**Periodisation : what is it ? And how to implement it .**

With the track season finished and athletes returning after a well deserved break , the time isopportune to discuss the topic of Periodisation.

So what is it ? In simple terms it is dividing the training year into a number of different phases and doing the kind of training which is most appropriate for that time of year, or for that particular phase of the training programme, with a view to achieving peak performance when it is most required. In simple basic terms, the training year ( or training cycle) should be divided into **( a) a Conditioning Phase (b) a Sharpening Phase (c) a Racing Phase.** Peter Coe defines periodisation as the “reasoned division of a training season into intermediate-length time blocks which have a broad focus of improvement ,and into shorter time blocks which contain daily assignments for specific development”. Alberto Salazar defines periodisation as follows: “ Instead of having your training at one level throughout the entire year, you should have high peaks and low valleys. World records or great performances are preceded by great workouts, but you can’t do great workouts all year round. You’ll simply get too tired”. During those peak training periods, he advocates “max. volume and max.intensity” but cautions that “ there is a fine line between peak fitness and break down”. ( cf. the earlier article by Dr. Liam Hennessy on “Over-reaching vs. Overtraining”. ) He also stresses that there should be “ no PR workouts within two weeks of a major event . Don’t leave it behind you on the training track”.

Coaches and athletes ideally need to plan the training and competitive year together. Some coaches adopt a “ Let me do the thinking and let you do the running” approach . While there is some merit in this, ( e.g.it allows the athlete simply to concentrate on his training/racing while letting the coach worry about the planning ) it is generally found that joint planning by the coach and athlete produces better results. ( Obviously, I am not talking about under-age athletes here who, because of their inexperience, simply have to be told what to do and how to do it ). Athletes who tend to be very nervous and worry excessively about their performance may also prosper better under a coach who relieves them of the necessity to do any thinking and/or planning for themselves. Needless to say, such athletes need to have a total, unwavering trust in their coach and his methods .But more mature ,experienced athletes tend to do better if they are involved in the planning process and are made to feel that they have an input into the training which they will be expected to do . Both Salazar and Peter Coe said “The more athletes understand about training, the better the results they will get as  **they understand why they are doing things ”.**

Another definition of periodisation **is the systematic planning of athletic training in order to reach the best possible performance in the most important competition of the year** (“ peaking at the right time”).It involves progressive cycling of various aspects of training during a specific period. So it will break the year up into off-season , pre-season, in-season and post season.

Training should be divided into cycles . These are generally known as micro cycles , mesocycles and macrocycles. A microcycle may be simply a week\* during which the athlete does 2-3 key sessions or workouts interspersed with easy, recovery runs. A mesocycle may consist of 3-6 microcycles , while the macrocycle will consist of 6 months to a year.The “ Oregon Project” athletes do two 20 week macro cycles in the year. Each cycle is preceded by a conditioning phase, comprised of 2 weeks complete rest , two weeks of “jogging” and two weeks of steady runs. This approximates to the template which I outlined above . Peter Coe ,on the other hand ,believed in just one macro cycle i.e. a full year . He recommended 4 weeks of recovery from the previous season, 33 weeks of progressively harder mesocycles , 3 weeks of fine tuning and 12 weeks of competition. He asked ”Is it possible for one to have two major peaks per year ? Perhaps, but could either peak match one single peak in excellence?” . Of course amateur athletes with club commitments do not have the luxury of peaking just once in the year. Most of our middle and long distance runners have cross-country commitments during the Autumn/Winter and track commitments during the Summer. This could fall neatly into the Salazar model but we now have an indoor season as well and that may bring further club commitments. *( Indeed the Irish competitive season is now quite similar to the American Collegiate one : cross-country in the Fall, indoor track in the Spring and outdoor track in the Summer ).* It is very debatable whether an athlete who is serious about the outdoor track season should run indoor at all. We see young Irish athletes coming back from the US in the Summer having completed three seasons in less than one year. Very few of them have the appetite or the ability to face into an Irish or European track season. Most of them race poorly ,if at all, as they are exhausted from the rigours of three seasons in 9 months. ( with some notable exceptions e.g. Seán Tobin.). This just highlights the need for periodisation. Seb Coe once said that he would not fancy racing Eamonn Coghlan in February – but he didn’t mind racing him in July or August. One of Salazar’s reasons for preferring two macrocycles is that it allows him to “tweak” his athletes’ training : “ Two cycles in the year give the coach and athlete a chance to learn from mistakes. If I screw up I have the chance to put it right”. *( Nice to hear that even a coach at his level is not infallible ! ) .* He admits that on one occasion ,before the World Indoor Championships some years ago, he had Mo Farah and Galen Rupp do 2 sets of ( 1200 in 2:59 , 800 in 1:52,400 in 52 ) just 8 days before the Championships. Their legs “were shocked and they never came back. I was mad at myself”.

Arthur Lydiard used the symbol of a pencil to outline his theory of periodisation : the shaft represented a long conditioning/strengthening phase, the pared section symbolised the sharpening period comprised of more faster work, while the lead(Pb) point represented the racing phase. **But the most important ,basic thing to remember is that athletes should NOT be doing exactly the** **same type of training, at the same level of intensity, week in ,week out throughout the year .** *\* Many coaches now prefer to work with a 10 day or even a 2 week micro cycle as it allows a greater* *variety of workouts to be included in the cycle. Salazar , for instance, favours a 2 week micro cycle.*

The roots of periodisation go back to that great authority on stress and the body’s ability to adaptto it, Hans Selye . ( We met him way back when talking about GAS, i.e .General Adaption Syndrome. See the two earlier articles on Recovery ). The General Adaption Syndrome describes three stages of response to stress\* : (a) The “Alarm” stage , involving the initial shock of the stimulus on the system , b) the “Resistance ” stage ,involving the adaption to the stimulus by the system and (c) the “Exhaustion” stage ,in that repairs are inadequate and a decrease in system function ( or injury ) results. **The foundation of periodic training is keeping the athlete’s body in the resistance stage without ever going into the exhaustion stage . By adhering to cyclic training, the body is given adequate time** **to recover from significant stress before additional hard training is undertaken .**  \**In the context of middle and long distance training , the word “stress”, of course, means “ intensive* *workout” and “the system” means the athlete’s body.*

Selye believed that even each mesocycle should be followed by a short recovery period (e.g.an easy week ) to allow the body to assimilate and to reap the benefits of the hard training. This is why many coaches believe in having their athletes do three hard weeks training followed by an easy week.

Physiologists such as the Russian Leo Matveyev and Romanian Tudor Bompa expanded and refined the periodisation model. They believed that the preparation phase should be about two-thirds to three-quarters of the entire macrocycle. The preparation phase is further broken down into general and specific preparation , of which general preparation takes over half. This is actually quite similar to Lydiard’s model.

**Planning the Training Year :** Peter Coe was always adamant that athletes have a genuine need for full recovery from the previous training and competitive period before embarking on another year of dedicated effort . He believed that a rest ( either complete or active ) was vitally necessary for mental refreshment and complete musculoskeletal repair. He used to say “ Resuming training too early is like pulling an onion out of the garden and discovering that it is not yet fully grown. One cannot thrust it back in and expect more growth !” ( This why Salazar recommends 6 week “down periods” between the macro cycles and why many great Kenyan and Ethiopian runners take as much as two months off training after the track season concludes.) “ Physical and psychological fatigue must be fully resolved,” Coe continues, “if the athlete is to embark on another year of training with excitement, anticipation and willingness to rededicate his life to training . Time does heal everything – but that requires time off”. *I am glad to see that the present National Junior Coach sent a circular to all squad members* *recommending that they take two weeks off after the National Senior T&F championships and not to* *resume their training or begin their cross-country build up until August 7th.*

Many coaches and athletes start the planning process by setting goals. They should have short term goals and long term goals. One of my favourite clichés is “Goals should be high enough to be challenging but low enough to be achievable”. Short term goals delineate desired outcomes of day to day and week to week training, and are thus the building blocks of the overall plan to reach long term goals. For most athletes it is difficult to put an entire year’s training into a functional perspective unless the day to day building blocks are laid out to show the path towards progress. As Coe used to say “ The hunting dog must see the rabbit for an effective chase”.

It is obviously essential that coach and athlete should share the same goal . Sometimes athletes, young athletes in particular, can have very unrealistic expectations and then become disillusioned when they fail to achieve them. I have met 18-19 year old athletes who had not broken 4 minutes for 1500 or 2 minutes for 800, yet believed that they could be running in the next Olympics four years later. While it is good and natural that young athletes should have big dreams (and no coach should be so callous as to destroy those dreams) , yet the coach should gently and gradually help the young person to come to a more realistic appraisal of his ability and potential. It is the coach’s task to help the athlete to become as good as he possibly can be while admitting that there may be certain genetic factors which limit the ultimate potential of each person. “ You can’t turn a plough horse into a Derby-winning thoroughbred” is just one of the more polite colloquial expressions to denote this truth. Peter Coe believed that each athlete should honestly answer the question : “ What do you want from running?”. He said that if this answer is identified , it becomes the ultimate goal ; “working backward from that goal to the present is then much easier”. It is also essential that the athlete has some success along the way : staying enthusiastic for 6 to 10 months in a season or 6 to 10 years in a career is not easy ( if not impossible ) if the athlete has no intermediate successes and victories to keep him motivated. In attempting to formulate a plan for the upcoming season , the coach and athlete should take certain factors into consideration . Among these would be the following : (a) What is the runner’s current level of fitness / What is his readiness for training and competing ? Obviously, an athlete who has had a long spell of healthy, injury free training is in a very different position to an athlete who may be attempting a comeback after a long period of inactivity due to illness or injury. (b) How much time ( in weeks or months ) are available until the target race/competition ? (c) How much time ( in hours per day ) is available for training. There is no point in attempting to copy the training programme of a full-time professional athlete if you are trying to hold down a challenging 9-5 ( or much longer ) job. (d) What are the runner’s strengths and weaknesses, in terms of speed, endurance, lactate threshold, VO2 max., running economy, etc. (e )To what type(s) of training does the runner respond well ? (f) For what specific event is the runner preparing ? (g) How should periodic races fit into the training programme ? What club/school commitments does the athlete have ? (h) What are the environmental conditions that must be coped with and what training facilities are available? Let us get back to the athlete who has taken a rest or period of “ active rest” after the competitive season. An interesting study by a sports scientist called Cullinane on 15 distance runners in 1986 reported that 10 days of rest reduced plasma volume by 5% and raised resting heart rate by 9 beats per minute but **Vo2 max. was unchanged. Mitochondrial size, enzyme concentrations and energy storage capabilities in skeletal muscles showed almost no change . Furthermore , within 2-3 weeks of resuming training , the runners were able to handle 10 mile runs at 95% of earlier training paces.** The first phase ( mesocycle ) after resuming training should consist of lots of easy/steady aerobic running. This phase should last approximately 4 weeks. After this basic conditioning period, coaches and runners can gradually introduce greater quality and intensity into their programme. Tempos and fartlek sessions are excellent ways of getting the athlete accustomed to running fast again after the slower conditioning work . While Lydiard believed that a much longer period should be spent on steady running, most coaches in recent times , including Coe and Salazar, advocate the introduction of some faster work at an earlier stage . As Coe said “ If speed is important ,then never venture very far away from it ”. Sport science has shown that the fast twitch fibres can become “dormant” if they are not regularly “recruited” or stimulated. ( Indeed the “C type” fibres can metamorphosize into slow twitch if not regularly activated ). This is why Salazar ,for instance, will have Galen Rupp do a light workout of 12 X 200 in 29 seconds ( with a full 200 jog ) early on in the training cycle. *Incidentally, Salazar believes in 4 different types of workout intensity which he calls A,B,C and D,* *ranging from very severe to very easy ( The one above would be a D : very easy ).* Gradually, this session becomes more intense as the season( or macro cycle) progresses until eventually Rupp is doing 12 X 200 in 25.( followed by 12 X 200 uphill.) All progression should be gradual : if not , breakdown may ensue. Incidentally , the renowned exercise physiologist David Costill found, in a number of studies, that no measurable improvement in VO2 max. occurred in more than 90 miles per week of aerobic conditioning. Therefore it seems imperative that a certain amount of slightly faster work is introduced relatively early in the programme , while still remembering the words of Lydiard “ Give me an athlete and I will make him fast , but first I will make him strong ”. *( How many times have I used that quotation ? ! )*  Peter Coe , who is probably regarded as a coach who was very orientated towards speed, pointed out that long ,slow distance running provides little training stimulus to the FT muscle fibres, “leaving any distance runner trained on such a diet unprepared for high-speed racing”. However, he went on to say “ But long distance runners need to develop endurance through long runs if they are to manage multiple high-speed races in a major championship. The longer runs also provide the overall base on which speed training can be placed for specialisation.” In a recent Irish Times article, Sonia O’Sullivan stated that it was the 100 mile weeks she had regularly done in training which enabled her to run a 3000 and three 1500s in the space of a week in the World Championships in Stuttgart in 1993. ( She won Silver in the 1500 ) Coe believed in using a 12 day training block ( microcycle ).As the cycle progressed ,the faster sessions got shorter in total distance but quicker in pace . So the total distance covered in Day 10 (say ) would be much less- but more intense- than what was done on Day 7. It is up to the coach, in consultation with the athlete, to decide the precise composition of a microcycle and how many days should be in such a cycle. When an athlete is not full time, it is difficult ( but not impossible ) to adopt anything other than a 7 day cycle. Furthermore, in our own club, the access to the track, which is limited to certain specific days, imposes its own rigidity on when an athlete can or cannot do certain types of workout. It is generally accepted that a sound template for a week long microcycle is one long run , two hard sessions and 3-4 recovery days. This is quite traditional and usually brings good results. John McDonnell , the former Clonliffe man who became the most successful coach in NCAA history , followed this format year after year with extraordinary success. Sunday was a long run , Tuesday brought 400s on the track ( usually 16 ) and Saturday was repetition miles ( generally 6 ) on an undulating golf course. Occasionally his Arkansas runners would do a brisk “steady state run” ( tempo ) on a Thursday. Of course the intensity and length of these workouts would vary in accordance with the time of the season and the proximity to a competition. ( e.g. I remember Niall Bruton doing 16 X 400 in 61/62 with a 50 sec .recovery on a dark, wet Christmas Eve; the following July he was doing 8 X 400 in 56) This is quite similar to Salazar’s methods : he believes in one long run per week , one long workout ( e.g. 6 X 1600 or 8 X 1200 or 6-8 mile tempo) and one short session of 10-12 x200(200 jog) followed by 10-12 X 200 uphill. . Every other week ( or once per micro cycle ) he believes in doing a third session , “a medium“ workout e.g. 6-8 X 600 or 6-8 X 800 or 3 X ( 600,400,300,200). *All this might appear relatively light or at least not hair-raisingly scary, but of course the devil is in the detail . By a long run Salazar means anything up to 27 miles at 5:15-5:30 pace ; tempos, for athletes like Matt Centrowitz, are run at 4:30 mile pace or faster ; mile repeats are done at 10K race pace ; an “easy” run means 5:40 pace, etc. Morning runs are de rigueur of course while weight training takes place 2-3 times per week.* We must remember that these workouts are carried out by mature, full-time athletes who have lots of time to rest ,get a massage at least twice a week ,have all the best facilities and modern developments which sport science has to offer ( lab.testing, bioanalytics, cryotherapy, anti-gravity treadmills/AlterG, etc.,etc. ).So young athletes and/or athletes who have to hold down a full time job should be very wary indeed of attempting to copy them. One thing which “ordinary athletes” could copy from the Oregon Project is that the workouts, as said before, are divided into A,B,C and D categories of intensity . So an A category session is never followed by another A type. Instead if ,for example , they do an A type on a Tuesday they would do a B or C type on a Friday . It just emphasises again that one should not constantly “hammer” one’s training . As Salazar says “You will get burned out if you are running all out, as fast as you can,in every workout”.

We have seen that a micro-cycle consists of anything from 7-14 days , while a meso-cycle will be composed of 2-4 micro-cycles. A macrocycle will consist of 5-6 mesocycles. The mesocycles will see a gradual increase in volume and intensity. While one mesocycle may emphasise development of an endurance base, another may represent a period of fine tuning. The middle of the macro cycle will see the hardest training being effected . Some coaches believe in a sustained period of very intense training of 4-6 weeks followed by 3- 4 weeks of gradually tapering off this intensity before the competition phase begins. As stated before, this gels with the theory of “over-reaching” as outlined in an earlier article. It is based on the belief ,with considerable scientific backup , that the best racing results come after intense periods of training provided ,of course, that they are not over done and that there is a sufficiently long tapering period . The Oregon Project athletes engage in approx.5-7 weeks of “ incredible workouts” in the middle to final third of the macrocycle and then ,”right before they fall apart” ,they start a gradual tapering period of up to 3 weeks prior to the competition phase.

While variety in training is important, as discussed in an earlier article, the training should not vary too much . There must be some repetition or the coach and athlete don’t get a chance to compare workouts and see if progress is being made. If an athlete does a particular session at the start of a mesocycle, it is important that the same workout be repeated in the middle and at the end of the cycle to see if he can do the same or better with less effort ,lower heart rate or with shorter recovery e.g. if an athlete runs a 5 mile tempo in 26:30 with a consistent H/R of 175 ( +/-3) at the start of a mesocycle, then it’s important to get that athlete to do the same tempo (on the same track or loop with the same weather conditions- not always easy ! ) a couple of weeks later to see if he can run faster while keeping the H/R at the same level as before. If so , progress is being made. *( A future article will examine methods of testing/monitoring the athlete’s progression ) .*

The very nature and format of the Irish athletic season lends itself to having two macro cycles. Most distance runners will run cross-country in the Winter/Spring and then race track in the Summer. When the National Senior C.C .championships were held in late February or early March ,it was easier for the athlete to spend a substantial period of time in laying down a very solid base of conditioning . Now, with the National/Euro Cross trial coming in late November , the athlete has a shorter build up period. If such an athlete wants to run track ,he needs to take a short break after the country season ends and then engage in another 3 months of conditioning work . The American runner , Craig Virgin, was a perfect example of an athlete who managed to perfect the art of peaking twice in a year at exactly the right times. Virgin ,who won the World Cross twice in the 1980s always used cross-country during the Autumn and Winter to build up strength and endurance .His goal ,for the end of this cycle ,was always the World Cross in March. ( He made the US team 10 times). After this, he would either take a break straight away or he would run a couple of road races and then take a break.\* Building on the well developed base of endurance fitness ,he would then begin a phase of faster endurance and speed training needed for a potential track champion. If he had to peak-or at least be in good shape - for the USA National T&F championships in June , he would again take a short break after these championships before building up once more for a later peak on the European circuit in August and early September. This is still a good model for senior runners in Ireland -despite the earlier, shorter cross-country season. *\* Back in the 70s and 80s, here in Ireland , after the cross-country season was over we had a short road racing season ( about a month to 6 weeks ) when we competed for our clubs in many road relays. Sadly all, except the National Road Relays are now gone. They were an excellent means of sharpening runners for the track season.* The athletes who may find it most difficult to peak just twice a year are under-age runners due to the many demands made on them. This also poses a problem for their coaches. Young athletes have their club regional and National C.C. Championships before Christmas, their school C.C. championships in February /March, their school track championships in May/June and their club regional and national track championships in June /July. Is it any wonder that so many get burned out and give up the sport ? Peter Coe had some very trenchant comments to make about what he calls “ excessive racing in the school setting” . He goes on to say that “the coach-athlete relationship ought to exist with the aim of long-term benefit to the athlete (i.e. post-high school, post-collegiate) rather than solely immediate benefit ( gratification of club, school or college ). Demanding pressures placed on young athletes to perform at their maximum too often can be more debilitating to the spirit than beneficial to improvement. And they can produce injury”.

The final meso-cycle is some times called the “ fine tuning cycle” where the finishing touches are added. This is the phase ( usually lasting about 3-4 weeks ) where specialised performance skills germane to the specific event are developed or honed . These might include acceleration runs, differential runs, “hammer intervals” ,etc. This is followed by a tapering period designed to freshen up the athlete and restore the bounce and zip which the hard training may have dulled. Tapering leads to regeneration and, if timed properly ( one of the most difficult skills in coaching ), will lead to exceptional performance. This is the point where the athlete must mentally switch from training mode to racing mode. During the racing phase, athletes must acquire the confidence that they have done the work required during their previous meso-cycles and that they must now turn off the focal emphasis on training and tune into competing. It is virtually impossible for athletes to simultaneously train hard and compete well.\* A few races which are longer or shorter than the athlete’s event speciality against athletes of various abilities, will create a mental framework conducive to competing again. ( The Lovelock template ) *\*I remember Seamus Power and Peter Matthews ( the two finest distance runners of their era ) training very hard during a warm weather stint in Portugal in 2001. Almost on a whim, they decided to run the Almond Blosson cross-country . Both ran poorly and Power correctly analysed his performance afterwards by saying “ We were still in training mode”.*

So to sum up: the training life of an athlete is a constant cycle of hard work ( leading to fatigue ) , recovery ( bringing adaptation and regeneration ), improvement in performance ( for a brief period ), and short lay-off ( for mental and physical rest ) to permit another cycle to begin and repeat. The objective of training is to bring an athlete to a peak of fitness at the proper time. Periodisation permits a balanced progression by ensuring that the appropriate mix ( of hard training and active rest ,etc. )is put together into a unified plan. While running and comprehensive conditioning will form the backbone of the plan, it will also include other activities, such as stretching , core work, recuperative modalities, (e.g. massage ) and periodic health and fitness evaluation ( blood testing, lactate tests, etc.).

Runners , especially young runners , should not attempt to copy the training programmes of elite athletes .  *(Perhaps I should not have given some examples from the Oregon Project earlier on ! )* The great Jim Ryun used to receive many letters from young athletes asking him about his training schedules. They wanted to do what he was doing so they could run as fast as he did. They didn’t want to wait until they were his age or until they had progressed to a certain performance level before attempting to copy his workouts. They wanted his training programme and they wanted it now! Just because a certain type of training worked for one athlete does not necessarily mean that the same programme will work for somebody else. And attempting to copy the training of a world record holder while still a novice runner will only result in disillusionment and quite possibly injury.

Final word from Peter Coe : “ Training should not consume every single moment of any runner’s day or career . This puts the runner into a very deep rut, and there is little difference between a rut and a grave, save for depth. If easy training (mentally low key as well as physically manageable) is appropriate, that is fine as well. Typically, the day off (or off-day ) serves to invigorate body and soul for good quality training in the few days following. Hard work over a long period of time is the primary route ( perhaps the only one ) to developing athletic performance potential. The art of coaching is to identify the smallest amount of the most specific work needed to ensure continual progress in performance ability. Every training session should end with the athlete capable of doing more. If there is ever a question of whether to do more, **do less.”**

**Coe firmly believed in the importance of keeping a training diary or manual : “**The best method of keeping track of training responses and for improving on the plan is to keep reasonably detailed records in the form of a training log or journal.” *It has often been said that a training diary is a very good “coach” as the athlete can look back on his training over a sustained period of time , see what worked well ,what didn’t work so well , what workouts produced the best results in racing ,etc. He can then replicate what he was doing in training when he was getting good results in races . So, young athletes should start keeping a training diary NOW if not already doing so !*