

TRAINING FOR THE MARATHON

By Harold Tinsley

INTRODUCTION

MARATHON PARTICIPATION In the late 1970's and early 1980's, there was a major increase in the participation in road racing. The increase was directly reflected in marathons, that is, until 1983. During the period of rapid growth the number of marathons increased significantly and for a while race directors could plan on their fields doubling each year. It was not uncommon for nearly half of the field to be first-time marathoners.

OLD TIME MARATHONERS There was a time when would-be marathoners trained for years and were long-time participants in shorter road races before moving up to the 26.2 mile distance. The years of training built an endurance background and their participation in road races prepared them for that final step. A large majority of these old time marathoners are still running and their ranks have grown with others who have taken a serious approach to the sport. They travel far and wide to sample the new marathons and participate in the mega events such as New York and Boston. Some go so far as to run one in each state, run 50 during their 50th year, reach the century mark, etc. Obviously, they are durable and enjoy the sport.

NEW BREED The rapid increase in participation and marathons to participate in created a driving desire to run a marathon. This interest and phenomena brought about, rather rapidly, a new breed of first-time marathoners. The old timers were astounded that many of these first-timers had only been running for a short period of time. A few 10K's and their interest turned to the marathon as their next goal to conquer. As a race director, I have more than once had an entrant sign up to run the Rocket City Marathon as his or her first road race. Their success in going the distance has been a source of amazement to the veteran marathoner.

INJURIES AND PERFORMANCE A more in-depth look at this new breed of marathoner will reveal two important facts. Suddenly there has been a major increase in number of entrants over the number of starters, and many more plan to enter but never do. Their rapid acceleration of mileage without the background base on which to build leads to injuries. Many of these injuries could be avoided with a sensible training plan. The second observation is that many who go the distance are not properly prepared. Their race is a struggle, hitting the wall early, walking much of the latter miles. This has led to a significant increase in the percentage of over four hour finishers. Their run is not one of enjoyment as they simply survive to achieve the recognition of having finished at any cost.

TAKING THE WRONG APPROACH This author finds the popular two month training plans and low-mileage, long-run plan misleading for these runners and not a wise plan for even the established runner. There is no short cut to building a mileage base on which the long runs can be increased safely and with enjoyment. A rapid buildup of mileage leads to the overuse syndrome and an almost sure ticket to injury. In the formula: **TRAINING EFFECT = STRESS (Running) + RECOVERY (Rest)**, there must be a balance between stress and recovery. Time is the primary ingredient in recovery; it cannot be ignored and there is no substitute for time. While long runs are the primary training technique for marathons, it cannot be more than one-third of the

weekly mileage. Any ratio that is greater results in undue suffering during the latter miles of the run and many days of discomfort while you recover from this excessive application of stress.

THE LATEST TREND While the participation in road races continued to increase there was a significant decline beginning in 1983 in marathon participation as compiled by the National Running Data Center. As one would expect, the percent of first time marathoners also decreased. This alone would result only in a decline in the growth of marathoning, not the decline that was experienced. By far the greatest decrease was the marathoner who ran his or her first marathon and did not come back for a second time. The quickie plans and long-run systems do not produce positive memories of the struggles they endured to run that first marathon. It became a once-in-a-lifetime experience - and some experience it was for many. The decline eventually bottomed out and in recent years there has been a more reasonable and steady increase.

ESTABLISH A TRAINING PLAN This training plan will present basic principles that are applicable to all levels of runners. A specific training example based on these principles will be given. The example is based on the mileage necessary for the average "new breed" marathoner to reach a realistic goal for a first marathon.

PLANNING FOR A GOAL That goal is as follows: (1) Be able to complete the distance without walking, (2) Achieve a finish time under four hours, (3) Avoid hitting the wall and the associated major struggle which follows, (4) Be able to enjoy the entire run enhancing the euphoria of accomplishment, and (5) To achieve this goal with a minimum risk of injury.

THE LONG RANGE TRAINING PLAN

THREE PHASES When preparing a training plan for the marathon, three phases must be considered. The first phase is the **BUILD-UP** during which time average mileage is increased. The second phase is the **STABILIZATION** period which allows the body to adapt to the stress of increased training. The third phase is the **TAPER** during which time mileage is reduced to allow the body to store reserves for the major effort demanded by the marathon.

A THEORY ON "THE WALL" A highly quoted and accepted formula that a trained runner will "hit the wall" at a distance three times daily average mileage over a two month period prior to the event requires the average to be 9 miles per day (63 miles per week) for the 26.2 mile marathon ($3 \times 9 = 27$). In this training plan this requirement is met during the eight week stabilization period.

ENERGY RESERVES No runner trains at a daily average of 26 miles and at the intensity he/she would race a marathon. Thus, the race demands a much greater effort than this or any other training plan prepares the physical capacities of the body to meet on a day to day basis. The two months of high mileage following a significant mileage increase has been an extensive effort, a stress level hard for the average to cope with. The less than average could be near the breaking point and a race immediately following the stabilization phase could result in injury. For all, a race at this time would not provide optimum performance. The taper and its extent as well as importance are often overlooked. A sudden break in the training routine would leave the runner stale. A gradual tapering of mileage and long runs will avoid staleness and allow recovery to generate an energy reserve. This will result in a more enjoyable run at a higher level of performance for a longer duration while minimizing the risk of injury. The taper in this plan is for a duration of two weeks following the stabilization phase. More will be given concerning the taper in following paragraphs.

INCREASING MILEAGE Just as decreasing mileage following the stabilization period is important, so is the method of increasing mileage important. The present accepted rate to accelerate mileage without excessive risk of injury is based on three factors: (1) Weekly peak mileage should not increase by more than 5 miles, (2) Weekly peak mileage for a month (4 week period) should not exceed 10 miles, and (3) One of every four weeks should be a recovery week that is 50% of the weekly average for the prior three weeks during the build-up.

EXAMPLE An example to illustrate the concept presented here is provided in the graph and table which follow on the next page at the end of this section. The plan is based on a 3 mile a day jogger who decides to run a marathon. The build-up phase requires 16 weeks to increase mileage by a factor of three from 3 miles a day to 9 miles a day.

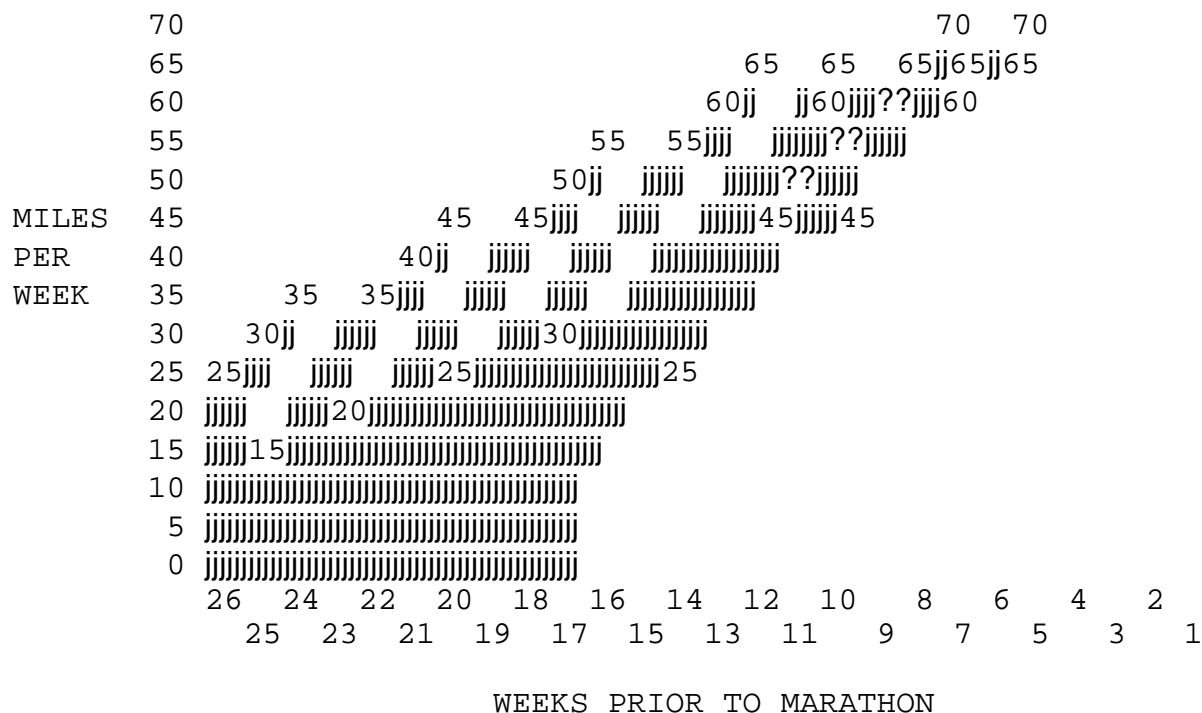
CONSERVATIVE APPROACH One may consider this a conservative approach and for the trained long distance runner the extensive build-up is not necessary as he/she begins at a higher level. However, should your daily average mileage be at a level between the starting 3 a day and the two month stabilization period of 9 a day, you should adhere to the plan beginning at the week equivalent to your present weekly average mileage. This is not to say that a runner with a greater mileage per day now should not follow this plan and stabilize at a higher mileage. Obviously, this is ideal. The extra mileage will insure better performance and a more enjoyable race. The less accomplished runner must not accelerate his mileage to achieve a higher stabilization level or injuries are almost sure to occur.

THE IMPORTANCE OF A PLAN While the number and finish percentage of first time marathon runners is outstanding, it remains a fact that many who planned to run didn't make it to the starting line due to injury. Few of those realize, and most would not admit, that their acceleration was too great and lacked a planned rest/recovery period. Other factors are usually cited as the blame. It is true that races and other stresses lead to injury. The conservative approach of this plan allows for a reasonable number of races and other outside stresses to be within the adaptation limits. Long runs are of prime importance in the final stages of preparation and so is the necessity to race important, for the race itself is a stress that requires adaptation prior to the final and major effort.

MILEAGE/TIME TABLE

PHASE	*	BUILD-UP																*	STABILIZATION							*	TAPER					
WEEKS	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1						
MILEAGE	25	30	35	15	35	40	45	20	45	50	55	25	55	60	65	30	65	60	65	70	65	70	65	60	45	25						

MILEAGE/TIME GRAPH



NOTE: Mileage for weeks 10 through 3 average 65 miles, or 9.3 miles per day, which calculates "the wall" to occur at 28 miles - just beyond the marathon distance. If you feel over stressed as you enter week 6 run the lower mileage of 45 rather than 65.

THE DAY BY DAY TRAINING PLAN

HARD DAY/EASY DAY Also of importance is the method in which the day by day, weekly mileage is achieved. The hard/day, easy/day approach is an accepted and established training technique. The basis for the hard/easy concept is based on the fundamental formula for achieving the training effect.

TRAINING EFFECT = STRESS + RECOVERY

Most consider running (stress) to be the most important aspect of training. Of equal importance is the recovery. It is during the recovery that the body actually grows stronger. The stress of running actually weakens the body. Too much too often will lead to injury. The human body has an uncanny ability to adapt to stress. Apply a level of stress above that which it can easily cope with, then allow sufficient recovery and it will achieve a higher stress tolerance. Repeating this cycle on a regular basis is the fundamental concept of training.

DAILY MILEAGE PLAN A daily schedule for any given week is given in the following table. The schedule considers that races will often be included on Saturday. Races on Sunday, except on an occasional basis, should be avoided or the long Sunday run will be eliminated too often. The long run is of prime importance to preparation for the marathon distance. The long run is as important as the average mileage itself.

In fact the purpose of building average mileage is to be able to safely increase the distance of the long run, which is the primary goal that must be achieved to be able to go the marathon distance.

Since daily mileage will vary at any given week on the schedule, the daily distance in percent (%) of the weekly average is given. To aid you in verifying your conversion from percent to miles, two example weeks are given. One is for the early phase, a 30 mile week, and the other during the high mileage stabilization period, a 70 mile week. Some modifications to this schedule are necessary during the stabilization and taper phases and are discussed in later paragraphs. At the end of this article is a table which gives the mileage that is to be run each day of each week for the 26 week training period, plus three additional weeks of recovery following the marathon.

DAILY MILEAGE PLAN

SUN MON TUE WED THU FRI SAT

33%	7%	16%	7%	20%	7%	10%	= 100%	- PERCENT MILEAGE EACH DAY
10	2	5	2	6	2	3	= 30	- MILE WEEK EXAMPLE (Miles Per Day)
23	5	11	5	14	5	7	= 70	- MILE WEEK EXAMPLE (Miles Per Day)

MILES PER DAY FOR EACH MILEAGE WEEK

MILES PER WEEK	SUN	MON	TUE	WED	THU	FRI	SAT
100%	33%	7%	16%	7%	20%	7%	10%
15	5	1	2	1	3	1	2
20	7	1	3	2	4	1	2
25	8	2	4	2	5	2	2
30	10	2	5	2	6	2	3
35	12	2	6	2	7	2	4
40	13	3	6	3	8	3	4
45	15	3	7	3	9	3	5
50	16	3	8	4	10	4	5
55	18	3	9	4	11	4	6
60	20	4	10	4	12	4	6
65	21	5	10	4	13	5	7
70	23	5	11	5	14	5	7

THE LONG RUN DISTANCE The long run should be no more than one-third of weekly average mileage. Any more and pace will suffer and you will not be training the body at what will be expected of it when you go

the full race distance. As an example, if you have reached 45 miles per week your long run should be 15 miles ($45/3 = 15$)

TRAINING EFFORT Other than distance, the other variable is speed or pace. Pace rather than speed is more important in running a marathon. Another basic law is that you cannot run the marathon at a pace greater than the body has adapted to handle over the full distance. This means that two-thirds of the long run must be at marathon race pace. This limits the rate at which you can increase the distance of the long runs. It is unrealistic to think that you can slog through your long training runs and then expect to carry a faster pace in the race, which is most likely to be longer than your longest training run! Other than shorter races during the training period, this should be the extent of focus on the pace at which you train. All other training is recovery and should be run easy. Your actual racing and training pace is a function of your ability and only an individualized training plan can account for that. I've run two marathons in the 2:33's, one as a master, using this schedule. Some will run faster and others just to make the four hour goal. Race pace and recovery pace is a function you must control. Recovery training pace should be approximately three-quarters of marathon race pace (not your 10K race pace). Marathon race pace only applies to the once a week long run, which in the schedule is run on Sunday. All other training is recovery and should be run easy, which is a pace of approximately three-quarters of marathon race pace (effort)."

Marathon race pace for two-thirds the long run distance applies to all the Sunday long runs on weekends on which you do not race except the last taper week. In other words you do a pace run once a week when training for a marathon and that can be either a shorter race or marathon race pace for two-thirds the long run, but not both. A minimum of every other week should have the long run with race pace included. This means that you cannot race every weekend when training for a marathon.

Example: If your goal is to run a 3-hour marathon, that is a race pace of 6:52. Let's say you are at a week in your training where your long run is 18 miles. You need to run 12 miles of that distance at a 6:52 pace. You would start out running easy, gradually building to that pace over the first four miles giving your body time to warmup and adapt to marathon race pace. From mile 4 to 16 you would try to hold your pace between 6:50 and 6:55, finally tapering down the last two miles so that you don't go through a metabolic shock when you stop. This race pace results in a recovery training pace for the rest of the week of 9:10 per mile. ($6:52 = 412$ seconds, $412 / 3 = 137.4 \times 4 = 549.6$ seconds rounded to 550 seconds = 9:10 per mile recovery training pace) A person trained to run at this race pace would feel quite comfortable running 7:30 to 8 minutes everyday. However, they would not make it through the 26 week program running long runs of 23 miles near the end with 16 of it at the 6:52 pace. If they did not become injured or sick they would go stale finding it difficult or impossible to hold the pace the last third of the pace distance. Then when they entered the two week taper period their body would go into a recovery mode to rebuild instead of being rejuvenated and having it able to cover the other one third of the distance at race pace that you've been using as the warmup/warmdown. What happens? They start out sluggish (metabolism systems in slow motion) and struggle the last six to eight miles of the marathon at far below the 6:52 pace. The letdown is bad and that has a lasting effect on your future training and racing.

WARNING Most people's normal pace is too fast and violates the three-quarter marathon pace effort stated in the plan for recovery training. Most people run according to how they feel and run their recovery runs too fast so that they aren't recovery at all. Then they can't put the necessary effort into the long run to do two-thirds of it at marathon race pace; ie. they tire at the end and slow down. You actually have to hold back to run three-quarter marathon pace effort. Training and running for fun do not mix. Running for fun you never really recover and you never really train. Therefore there is little progress after the first few years of running when

the body has adapted to your fun running routine. Once you have reached the stabilization years you must put in hard effort (long run at race pace for marathon training or speed work for shorter racing) to gain progress. You must be fully recovered for these hard efforts to be achievable and effective.

SUMMARY This article has covered five very important aspects of marathon training. **One** was the average mileage required prior to the event to survive the distance at a minimum of discomfort, ie. avoid "The Wall". The **second** was the mileage profile which demonstrated the mileage buildup to the desired average with a minimum risk of injury. The weekly five mile maximum increase, monthly ten mile maximum increase and 50% of average mileage every fourth week are extremely important to your success. Ignore these and you are almost sure to incur injury and not be able to reach the desired mileage. The profile demonstrated when and where the average mileage should occur (weeks 3 through 10) and that the last two weeks should be a taper period. The **third** concept covered was the hard/easy daily training routine to produce the necessary long runs. The long runs are as important as average mileage in preparing for a marathon - "one must train long to race long". If you run an important race on Saturday and extend considerable effort, the long run on Sunday must be reduced to a short recovery run. Never eliminate the long run on two successive weeks. Plan important races so that they occur on the easy week allowing three long runs in every four week period. The **fourth** was the long run and that it should be one-third of the mileage for that week and that two-thirds should be at marathon race pace. The **fifth** was that the other two-thirds of the mileage run that week should be at recovery pace which is three-fourth marathon race pace.

DO NOT CHEAT ON THE EASY WEEK You will want to run more, especially in the early weeks. Do not bend to that temptation. Later you will pay the price, most likely with an injury. The easy week is just as important as the hard weeks, so keep it easy.

The remainder of this article will cover a number of other important aspects of marathon training and race preparation. Many are applicable to training in general and should be employed throughout the year while others are specific to marathon preparation. Some are a topic all their own, too detailed to cover here, but mentioned to reference their importance.

RACE PREPARATION

DETAILS ON THE TAPER A previous paragraph discussed a two-week mileage taper period prior to the marathon. This is very important and not adequately included in most training programs. Most runners consider that if they take the day or two days off before a race they will be ready on race day. This is all wrong and you'll hear them complain of being stale, which they are, and disappointed with their race results. So the next time they don't take a break from training and the results are poor again. They then alternate between the two extremes and seldom get adequate results. The body goes through a shock if you don't run after training hard day after day and will result in staleness. But, no recovery cycle is even worse, leading to poor results and less than enjoyable racing. Recovery is necessary and must be keyed to the expected goals (your race purpose), previous training and race distance.

The taper defined here is specific to the marathon and should only be used to peak for a major event. Shorter races and less important races require different tapers, dependent upon the desired race goals. Some races are used as an extension of training, some for fun, some to be competitive and some to achieve maximum results. The taper or lack thereof is dependent upon these goals. Another factor that is inter-related to the taper is

carbohydrate loading. The taper given here is designed specifically for the marathon, where the runner will employ "loading" and expect to achieve maximum results.

BASICS OF THE TAPER Without going into details on the concept and philosophy of this taper, here are the basics. You have increased mileage drastically, the body needs a rest to recover for maximum performance. The reduction must be done slowly with a gradual reduction in mileage to allow the body to adapt. The bottom of the taper must be reached 3 to 4 days prior to the race to allow a gradual build back up the last 2 to 3 days. This clears body waste products that settle in during low activity and increases metabolism to be active and primed for the race. The taper must also be adapted to the special needs for the carbohydrate loading to be effective. This requires a fairly long (1:30 to 1:45 hour), but easy effort, depletion run the seventh day prior to the race. The next three days are the depletion days (low carbo intake) where energy levels are low and running must be minimal to avoid stress. The next three days are the loading days (high carbo intake) to store glycogen in the muscles and requires low mileage to insure the glycogen stores are not burned up. Putting all this together results in the daily mileage distribution as shown below for the last two weeks.

DAY	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
MILES	15	3	7	5	7	5	3	14	4	2	0	2	3	Race
MILES	* - - - - -	- - - - -	- - - - -	45 - - - - -	- - - - -	- - - - -	* - - - - -	- - - - -	- - - - -	25 - - - - -	- - - - -	- - - - -	- - - - -	* - - - - -

This is the complete two week taper cycle including the important Sunday runs, both of which should be run at easy effort. No races here, and week three just prior to this should have a more consistent daily average with less of the hard/easy pattern as in the previous weeks. Long runs in the 60/70 mile average weeks had reached 23 and several should be well beyond 20 in the mid weeks. But as you notice for weeks 2 and 1, they have been drastically reduced and this reduction of long runs should begin in week 4 and become significant in week 3. Thus, tapering of long runs begins 4 weeks prior to the race and decreasing average mileage begins two weeks prior to the race. The short runs during the last weeks should include several brisk "pick-ups" to stimulate the body's metabolism. This is especially true during the last two days. They should be hard enough so that the last one causes you to sweat and breathe harder, but short so that endurance reserves are not tapped.

PSYCHOLOGICAL FACTOR There is a psychological factor involved that you should be aware of. After training at the elevated mileage for this period, you have adjusted to the "dead leg" syndrome. As your legs become fresh, it is a new experience; little aches and pains will appear as the lively feeling returns. You will have an extreme desire to run more than the schedule calls for. It is as if your body demands it, after all, it has become adjusted to it. You will actually experience a guilt feeling from lack of the normal mileage. Don't give in, hold to the schedule. Due to the reduced mileage, you will tend to gain weight if food intake isn't reduced slightly. Don't let this happen; watch your diet in week two. The week one "loading" will take care of diet for that week. Extra pounds are not conducive to running the marathon well, but a weight loss this late in the program is not good, leaving you weak. Any necessary weight reduction should be done early in the program.

OTHER TRAINING TECHNIQUES In addition to the long runs, some other special training techniques should be used after reaching the 60/70 mile-a-week plateau. The following paragraphs will discuss the importance of running on the grass, hill training (uphill) and learning to relax on the down hills. As for speed training, some is desirable but is not overly important for the marathon distance. Pick-ups or fartlek during the last miles on good days when running seems easy and a pleasure are good sources of speed. The best source of speed, since it also provides other benefits, are shorter races. Stay away from fast intervals on the track during high mileage. The body is already under considerable stress from the increased mileage and to add an

additional stress from intervals would create a high risk of injury. The last week that you can race at a pace greater than marathon pace is two weeks for distances up to 10K, three for a 15K or 10 miler, and four weeks for the 20K or half-marathon.

RUNNING TECHNIQUE Studies of the biomechanical technique of marathon runners have shown that their running technique is altered due to fatigue and muscle tightness in the latter stages of the race. Both are a function of the lactic acid build-up in the muscles in addition to energy (glycogen) depletion. It was found that the marathoner, throughout the course of the race, decreased their stride rate and length and displayed an increased vertical displacement of the center of gravity. Due to the fatigued muscles, the runners were not able to exert as much torque at the knee and hip joints which carry most of the load after pounding has removed the drive from the ankles. We are all familiar with this last function, when our feet lose the light touch and toe-off spring. The feet begin to "plop" and pound the pavement and pains seem to radiate from the feet up the leg to eventually consume the total body. Obviously, strengthening these muscles is the answer but must be combined with the long runs to provide the body a chance to adapt to the lactic acid build-up. Hill training will strengthen the hip flexors and the calf muscle is exercised to flex the ankle to drive off the toe for the elevation increase. Both of these take place with pace work but causes the runner to tire early, before significant strength is gained, and at the expense of joint pounding. Flexibility work gives a bonus addition to stride length. An increase of one inch in stride would reduce marathon time by three to four minutes! However, increased stride length is not the answer when stride rate decreases and the vertical displacement increases. This causes the foot plant to get too far out in front of the body resulting in a tiring, braking action with each step.

It is obvious that stride rate, length and efficiency all deteriorate during the run. But, it is also as obvious that training can help overcome or delay this deterioration. The more one runs and the stronger the runner gets, the longer he will be able to maintain an efficient and normal stride. However, in a long distance race such as the marathon, the runner cannot develop the capability to maintain his normal and consistent stride efficiency throughout the run. It is fact that the stride will change during the run. This is not so bad if acknowledged and the runner prepares for it. In your training during the phase where fatigue has not set in you are running with a smooth and efficient stride. On a smooth road surface or track each foot plant is the same and the thrust transmitted by the leg is very repetitious with each push-off angle being very nearly the same. In such a case, the large calf muscle, and this is true with the other involved muscles as well, only a portion of the muscle is being developed. In the longer runs when this muscle gives out due to fatigue, the push-off angle changes, moving the thrust to a different portion of the muscle. True, we may be less efficient in that movement, but it is fact that it will happen. Thus we should not be as concerned that it happens and try to prevent it as we should be concerned with how to work this to our advantage. The answer is to build strength in the total muscle. Take a runner trained on intervals on the track and put him on the road for a long run and he won't cover the distance his training should allow. But repeat the long runs and quickly he will be able to improve the distance covered. Why? Each long run when fatigue sets in and the stride alters, he begins to develop more of the muscle. As the muscle develops, he is able to cover a greater distance. Not just because his normal stride is more efficient, but also because his abnormal stride is more efficient with the increased strength of the portion of the muscle involved at that push off angle. In the formulas that predict how well a runner will perform in the marathon, one of the biggest and most helpful factors is the number of long runs he has done prior to the marathon. Long runs are obviously then one way to build the total muscle so that it is prepared to provide thrust when the stride alters due to fatigue late in the run. Time to do the long runs, pounding of the joints, the build-up of fatigue, etc., all work against the long runs as the sole answer. Are there other ways to accomplish the same end result? One of the more famous coaches used running in the sand to accomplish this. Most of us are not so fortunate as to have the sand available. Running in the grass has a similar effect. Hill running to a lesser degree will

benefit. Why do these work? Running in the grass, for example, the foot plant is not the same every time. Each push-off is at a slightly different angle building strength throughout the total muscle. One can be in excellent shape and begin grass training and this will result in soreness in the calf muscle - a general soreness throughout the muscle. By running on the grass you can accomplish the same training effect as long runs on the road but at 75% of the distance and with much less pounding. A significant portion of training must be done at, or close to, race pace. Only at that speed will the stride approximate that used in the race and only at that stride is the proper portion of the muscle being exercised. In the case of marathon training, this is really not that fast.

HILL TRAINING Hill training (uphill) builds leg strength in less distance with less wear and tear on the joints, so is an important training technique. It also elevates the breathing rate (important and something the grass training can't do) and pulse rate (not so important), similar to what fast running would do. Long enduring hills also tax your mental staying power, an important technique to prepare you for those last miles in the marathon. Even if the course is not hilly, some hill training once a week is still important and should be included in the training program.

RUN RELAXED "Run relaxed" should be ever present on your mind as you train, especially as you tire near the end of a run. Keep those shoulders forward and loose. Once they draw back you get tight from the neck to the lower back and this will progress into the legs. It is especially important that you run the downhill relaxed. It is easy to get tight on a downhill and this can ruin your race and make the remainder miserable. All runners seem to be concerned about how to run uphill. Many articles on this subject have occurred in running magazines. Few consider how to run downhill and most can't even though they think they can. It's important as most courses have just as much downhill as uphill. Few coaches know the technique and most I've heard tell the runner the exact opposite of what should be done. Running downhill takes little effort if done properly and relaxed. It is much like sprinting (you do go fast and should carry a long stride) without the pushing effort. Here's how to run downhill: Don't bow your back, which will occur if you hit on your heels and will cause you to get excessively tight. Don't put any effort into going faster or slower than the momentum you get from the hill itself. Run with a longer stride and roll off the toes, much like sprinting, for after all you are going faster than normal pace. This is a different muscle set being exercised and they will tire quickly if not in shape. So train some on down hills at least once a week. Keep those shoulders forward and relaxed. Don't get tense trying to maintain balance at the increased and unaccustomed speed. If need be, move the elbows out from the body slightly to get the extra leverage to control balance easily. Breathing rate will go up, but not because the cardiovascular system needs the oxygen. Breath rate is synchronized to leg speed, and you are going faster, so you breathe faster. This will flush your system for rapid recovery, especially after an uphill. Good sailing!

CARBOHYDRATE LOADING Earlier mention was made of the concept of carbohydrate loading. This is an involved subject and only the basics will be covered here. Basically, the concept is this: Muscle energy is derived from glycogen, the fuel burned (oxidized) during the exercise. The quantity is limited and can only be moderately increased through training. How long it will last is dependent upon the fitness of the runner and his level of effort. For the average runner this is about the time, regardless of pace, that it takes to run 16 to 20 miles. For the elite or properly trained runner, it may extend beyond the marathon. Once depleted, the body, through its metabolic processes, must convert fat to glucose. Via the body's circulatory system, the blood transports the glucose to the muscles where it is converted to glycogen before being oxidized. These are additional metabolic processes also employing oxygen. Oxygen consumption is greatly increased as evidenced by increased breathing rate. In the advanced stages, which occur rather rapidly once the glycogen depletion has occurred, oxygen is diverted from the primary running muscles. Pace will necessarily slow down and the pain level increases. This is called "hitting the wall". The effects are a one to two minute reduction in pace, a

sprinter's breathing rate and intense pain due to the build up of lactic acid. The pain is similar to that intense pain experienced during the final phases of the "kick" at the completion of a race when anaerobic running occurs. The lack of oxygen at the muscle means incomplete oxidation and a build up of lactic acid, the source of the pain and muscle cramps. At the end of the "kick" in a short race, this must only be tolerated for a short duration. In the marathon, it could last for miles. Only the most dedicated endure to finish.

The human body has an uncanny ability to adapt. The depletion run (day 7) and carbohydrate depletion (days 6 to 4) starve the muscle of glycogen. When carbohydrate intake is resumed, during days 3 to 1, the body remembers this condition and tries to adapt as a means to avoid a repeated depletion. Thus, the glycogen stored may increase (for a short duration) by as much as 15%. As a result, you can run longer before "hitting the wall" or may even avoid the wall altogether. Do this too often and the body will also adapt to the fake need and not store as much glycogen stores. So limit the number of times (no more than four per year) employed to only include the important long races.

The depletion run should burn all glycogen stores but care must be taken to avoid stress. Long, low effort runs are the least risk. The depletion days allow the body time to adapt. Don't increase protein as originally stated during these days. Simply eat normally except limit drastically the carbohydrates (starches and sugars). Also limit training during these days (6 to 4) to avoid stress. To "load", resume your normal diet, and to insure the extra glycogen is available, slightly increase the starches and sweets (DON'T OVER DO IT).

FRUCTOSE Fructose taken during the run can help delay depletion by increasing blood glucose which will feed the muscle stores prior to depletion. Fructose versus other sugars is more quickly absorbed from the digestive system, more evenly absorbed, thus averaging blood sugar for a longer duration boost and acts less towards insulin release, which with time reduces blood sugar.

OTHER PHYSICAL ASPECTS Several other physical aspects relating to marathon training are stretching, body weight, lung exercises and nutrition. Stretching and front body exercises are important year round. If you don't stretch or have never had a demonstration on how to stretch properly, you should look into this aspect of training. Weight is important to running, especially in the marathon where any excess is carried for 26 miles. Get your weight down to best racing level early. Those last weeks of tapering are to build strength, that's the purpose of reducing mileage and long runs. Don't weaken yourself then by dieting. The reduced mileage and carbohydrate loading may cause you to gain a pound or two, so be slightly below your best weight as you enter the weeks of tapering. Lung exercises consist of deep breathing and breath holding. They will increase lung size, function efficiency and make the air sacs more easily excited on demand. Diet, vitamins, minerals and fluid intake are all important to training. Nutrition is a confusing and, therefore, a controversial subject. It is a major topic, too involved to cover here. Read literature on this subject and draw your own conclusions by experimentation. It is universally accepted that fluids are important during long runs, especially the marathon and double-especially if it is hot. Take adequate fluids during the run and replenish fluids after a run. Don't become dehydrated during the run and give the kidneys plenty to flush your system with after the run. Begin your fluid intake prior to the race and take fluids as often as possible. Don't depend on thirst to be your guide. You can't take too much fluid.

MENTAL PREPARATION Pre-race mental preparation is as important as the physical preparation. A challenge is that one thing that will keep you going those last miles when it seems as if your physical capabilities have deserted you. It is very important that you have a challenge. If you haven't run a marathon before, then let it be to finish. If you've finished one but had to walk part, then let the challenge be to run every

step this time. Later marathons, it can be to beat someone or to run a particular time or achieve a personal record.

SET A REASONABLE GOAL Prior marathons are an important input to the formulas used to predict how well you will do in the marathon. If you haven't run a marathon, then you may think this is of little significance to you. However, it is important and must not be ignored. What is meant is this; you can't expect to do as well without the experience gained from having run a marathon. Thus, don't set your goals too high on the first marathon. The benefit is probably more mental than physical, especially if they don't occur in a build up sequence. It cannot be explained and you cannot visualize what to expect in those last six miles. A popular saying is, "when you reach 20 miles you are only half way". Having run a marathon gives you this knowledge so that you will be better prepared to handle the succeeding efforts. So, be realistic in your first race.

PACING Training on the course will prepare you for what otherwise may be the unexpected. Pacing in the marathon is extremely important. So get to know those hills and the effort required. If you know every step of the course, then you will be much better prepared to pace the race correctly. Study course maps and profiles, they are a big help and if you can't train on the course, they are the next best thing.

A COMMON QUESTION Can you run less than the 7 days specified in the training plan, such as resting 1 or 2 days and adding those miles to another day/s? The body functions on cycles or rhythms, so expects and functions best if you run everyday, even if it's nothing more than a warmup/warmdown. A warmup/warmdown is more beneficial to recovery than no running. You can miss one day and adjust the mileage, but if you miss two days drop mileage that week to an extra recovery week and add a week to your schedule. The schedule is a 26 week plan leading up to the marathon, but you should start 28 to 30 weeks before your planned marathon so you can add recovery weeks if necessary, or add recovery week/s in case you get sick, or in case you want to add an extra recovery week for a key race that doesn't occur on one of the existing recovery weeks. If you race on a non-recovery week don't expect to do well because your legs will be tired from the mileage increase to which you have not yet adapted.

POSITIVE ATTITUDE Your challenge should provide the motivation to keep going. But have a challenge that you are positive you can achieve. A very positive attitude is necessary for the motivating factors to last the duration of the marathon. Set your training goals where when you achieve them you believe they will provide you a particular race performance. A subconscious doubt can lead to destruction - the excuse to quit or to slow down. Plan ahead as to how you will fight fatigue and the resulting pain. You must be positive that the reward of finishing is worth the effort. Most individuals will avoid embarrassment at all cost. Yet, some people subconsciously set up an embarrassing situation so that they will have to produce to avoid this undesirable result. A family member, friend or running acquaintance can keep you going when otherwise you would have quit if no one but you had expected you to finish. You can't push your body for 26 miles, so plan your race strategy where you will ease your way through some number of miles and then push yourself those last miles. This is associated with proper pacing. The early miles must be easy. Don't get caught up in the excitement of the start and the other fast runners and go out too fast. The marathon requires patience - three or four or more hours of it.

If you haven't run a marathon before, it is best to let your first 26 mile distance occur in the race. The race is an experience that can't be gained in practice. The small doubt is a source of excitement and results in a real sense of accomplishment when you achieve your goal. But, it is wise to go long enough to feel sure that it is possible when you do race.

Run the race mentally to the point where your adrenalin flows almost on call. Relive this experience during the latter phases of the run to get a needed lift from the adrenalin release. See yourself finishing and the resulting thrill until it becomes extremely important to you to achieve it in reality. The sense of accomplishment you will feel when you finish your first marathon is an extreme pleasure that lasts for days, even weeks. We who have run many marathons in the past may continue to do so to experience the "runner's high". It, like the last six mile struggle, cannot be explained to someone who has never run a marathon. Things that come easy don't result in as much pleasure as those things we have to work hard for. The marathon doesn't come easy, and this in itself is a motivating factor. Good luck, train wisely and hang in there till the end.

MILES PER DAY FOR EACH MARATHON TRAINING WEEK

WEEKS TO GO	M/W	SUN	MON	TUE	WED	THU	FRI	SAT	PHASE
	100%	33%	7%	16%	7%	20%	7%	10%	
26	25	8	2	4	2	5	2	2	BUILD-UP WEEK 1
25	30	10	2	5	2	6	2	3	BUILD-UP WEEK 2
24	35	12	2	6	2	7	2	4	BUILD-UP WEEK 3
23 REST	15	5	1	2	1	3	1	2	BUILD-UP WEEK 4
22	35	12	2	6	2	7	2	4	BUILD-UP WEEK 5
21	40	13	3	6	3	8	3	4	BUILD-UP WEEK 6
20	45	15	3	7	3	9	3	5	BUILD-UP WEEK 7
19R	20	7	1	3	2	4	1	2	BUILD-UP WEEK 8
18	45	15	3	7	3	9	3	5	BUILD-UP WEEK 9
17	50	16	3	8	4	10	4	5	BUILD-UP WEEK 10
16	55	18	3	9	4	11	4	6	BUILD-UP WEEK 11
15R	25	8	2	4	2	5	2	2	BUILD-UP WEEK 12
14	55	18	3	9	4	11	4	6	BUILD-UP WEEK 13
13	60	20	4	10	4	12	4	6	BUILD-UP WEEK 14
12	65	21	5	10	4	13	5	7	BUILD-UP WEEK 15
11R	30	10	2	5	2	6	2	3	BUILD-UP WEEK 16
10	65	21	5	10	4	13	5	7	STABILIZATION WK 1
9	60	20	4	10	4	12	4	6	STABILIZATION WK 2
8	65	21	5	10	4	13	5	7	STABILIZATION WK 3
7	70	23	5	11	5	14	5	7	STABILIZATION WK 4
6	45	15	3	7	3	9	3	5	STABILIZATION WK 5
5	70	23	5	11	5	14	5	7	STABILIZATION WK 6
4	65	21	5	10	4	13	5	7	STABILIZATION WK 7
3	60	20	4	10	4	12	4	6	STABILIZATION WK 8
2	45	15	3	7	3	9	3	5	TAPER WEEK 1
1	25	8	2	4	2	5	2	2	TAPER WEEK 2
RACE	35	28	0	1	1	2	3	0	RECOVERY WEEK 1
+1R	15	5	1	2	1	3	1	2	RECOVERY WEEK 2
+2R	30	10	2	5	2	6	2	3	RECOVERY WEEK 3
+3R	45	15	3	7	3	9	3	5	RECOVERY WEEK 4

NOTES: M/W - Miles Per Week * R in first column denotes Recovery Week