

ESSENTIAL LYDIARD

Principles not formulas are the keys to successful training

There's a story about Lydiard and his golden boys at the '64 Olympics in Tokyo. Down at the training track with their rivals looking on they ran an impressive interval session of twenty quarters. The next day one of these opponents, a talented interval-trained Canadian in his first Olympics, showed up at the track with his coach and proceeded to run the same session. Lydiard's boys cheered him on as he ran each interval faster than the last. When it was all done a reporter asked Lydiard what he thought of the kid's workout. "I think it was the last nail in his coffin." Lydiard replied.

"But your boys ran the same session yesterday."

"Yes, but my boys needed it."

Perfectly peaked Lydiard's protégé, Peter Snell, won two gold medals. His team-mate, John Davies, won a bronze. The Canadian who had eclipsed the Kiwis' training run with his own failed to advance to the finals in his event as Lydiard had predicted.

One of my former coaches, Ron Daws, often quoted the above story to illustrate his axiom: "Good training and bad training look exactly the same on paper". Daws, adhering to Lydiard's philosophy, recognized that stand-alone workouts mean little; it is their contextual application to the advancement of the athlete's goal that matters. As the above story indicates, twenty quarters can bring one runner to their peak and bury another in a hole. Training, then, is not a series of numbers that can be universally applied but is rather the art of combining measure, timing and sequence to the specific needs of the individual. Herein lays the brilliance of the coaching of Arthur Lydiard.

I can recall my first coach, John Davies, one of Lydiard's star athletes, calling Arthur to ask him how to adapt the training for a promising fourteen year old girl. He didn't want to wreck me. Arthur advised him to build a base by increasing my mileage. I began on regular runs soon reaching my target of 40 miles per week which I continued for some months. There were never any hard and fast rules that are regularly attributed to Lydiard, such as the 100 miles per week mandate, but rather a careful consideration for my age, gender, ability, fitness and event. And that's how it was for the next twenty-eight years of my career as an international athlete under the guidance of three consecutive Lydiard coaches; John Davies, Ron Daws and Dick Quax. My schedules were never replicated in content; however the principles that defined them as good Lydiard training were unwavering.

These principles are:

- 1. Miles in the Bank - *maximize aerobic capacity first***

The first phase of Lydiard training is endurance/aerobic development. Think of aerobic running as Home Base – the place where we hang out until we are mature enough to leave, and the place we always come back to for rest and recuperation. As the miles stack up, we increase the capacity of both the heart and the lungs for work, build our circulatory network to the muscles through increased capillarization, increase the number of mitochondria in the muscle cells, and develop other beneficial metabolic and enzymatic pathways for gathering and converting oxygen to energy. Once these structures are established they allow us to respond and recover quickly. Aerobic training then is training for all other types of training.

Lydiard often described miles as money in the bank - the more you have the greater your currency to buy ATP's (the units of energy your muscles need for contraction) and the faster you will eventually be able to race in any event that has a large aerobic component. From the 800 meters on up the body's energy needs are met primarily from aerobic metabolism as Table 1 shows. Notice that there's considerable variation in the shorter distances depending on one's percentage of fast-twitch /slow-twitch fibers.

Table 1: Approx. Percentage Aerobic/Anaerobic Contribution

800 meters	40-60/60-40
1500 meters	50-80/50-20
5000 meters	85-95/25-5
10,000 meters	90/10
Marathon	99/1
<i>Figures Courtesy of Dr David Martin</i>	

There is no argument: the greatest gain for any aspiring distance athlete is made by spending the majority of time on aerobic development. And for those beginning and recreational athletes who have limited time for training and wish to partake in the weekend road race, this is the only phase of Lydiard training that is initially indispensable.

While easy running is always the safest place to start it is often the case that the cardio-vascular system develops very quickly while the muscular-skeletal system tends to lag somewhat. The golden rule is that you can never progress faster than your slowest part will allow. Case in point: for the past twenty years Japanese teams have regularly altitude-trained in Colorado. I often recognized some of these petite women, backpacks on, hiking up the steep incline of Gold Hill some twenty miles out of Boulder. Taking the base-building strategy one step further, the coach had prescribed extended hiking and jogging sessions during year one of the four-year Olympic cycle solely to condition the muscular-skeletal system for base-building. With strong tendons and ligaments these runners could then handle up to 200 mile training weeks without injury, and thus develop a superior aerobic capacity.

2. Feeling-Based Training – *tune into your inner coach*

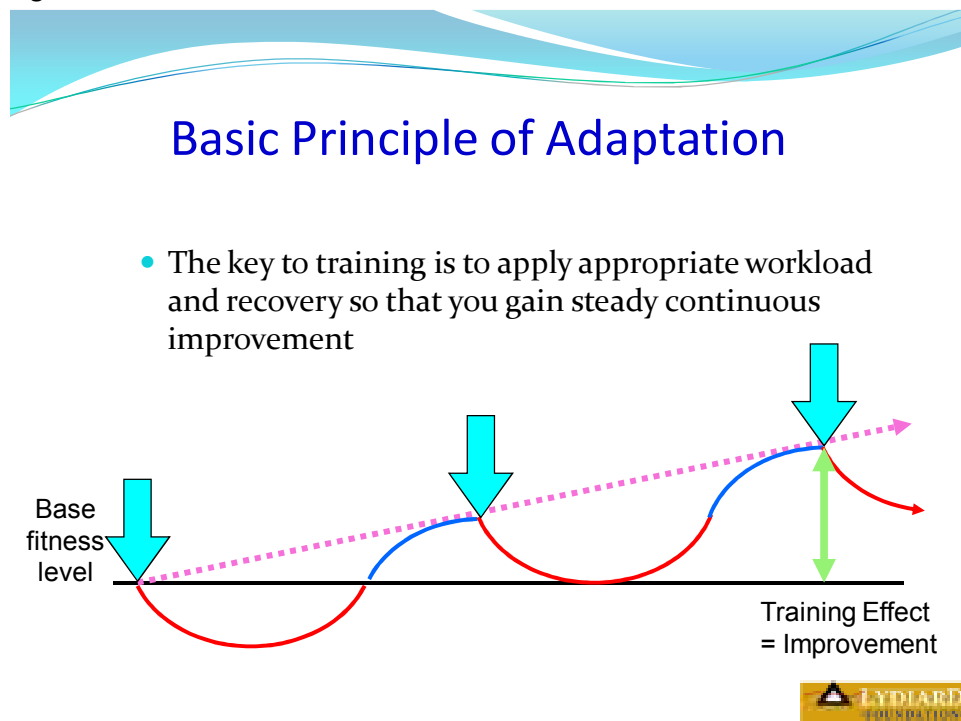
One of the benefits of the build-up phase is that these longer aerobic runs allow the runner to safely build a rapport with his/her body. This is a greatly underrated aspect of training, probably because feelings have generally not been a part of any serious exercise discussion. But being able to precisely gauge one's effort over time is an ability that is the hallmark of all great athletes. They can run the razor's edge, knowing how to pitch their effort and energy to extract the very best from their bodies on any given day.

Lydiard fostered this ability in all his runners by prescribing feeling-based training goals. A typical running schedule would ask for half effort on one day and three-quarters or seven-eighths effort on another. Half-effort was half the effort of a full effort and so on. In the days before heart rate monitors and chronographs one simply had to guesstimate until they got the gist of it, which they did very quickly.

Modern technology can be helpful training wheels to developing this rapport but an over-reliance on outside feedback, whether a beeping monitor or a coach bellowing splits from the sidelines, is also a dangerous trap. Ultimately we are on our own in competition, reliant on the clarity of communication between our mind and our body. I call this the 'inner coach,' the voice within that knows exactly what we need to do at any point in time to reach our potential. Whether it tells us to back-off, relax, pick it up, or make a break, in hindsight it was always the right thing to do. As we learn to trust the inner coach over time the stronger its voice becomes.

3. Response-Regulated Recovery - *balance work-outs with recovery*

Figure 2



Training can be defined as specific stress applied to the body to invoke a corresponding adaptation. The training stimulus (workout) causes a temporary breakdown in the body (catabolic phase) followed by the adaptive period (recovery) during which the body builds itself up so as to better withstand the stress that it has just endured (anabolic phase). Breakdown and build-up better than before, breakdown and build-up better than before; this is the rhythm of good training. Interestingly enough the desired training effect does not take place during the workout but during the recovery. We improve not while we are training but while we are resting. More often than not bad training is a mismatch of breakdown and build-up - either the workout is too hard or the recovery is inadequate, or both. (Rarely amongst motivated athletes is it the result of under-training.)

The tendency for many runners to over-train and/or under-recover is underscored by an inflexible training schedule. While Lydiard pushed his runners he offset the overtraining syndrome by preparing them for optimal recovery with base training, gearing the training to be feeling-based, and adjusting workouts according to the athlete's recovery response. The art of good training calls for an accurate assessment of which side of the adaptation curve the runner is on – catabolic or anabolic – and prescribing appropriately; a recovery run or a workout. There are very simple ways of assessing this: an elevated morning heart-rate, poor quality sleep, low energy, sore muscles and bad mood are all indicators that the runner needs further recovery and a workout of any intensity is contraindicated. Once the 'spark' has returned the runner is ready for the next 'stress'.

Shigeharu Watanabe, coach of Yoko Shibui whose personal best of 2:19 ranks her as the 7th all-time fastest woman in the world, served his coaching apprenticeship with Lydiard in New Zealand. Of his team he says, "We do only that which is necessary to do, we do not follow any numbers."

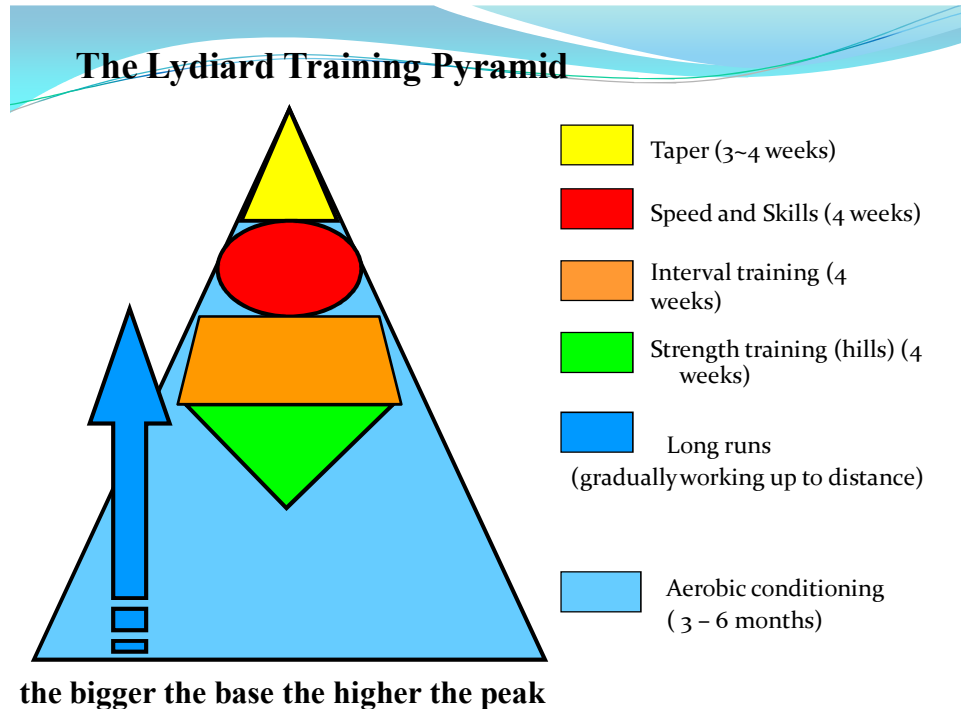
4. Sequential Development of Energy Systems

There is a study performed by Dr. Izumi Tabata (and colleagues) at the National Institute of Fitness and Sports in Tokyo, Japan, showing that over a six-week period interval training is more efficient than steady exercise of lesser intensity. This study has been quoted by get-fit-quick advocates as proof of the superiority of interval training. What they do not tell you is that anaerobic development takes 4 to 6 weeks to top out, and that when preceded by endurance and strength training the possibility of injury is decreased and the quality of the intervals is enhanced.

Whenever Lydiard was asked which part of the training was the most valuable, he always answered simply, "everything." Often he would follow up with the question, "Who would want to eat a cake half-baked?" This holistic approach distinguishes Lydiard training from one-brand-fits-all formulas and squelches the quest for the 'magic workout.' There is no single element that makes one a champion. Rather it is the progressive development of each energy system from low intensity to high intensity, each stage preparing the runner for what is to come next. Speed

is built on interval training which is built on strength which is built on endurance. When the runner finally reaches his/her target race, he/she possesses the entire gamut of adaptive responses from jogging to sprinting.

Table 3



5. Correct Timing

Peaking is a matter of correct timing. It is one thing to maximize the amount of energy at the disposal of an athlete. It is another to channel that energy into the event that matters. To ensure the meeting of one's best form on competition day a Lydiard schedule is always written from the goal backwards, allotting the amount of time needed for each phase and using the remaining time for base training. Thus the training pyramid serves the twofold purpose of physiological and mental focus to arrive at one point in time – the goal. There is no need for a separate mental training program of affirmation and visualization – it is inbuilt into the training program. As the athlete gets closer and closer to the top of the pyramid the training increasingly simulates the race. There is nothing more confidence-building than the somatic knowing of thorough preparation.

Greg McMillan, coach of McMillan-Elite Team based in Flagstaff Arizona, says that the training pyramid allays the fear amongst his runners of being 'off' on the big day.

“Lydiard did all the hard work, there is no need as a coach to reinvent the wheel. My runners and I all know it works and why, so we can proceed with the confidence that the program will deliver them to

their race ready. There is no telling what a comfort that is. The fun for me is using the Lydiard principles to sculpt the workouts to each individual; the fun for them is seeing their dreams become reality.”

Using the five principles of miles in the bank - feeling-based training, response-regulated recovery, sequential development of the various energy systems and correct timing - the what, when, how and why of every action from sleeping to running is another brick in the pyramid that takes one to the top.

Lydiard’s greatest protégé, Peter Snell, retired with three Olympic gold medals and numerous world records to his name. In his post-athlete career he came to live in the USA where he became a Doctor of Exercise Physiology and associate professor of Internal Medicine. With the eminent credentials of both athlete and academic, who is better equipped to offer a final thought on the relevance of Lydiard today?

For Lorraine by Peter Snell July 28, 2009

What has physiology shown you about how you trained back in the 60's and knowing what you know now, what would you do differently? How relevant is Lydiard training to today's athletes?

The core of Lydiard training is the quantity and quality of the base training. Although Arthur appeared to be very precise about the track training leading up to the racing season, I believe this was not as important as the base.

Marathon training for an 800 meters runner is difficult for many coaches and particularly scientists to understand. Many have been quite dismissive about the benefits in the face of the outstanding results associated with marathon training. To them it makes no sense training slowly for a speed event. The rule of specificity is violated.

Lydiard developed his methods empirically – making careful observations on the effects of varying the distance and pace of workouts

Why then does it work? Today our knowledge of physiology provides some answers.

1. Long endurance runs appear to provide protection against overtraining from too much high intensity speed work. Therefore more race-related training may be accomplished.
2. Activation of fast twitch muscle fibers is normally accomplished by high intensity interval runs. We now know that long moderate-pace runs also activate fast twitch muscle fibers, after slow twitch fibers have become glycogen depleted after the first 1-2 hours.

Long moderate-pace running is anabolic whereas high intensity denuding training, while having its place is catabolic. Thus the base is critical to prevention of overtraining.

In summary to answer your questions there is little I would do differently today other than incorporate some long easy intervals once a week during the base training. Training of the current top athletes is testimony to the relevance of Lydiard training today.