was cheating at the center of the program, but the abuse of the athletes' health was too.

Female athletes, including adolescents, experienced virilisation symptoms. "Virilization or masculinization" is the biological development of sex differences that is to say changes that make a male body different from a female body. Most of the changes of virilisation are produced by androgens and possibly as many as 1,000 sportsmen and women suffered serious and lasting physical and psychological damage.

While the doping worked in achieving victories for the state and advancing a small nation to prominence on the world stage, many concerns remain. All victories by East German athletes are tainted due to the widespread use of drugs and many former doctors and former athletes struggling with the side effects have been bringing sports directors to court.

The legacy of East German sport outlasted the country. In 1977, the shot-putter Ilona Slupianek, who weighed 93 kg (205 lb), tested positive for anabolic steroids at the European Cup meeting in Helsinki. At the same time, the Kreischa testing laboratory near Dresden passed into government control. The Kreischa lab was reputed to perform approximately 12,000 tests a year on East German athletes but without being penalized.

On August 26, 1993, the former GDR disbanded itself to accede to the Federal Republic of Germany. In 1990, the records had been opened and evidence was found that the Stasi, the GDR state secret police, had supervised systematic doping of East German athletes from 1971 until reunification in 1990. Doping existed in other countries, both communist and capitalist, but the difference with East Germany was that it was a state policy. Often, doping had been carried out without the knowledge of the athletes, some as young as ten years of age. It is estimated that around 10,000 former athletes bear the physical and mental scars of years of drug abuse.

It was revealed at a much later date that the East Germans were manufacturing a steroid, artificial epitestosterone, and administering it to 14-year-old athletes. These young people were unaware of the contents of the many pills which they ingested daily. They were given vitamins and supplements in addition to the anabolic steroids but they lived in a controlled environment in which they trusted everyone who worked with them. They had no reason to distrust, neither the individuals, nor the contents of the pills they were given. Unfortunately, the side effects of the anabolic steroids had lifelong damaging consequences.

When the doctors were finally taken to court, their defense was that they had been forced to give the athletes these drugs by the secret police (Stasi). However, my impressions during my visit to Leipzig were that these scientists knew ex-

actly what they were doing. In their defense, they may have been unaware of the long-term consequences of these steroids but there is no doubt that they recognized the advantage of the short-term effects. Unfortunately, females were particularly vulnerable to the adverse side effects of these anabolic steroids. On the one hand, their performances may have been spectacular. In fact, the women produced greater results than those by the men. Unfortunately, the risks to these women were substantially higher.

Using drugs to enhance performance was nothing new in Germany. During World War II, Hitler issued vast quantities of steroids to the SS and the Wehrmacht so that his troops would better resist combat fatigue and were more ruthless in following any order. As early as 1941, Soviet Red Army observers had noted an unusually passionate fighting spirit among German soldiers who often seemed eager to die for the glory of the Third Reich.

Now these girls would be physically maimed for the glory of the German Democratic Republic (GDR). The doctors had taken the scientific knowledge gleaned in the Nazi era to carry this human engineering experiment a giant step forward. Their program had a single goal: to transform the GDR from a lackluster Soviet satellite into a giant in the global arena of competitive sport.

Within this context, the quadrennial Olympic Games were the summit of ambition. Maximum efforts, financial resources, everyone, and everything were dedicated toward amassing Olympic medals regardless of the costs to any individual. Sadly, the researchers also discovered that the drugs affected the mind as well as the body. Sometimes after taking these drugs, the athletes—like the shock troops of Hitler's elite SS units—reported a sense of invincibility, unlimited energy, and an uncontrollable libido. Early in the program, female athletes as young as fourteen embarked on sexual rampages in the sports complexes that their trainers, coaches, and physicians ignored as long as the girls performed well in the pool or on the track.

So, as it transpired, the key to East German dominance and gold medal successes was the doping control laboratory in Kreischa. The laboratory was built in 1977 and served to secure and to conceal the use of all performance enhancing medications. I did not visit that particular laboratory facility and, like everyone else, learned about it only after it was finally closed and outlawed. Ignoring their drug program, I had observed that the East German program was systematized, scientific, and efficient.

One thing that was abundantly clear is that neither the United States, nor any other free country, would be able to successfully perform against the GDR's highly regulated, efficient, dedicated system with the sports structure that currently existed in the U.S. The U.S. relied on DNA and talent,



*Dr. Jochen Zinner*

but had no organized program to augment or increase performance skills or raise the levels of achievement. No athlete in the U.S. could improve or enhance their physical abilities to their optimal capacity, compared with the East German's successful achievement with their athletes.

I returned from the visit to East Germany and joined my Israeli friends and the other athletes of the world to mourn the losses of our friends and colleagues who had been senselessly murdered. We stood in the sun, in an open field with participants from around the globe, and everyone wept. My old friend Gilad, from our Wyoming days, was on one side of me, and Yariv, my first coach and mentor, stood on the other. The grief among all of us was intense and palpable. This one moment in time with all the countries joined to mourn was very moving. We were all athletes rather than countries competing against each other. Each man and woman knew what our Israeli athletes had endured on the training fields and the fitness rooms to participate and how they had been senselessly murdered in their prime.

The Arab countries and the Soviet Union were the only countries that refused to lower their flags. An additional insult was that the dead terrorists were welcomed as heroes when their coffins arrived in Libya. It was a disgusting display of insensitivity and an unfortunate form of victory. Rather than relentlessly pursuing peaceful solutions, murder had become the ultimate trophy for victory.

The remaining days of the Olympics were difficult for the other Israelis and me. I would have preferred that they can-

cel the remaining competitions. I listened to the argument that canceling the competitive schedule would prove to the terrorists that they had won their victory. Perhaps, from one perspective, it was the correct decision to continue with the Games. However, for my friends and me, it was extremely difficult to be in the Olympic venues surrounded by ordinary daily events while over-shadowed with an umbrella of grief. I remember that Jim Murray of the Los Angeles Times wrote, "Incredibly, they're going on with it. It's almost like having a dance at Dachau."

When the Games ended, George Dales and I returned to the United States. After I returned, I knew I had to do something after what I had learned in East Germany. Our training system had to change if we wanted the American athletes to win future Olympic medals. At that time, the U.S. had no training centers. Athletes were trained at universities, clubs, or at camps such as we had conducted at Dartmouth College. I was convinced that the United States could do better than that. We may have had superior athletes at that time because we had such a large population pool from which to select the best performers. But these athletes were severely hampered by the lack of a system to help them achieve their optimum performance level. America had the best technologies and the best equipment but now we needed a system to amalgamate technology with DNA.



*Dr. Zinner's partial evaluation*

<http://arielnet.com/ref/go/1111>

Simply the best!

Working visit of the Olympiastützpunkt (OSP) Berlin by one of the world's leading sport scientists

On 8th and 9th August 1995, Gideon Ariel was guest at the OSP support centre for olympic sports in Berlin.

Proverbial Californian kindness and civility might have been one reason why Professor Dr. Ariel found nothing but praise for the OSP sport-scientific centre. But the Professor was no doubt genuinely impressed by what he had seen and experienced at the OSP and the Sportforum multi-sport facilities.

No sooner had the OSP director, "long jumper" Armin Baumert, welcomed "discus thrower" Gideon Ariel, they began to dwell on the subject both of them knew and have lived by heart: ATHLETICS from the 1960 Rome Olympics to the 1995 Gothenburg World Championships. As their conversation went through the chain of events, many stations of the extraordinary career of Gideon Ariel were highlighted. In 1960 and 1964, he paraded the Israeli flag in the olympic opening ceremonies of Rome and Tokyo. He then studied and took a doctor's degree in sport sciences in the United States, followed by a professorship at the University of California. Being among the world's first and leading experts in his field, he developed computer-aided video analysis systems for motion sequences in sports and further sophisticated them by designing intelligent strength diagnostic and training apparatus. Based upon these systems he diagnosed and guided top athletes like Al Oerter, Carl Lewis, Mike Powell, Jimmy Connors and others. For nearly nine years Professor Ariel was the US National Olympic Committee's representative for biomechanics and training sciences and today is regarded the "father" of the American olympic centers. Nowadays, he is a sought-after lecturer at all facets of sport science conferences. As President and spiritual founder of Ariel Dynamics, Inc., he has made his inventions well known and available all over the world. The Ariel technology is also applied for coaching and diagnosing hopeful young athletes and olympic candidates from Berlin, which practically brought about the Professor's links with the Berlin Olympiastützpunkt.

The first day of visit was set aside for discussing a few problems that had been encountered during the application of Ariel systems, and for explaining and demonstrating useful test procedures for various sports as well as theoretical approaches. Being an expert in informational sciences, Professor Ariel did not find it difficult during demonstrations to browse through the hard disc directories of his systems looking for data on the kind of sporting disciplines and the number of athletes analysed at the OSP. With growing enthusiasm did he watch motion analyses of track-and-field athletes, swimmers, speed skaters, gymnasts, weight lifters, canoeists etc. on the APAS picture analysis system, discover more than 1,000 isokinetic strength analyses on the multi-functions system, and come across a vast number of rehabilitation practises on the arm-leg system. All excellent examples, as he found, for a well-achieved dovetailing of theory and practice which he has incessantly called for. Also the OSP director and his co-workers noted with pride that their long-term principles (e.g. "a good theory is the most practical thing"; "smart athletes demand nothing but the best possible coaching") were not just accepted by their day-to-day clients - namely the coaches and athletes - but likewise recognised and appreciated by such highly-competent authority. And we were also

Also, there was the disadvantage of financial support. In East Germany and the Soviet Union, athletes were in the Army or some other government department, so they were paid to do their job. By holding these government jobs, they were not paid to play and could retain their amateur status as defined by the Olympic rules. Because no such system existed in the U.S., athletes had to find jobs to support their own athletic endeavors while continuing to be recognized as amateurs. The discrepancy was difficult and inherently unfair but it meant that the Americans had to find a clever way to overcome this imbalance. We needed to develop our own unique system so our athletes could excel to their maximum and defeat the Eastern Bloc countries at the next Olympics.

This was my mission. Now I had to find connections to make my case to the authorities that actually controlled Olympic Sports in the U.S. Unfortunately, I was not able to work fast enough. At the next summer games in Montreal in 1976, East Germans dominated the gold medal count, especially in swimming, sweeping eleven out of a possible thir-

teen first place finishes. But, tenacity is one of my most dominant characteristics so I continued searching and working on the goal of improving the training system for U.S. Olympic athletes.

My first order of business after returning to Amherst was to take care of things there. I had classes to teach at the university, and I had to help Ann with our CBA projects. We had several important projects to complete which she had been working on while I had been in Munich. Our company was doing well and we needed to continue our business progress. Things had been more successful than we had dreamt they could be and now we needed to maintain the initiative. After Ann and I brought CBA up to date on our projects and my university duties were being satisfactorily addressed, I would track down the heads of the Olympic sports. I was confident that we could improve the situation. Although this was a burning issue for me, it would have to be on a back burner for the immediate future.

