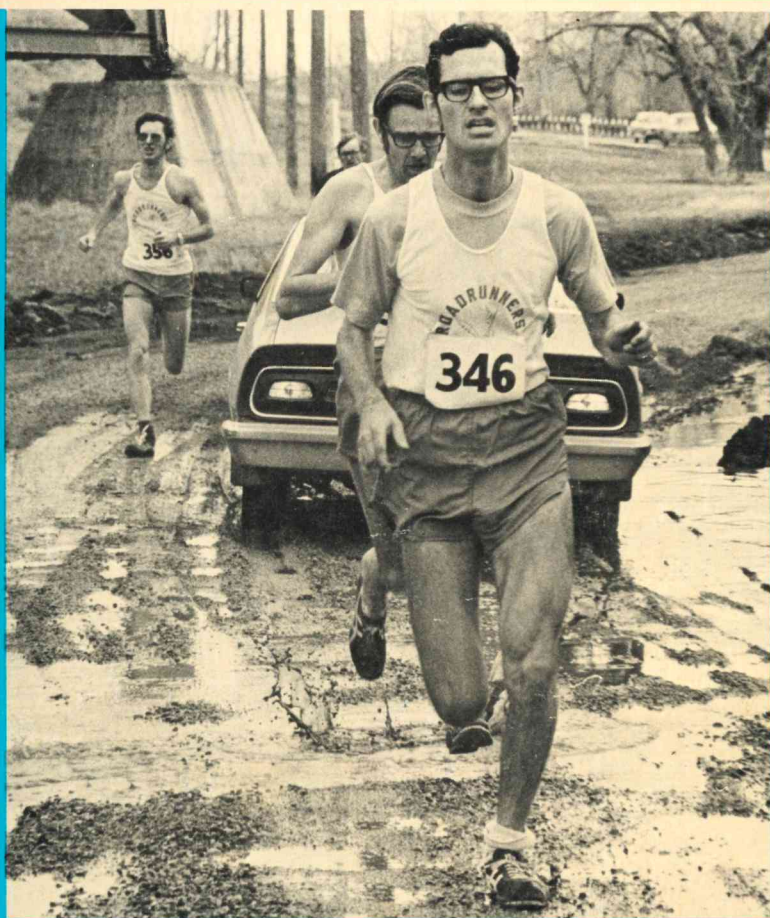


Step Up to **RACING**



\$1.75

Step Up to RAGING



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Foreword

For awhile in the mid-1970s, runners carried on a silly argument over definitions. They tried to separate the people in the activity-sport into “runners” and “joggers.”

In fact, anyone who runs is a runner. If there’s a separation in style and attitude, it’s between “runners” and “racers.” Racing is a step up from running, and not everyone who runs takes this step. Not everyone should.

Here, we define racing in the broadest sense of the word: any all-out effort in the company of other runners when results are taken. Past booklets have told the differences between running and racing.

A writer in *Running with Style* says, “Running is physical, but racing is emotional. To race is to turn loose competitive urges to go all-out, and these usually conflict with the body’s messages, which shout, ‘Don’t do this to me!’ ”

He’s not saying racing is without physical demands. It’s the hardest physical work most of these people ever do. But it takes the emotion of the race to bring it out.

“Everyday runs balance themselves between ‘comfortable’ and ‘uncomfortable,’ ” the booklet *Run Gently Run Long* explains. “Races operate close to the jagged edge of exhaustion. The trick is to see how close to that edge you can push without falling over.”

After the ideal run, you feel pleasantly tired. At the end of the ideal race, you feel you’ve gone as far as you can go.

Running is traveling a familiar route. Racing is exploring the unknown. The booklet *Practical Running Psychology* says, “The runner who only runs comfortably sees only the flatlands. The racer seeks out the valleys and peaks of himself.”

The valleys are as important as the peaks, since a racer learns as much from failure as from success. The degrees of failure and success are many times higher in racing than in everyday running.

But while the two are different, they go together. Running is the base which decides how high the racing peak can go. Running comes first, and without it there can be no worthwhile racing.

The booklet *First Steps to Fitness* is an encyclopedia-like introduction to running methods. *Step Up to Racing* is a continuation of that one, for people who want to go all-out. The organization is the same in the two booklets. Topics are arranged alphabetically and are cross-referenced to provide quick answers. The advice on everything from “Age-Group Racing” to “Women’s Competition” is straightforward and easily read. It summarizes the best material from hundreds of references. (And if you want more information yet, the references are cited.)

The two booklets look the same but read quite differently because running and racing are so different. *First Steps to Fitness* has one page on racing. *Step Up to Racing* splits that question into 50 parts and looks at each one carefully.

Age-Group Racing

“One of the beautiful things about running is that age has no penalties. The runner lives in an eternal present. The passage of time does not alter his daily self-discovery, his struggles and his sufferings, his pains and his pleasures. The decline of his ability does not interfere with the constant interchange between him, his solitude, and the world and everyone around him. And neither of these happenings prevents him from challenging himself to the ultimate limit, putting himself in jeopardy, courting crisis, risking catastrophe.”

—George Sheehan, RW medical writer

Runners at any age can compete—with each other and against their own personal standards, barriers and goals. Most long distance competition is open to men and women, boys and girls of all ages. They race together, but usually are separated into age-groups in the final results.

In other meets, athletes actually race only against people their own age. The Amateur Athletic Union (AAU) promotes meets ranging from local to national championships for both the young and old. Standard classification for the youths is: ages 9 and under, 10-11, 12-13, 14-15 and 16-19. Runners under 20 are called “juniors.” The older runners compete in five-year age-groups from 40 years up (40-44, 45-49, etc.). They are called “veterans” or “masters.” Sub-masters racing—30-34, 35-39—is also increasingly popular.

Separate scoring and racing neutralizes the natural advantage of runners in their 20s. They win most of the championships and hold most of the records in open competition. Sprinters, as a rule, “peak” youngest and long distance runners and walkers oldest.

At the 1972 Olympics, for instance, these were the average ages of the first 10 place-winners:

Events	Men	Women
Sprints (100m-400m)	23.3	22.0
Mid-distances (800m-10,000m)	25.0	25.7
Marathon (26 miles 385 yards)	31.3	—
Walks (20 & 50 kilometers)	30.2	—
Hurdles (110m & 400m)	24.5	26.9
Overall Averages	25.8	24.1

The records lists show the same trends—with almost all of the fastest runners being within a few years of 25. For that reason, year-by-year age-group records are kept in all the standard events for men and women.

From these records, Ken Young has devised a set of “age-graded” scoring tables. They take into account the fact that we all improve rapidly in ability through our teens, level off in the 20s, and decline gradually from the 30s on. Young’s tables give about equal weight to a four-minute mile at age 25 and 4:50 at 50. The chart on page 9 gives 900-point levels—“national class” times—through the ages.

(See related material in "Entering Races," "Events to Race," "Information on Races," "Time Comparisons.")

For more information:

"Age," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 10.

Age of the Runner, Booklet No. 39, Sept. 74.

Corbitt, Ted—"Adjusting to Advancing Age," RW, Nov. 71, p. 29.

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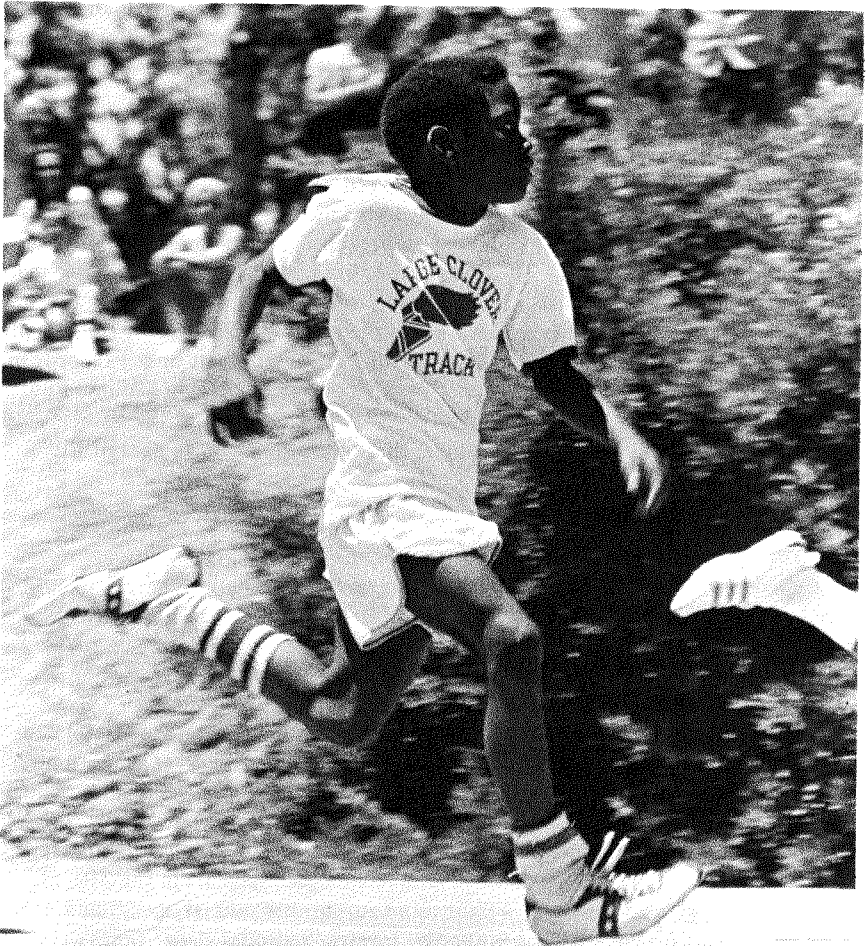
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The Young Runner, Booklet No. 24, June 73.

"The Young Runner," Complete Runner, 1974, pp. 78-82.

"Runners at any age can compete—with each other and against their own personal standards, barriers and goals." (John Marconi photo)



Age-Graded Scoring

Age	880y	Mile	2 miles	3 miles	6 miles	10 miles	15 miles	20 miles	Marathon
10	2:11	4:55	10:55	17:18	37:47	66:55	1:45:07	2:24:37	3:15:11
15	1:54	4:15	9:16	14:32	31:11	54:35	1:25:08	1:56:46	2:37:18
20	1:50	4:04	8:46	13:38	28:47	49:53	1:17:21	1:45:46	2:22:15
25	1:50	4:03	8:40	13:24	28:00	48:13	1:14:27	1:41:37	2:16:31
30	1:51	4:07	8:45	13:29	27:59	47:58	1:13:52	1:40:40	2:15:10
35	1:55	4:14	9:00	13:49	28:33	48:27	1:14:59	1:42:07	2:17:04
40	1:59	4:25	9:21	14:21	29:34	50:25	1:17:25	1:45:23	2:21:26
45	2:05	4:37	9:48	15:01	30:53	52:38	1:20:47	1:49:58	2:27:36
50	2:11	4:52	10:18	15:47	32:28	55:19	1:24:54	1:55:33	2:35:07
55	2:18	5:07	10:52	16:39	34:15	58:21	1:29:34	2:01:56	2:43:42
60	2:25	5:24	11:28	17:34	36:11	61:41	1:34:42	2:08:56	2:53:07
65	2:33	5:42	12:06	18:34	38:15	64:14	1:40:11	2:16:26	3:03:12
70	2:42	6:01	12:46	19:36	40:25	68:59	1:45:59	2:24:21	3:13:50
75	2:51	6:20	13:28	20:40	42:40	72:53	1:52:01	2:32:35	3:24:25
80	3:00	6:40	14:11	21:47	45:00	76:55	1:58:15	2:41:06	3:36:21

These are the 900-point levels ("national class times") on Ken Young's age-graded scoring tables for men. They're based on actual and projected age-group records. Full charts for all events and all point levels are available from Young at the Institute of Atmospheric Physics, University of Arizona, Tucson, Arizona 85721.

Altitude Training

"This was the lesson of Mexico City—that while thin air may be something to fear in racing, it's a valuable aid to training. Runners training at altitudes of a mile or more above sea level adapt to their short oxygen supply. When they get back down where oxygen levels are normal, they find they're 'super-compensated.' They run faster, easier."

—Running With The Elements

High altitude takes a runner's breath away. This can be either bad or good, however, depending on one's attitude toward the altitude.

It can be a depressing comedown to go to 3000-4000 feet or more, expecting distance performances equal to those at sea level. You wheeze through your event, look at the result and see you're 2-10 seconds per mile slower than before. And you worked harder for this time.

This happens in the long races because there is less oxygen in the air at high elevations. There also is less air density or resistance. And this works to the benefit of short-distance runners who don't require so much oxygen.

While the runners at the Mexico City Olympics in 1968 were cursing the altitude (7000 feet plus), the sprinters loved it. They set world records at 100, 200, 400 and 800 meters.

High-altitude natives won most of the distance medals at Mexico City. Lowlanders grumbled about this, but they learned from it, too. They learned that training at altitude seems to make them better sea-level competitors. The main reason for the improvement is the body's production of the additional oxygen-carrying red cells in the blood, to compensate for the "thin" air. The blood remains enriched for several weeks after leaving the high elevations.

Significantly, every 1972 Olympic winner in races 1500 meters up had done extensive training at altitude.

Dr. Jack Daniels, a well-known researcher on altitude training, offers these recommendations:

1. Plunge right into training there. "The sooner an athlete tries something for time, the sooner the effects are fully appreciated."
2. Altitudes of 7000-8000 feet are ideal for training. "Hard early work is possible; normal workouts are eventually possible; there are generally more choices of sites with good facilities available, and it's still easy to plan runs from a moderate altitude to higher elevations without much inconvenience."
3. Alternate high-altitude training with trips to sea level. "This provides for occasional periods of psychological boost through sea-level racing successes, as well as opportunity to reassure the mind that usual sea-level workouts are still possible, if not easier than before."
4. If you're preparing for high-altitude racing, experience in all-out races at altitude is as important as the training done there. Compete regularly at altitude. (See related material in "Breathing," "Training Fundamentals," "Training Methods," "Training Schedules.")

For more information:

"Air," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 11.

Arnold, M.H.M.—"Benefits of Altitude Training," RW, Nov. 72, pp. 34-35.

Daniels, Jack—"High Altitude," RW, Nov. 74, pp. 6-7.

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"Experiments with Altitude," RW, Sept. 74, pp. 20-23.

Frederick, E.C.—"Training at Altitude," Complete Runner, 1974, pp. 190-196.

Attitudes On Competition

"Sport does not have to be so exclusively competitive that all but the most skilled must be discouraged from participating. Sport doesn't have to be unconditionally aggressive, either. Anyone who has been active well knows that man vs. man is but one form of sports conflict. The athlete must compete against himself and the environment, and these common struggles outweigh the interpersonal struggle almost every time."

—Bruce Kidd, Canadian Olympian

It's a rare individual who never competes—that is, if we look at the word "competition" in all its meaning.

Competing can mean racing to beat the person beside you now, or someone who ran years earlier, or will run years from now. Or it can mean racing against the marks you yourself once ran, or once thought were impossible to run.

Competition can be racing for first place or 101st. It can be challenging everybody in the field, a few people around you or no one but yourself.

Running has a flexibility that lets it be whatever the competitor wants it to be. The kind of approach one takes depends on abilities and personalities. Generally, these divide runners into two types:

- "Racers" whose main goal is to win a runner-vs.-runner test, and whose kicks come from symbolically thrashing an opponent. Racers measure themselves by those around them.

- "Pacers" who are most concerned with the runner-vs. stopwatch challenge. They are mainly testing themselves, and time is the most objective way to measure their success or failure.

"Racers" practice the more traditional form of competition. "Pacers," however, avoid many of the obstacles of that form—primarily the old philosophy that only the best racers should compete.

Self-competition gives everyone a chance to race, and lets everyone have a shot at winning on his or her own terms.

(See related material in "Nervousness before Races," "Pacing," "Tactics in Racing.")

For more information:

"Championship Character," Practical Running Psychology, Booklet No. 11, May 72, pp. 9-10.

Connolly, Joe—"Test Yourself," RW, Jan. 74, pp. 4-5.

"The Driving Forces," Practical Running Psychology, Booklet No. 11, May 72, pp. 18-36.

"The Need to Race," Run Gently, Run Long, Booklet No. 37, July 74, p. 64.

"Psychological Warfare," Practical Running Psychology, Booklet No. 11, May 72, pp. 37-44.

"Psychology," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 43.

"Taking Pains, Racing Techniques, Booklet No. 13, July 72, pp. 4-11.

Tomczak, Garrett—"Is the Pain Necessary?" Complete Runner, 1974, pp. 9-11.

Basic Training

"What is the 'collapse point'? In simple terms, it is the maximum distance a runner can expect to go before the urge to slow down overwhelms him. More commonly, the collapse point is called 'the wall' (which one runs into) or 'the bear' (which jumps on one's back)...The collapse point is characterized by a sudden decrease in performance, often occurring within a single mile. Pace may drop off by 2-3 minutes per mile or more.

—Ken Young, US record holder

You must be able to run a distance before you can race it. And as racing distances grow, just getting through them is increasingly difficult.

Basic training means building the ability to go the distance—laying in a strong foundation of endurance. Without this base, you can forget about speed training. It won't help if you can't lift your feet in the last lap of the race.

Endurance comes as the miles pile up. How many miles? Well, that depends on the racing distance. Sprinters may only need a couple a day, since they have no trouble covering a few hundred racing yards. Marathoners, on the other hand, require about 8-10 a day for many months to get ready for their 26-mile race.

Background mileage obviously is most critical for long distance road runners, since they're most likely to "hit the wall" in their events.

Ken Young worked out a formula which predicts when a runner will reach his or her limit. He calls it the "collapse point theory." It goes like this: you will stop or slow down dramatically at a point about *three times your average daily distance for the past 6-8 weeks*.

Say you've averaged 35 miles a week during that time. That's five miles a day. Your projected collapse point is 15 miles. You can count on getting through a half-marathon rather comfortably. But to try a marathon is to invite trouble. Put in some more miles first.

Young advises training a little longer than the minimum to give yourself a safety margin. The accompanying chart lists collapse points at various mileages, and recommended basic distances at each training level.

The farther above minimum mileage you go, the less you need to worry about merely surviving a race. Once you're training at half the race distance or more each day, then it's safe to think about speedwork, tactics, etc.

(See related material in "Fartlek Training," "Fast Distance Training," "Interval Training," "Slow Distance Training," "Training Fundamentals," "Training Methods," "Training Schedules.")

For more information:

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"Long Runs: Do We Need Them?" RW, June 74, p. 23.

Osler, Tom—The Conditioning of Distance Runners, Long Distance Log, Woodbury, N.J. 1967

Riley, Rick—"100 Miles: The Upper Limit," RW, Nov. 74, p. 25.

Run Gently, Run Long, Booklet No. 37, July 74, 37-81.

"Training to Compete," RW, Sept. 74, pp. 8-14.

Young, Ken—"Going Over the Wall," 1974 Marathon Handbook, Jan. 74, pp.22-24.

"Collapse Points"

BASIC MILEAGE REQUIREMENTS

Weekly Total	Per Day	"Collapse"	Max. Race
10 miles	1½ miles	5 miles	3 miles
15 miles	2¼ miles	7 miles	5 miles
20 miles	3 miles	9 miles	6 miles
25 miles	3½ miles	11 miles	8 miles
30 miles	4¼ miles	13 miles	10 miles
35 miles	5 miles	15 miles	13 miles*
40 miles	5¾ miles	17 miles	15 miles
45 miles	6½ miles	20 miles	19 miles*
50 miles	7 miles	21 miles	19 miles*
55 miles	7¾ miles	23 miles	20 miles
60 miles	8½ miles	26 miles	20 miles
65 miles	9¼ miles	28 miles	marathon
70 miles	10 miles	30 miles	marathon
75 miles	10¾ miles	32 miles	31 miles*
80 miles	11½ miles	34½ miles	31 miles*
85 miles	12¼ miles	37 miles	31 miles*
90 miles	12¾ miles	39 miles	31 miles*
95 miles	13½ miles	41 miles	31 miles*
100 miles	14¼ miles	43 miles	31 miles*

"Collapse point" is approximately three times the daily average; maximum racing distance should be slightly below the collapse point. * = 20 kilometers is slightly less than 13 miles, the half-marathon slightly more; 30 kilometers is just below 19 miles; 31 miles is about 50 kilos.

Beginning Racing

"Probably the hardest thing about the first (race) is thinking about it in advance. It's kind of like standing on the edge of a cold swimming pool on a hot day. You're anxious to get in, but hesitant about experiencing the first shock. So you teeter on the brink. It's best just to fall in without giving it much thought.

—1972 Marathon Handbook

In racing as in running itself, the first step is the longest one, and the one which trips up far too many people. People who could benefit from running never go the first mile, and those who might have a hidden talent for racing never get to the starting line.

Some non-racers feel the same about competing as non-runners do about exercising: self-conscious. They think everyone's looking at them, judging them. They're afraid of "looking bad."

Some reassurance: you aren't starting in the Olympic Games. More likely, it will be a high school dual meet or a Sunday fun-run. In events like these, no one finishes last because just finishing is some kind of victory. You've beaten everyone who didn't start.

Even if you do trail along a mile behind everyone else, no one cares. Runners at these races usually outnumber spectators 100-1, and the other runners are glad to see a new face.

Four basic rules for first time racers:

1. Be prepared. Make sure you have enough training background to go the distance. Remember the formula from the "Basic Training" section: average at least one-third the racing distance per day.
2. Choose a low-key event. Run where there are runners like you. You'll find them at any open road race, all-comers track meet or informal fun-run.
3. Set modest goals. If it's a short race, plan only to run a little faster than you have in practice. If it's a long race plan only to finish. Let anything more be a surprise.
4. Pace yourself. Consciously hold back at the start. Let the leaders disappear. If at halfway you still feel fresh, that's the time to accelerate. It's better to start too slowly than to blow everything in an early rush.
5. Analyze your result. Look back immediately at what went well, what didn't, and why. Use the experience for a better race next time.

(See related material in "Attitudes on Competition," "Basic Training," "Entering Races," "Events to Race," "Information on Races," "Pacing.")

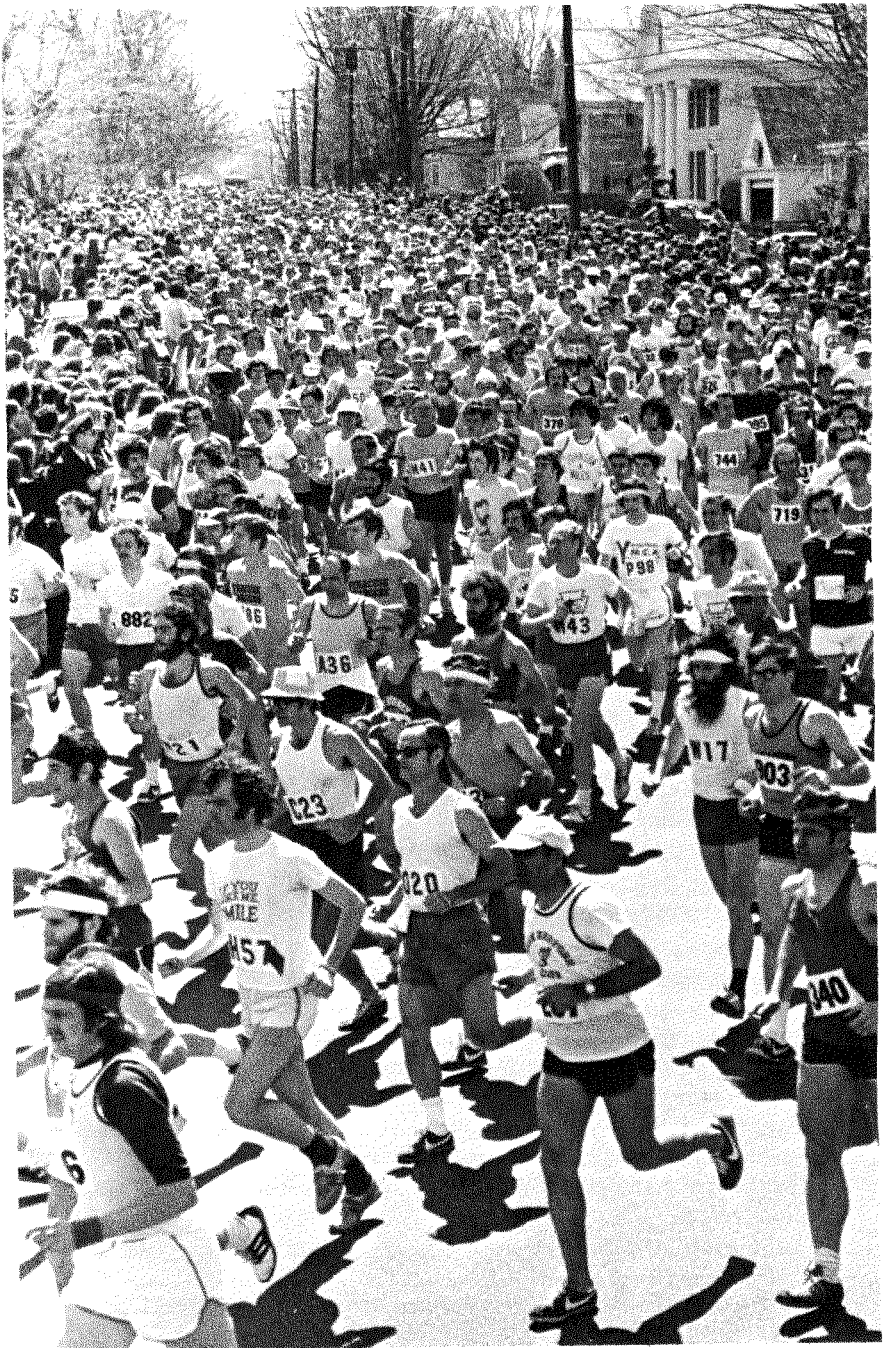
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Dirksen, Jay—"Marathoning for Beginners," *Guide to Distance Running*, 1971, pp. 51-52.

"Racing," *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 46.

"Taking the Plunge," *1972 Marathon Handbook*, Booklet No. 7, Jan. 72, pp. 32-35.



"Runners at these races usually outnumber spectators 100-1, and the other runners are glad to see a new face." (Jeff Johnson photo)

Breathing Principles

“Breathing is simple to assess. If you’re laboring to get air, there’s oxygen debt. Therefore, the run is anaerobic. The more you labor, the more anaerobic it is. If there’s no oxygen debt, it is aerobic.”

—Runner’s Training Guide

“O.D.” doesn’t mean quite the same thing to a runner as to a drug-user, but the two are distantly related. In the drug culture, O.D. means overdose. In running, it refers to oxygen debt. Neither of the two is pleasant.

Going into oxygen debt simply is needing more air than you’re getting during the run. The body can keep working for a while with this debt, but not without a shift in metabolism. This shift yields waste products which act as a drug to deaden the system—the familiar “tightened-up” feeling at the end of a short, hard race.

“Anaerobic” running is the out-of-breath kind. It is “aerobic” when you can talk or whistle while running. All racing is a mixture of aerobic and anaerobic work—the degree of each depending on distance and pace. Ken Dogerty, author of the *Track and Field Omnibook*, lists the following percentages:

Race	Aerobic%	Anaerobic%
440y/400m	25%	75%
880y/800m	50%	50%
Mile/1500m	70%	30%
2 miles/3000m	85%	15%
3 miles/5000m	90%	10%
6 miles/10,000m	95%	5%
Marathon	99%	1%

(The 100y/100m and 220y/200m races are almost 100% anaerobic.)

The significance of these figures is that training parallels them. If you’re a miler and your race is 70% aerobic, for instance, then your percentage of aerobic training should be similar.

By staying “specific” in your training—relating it rather closely to racing distance and/or pace—you automatically take care of the breathing balance.

With training, two things happen which relate to breathing: you increase your capacity to take in and use oxygen by doing aerobic running, and with anaerobic work you increase your tolerance to O.D.

(See related material in “Altitude Training,” “Training Fundamentals,” “Training Methods.”)

For more information:

“Air,” *First Steps to Fitness*, Booklet No. 40, p. 11.

“Balancing the Oxygen Budget,” *Guide to Distance Running*, 1971, p. 91.

“Breathing,” *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 15.

Frederick, E.C.—*The Running Body*, Booklet No. 27, Sept. 73, pp. 24-32.

“Meeting Oxygen Needs,” *Runner’s Training Guide*, Booklet No. 23, May 73, pp. 47-48.

“The Need for Speed,” *New Views of Speed Training*, Booklet No. 4, Oct. 71, pp. 5-10.

Cross-Country Racing

“In cross-country, both track and road runners can get together and get away away—if the race is properly conceived—from the artificial surfaces and dependence on the stopwatch. Back to the earth for a couple of months. Away from restrictive tracks and traffic and times. Back to the purity, beauty, variety and challenge of a run in the country. It’s an ecological experience.”

—Varied World of Cross-Country

Cross-country season—fall in the United States and Canada, winter in most other countries—offers a pure kind of sport. The booklet *Varied World of Cross-Country* defined it as “racing that occurs on more or less natural terrain. This definition excludes man-made tracks and man-made roads.”

Cross-country season is a chance for everyone to get together: those who are using it as a break between track or road racing, and those who see it as an end in itself; those who normally race sprints and middle distances, and the marathon specialists.

The variety here isn’t found anywhere else in running. A road is a road. A track is a track. But cross-country is as different as the courses it’s run over. “In England,” according to *Varied World*, it can mean racing across plowed fields . . . in Europe, racing on flat turf littered with obstacles . . . in Africa, racing over jungle paths . . . in Australia, racing through sand . . . in the United States, racing along golf course fairways.”

The common denominators, though, are usually hills, soft and rough ground and nasty weather. These diminish the importance of the almighty stopwatch, and shift the emphasis to dealing with the basics of nature.

Cross-country distances are modest. Seldom is a race longer than 10-miles. Pre-high schoolers in the United States run 1-2 miles, high schoolers 2-3 miles. The college men go 3-6 miles. The AAU championship distance for men is 10,000 meters (6.2 miles) and for the women 5000 meters (3.1 miles).

The various US championships are run in November. The International meet is each March over courses of 12,000 meters (7½ miles) for senior men, 7000-8000 meters (4½-5 miles) for junior men, and 4000 meters (2½ miles) for women.

Nowhere in running does team scoring and team tactics get more emphasis than in cross-country. The typical scoring system is seven runners compete, the first five finishers score. The team’s score is the sum of the runners places. If they place 1-3-5-7-9, for instance, the team total is 25. Low score wins. The other two team members don’t score, but are “pushers” who force other teams’ runners farther back in the places.

(See related material in “Hill Running Technique,” “Hill Training,” “Steeplechase Racing,” “Team Racing,” “Weather Conditions.”)

For more information:

Lawrence, Al—“Cross-Country Technique,” *Guide to Distance Running*, 1971, pp. 52-53.
 Rosandich, Tom—*Olympia Cross-Country Clinic Notes*, 1967.
 The *Varied World of Cross-Country*, Booklet No. 2, Aug. 71.

Diet Before Racing

“Runners are beginning to wake up to several facts about diet in the pre-race period. First, that it may bring as many problems as benefits. Second, they’re better off eating nothing than too much. Third, food is a fuel which at best extends their mileage only slightly.”

—Food for Fitness

Noted German doctor-coach-researched Ernst van Aaken says, “No one ever got fast by eating.” Yet, as New Zealand coach Arthur Lydiard points out, “The way runners eat before races, you’d think they were worried about dying of malnutrition after 50 meters.”

Van Aaken thinks runners shouldn’t eat at all in the 12-24 hours before a race. They have all the stored fuel they need, he says, and putting more food into a tense system might cause trouble (indigestion, cramping, diarrhea, “stitch,” etc.)

The best advice on eating immediately before competition is this: if in doubt, don’t. This advice applies to the last hours before an event. You can’t help yourself much by eating then. But in long distance running, evidence points to significant benefits from dietary juggling earlier in the pre-race week.

It involves packing the body with high-energy fuel called glycogen. This is a product of carbohydrate foods—starches and sugars found in bread, pasta, potatoes and the like. Runners call this method “carbohydrate-loading.”

The theory behind it: Muscle glycogen supplies are limited. They run low in long races, causing us to slow down or stop. But these reserves can be built up with the special diet, and we can go farther before a “collapse” occurs. The diet does not increase speed, but only delays slowing. It works best in races longer than an hour.

The classic carbohydrate-loading routine involves three steps:

1. A long “depletion” run 7-8 days before the competition. The intent is to drain yourself of glycogen.
2. The protein phase. Keep the glycogen level low by eating high-protein, low-carbohydrate meals—meats, eggs, fish, etc.—for three days.
3. The carbohydrate phase. Pack in the carbs for three days (but don’t interpret this as an invitation to overeat; maintain normal caloric levels).

Paul Slovic tested the results of “loading” in a marathon. He found that the people on this diet had a 6-11½ minute advantage over those who didn’t use it.

The main complaint about the routine is the high-protein phase. Runners say they feel exhausted and irritable then. For them, physiologist Bob Fitts has comforting news. He says the results are almost as good when the three protein days are skipped. He advises taking the “depletion” run 4-5 days before the race, then starting carbohydrate-loading immediately.

(See related material in “Drinks Before Races,” “Recovery After Races.”)

For more information:

“The Body’s Fuel,” Runners’ Diet, Booklet No. 14, Aug. 72, pp. 29-45.

"Diet," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 19.

Fitts, Bob—"The Modified Diet Act," RW, Oct. 74, p. 37.

"The Last Sup?"

"The Last Suppers," Food for Fitness, 1975, pp. 68-82.

Londeree, Ben—"Pre-Event Diet Routine," RW, July 74, pp. 26-29.

"Skip Meets Before Meets," RW, Nov. 71, pp. 38-39.

Slovic, Paul—"Eating Away Precious Minutes," RW, Nov. 74, pp. 34-35.

Van Handel, Peter—"Carbohydrate-Packing," Complete Runner, 1974, pp. 134-140.

Drinks During Races

"Man generally relies on his thirst to control body fluid balance. Unfortunately, this mechanism is far from accurate. In laboratory tests that require about eight pounds of sweat loss, we found that thirst was temporarily satisfied by drinking as little as one pound of water."

—Dr. David Costill, Researcher

Bill Rodgers was on his way to winning the 1975 Boston marathon, possibly headed for a world best time. He was running at better than five minutes per mile with a cool wind at his back.

Then he stopped, took a cup of water and stood in the middle of the road drinking it—looking around to see if anyone was catching him. Two more times before the race ended, Rodgers did the same thing. He explained afterwards that he had to drink and couldn't gulp it down while running.

This says a lot about the value of drinking during long races. If a man running world record pace on a 50-degree day needs to stop for water, we all must need it.

Liquid replacement, or the lack of it, has an effect on performance in long races on any kind of day. When temperature and humidity are high, fluid loss can threaten health—even life itself.

Running doctors say that after you've sweated away about five pounds, body temperature goes up to the point that performance suffers. When the sweat loss hits 10 pounds, heat exhaustion or heat stroke are possible. The latter has killed more than a few runners.

What to drink? Water is the first priority, says Dr. George Sheehan, *Runner's World* medical columnist. "The second priority is sodium chloride (salt), then potassium. These electrolytes, as they are called, are found in commercial 'ade' drinks."

The prepared drinks also have sweeteners, on the theory that they provide quick energy. In fact, heavily-sugared drinks are slow to leave the stomach—and may keep vital water and electrolytes from being absorbed as quickly as they're needed.

How often to drink? Dr. David Costill, a prominent running researcher, recommends taking a pint 10 minutes before the race, and a half-pint at 10-15-minute intervals during the run. If you wait until you're thirsty to drink and drink only as much as your thirst demands, he says, you will go increasingly dry.

Associations Of The A.A.U.



AAU associations often cross state lines or take in only portions of states. The AAU boundaries are the heavy lines.



(See related material in "Diet Before Races," "Injuries and Illnesses," "Recovery After Races," "Weather Conditions.")

For more information:

- "The Body's Regulators," Runner's Diet, Booklet No. 14, Aug. 72, pp. 49-62.
- Costill, David—"To Drink or Not to Drink," Guide to Distance Running, 1971, pp. 29-30.
- "Diet," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 19.
- "First Water, Then Salt," Running With the Elements, Booklet No. 35, May 74, pp. 30-31.
- Mayhew, J.L.—"Drinking on the Run," Complete Runner, 1974, pp. 141-144.
- "The Need to Drink," Food for Fitness, 1975, pp. 83-89.
- Sturak, Tom—"Thinking Man's Drink," RW, Mar. 72, pp. 32-34.
- Van Handel, Peter—"Drinks for the Road," RW, July 74, pp. 29-31.

Entering Races

"Organized running doesn't imply joining up with a bunch of super-serious four-minute milers and 2½-hour marathoners. Organizations have things to offer runners on every level, if only to give a we're-in-this-together feeling to people who otherwise think they're running in isolation."

—First Steps to Fitness

Everyone can find some kind of race to run, but not all runners can enter all kinds of races. Most events have standards that must be met.

Group membership is the key one. All but a few races require affiliation of some type—school or club team, Amateur Athletic Union, Road Runners Club or US Track and Field Federation.

The AAU, RRC and USTFF sponsor most open competition in the United States. For information on the AAU, write to the national office, 3400 W. 86th St., Indianapolis, Ind. 46268. The RRC national president is Gar Williams, Box 454, Star Route, Morrison, Colo. 80465. The USTFF is based at 1225 N. 10th Ave., Tucson, Ariz. 85705.

Each organization is divided into local, state or regional branches. Ask for information on the one nearest you. The accompanying map on pages 20-21 shows AAU district boundaries.

Races are also sometimes limited by the sex, age and speed of participants. The AAU has separate championships for men and women at most distances, and promotes competition for runners under age 20 and over 40.

Most large track meets, and even a few road races, use proven ability as a prerequisite. The Boston marathon, for instance, limited entries with a 3½-hour qualification standard in 1975.

Check the entrance requirements in advance through advertising and entry blanks. Note that most races have entry deadlines and charge entry fees of \$1-3.

(See related material in "Events to Race," "Frequency of Racing," "Information on Races," "Planning Races," "Seasons of Racing.")

For more information:

- "Organizations," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 44.
- "The Ruling Groups," 1974 Runner's Almanac, Booklet No. 33, Mar. 74, pp. 18-23.
- "Where to Go," 1974 Runner's Almanac, Booklet No. 33, Mar. 74, pp. 37-93.
- "Publications," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 44.

Events To Race

"Running and walking events fall roughly into eight categories. 'Roughly' because they don't fall into neat little boxes. Distances are on a continuum, and it isn't easy to tell where one category stops and the next one begins."

—1974 Runner's Almanac

The continuum starts at 50 yards and goes on across whole continents. But for the sake of record keeping, it stops at 24 hours. The eight divisions of the events are:

- Sprints—50-660 yards and their metric equivalents (see chart on page 24).
- Middle distances—880 yards to six miles.
- Long distances—above six miles to marathon (26 miles 385 yards).
- Ultra-long distances—above marathon to 24 hours.
- Hurdles—high, intermediate and low barriers at distances of 50-440 yards.
- Steeplechase—running with barriers and water jumps for 3000 meters (about 1 7/8 miles).
- Relays—the standard ones involving four runners going 110 yards to one mile apiece.
- Race walking—covering the same distances as the middle and long distance runners.

Running is organized into seasons paralleling the seasons of the year. Indoor track is a winter sport, outdoor track goes on in the spring and summer, and cross-country in the fall. Long distance road running and race walking continue year-round.

Indoor track meets may include these events: a short dash of 50-100 yards, 220, 300, 440, 500 and 600, 880, 1000, one mile, two miles, three miles, and a hurdle race of 45-120 yards—plus relays.

Outdoor track meets are made up of these runs: 100, 220, 440, 880 yards, one mile, two miles, three miles, six miles, steeplechase, and various hurdle and relay races.

Cross-country distances range from 1-10 miles. Road runs and walks can be any distance above a mile.

All of these events are often run at metric distances—100 meters instead of 100 yards, 1500 meters instead of a mile, etc. The chart on the next page gives conversions both ways.

(See related material in "Hurdle Racing," "Long Distance Racing," "Middle Distance Racing," "Road Racing," "Steeplechase Racing," "Sprint Racing," "Team Racing," "Track Racing," "Ultra-Distance Racing," "Walking Races.")

For more information:

- "Aspects of the Sport," 1974 Runner's Almanac, Booklet No. 33, Mar. 74, pp. 16-17.
- "Distances and Times," 1974 Runner's Almanac, Booklet No. 33, Mar. 74, pp. 14-15.
- "Running," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 49.

Metric Conversions

(NOTE: A kilometer is 1000 meters)

50 meters = 54 yards 6.5 inches

60 meters = 65 yards 1 foot 10.2 inches

100 meters = 109 yards 1 foot 1 inch

110 meters = 120 yards 10.7 inches

200 meters = 218 yards 2 feet 2 inches

300 meters = 328 yards 3 inches

400 meters = 437 yards 1 foot 4 inches

500 meters = 546 yards 2 feet 5 inches

600 meters = 656 yards 6 inches

800 meters = 874 yards 2 feet 8 inches

1000 meters = 1093 yards 1 foot 10 inches

1500 meters = 1640 yards 1 foot 3 inches

2000 meters = 1 mile 427 yards 8 inches

3000 meters = 1 mile 1520 yards 2 feet 6 inches

4000 meters = 2 miles 854 yards 1 foot 4 inches

5000 meters = 3 miles 188 yards 2.4 inches

6000 meters = 3 miles 1281 yards 2 feet

7000 meters = 4 miles 615 yards 10 inches

8000 meters = 4 miles 1708 yards 2 feet 8 inches

9000 meters = 5 miles 1042 yards 1 foot 6 inches

10,000 meters = 6 miles 376 yards 4.8 inches

12,000 meters = 7 miles 803 yards 1 foot

15,000 meters = 9 miles 564 yards 7.2 inches

20,000 meters = 12 miles 754 yards 9.6 inches

25,000 meters = 15 miles 940 yards 1 foot

30,000 meters = 18 miles 1128 yards 1 foot 2.4 inches

35,000 meters = 21 miles 1316 yards 1 foot 4.8 inches

40,000 meters = 24 miles 1504 yards 1 foot 7.2 inches

50,000 meters = 31 miles 120 yards 2 feet

60,000 meters = 37 miles 476 yards 2 feet 4.8 inches

70,000 meters = 43 miles 872 yards 2 feet 9.6 inches

80,000 meters = 49 miles 1249 yards 2.4 inches

90,000 meters = 55 miles, 1625 yards 7.2 inches

100,000 meters = 62 miles 241 yards 1 foot

50 yards = 45.72m

60 yards = 54.864m

70 yards = 64.008m

100 yards = 91.44m

120 yards = 109.728m

220 yards = 201.168m

300 yards = 274.32m

330 yards = 301.644m

440 yards = 402.336m

500 yards = 457.2m

600 yards = 548.64m

660 yards = 603.504m

880 yards = 804.672m

1000 yards = 914.4m

1320 yards = 1207.008m

One mile = 1609.344m

2 miles = 3218.688m

3 miles = 4828.032m

4 miles = 6437.376m

5 miles = 8046.72m

6 miles = 9656.064m

7 miles = 11,265.408m

8 miles = 12,874.752m

9 miles = 14,484.096m

10 miles = 16,093.44m

15 miles = 24,140.16m

20 miles = 32,186.88m

Marathon = 42,195m

30 miles = 48,280.32m

40 miles = 64,373.76m

50 miles = 80,467.2m

60 miles = 96,560.64m

70 miles = 112,654.08m

80 miles = 128,747.52m

90 miles = 144,840.96m

100 miles = 160,934.4m

Fartlek Training

“Let your imagination and intuition run wild. Change the pace endlessly. Charge the hills. Stretch out going down. Accelerate. Sprint. Stride. Jog. Walk. Let fartlek bursts occur naturally when avoiding onrushing cars at busy intersections...responding to the challenge of a jogger who thinks he’s Jim Ryun... escaping an enraged dog...or just feeling particularly bouncy for no particular reason.”

—New Views of Speed Training

Fartlek. It’s Swedish for “speed play.” The easiest way to explain it is to tell what it isn’t.

Fartlek is not a long, easy distance run in the country with a 50-yard burst tossed in at random—every mile or so. And it is not a structured, fast-slow workout with times taken over measured distances. There’s nothing wrong with either of these methods, but they aren’t fartlek. Fartlek has features of both but is unique.

You do it off the track, but more in the style of interval training than steady distance. It’s a free-form style of intervals, combining all speeds from walking and jogging to sprinting.

Gosta Holmer, the coach who popularized fartlek, said the method develops speed and endurance at the same time, while giving “the feeling of self-creation, of individuality.”

Fartlek sessions, done correctly, are an excellent way to sharpen up for races. Fred Wilt, editor of *Track Technique*, and a series of *How They Train* books, writes, “A short race and a day of fartlek (each week) is adequate for the marathon in terms of speed.” He adds, however, “I am skeptical of fartlek because the athlete tends to let it degenerate into a long, slow jog in the woods.”

The booklet *New Views of Speed Training* gives these tips on fartlek sessions:

1. Cut mileage to 50-75% of the normal daily total.
2. Count on as much as half of the run being done at hard pace—but with adequate recovery from the bursts.
3. Don’t run hard speed days more than every other day. Fartlek, done properly, is hard speed work and can be too draining if done too often.

Give the emphasis to “speed” while retaining the “play.”

(See related material in “Fast Distance Training,” “Hill Training,” “Interval Training,” “Training Fundamentals,” “Training Methods,” “Training Schedules.”)

For more information:

“Fartlek Training,” *Runner’s Training Guide*, Booklet No. 23, May 73, pp. 32-34.

“Fartlek-Type Speed,” *New Views of Speed Training*, Booklet No. 4, Oct. 71, pp. 40-43.

Osler, Tom—*The Conditioning of Distance Runners*, Long Distance Log, 1967.

Fast Distance Training

"Long slow distance is better than nothing, but not nearly so good as long fast distance."

—Fred Wilt, Editor of Track Technique

How fast is "fast?"

The most obvious answer, of course is "all-out" —as fast as you can go for a given distance. But let's dismiss this right away, because it isn't training. It's racing.

Training is sub-maximal work designed to lead to maximal results. You can't run at your maximum every day, but you don't have to jog along, either.

Going 5-10% below racing pace still is fast running, but it's something most runners can handle regularly and build from. (Five per cent is 15 seconds per mile at 5:00 pace, 18 seconds at 6:00, 21 seconds at 7:00. Ten percent is 30 seconds, 36, etc. The accompanying chart has a complete list.)

Another way to judge what's fast is to check your pulse. A pulse rate of 150 immediately after a run is generally thought to be the dividing line between slow and fast running. If you're above 150, you're running fast no matter what the watch says.

Arthur Lydiard advocates rather fast distance training. He says, "In the US, many people believe in the LSD method of running—long slow distance. Let's realize that by running this way you're going to get fine cardiac efficiency. But you also have to realize you haven't got 20 years to develop this efficiency. We have to use a few years' time to best advantage."

Lydiard advises that a runner work "at speeds just under his maximum oxygen uptake. He should be working at a rate which puts some pressure on his heart. So what the LSD runner does in two years, maybe he can do in one."

But Lydiard also has a motto—"train, don't strain"—which applies here.

The booklet *Runner's Training Guide* says, "This thinly-disguised racing gives quite specific fitness, and is nearly as exciting and straightforward as racing itself. These are the main benefits of training this way. However, the negative feature is the work load it imposes. A runner working on fast distance is tempted to slip from *training* into *straining*."

Don't leave your best races on the training course. Plan to run the practice ones 5-10% slower than you're able to go.

(See related material in "Basic Training," "Fartlek Training," "Slow Distance Training," "Training Fundamentals," "Training Methods," "Training Schedules.")

For more information:

"Fast Distance," *Runner's Training Guide*, Booklet No. 23, pp. 39-40.

"How Far," *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 32.

"How Fast," *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 33

"Race-Type Speed," *New Views of Speed Training*, Booklet No. 4, Oct. 71, pp. 35-39.

Degrees Of Speed

Pace per mile (all-out)	For each 1% add	5% slower than max.	10% slower than max.
4:00	2.4 sec	4:12	4:24
4:10	2.5 sec.	4:22	4:35
4:20	2.6 sec.	4:33	4:46
4:30	2.7 sec.	4:43	4:57
4:40	2.8 sec.	4:54	5:08
4:50	2.9 sec.	5:04	5:19
5:00	3.0 sec.	5:15	5:30
5:10	3.1 sec.	5:25	5:41
5:20	3.2 sec.	5:36	5:52
5:30	3.3 sec.	5:46	6:03
5:40	3.4 sec.	5:57	6:14
5:50	3.5 sec.	6:07	6:25
6:00	3.6 sec.	6:18	6:36
6:10	3.7 sec.	6:28	6:47
6:20	3.8 sec.	6:39	6:58
6:30	3.9 sec.	6:49	7:09
6:40	4.0 sec.	7:00	7:20
6:50	4.1 sec.	7:10	7:31
7:00	4.2 sec.	7:21	7:42
7:10	4.3 sec.	7:31	7:53
7:20	4.4 sec.	7:42	8:04
7:30	4.5 sec.	7:52	8:15
7:40	4.6 sec.	8:03	8:26
7:50	4.7 sec.	8:13	8:37
8:00	4.8 sec.	8:24	8:48
8:10	4.9 sec.	8:34	8:59
8:20	5.0 sec.	8:45	9:10
8:30	5.1 sec.	8:55	9:21
8:40	5.2 sec.	9:06	9:32
8:50	5.3 sec.	9:16	9:43
9:00	5.4 sec.	9:27	9:54

Figure the per-mile pace of your best race at a given distance. To run 5% or 10% slower, go at the pace indicated. Say you have run 60 minutes for 10 miles. That's 6:00 per mile. Ten percent slower is 6:36 pace, or 66 minutes.

Frequency Of Racing

"Runners training for races are like children building sand castles. We work long and carefully on the building. Then swoosh! A hard race rolls in like a wave to level the project. Then we carry away the remains to start building again."

—Runner's World

Racing is like a vaccine. The right dose can make you faster than you've ever been before, but too much of it can make you sick.

Racing itself brings runners to their final peaks better than any type of speed training does. Racers at the world class level usually are 5-10 meets into the season before they're ready to run their best times.

But racing is also the most common cause of injuries and poor performances. More precisely, *overracing* is the cause—racing too often with not enough recovery and rebuilding time in between.

Two innovative coaches on different sides of the world, Arthur Lydiard in New Zealand and Ernst van Aaken in Germany, have hinted at how often a person can race.

Lydiard says hard speedwork should total no more than 10% of one's running. Van Aaken goes even lower. He says 2-5% racing and speed training, the rest basic endurance work.

Using these formulas, a runner is limited to one racing mile in 10. And if training is speed-oriented, the amount of racing should be much less.

An easy method of insuring that races are spaced properly is to multiply the race distance by 10 (if races make up 10% of the total), 20 (5%) or 50 (2%). Don't race again until you've covered the resulting quota of miles.

Say you're basically a distance trainer and don't do speed work other than races. You find you work well on the 10% formula. You race 10 miles. Ten times 10 is 100. So you go at least 100 miles before you race again.

This method automatically lets you race more often at the shorter, less taxing distance and less frequently at the longer, tougher ones.

"Two self-adjustments are built into the formula," according to *Runner's World*. "Theoretically, the more one is accustomed to running, the quicker he recovers. The percentage allows a high-mileage runner to compete more often than a lighter trainer. And, in theory, the mile doesn't demand nearly as much recovery time as a marathon. So miles can be run more often." A miler also needs more racing to stay sharp, a marathoner needs more basic work.

(See related material in "Injuries and Illnesses," "Longevity in Racing," "Peaking," "Planning Races," "Recovery After Races," "Rest Before Races.")

For more information:

"Double, Toil and Trouble," RW, July 73, p. 3.

"Race-Type Speed," New Views of Speed Training, Booklet No. 4, Oct. 71, pp. 35-40.

"Training to Compete," RW, Sept. 73, pp. 8-14.

"Racing and Surviving," Run Gently, Run Long, Booklet No. 37, July 74, pp. 74-81.

Sheehan, George—"Overracing and Its Results," RW, Sept. 72, p. 28.

Spacing Of Racing

Racing Distance	Recovery/Rebuilding Mileage		
	10%	5%	2%
1500m/mile	10 miles	20 miles	50 miles
3000m/2 miles	20 miles	40 miles	100 miles
5000m/3 miles	30 miles	60 miles	150 miles
10,000m/6 miles	60 miles	120 miles	300 miles
15 km./10 miles	100 miles	200 miles	500 miles
20 km./Half-mar.	130 miles	260 miles	650 miles
25 km./15 miles	150 miles	300 miles	750 miles
30 km./20 miles	200 miles	400 miles	1000 miles
Marathon	260 miles	520 miles	1300 miles
50 km./31+ miles	310 miles	620 miles	1550 miles
50 miles	500 miles	1000 miles	2500 miles

Racing Time	Recovery/Rebuilding Time		
	10%	5%	2%
5 minutes	1 hour	2 hours	4½ hours
10 minutes	2 hours	3½ hours	8½ hours
15 minutes	2½ hours	5 hours	12½ hours
30 minutes	5 hours	10 hours	25 hours
One hour	10 hours	20 hours	50 hours
1½ hours	15 hours	30 hours	75 hours
2 hours	20 hours	40 hours	100 hours
2½ hours	25 hours	50 hours	125 hours
3 hours	30 hours	60 hours	150 hours
4 hours	40 hours	80 hours	200 hours
6 hours	60 hours	120 hours	300 hours

The easiest way to keep racing under control is to run a certain quota of recovery/rebuilding mileage before racing again. The charts here list quotas on the basis of 10% racing, 5% and 2%. The quotas simply are the racing distances times for 10, 20 and 50. The second chart does the same thing, but in time terms for those who keep their records that way.

Hill-Running Technique

"Few runners enjoy hills. Some like the advantages hills give them in relation to their opponents. Some like being able to say when it's behind them, 'There, I beat you.' But few like the actual running of hills."

—*Runner's World*

Shakespeare never ran a cross-country or road races, as far as we know, but he knew of the experience when he wrote that hills "draw out our miles and make them wearisome."

Uphill running obviously slows us down, but without giving the usual rest of slowing. The body still may be working at five minutes per mile effort while moving at only eights or nines.

By comparison, downhill running is easier. But it isn't completely relaxing, either. Gravity tugs you out of control. The feet, calves, knees and thighs take a terrible beating.

"The hills will find you out," Arthur Lydiard has written. They'll find out what kind of shape you're in, and how well you know how to get up and down hills.

The best tactic for racing on hills is to train on hills. Hill racing is strength work, and hill training builds the necessary muscles for it. (This subject is covered in more detail in the following section.)

Climbing hills is more a matter of brute strength and pacing than special technique. The descent is more a matter of style.

The booklet *Running With Style* tells how to run downhill:

"Lean forward. Keep the torso perpendicular to the ground. Run with the same action and footplant as on the level. The normal and inefficient tendency is to hold the arms high, lean back and brake with the heels."

If a race has an equal amount of uphill and downhill running, count on your time still being significantly slower than it would be on the flat. According to Dr. David Costill, you never make up as much time going down as you've lost going up.

(See related material in "Cross-Country Racing," "Hill Training," "Road Racing.")

For more information:

"Gearing Yourself for Hills," *RW*, Oct. 73, pp. 20-21.

Higdon, Hal—"Secrets of the Hills," *RW*, July 74, pp. 32-34.

Higdon, Hal—"Advanced Lessons on Hills," *RW*, Aug. 74, pp. 14-17.

Hill, David—"Profiles of a Mountain Man," *RW*, Sept. 74, pp. 18-19.

"Hills," *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 31.

Lawrence, Al—"Cross-Country Techniques," *Guide to Distance Running*, 1971, pp. 52-53.

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"The hills find out what kind of shape you're in, and how well you know how to get up and down." (Jeff Johnson photo)

Hill Training

"Training on the downhill slope will accomplish an increase in frequency of strides, increase in length of stride and adjustment to speeds faster than those attained on a flat surface. Training on the uphill incline will increase leg strength, knee lift, rhythm and speed-endurance."

—Milan Milakov, Yugoslavian Coach

Much of the research on running techniques has come from the Soviet Union. Several years ago, for instance, scientists at Tartu University compared nine different training methods for short-term results. The methods ranged from long steady running to interval sprinting. One group of previously untrained individuals did repeated uphill runs.

All 94 subjects took time trials at 100, 400 and 800 meters to start the test, trained on their respective methods three times a week for six weeks, then were timed again.

The uphill trainers scored best at two of the three distances and were a close second in the other. They improved by an average of three-tenths of a second at 100 meters, 3.85 seconds in the 400 (trailing the long sprint group by just five-hundredths) and 12.85 seconds over 800 meters.

These results are no surprise when you realize what hills do to the body both while climbing and descending. Uphills send the pulse and breathing rates up, and build muscle strength. Downhills stretch out the stride.

For these reasons, hill training might be called "speed-work in disguise." Despite the slow pace while going up and the relative ease of coming back down, the physiological benefits are much the same as (sometimes even superior to) those of fast running on the flat.

Both kinds of running—up and down—are staples of the training diets of coaches Jim Bush and Arthur Lydiard. Bush's quarter-milers, who regularly rank with the best in the world, train most of the year on a 500-yard incline at UCLA. In the widely-used Lydiard system, half-mile uphill *springing* and downhill *striding* provide the transition between road and track work.

A number of coaches, both in the US and Europe, report that best hill-training results come when the inclines are moderate and can be run with near-normal motion. Hands-and-knees climbing and out-of-control downhill racing are less effective—and can be exhausting and dangerous.

(See related material in "Cross-Country Racing," "Hill-Running Technique," "Strength-Training Exercises," "Training Fundamentals," "Training Schedules.")

For more information:

"Gearing Yourself for Hills," RW, Oct. 73, pp. 20-21.

"Hills," First Steps to Fitness," Booklet No. 40, Oct. 74, p. 31.

"There's Speed in the Hills," RW, Mar. 73, pp. 22-23.

Hurdle Racing

"Hurdling is a sprinting event. To a beginning hurdler, this may seem an impossibility. The beginner will view the hurdle as a barrier and consider jumping over it. But hurdling is not a jumping event. The first lesson in hurdling is that one needs to clear a hurdle in an elongated running stride, with as little deviation from correct sprint form as possible."

—Hurdling and Steeplechasing

Hurdle racing, at any of its distances and heights of hurdles, requires a combination of talents: the speed of a sprinter, the flexibility and technical proficiency of a gymnast, and the courage of a halfback. Hurdlers train in all these areas.

While running comes naturally, hurdling doesn't. The technique of sprinting over hurdles must be carefully taught. Most beginners are hurdle shy. They approach the hurdle as if it were made of brick and had electrified barbed wire on top.

Coaches overcome this shyness by starting their athletes from the ground up. At first, they just lay a stick on the ground and tell their pupils to hit it in stride. They gradually prop up the stick (which isn't as fearsome as a solid hurdle) until the beginners are clearing it at full height with good form. Only then do they graduate to actual hurdles.

The indoor hurdle races for men and women generally range from 45-70 yards. Outdoors, the men's high hurdles are 120 yards, the "lows" 180 or 330 yards, the "intermediates" 330 or 440 yards. Women run 100 and 400 meters. This chart lists specifications for the various events:

Event	Distance	Height	Number	Spacing
Men's highs	120y/110m	3'6"	10	10 yds.
H.S. highs	120y	3'3"	10	10 yds.
H.S. lows	180y	2'6"	8	20 yds.
Men's intermediates	440y/400m	3'0"	10	40 yds.
H.S. intermediates	330y	3'0"	8	40 yds.
Women's "highs"	100m	2'9"	10	10 yds.
Women's "lows"	400m	2'6"	10	40 yds.

Hurdlers use the same basic and sharpening training as sprinters. In fact, sprint speed is so important in hurdling that the hurdlers also must be capable of competing well on the flat.

(See related material in "Steeplechase Racing," "Sprint Racing.")

For more information:

Gambetta, Vernon—Hurdling and Steeplechasing, Booklet No. 38, Aug. 74, pp. 4-37.

Johnson, Brooks—"Try This for a Start," Complete Runner, 1974, pp. 242-250.

Powell, John—"Learning Hurdling," Complete Runner, 1974, pp. 251-257.

Wilt, Fred—"How They Train" Sprinting and Hurdling, Tafnews Press, Los Altos, Ca. 1973.

Information On Races

"The closest most runners get to an authority who can answer their questions and solve their problems is through the magazines and books they read."

—First Steps to Fitness

If you have advertising dollars to spend, a safe place to put them is in running publications. Runners read *everything* in a magazine—ads as well as articles—looking for information which applies to them.

Magazines are silent coaches in another sense besides the technical one. They also tell where to go and what has happened in the sport.

Most newspapers put running on a plane with frisbee-tossing and report little or nothing about it. So we have to look elsewhere for schedules and results. Local club newsletters do the best job of reporting your own races, but national and international publications also cover this. Seven which include race information:

- *Athletica*—concentrating on Canadian news. Box 4981, Vancouver, B.C. V6B 4A6, Canada.
- *Athletics Weekly*—British and world news. 344 High Street, Rochester, Kent, England.
- *Long Distance Log*—events above the track distances. P.O. Box 190, Tucson, Ariz. 85702.
- *Ohio Race Walker*—national and international walks. 3184 Summit Street, Columbus, Ohio 43202.
- *Runner's World*—emphasizing long distance events. P.O. Box 366, Mountain View, Calif. 94040.
- *Track and Field News*—mostly men's events. P.O. Box 296, Los Altos, Calif. 94040.
- *Women's Track & Field World*—only track magazine exclusively about females. P.O. Box 371, Claremont, Calif. 91711.

(See related material in "Age-Group Racing," "Cross-Country Racing," "Entering Races," "Events to Race," "Hurdle Racing," "Long Distance Racing," "Middle Distance Racing," "Road Racing," "Seasons of Racing," "Steeplechase Racing," "Sprint Racing," "Team Racing," "Track Racing," "Ultra-Distance Racing," "Walking Races," "Women's Competition.")

For more information:

- "Organizations," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 38.
- "Publications," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 44.
- "The Ruling Groups," 1974 Runner's Almanac, Booklet No. 33, Mar. 74, pp. 18-23.
- "Where to Go," 1974 Runner's Almanac, Booklet No. 33, Mar. 74, pp. 37-93.

Injuries And Illnesses

“When we feel good, look good and are alert and productive, our bodies will be adapting effectively to stresses (like running) which we place upon them. If we feel tired, pain and are washed out, we need rest, not stress.”

—Tom Osler, running theorist

Racing is pushing the body at red-line pace. It's testing your own breaking point—and, unfortunately, you often find it. *Runner's World* has found in surveying its readers that those who race get hurt significantly more often than non-racers. More than twice as often!

Racing is intentionally stressful. It wouldn't be worth doing if it were easy. But we don't go into it with the intention of hurting ourselves in the injury of illness sense.

Racers get hurt because they push beyond their ability to adapt to stress. The reasons why this happens are many:

1. Inadequate preparation in terms of distance or pace—going beyond the “collapse point” or shifting too suddenly from slow to fast pace.
2. Inadequate recovery from the last race or hard workout.
3. Inadequate warmup before a hard burst of speed.
4. Running while ill or sore.
5. Environmental stress—excessive heat, cold, wind, altitude, etc.

Chronic fatigue, muscle soreness, colds and sore throats, and a disinterest in running are all symptoms of overstraining. They indicate the need for cutting back your running—not increasing the stress with a race.

But runners aren't known for using common sense before and during races. So instead of easing off, they plunge on, trying to run through pain. They often end up running through it for the next several days, weeks or months.

Racing brings out the worst.

(See related material in “Basic Training,” “Diet before Races,” “Drinks during Races,” “Frequency of Racing,” “Nervousness before Races,” “Recovery after Races,” “Rest before Races,” “Strength-Training Exercises,” “Stretching Exercises,” “Warm-up and Warmdown,” “Weather Conditions.”)

For more information:

- “Causes and Prevention,” *Encyclopedia of Athletic Medicine*, June 72, pp. 5-22.
- “Got That Rundown Feeling?” *RW*, Sept. 71, pp. 36-37.
- “Illnesses,” *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 35.
- “Injuries,” *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 36.
- “Internal Problems,” *Encyclopedia of Athletic Medicine*, June 72, pp. 55-76.
- Jackson, Ian—“The Root of All Training,” *Complete Runner*, 1974, pp. 288-297.
- Osler, Tom—“Avoiding All Injuries,” *Complete Runner*, 1974, pp. 100-105.
- “Self-Help,” *Athlete's Feet*, Booklet No. 42, Dec. 74, pp. 19-41.
- Sheehan, George—“Structural Troubles,” *Complete Runner*, 1974, pp. 106-110.
- “Stress,” *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 51.

Interval Training

"The beauty of this method is its adaptability. It can be used as endurance training, as pace work, or as speed sharpening—or as combinations of all three."

—**Runner's Training Guide**

Interval training is a formalized descendant of "fartlek" (speed-play), which itself is perhaps the most natural form of running: varying paces with frequent recovery pauses.

Interval training doesn't have to be done on a track, under a watch and with a fixed schedule, though it is usually thought of that way. It is thought of, too, as being primarily a "sharpening" activity, but it can be just as effective for building an endurance base.

Interval training is as adaptable as you want to make it, since there are five variables involved. Together, they spell "DIRTY."

- *Distance* of each fast run.
- *Interval* of recovery between fast runs.
- *Repetitions* (number) of fast runs.
- *Time* of each fast run.
- *Your activity* (walking, jogging, resting) between fast runs.

This type of stop-and-go work lets runners go farther and/or faster than they could without the recovery pauses.

Dr. Ernst van Aaken, who's usually regarded as a slow-distance advocate, says runners can greatly extend their distance range by stopping for brief walks before fatigue mounts. He particularly recommends this method to beginners and to anyone else stepping up training mileage.

Mihaly Igloi, a coach of many world record setters, uses interval training almost to the exclusion of all else. Rarely do his athletes go more than a few hundred yards at a time. But they finish their workouts with a total of 10-25 miles of high-speed work.

Some interval trainers follow the "Gerschler-Reindell law." It states that "the running effort in interval training should send the heart rate to around 180 beats per minute. From this point, the heart is allowed 90 seconds to return to 120-125 beats per minute. If it takes longer, the effort demanded has either been too violent or too long."

(See related material in "Fartlek Training," "Hill Training," "Peaking," "Training Fundamentals," "Training Methods," "Training Schedules.")

For more information:

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Gardner, Jim and Purdy, Gerry—Computerized Running Training Programs, 1970.

"Interval Training," Runner's Training Guide, Booklet No. 23, May 73, pp. 35-36.

"Interval-Type Speed," New Views of Speed Training, Booklet No. 4, Oct. 71, pp. 44-47.

"One Workout with Everything," RW, Sept. 74, pp. 24-25.

Long Distance Racing

"The marathon isn't a single race. It's as many races as there are people in it, each runner poking around the edges of his or her own ability. The winners in marathons are the people who reach or go past their imagined limits. Using this standard, everyone who starts a race is a potential winner."

—1975 Marathon Handbook

The marathon is only the best known in a whole family of racing distances, all related by the kind of challenge they offer. In all of these races, the runner vs. runner competition is less important than runner vs. him/herself. In these events, unlike shorter ones, simple survival may be a victory.

Here, we define the "long" distances as those beyond the usual track limit of six miles/10,000 meters, through the marathon. Most of these races are run on the roads.

In the United States, the championship distances for men, women, masters (age 40-plus) and juniors (19 and under) include: 15, 20, 25 and 30 kilometers, marathon and one hour. Records may also be set in track runs at 10, 15, 20 miles and two hours. The half-marathon (13.11 miles) is a semi-standard racing distance.

Another attraction of long distance races—besides runner vs. self—is that these runs are usually open to all. Even the national championships have no ability restrictions.

A third appealing feature was mentioned in the *1975 Marathon Handbook*: "Nowhere else in running is the racing return so linked to training investment as in marathoning. The difference between finishing and not finishing, or between a four-hour and a three-hour marathon is most often found in the runner's daily, weekly and monthly mileage totals."

Endurance is favored over speed. A persistent runner can often outlast one with more native ability.

"Other than proper training," the *Handbook* says, "there are no prerequisites for surviving a marathon. Runners as young as five and as old as 79 have done it. Thousands of men and hundreds of women. Blind runners. 'Runners' in wheelchairs. Recovered heart attack victims. . ."

(See related material in "Cross-Country Racing," "Events to Race," "Frequency of Racing," "Pacing," "Recovery after Races," "Rest before Races," "Road Racing," "Tactics of Racing," "Ultra-Distance Racing," "Walking Races.")

For more information:

- Dirksen, Jay—"Marathoning for Beginners," *Guide to Distance Running*, 1971, pp. 51-52.
 "Long Distances," *Runner's Training Guide*, Booklet No. 23, May 73, pp. 87-88.
 "Making Your Own Time," *1975 Marathon Handbook*, Booklet No. 44, pp. 13-21.
 Slovic, Paul—"Distance Training," *Complete Runner*, 1974, pp. 320-326.
 Wilt, Fred—"How They Train: Long Distances," *Tafnews Press*, Los Altos, Calif., 1973.

Longevity In Racing

"The pursuit of excellence is so fast and hard that runners who choose this road don't often stay on it for long—"long" in this case meaning 10, 20 or more years, with no desire to stop. Pursuing excellence means suffering, sacrificing and gambling. It isn't easy to keep doing these things unless a person keeps meeting his high standards, and it is all but impossible to meet these standards year after year."

—The Complete Runner

It's a fundamental rule of pacing that distance is inversely proportional to speed. In other words, the faster you go, the less distance you're able to go. This refers to individual races. But the same rule applies, to some extent, to entire running careers.

The people who hit running the hardest are the least likely to last out the long haul. The strain of the pace they try to hold is too much. For a number of reasons, those who race best seldom last longest in the sports.

The reasons are partly physical, mostly psychological. Many runners break down with injury from the pace. But many more simply get tired of pushing. They lose interest in the chase because of their goals. They either reach them or see they can't reach them—and either way they feel there's nothing left to chase.

So the turnover rates at the top are quite high. The booklet *Racing Techniques* quotes some figures: More than half of the world ranked runners in any year are new to the list. Fifty-seven percent will be there only one year. Only one in 10 will rank this high for two or more years.

The conclusion: "The effort that gets them this far is so demanding that it's hard to sustain over long periods. Secondarily, the mentality (competitive instinct, determination, singleminded attitude) that pushes a man to the limits won't let him settle for anything less than that. Once he starts slipping, good-bye running."

A way to last is to adjust pace and goals with changing times. Look at your career as if it's a race. If you're planning to run indefinitely, don't sprint the first mile as if it's your last. Find a pace you can comfortably carry for the entire distance. If you're planning to run for 26 years, treat the first year like the first mile of a marathon.

(See related material in "Age-Group Racing," "Attitudes, on Competition," "Frequency of Racing," "Injuries and Illnesses.")

For more information:

"The Only Way to Lose" and "The Ideal," *Run Gently, Run Long*, pp. 6-14, 82-91.

"Prolonging Running Life," 1971 *Marathon Handbook*, pp. 34-37.

"Quitting," *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 45.

"Runs That Never End," *Complete Runner*, 1974, pp. 146-151.

Middle Distance Racing

"The mile is the true measure of a runner. It demands a unique mixture of your maximum speed, strength and endurance—while in other races any one of these will do. And it is the classical confrontation with the stopwatch, where moments no longer than a pause in a conversation damn you."

—George Sheehan, RW medical writer

The mile is to middle distance racing as the marathon is to the long distances and the 100 is to the sprints. A classic distance. Even people who don't run know what a mile is, what it takes to face one and what the times mean.

This is good and bad. Good because the mile attracts attention to running from those who otherwise ignore it. Bad because it takes attention away from surrounding events with the same mixture of demands.

The half-mile, for instance, is one of the most ignored events in track. Peter Snell, 1960 Olympic champion at 800 meters, had to move to the mile before he got full credit as a superstar. Jim Ryun probably had even more potential in the half than the mile, but seldom ran the shorter distance.

We define the middle distances as those from 800 meters/880 yards to six miles/10,000 meters. They're usually run on the track, indoors or outdoors. Track meets for men include these races: 880 and 1000 yards, one, two, three and six miles or their metric equivalents. Women run through two miles.

Top-level middle distance racing, as Dr. Sheehan points out, requires the speed of a quarter-miler and the endurance of a cross-country runner.

It isn't unusual for half-milers to train 50-100 miles a week, and for six-milers to do as much volume as marathoners. And at the same time, they may both include more speedwork than sprinters do.

Because of their training, we often see milers and half-milers like Ryun running on mile relay teams, and doing well because they're stronger than most sprinters. Six-milers like Frank Shorter effectively use their superior speed as they move up to the marathon.

But the mile remains the focus. George Sheehan writes, "This is no ordinary race that can be run again and again. The mile is the culmination of months of training, the final accomplishment of the athlete's year. That year starts in September with long runs over the autumn countryside, and continues through a winter of further extending the body's endurance, and then finally a spring of quarter-miles that would test a saint."

(See related material in "Cross-Country Racing," "Events to Race," "Frequency of Racing," "Pacing," "Tactics in Racing," "Track Racing.")

For more information:

"Middle Distances," *Runner's Training Guide*, Booklet No. 23, May 73, pp. 83-85.
Wilt, Fred—*How They Train: Middle Distances*, Tafnews Press, Los Altos, Calif. 1973.

Nervousness Before Races

“The waiting is the worst. You can’t wait to get started, yet at the same time you don’t know if you want to start—or will be able to. The last hours drag unmercifully, and a troubled mind fills them with a month’s worth of worrying. Every thought and move seems to pass under a microscope.”

—Racing Techniques

The worst fear before races is the “fear of fear itself.” Runners tend to look on pre-race nervousness as something harmful. In reality, it’s a normal part of preparing for hard effort and should be accepted as such.

The booklet *Practical Running Psychology* calls it “a useful kind of fear,” and quotes marathoner Ron Hill. “This is a good thing to develop, you know,” Hill says. “It keeps you moving.”

This doesn’t mean the anxiety is pleasant. It can be most distressing at times. But it’s a little easier to handle if you know what’s happening and why. The usual symptoms are these:

- Dryness of mouth—often called “cotton-mouth.”
- Stomach distress—an unsettled feeling; often accompanied by decreased appetite, and in some cases vomiting.
- Heavy perspiration.
- Frequent urination and mild diarrhea.
- Deeper, more rapid breathing.
- Faster, stronger heartbeat.
- Tense, tight muscles—particularly in the neck and shoulder area.
- Overall feeling of weakness and lethargy.
- Pale complexion.
- Fingernail biting—and other unconscious hand-occupying actions.
- Irritability and restlessness—along with difficulty getting to sleep and staying asleep.
- Withdrawal from social contacts.
- Vague desire to escape the event at hand, and to establish excuses in advance for failing to perform up to expectations.

Every runner suffers from some of these. They’re only harmful when they interfere with actual race performance, or interfere with normal living for several days or weeks before the race.

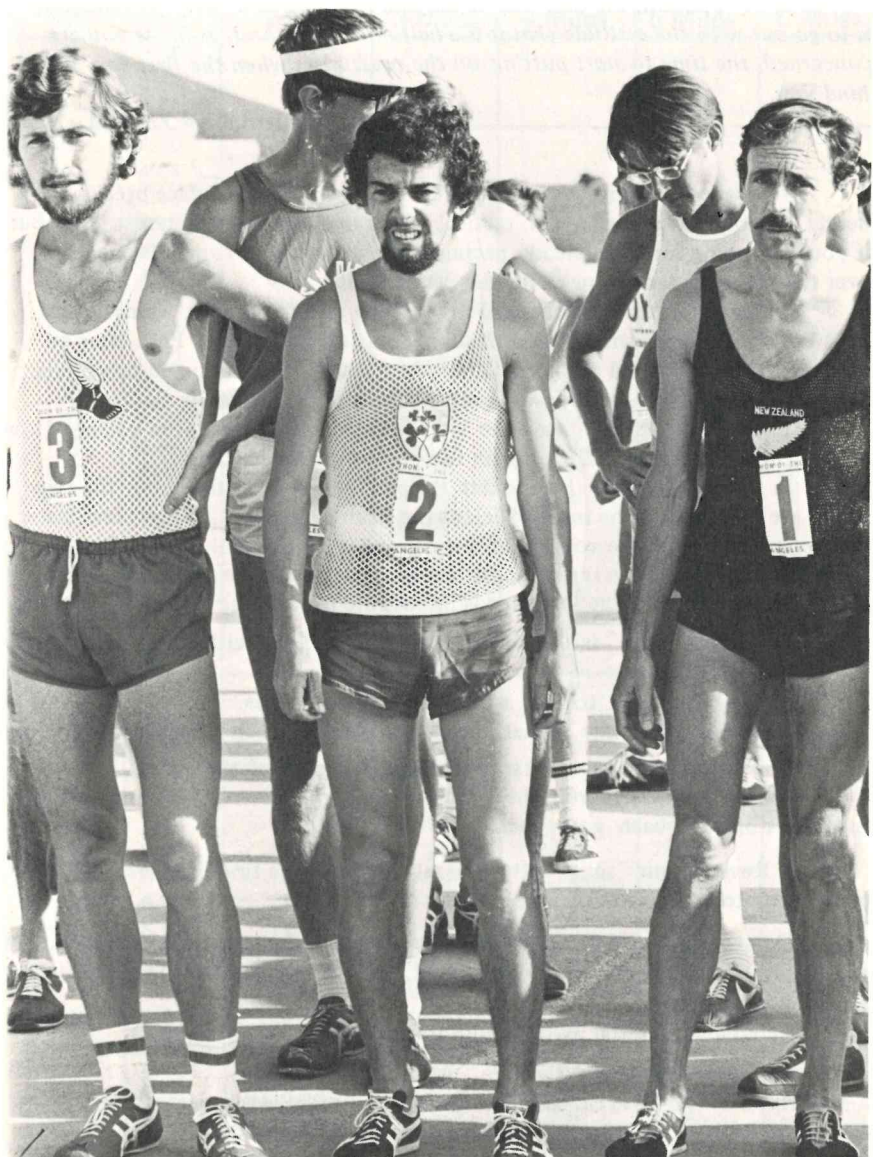
Runners practice a number of rituals to put down their fears. Training patterns in the last days, pre-race diet, uniform and shoes, warmup routine are important if for no other reason than they give some comfort at an unsettled time.

(See related material in “Attitudes on Competition,” “Diet before Races,” “Rest before Races.”)

For more information:

"Taking Pains," Racing Techniques, Booklet No. 13, July 72, pp. 4-11.

"A Useful Kind of Fear," Practical Running Psychology, May 72, pp. 39-40.



Even the best runners—(l-r) Tom Fleming, Neil Cusack, Jack Foster—wear worried looks. (M.J. Baum photo)

Pacing The Race

"In my opinion, the best way to get the full benefit of ability in the mile is to go out with the attitude that it is a half-mile race. And, as far as you are concerned, the time to start putting on the pressure is when the first half is behind you.

—Arthur Lydiard, New Zealand

Even-paced running, it's said, breaks records. Change of pace breaks hearts. If you're running to win, tactical bursts of speed might interest you. But if you're running for time, steady pacing is the way to go. It spreads energy over the racing distance and yields the fastest times.

You must control your natural urges when running evenly. Consciously hold back at the start when you're feeling fresh and full of run. Push later on when you're hurting and drained. Otherwise, you'll have an up-and-down race: fast first quarter, slow second, slower third and a slight revival on the fourth.

Almost without exception, the world records come with even pacing. How even? The first and last halves within five seconds of each other.

"In theory," reports the booklet *Racing Techniques*, "the closer the two halves are to equality, the more efficient the pacing has been. If you start faster than you finish, you lose considerably more speed in the last half than you've gained in the first. However, it's possible, too, to drop so far behind even pace in the early stages that the lost time is impossible to make up."

The "safety range" is about five seconds per mile on either side of even pace. Here's how to figure it:

1. Say you want to run a 10-mile in 60 minutes.
2. Divide that time in half. (30 minutes for each 5 miles in even pace.)
3. Add and subtract 50 seconds—five per mile of the race.
4. You can safely run the first five miles between 29:10 and 30:50, and still hope to reach your goal.
5. Review your "splits" after the race to see if the first-half pace should be speeded up or slowed down next time.

"Plan the first half," the booklet says, "and let the second half happen. Run the first half with the caution of a scientist, and the last half with the creative abandon of an artist . . ."

(See related material in "Planning Races," "Tactics in Racing.")

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 "Guide to Perfect Pacing," *Guide to Distance Running*, 1971, pp. 56-57.
 Moore, Dan—"Proper Pace for the Long Race," *RW*, Dec. 74, pp. 28-29.
 "Racing and Pacing," *Racing Techniques*, Booklet No. 13, July 73, pp. 12-26.
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Pacing: 1-6 Miles

440	Mile	2 Miles	3 Miles	4 Miles	5 Miles	6 Miles
57	3:48					
58	3:52					
59	3:56					
1:00	4:00					
1:01	4:04					
1:02	4:08	8:16				
1:03	4:12	8:24				
1:04	4:16	8:32	12:48	17:04		
1:05	4:20	8:40	13:00	17:20		
1:06	4:24	8:48	13:12	17:36	22:00	26:24
1:07	4:28	8:56	13:24	17:52	22:20	26:48
1:08	4:32	9:04	13:36	18:08	22:40	27:12
1:09	4:36	9:12	13:48	18:24	23:00	27:36
1:10	4:40	9:20	14:00	18:40	23:20	28:00
1:11	4:44	9:28	14:12	18:56	23:40	28:24
1:12	4:48	9:36	14:24	19:12	24:00	28:48
1:13	4:52	9:44	14:36	19:28	24:20	29:12
1:14	4:56	9:52	14:48	19:44	24:40	29:36
1:15	5:00	10:00	15:00	20:00	25:00	30:00
1:16	5:04	10:08	15:12	20:16	25:20	30:24
1:17	5:08	10:16	15:24	20:32	25:40	30:48
1:18	5:12	10:24	15:36	20:48	26:00	31:12
1:19	5:16	10:32	15:48	21:04	26:20	31:36
1:20	5:20	10:40	16:00	21:20	26:40	32:00
1:21	5:24	10:48	16:12	21:36	27:00	32:24
1:22	5:28	10:56	16:24	21:52	27:20	32:48
1:23	5:32	11:04	16:36	22:08	27:40	33:12
1:24	5:36	11:12	16:48	22:24	28:00	33:36
1:25	5:40	11:20	17:00	22:40	28:20	34:00
1:26	5:44	11:28	17:12	22:56	28:40	34:24
1:27	5:48	11:36	17:36	23:12	29:00	34:48
1:28	5:52	11:44	17:48	23:28	29:20	35:12
1:29	5:56	11:52	17:48	23:44	29:40	35:36
1:30	6:00	12:00	18:00	24:00	30:00	36:00
1:31	6:04	12:08	18:12	24:16	30:20	36:24
1:32	6:08	12:16	18:24	24:32	30:40	36:48
1:33	6:12	12:24	18:36	24:48	31:00	37:12
1:34	6:16	12:32	18:48	25:04	31:20	37:36
1:35	6:20	12:40	19:00	25:20	31:40	38:00
1:36	6:24	12:48	19:12	25:36	32:00	38:24
1:37	6:28	12:56	19:36	25:52	32:20	38:48
1:38	6:32	13:04	19:36	26:08	32:40	39:12
1:39	6:36	13:12	19:48	26:24	33:00	39:36

Pacing: 5-50 Miles

Mile	5 Miles	10 Miles	15 Miles	20 Miles	Marathon	50 Miles
4:50	24:10	48:20	1:12:30	1:36:40	2:07:44	
5:00	25:00	50:00	1:15:00	1:40:00	2:11:06	
5:10	25:50	51:40	1:17:30	1:43:20	2:15:28	
5:20	26:40	53:20	1:20:00	1:46:50	2:19:50	
5:30	27:30	55:00	1:22:30	1:50:00	2:24:12	
5:40	28:20	56:40	1:25:00	1:53:20	2:28:34	
5:50	29:10	58:20	1:27:30	1:56:40	2:32:56	
6:00	30:00	1:00:00	1:30:00	2:00:00	2:37:19	5:00:00
6:10	30:50	1:01:40	1:32:30	2:03:20	2:41:41	5:08:20
6:20	31:40	1:03:20	1:35:00	2:06:40	2:46:03	5:16:40
6:30	32:30	1:05:00	1:37:30	2:10:00	2:50:25	5:25:00
6:40	33:20	1:06:40	1:40:00	2:13:20	2:54:47	5:33:20
6:50	34:10	1:08:20	1:42:30	2:16:40	2:59:09	5:41:40
7:00	35:00	1:10:00	1:45:00	2:20:00	3:03:33	5:50:00
7:10	35:00	1:11:40	1:18:20	2:23:20	3:07:55	5:58:20
7:20	36:40	1:13:20	1:50:00	2:26:40	3:12:17	6:06:40
7:30	37:30	1:15:00	1:52:30	2:30:00	3:16:39	6:15:00
7:40	38:20	1:16:40	1:55:00	2:33:20	3:21:01	6:23:20
7:50	39:10	1:18:20	1:57:30	2:36:40	3:25:23	6:31:40
8:00	40:00	1:20:00	2:00:00	2:40:00	3:29:45	6:40:00
8:10	40:50	1:21:40	2:02:30	2:43:20	3:34:07	6:48:20
8:20	41:40	1:23:20	2:05:00	2:46:40	3:38:29	6:56:40
8:30	42:30	1:25:00	2:07:30	2:50:00	3:42:51	7:05:00
8:40	43:20	1:26:40	2:10:00	2:53:20	3:47:13	7:13:20
8:50	44:10	1:28:20	2:12:30	2:56:40	3:51:35	7:21:40
9:00	45:00	1:30:00	2:15:00	3:00:00	3:56:00	7:30:00
9:10	45:50	1:31:40	2:17:30	3:03:20	4:00:22	7:38:20
9:20	46:40	1:33:20	2:20:00	3:06:40	4:04:44	7:46:40
9:30	47:30	1:35:00	2:22:30	3:10:00	4:09:06	7:55:00
9:40	48:20	1:36:40	2:25:00	3:13:20	4:13:28	8:03:20
9:50	49:10	1:38:20	2:27:30	3:16:40	4:17:50	8:11:40

Pacing: One Hour

Distance	Per Mile	Distance	Per Mile	Distance	Per Mile
7 miles	8:35.46	9 miles	6:40.00	11 miles	5:27.24
7¼ miles	8:16.50	9¼ miles	6:29.16	11¼ miles	5:20.00
7½ miles	8:00.00	9½ miles	6:19.02	11½ miles	5:13.08
7¾ miles	7:44.50	9¾ miles	6:09.24	11¾ miles	5:06.20
8 miles	7:30.00	10 miles	6:00.00	12 miles	5:00.00
8¼ miles	7:16.32	10¼ miles	5:51.24	12¼ miles	5:53.88
8½ miles	7:03.44	10½ miles	5:42.84	12½ miles	4:48.00
8¾ miles	6:51.42	10¾ miles	5:34.80	12¾ miles	4:42.36

Safety Margins

Distance	Time*	Distance	Time*
Mile	5 sec.	1500m	5 sec.
2 miles	10 sec.	2000m	6 sec.
3 miles	15 sec.	3000m	9 sec.
4 miles	20 sec.	5000m	15 sec.
5 miles	25 sec.	10,000m	31 sec.
6 miles	30 sec.	15,000m	48 sec.
10 miles	50 sec.	20,000m	1:02
15 miles	1:15	25,000m	1:17
20 miles	1:40	30,000m	1:33
Marathon	2:10	50,000m	2:35

* Divide the projected time for a race in half to determine even pace; then add or subtract this factor to find the fastest and slowest you should be at the half-way point.

Peaking For Races

“Conditioning for racing can be likened to making a steel knife. There are three basic steps in knife making: (1) preparation of the raw material and tempering to produce durability and toughness; (2) grinding and sharpening to produce a rough cutting edge; (3) polishing and honing to get a razor edge and a bright finish.”

—Pat Lanin, high school coach

Tom Osler, in his mini-classic *The Conditioning of Distance Runners*, identifies two parts of training: “base work” and “sharpening.” The two are inseparable.

With slow basic training along, a runner is as strong as a water buffalo and about as graceful. He or she feels awkward at race pace because the cutting edge isn't there. But it does no good, either, trying to sharpen weak material. Without the base work, you can't hold an edge.

Base work and sharpening go together, in that order. Your foundation of endurance training determines how high your speed-trained peak will extend.

Actually, you don't suddenly stop base work one day and begin sharpening the next. The emphasis gradually shifts: pure endurance training, endurance with a tiny bit of speed, endurance-speed-minor races, speed-endurance-bigger races, light running-rest-most important races.

Among world class runners, the time from first race of the season to fastest is seldom more than two months. The sprinters, in one recent year, peaked on the average in their fourth major race and after 1½ months of competition. The middle distance runners also ran fastest in their fourth race, and after two months. (Marathoners only raced the full distance 2-3 times during the year.)

Racing eventually grinds away the sharp edge. All of these track runners continued racing for 1-2 months after they'd peaked.

"One can rarely maintain a high performance level for more than three months," Tom Osler notes. Slipping performance is the first sign that the racing edge has dulled and that a retreat to endurance work is in order.

(See related material in "Basic Training," "Frequency of Racing," "Planning Races," "Seasons of Racing.")

For more information:

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Planning Races

"There's a lot to be said for innocence. Provided the runner is fit and tactically wise, he is often better off not knowing some things. Better they come as a surprise than he worry about them too much in advance."

—Runner's World

A split personality isn't essential when thinking about racing, but it helps. You must do some planning, but too much of it can be self-defeating.

One contender for an Olympic title planned his gold medal chase down to hair-splitting detail before the Munich Games. The smallest disruptions in his pre-set routine upset him. His plan was too rigid, and his running reflected it as he finished far out of the medals, with a mark he'd bettered a dozen times before.

"His only problem," a coach said later, "is that he thinks too much."

It's a common problem among runners—an incredibly analytical and compulsive group. They think so much about what might go wrong that they can't appreciate what goes right. The elements of flexibility and surprise disappear under a flurry of schedules and statistics.

Some planning is essential, of course. It's important that you think about and plot out several general directions for yourself:

1. Ultimate goals.
2. Intermediate steps to those goals.
3. What you intend to run this year.
4. Plans for this season.
5. The time and place for "peaking."

6. The kind of training to take you where you want to go.

7. The general way to pace the next race.

Plan your running right up to the early part of the race, then let the rest of it take care of itself. Let it surprise you. Then incorporate the results into your planning for next time, making whatever adjustments seem necessary.

(See related material in "Events to Race," "Frequency of Racing" "Tactics.")

For more information:

"Long-Range Planning," *Racing Techniques*, Booklet No. 13, July 72, pp. 27-38.

Record-Keeping

"Timing gives an objective comparison between runners and walkers at different places and in different eras. But if records are to serve their purpose, certain standards have to be agreed upon."

—1974 *Runner's Almanac*

Only one runner can finish first in a race, but every runner can set a record. Personal records—"PRs"—are the most important marks in running because they are yours and don't depend at all on how you place.

Since these times are the means by which most runners measure success and failure, you should insist that race directors do three things:

1. Measure their courses accurately (no quick drives around them in a car).
2. Allow everyone who starts a race to finish it (no "if-lapped-drop-out" rule).
3. Give everyone who finishes an accurate time (no turning off the clock after one or three or five places).

Keep a list of your best times for standard distances (one, two, three miles, etc.) and for frequently-run courses. Better yet, log all of your running in a daily diary. You may think you can remember all the important figures, but memory is unreliable. Do you recall what you did on May 7, 1973? A simple notation in a diary could tell you.

It could also tell you where you've made your smart moves and mistakes. Memories of single days and events don't usually yield this information. You only see it in patterns that take shape over weeks, months and years.

If personal records are the most important type anyone can set, then a personal diary is the most important story anyone can write.

(See related material in "Planning Races," "Time Comparisons," "Training Schedules").

For more information:

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Recovery After Races

"The afterglow of victory or a good race can sometimes submerge (injury) symptoms and other post-race problems. The novice and the poorly trained runner are likely to have extremely sore muscles for several days. A well-trained runner has fewer post-race difficulties and worries less about them."

—Ted Corbitt, US record holder

This is a review. Read the sections on "Frequency of Racing" and "Injuries and Illnesses" for details.

Recovery has three stages: 1. Muscular; 2. Chemical; 3. Psychological.

Recovery from muscular soreness comes the quickest. Even marathoners get over it within a few days. But it takes longer to restore liquids, minerals and energy, and longer still to feel eager to race this far and fast again.

Budget more time for recovery than you think you need. At least 10 easy training miles for every mile of the race is one suggestion. Marathoner Jack Foster follows a similar plan. The man who ran 2:11 at age 41 says he takes one easy day for every mile of the race—26 recovery days after a marathon.

What happens if you don't take this much? If you're a fast rebounder and are lucky, nothing. If you're typical, you're running in a depleted state. Performance will suffer, and resistance to injury will be down.

Dr. George Sheehan's *Runner's World* medical advice mail increases several-fold each year immediately after the Boston marathon, and not by accident. Runners come home still glowing from the experience, and they push back into hard training and racing before they're ready. Then they write, "I was running so well last week. What happened?"

(See related material in "Drinks during Races," "Frequency of Racing," "Injuries and Illnesses," "Peaking," "Rest before Races," "Seasons of Racing," "Stretching Exercises.")

For more information:

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"The Trauma of Resting," Practical Running Psychology, Booklet No. 11, May 72, pp. 45-47.

Rest Before Races

"There is a time for strenuous activity and a time for resting. The rigidity of a too definite program of training may easily drive an athlete to exhaustion."

—Forbes Carlile, Australia

Forbes Carlile, Australian physiologist and swimming coach, tells the story of two athletes. "Both had been training consistently and hard. Their times started to fall off."

One swimmer trained harder, thinking his slower times meant he wasn't working enough. The other "spent most of his time in bed."

Carlile says, "The energetic one by a long way failed to come up to his previous standard. But the 'lazy' one won his Olympic race in record time."

Now imagine that today is Wednesday. You're scheduled to race on Saturday. You think, "Maybe I should start tapering down." But another voice says, "But look at all the training I'll miss. It might hurt me." So you train as usual—or worse, you raise your mileage or pace, cramming as you would in the last days before an exam.

If you still have trouble convincing yourself that rest before races is a good idea, remember this: training has a delayed reaction. The training you do today can't help you for Saturday. Maybe a week or a month from Saturday, but not this week. It can't help, but it can hurt. So don't feel guilty about easing off, even resting.

Experience with the "carbohydrate-loading" diet tells runners that the last few days before a race are the time for energy conservation—for building up fuel supplies in the muscles, not depleting the reserves with long and fast training.

(See related material in "Diet before Races," "Frequency of Racing," "Nervousness before Races," "Peaking," "Recovery after Races," "Seasons of Racing," "Training Schedules.")

For more information:

"Got That Rundown Feeling?" RW, Sept. 71, pp. 36-37.

"Recovery," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 48.

Road Racing

"Popular opinion among runners is this: the automobile is the root of all evil. They of course own cars and run on roads that wouldn't exist if there weren't cars. Yet runners see the automobile as their enemy."

—Running with the Elements

Roads are made for cars and trucks, not for pedestrians. So when we run there, we are in effect trespassing. There are several penalties for this which we accept when we compete in the increasingly popular road races.

We swallow exhaust fumes. Runners sometimes report feeling dizzy and nauseous while racing along heavily traveled streets. Carbon monoxide is to blame. Concentrations of the poisonous gas may be many times the safe level.

We also contend with unyielding surfaces, which are suspected of increasing the incidence of foot and leg injuries.

The cars are noisy and break our concentration. They shower us with water and slush as they speed past. The people inside often hurl trash and abuse.

Traffic pushes us into the gutters and ditches. And from time to time, a runner is hit and killed or seriously injured.

We are most vulnerable while racing on the roads because we develop a kind of tunnel vision. We focus so completely on racing that we shut out every-

thing else. We run down the middle of traffic lanes, or cut across streets, or go through red lights, oblivious to the flow of traffic. Most race officials try to protect us, but we also must look out for ourselves.

Occasionally, we're lucky enough to be in a race so big that runners take over the roads from cars. More likely, though, when an event grows to this size, the police say, "Find someplace else to run. The drivers are complaining." They come first.

(See related material in "Events to Race," "Long Distance Racing," "Ultra-Distance Racing," "Walking Races.")

For more information:

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- "Finding Room to Roam," Running With the Elements, Booklet No. 35, May 74, pp. 73-74.
- "Getting Down to Earth," Shoes for Runners, Booklet No. 25, July 73, pp. 77-78.
- Higdon, Hal—"Danger of the Highways," Complete Runner, 1974, pp. 200-204.
- "The Main Danger," RW, Jan. 73, p. 57.
- Sheehan, George—"From the Ground Up," Encyclopedia of Athletic Medicine, pp. 25-26.
- "Solo Running," Run Gently, Run Long, Booklet No. 37, July 74, pp. 45-48.
- "Surfaces and Terrains," Running with the Elements, Booklet No. 35, May 74, pp. 65-66.
- "Traffic," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 56.

Seasons Of Racing

"You can't race well the year-round because your condition will only take you so far. When you're racing hard, you can't train hard. If you compromise, you can hold your form for three or four months. But (then) you're going to have to go back and start to build again."

—Arthur Lydiard, New Zealand coach

Racing is never out of season. There's indoor track in winter, outdoor track in spring and summer, cross-country in the fall, and road runs and walks all the time.

There is no off-season for racing, but every runner should take one— or more. Here's why. You can't reap and sow at the same time. Basic training is sowing the seeds for racing success, and racing is the reaping. Once you've harvested a season's crop, you must go back and plant again.

As Arthur Lydiard says, rarely can a runner last more than three months at racing without compromising his or her form.

Tom Osler, author of *The Conditioning of Distance Runners*, mentions the same figure. He says we run in cycles which roughly parallel the seasons of the year—winter, spring, summer, fall. Osler thinks runners go through alternating high and low cycles, each lasting about three months. The "highs" are the time for peak racing, and the "lows" a period of recovery-rebuilding.

"In brief," Osler says, "easier, slower, longer training runs are best during the low phase. Harder, shorter, faster runs can be tolerated during the peak phase."

The pattern to avoid, obviously, is putting two hard racing seasons back to back. Instead, insert an easier one between them. The scheme might be:

- Peaking for cross-country and outdoor track—fall and spring.
- Peaking for indoor track in winter, going lightly through the spring, and hard again during the summer.
- Peaking for two marathons in a year, with six months between them.

(See related material in “Events to Race,” “Peaking,” “Planning Races,” “Weather Conditions.”)

For more information:

Osler, Tom—“Training to New Peaks,” RW, May 74, pp. 20-23.

“Plan for All Seasons,” Racing Techniques, Booklet No. 13, July 72, pp. 28-32.

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Young, Kenneth—“Patterns of Climate,” Running with the Elements, May 74, pp. 8-11.

Shoes For Races

“Popularity is a reasonably good gauge of a shoe’s worth, because runners whose foot health (and performance) is at stake tend to gravitate toward the most comfortable models—no matter how expensive or hard to get. Advertising claims can’t fool them for more than a mile or two.”

—Shoes for Runners

The standards for judging a racing shoe are different from those applied to a training shoe—because their purposes are different.

In training, you want durability and protection. Racing shoes aren’t worn too often or for very long, so you can sacrifice the heavy-duty features for the sake of speed.

The premium is on lightness. To make shoes light, manufacturers do away with much of the shoe’s padding and support. They leave you with the nearest thing to bare feet.

The most popular models of rubber-soled racing flats range in weight from 7-10 ounces apiece for a medium-sized shoe. The spikes are generally seven ounces or less.

Spiked shoes, as a rule, are increasingly less helpful as distances grow. Many track distance runners now use “waffle-soled” shoes (with rubber nubs instead of spikes) on all-weather surfaces because the waffles are more comfortable.

Waffles are most effective on cross-country courses which combine surfaces—grass, dirt, asphalt, etc. They offer traction of spikes and the cushioning of flats.

Long distance road runners generally favor flat-soled shoes which are somewhat lighter than their training model.

Warning: avoid racing in new shoes. Try them out and break them in a bit in training. Work out the trouble spots in practice instead of gutting them out in a race.

(See related material in “Cross-Country Racing,” “Road Racing,” “Track Racing,” “Weather Conditions.”)



Stan Pantovic photo.

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 Shoes for Runners, Booklet No. 25, July 73.

Slow Distance Training

"Run playfully in a state of respiratory balance. There must always be—even after hours of training—the desire for and joy in running more, and the ability to do so."

—Dr. Ernst van Aaken, West Germany

Supporters of slow distance running—"LSD," it's usually called—argue that training isn't really that complicated. The secret is simply staying with it long enough to improve.

Stay fresh, stay eager and don't get hurt or sick. Then you'll automatically be regular about it. Add a small but regular amount of racing (a few percent of the total), and you'll do okay.

Dr. Ernst van Aaken—the so-called "father of LSD"—says that slow train-

ing should account for 95% (or more) of a runner's work. "Slow," he claims, has little to do with a time on a watch. Listen to your heart, says van Aaken. Your pulse rate and your breathing. These are the only reliable indicators of proper pace.

Run at a pulse rate of about 130 beats per minute, certainly no higher than 150. (Count it for six seconds immediately after a run, then add a zero to the total.) According to the doctor, "At a pulse frequency of approximately 130, the organism absorbs a maximum quantity of oxygen at a minimum breathing volume."

If the pulse is within the 130-150 limits, you can talk or whistle while running. The pace feels "comfortable."

If you race after months of slow training, though, you'll feel awkward and the time might be slower than usual. Don't worry. Another race or two will sharpen you.

Bob Deines, an early advocate of LSD, found he improved by 10 or more seconds per mile with a single race. Deines holds the US 50-mile record, and the pace in that run was a minute per mile faster than he normally trained.

Slow trainers typically find they can race a minute to several minutes per mile faster than they go every day.

(See related material in "Basic Training," "Fartlek Training," "Fast Distance Training," "Hill Training," "Training Fundamentals," "Training Methods," "Training Schedules.")

For more information:

"How Far," First Steps to Fitness, Booklet No. 40, Oct. 74, p. 32.

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Sprint Racing

"Few events in sports are as short-lived as the 100-yard dash, and few compress so much furious activity into such a short span of time. The sprinter lives in a world where the distance from one end of the race to the other is clearly visible, where the time difference between first and last place is the blink of an eye, where there can be but one speed and where trivial matters have exaggerated importance."

—Guide to Sprinting

It's easy to get the wrong impressions about sprinters:

- The 100 lasts only about 5% as long as the mile, so it must be only 5% as hard.
- Since the sprint is a pure speed race, it takes no thought or mental preparation.

● Sprinting is a natural talent which you either have or don't. You can't improve what you don't have.

It's easy to think of the sprints as the easiest races in track, and the sprinters as the lightest-working athletes, because we see so little of them. And what we see is a blur. However, when the sprints are put in slow motion and analyzed, the facts don't support the assumptions.

The booklet *Guide to Sprinting* mentions that "no other runner puts himself under so much stress so quickly. Within seconds of leaving the blocks, the sprinter's heart triples its resting rate—reaching a maximum of more than 200 beats per minute by the time he hits top speed. Oxygen intake can't keep pace with him. Breath comes in hot gasps."

A sprint race is perhaps more demanding than a longer distance in terms of thought and anxiety because there's no room for error. Veteran sprinter Alex Pappas writes, "The sprinter finds himself in a world shrunken not only into seconds but into tenths or even hundredths of one second. He runs in a corridor of time where there is no wiping off of perspiration, no sip of Gatorade, no turning of the head."

And the training—with endurance work, speed work, starts, turn running, weight lifting and hills—is as explosive and exacting as the racing. It concentrates on shaving tenths and hundredths of seconds from times. As in the distances, times can come off, but it isn't as obvious here because sprinters work with so little time.

"I do not believe sprinters are born, not made," says America's leading sprint coach, Bud Winter. "It is true that a jackass never won the Kentucky Derby. But even a jackass can be made to run faster."

(See related material in "Events to Race," "Frequency of Racing," "Hurdle Racing," "Tactics in Racing," "Track Racing.")

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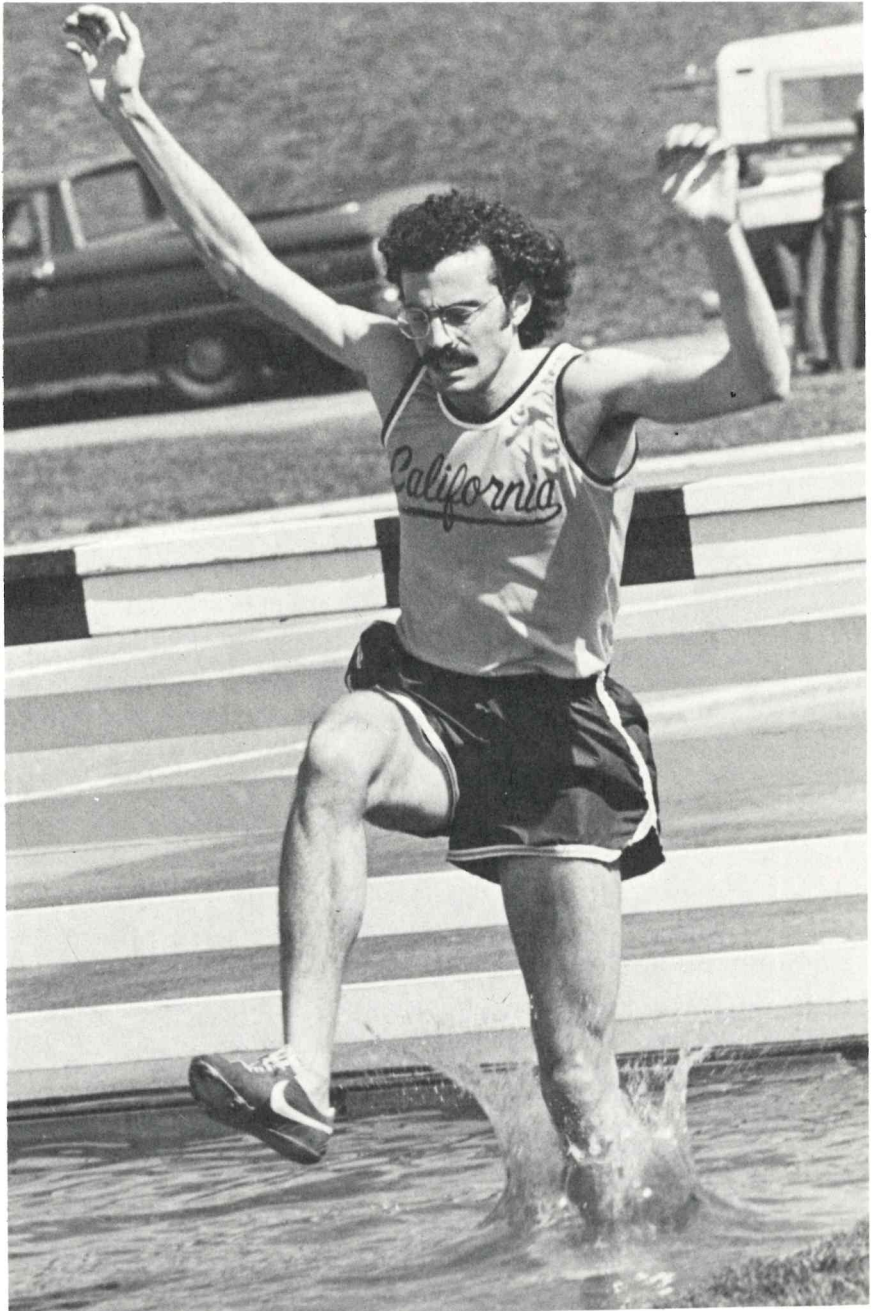
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Steeplechase Racing

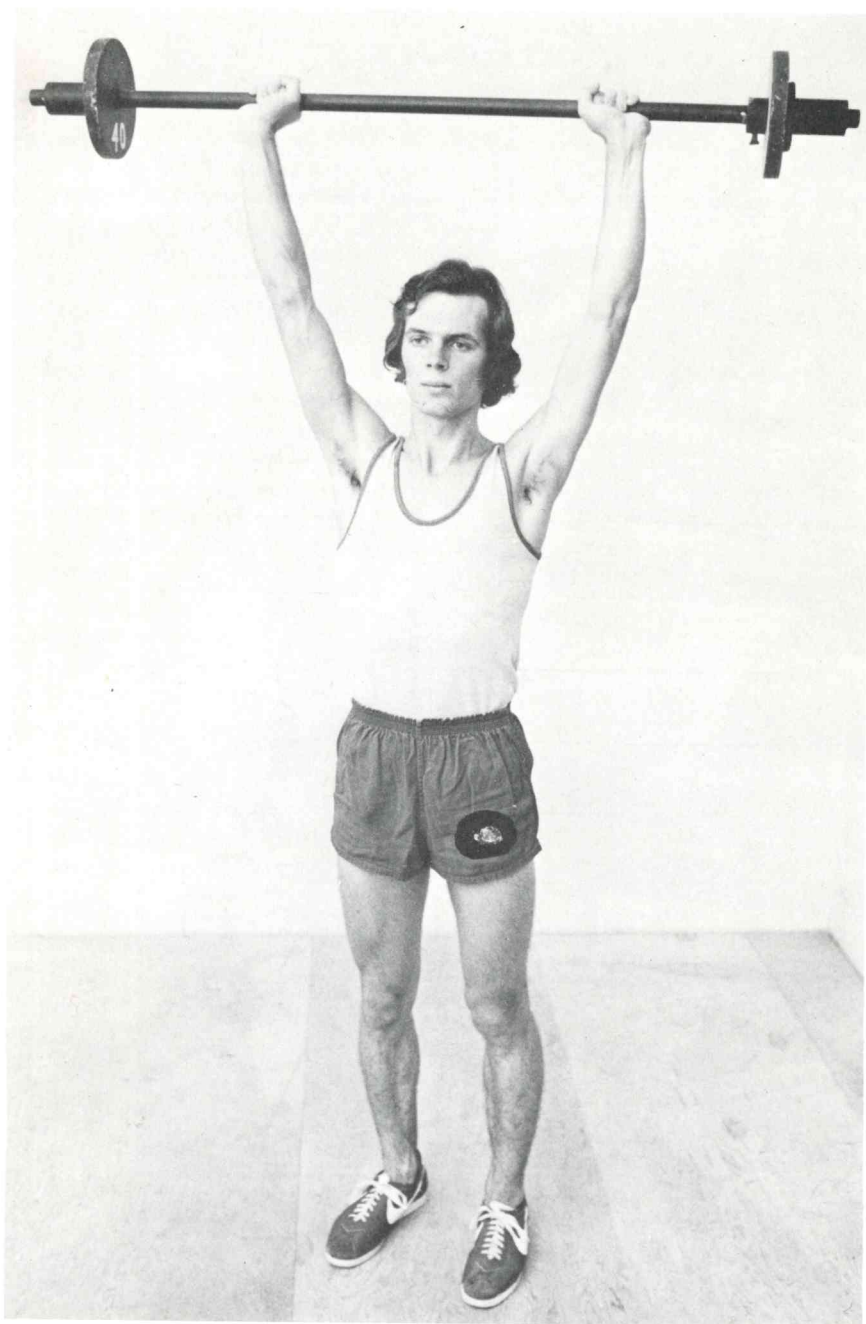
"It's really just plasticized cross-country. The barriers had their beginnings in fallen logs and streams. Perhaps that is so removed from Tartan tracks and striped traffic barricades that our absurdity is showing."

—Mike Manley, US Olympian

The steeplechase started as a cross-country race—for horses. And at least



*"The steeplechase water is deepest next to the barrier and slopes up to nothing. Only the rare steepler finishes a race without wet feet."
(John Marconi photo)*



"Weight training offers several benefits to runners, but most important for racing is the explosive power it builds." This runner executes a press. (Charles Palmer photo)

one runner, Olympic champion Kip Keino, says, "They should have left it to the horses."

Steeplechasing originated in England, where riders used church steeples as reference points. The horses jumped creeks, logs, fences—whatever got in their way. Human cross-country runners in England still race like this.

The track steeplechase is 3000 meters—7½ laps—of jumping, splashing and jarring. Littering the course are 28 barriers. Not hurdles which tip with the slightest pressure, but solid wood, three-foot obstacles which will support a man's full weight. Indeed, many runners choose to step on the top bar rather than using a modified hurdling style.

If the barriers aren't enough, there are also seven water jumps. Like the barriers, these are three feet high. But on the other side is 12 feet of water. Not 12 feet deep, 12 feet end to end. It's deepest next to the barrier and slopes up to nothing. Only the rare steepler finishes a race without wet feet.

The best men in the event are usually very fast runners with only passable technique. Kip Keino, for instance, is also an Olympic gold medalist in the flat 1500. Ben Jipcho, the world record holder in the steeple, is a 3:52 miler. Kerry O'Brien, former record holder, once had the fastest indoor two-mile. None of them did much training over the barriers.

(See related material in "Cross-Country Racing," "Events to Race," "Hurdle Racing," "Track Racing.")

For more information:

Gambetta, Vernon—Hurdling and Steeplechasing, Booklet No. 38, Aug. 74, pp. 38-43.

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Strength-Training Exercises

"The key is the arms. When I kick, all I do is concentrate on driving with the arms."

—Dave Wottle, Olympic champion

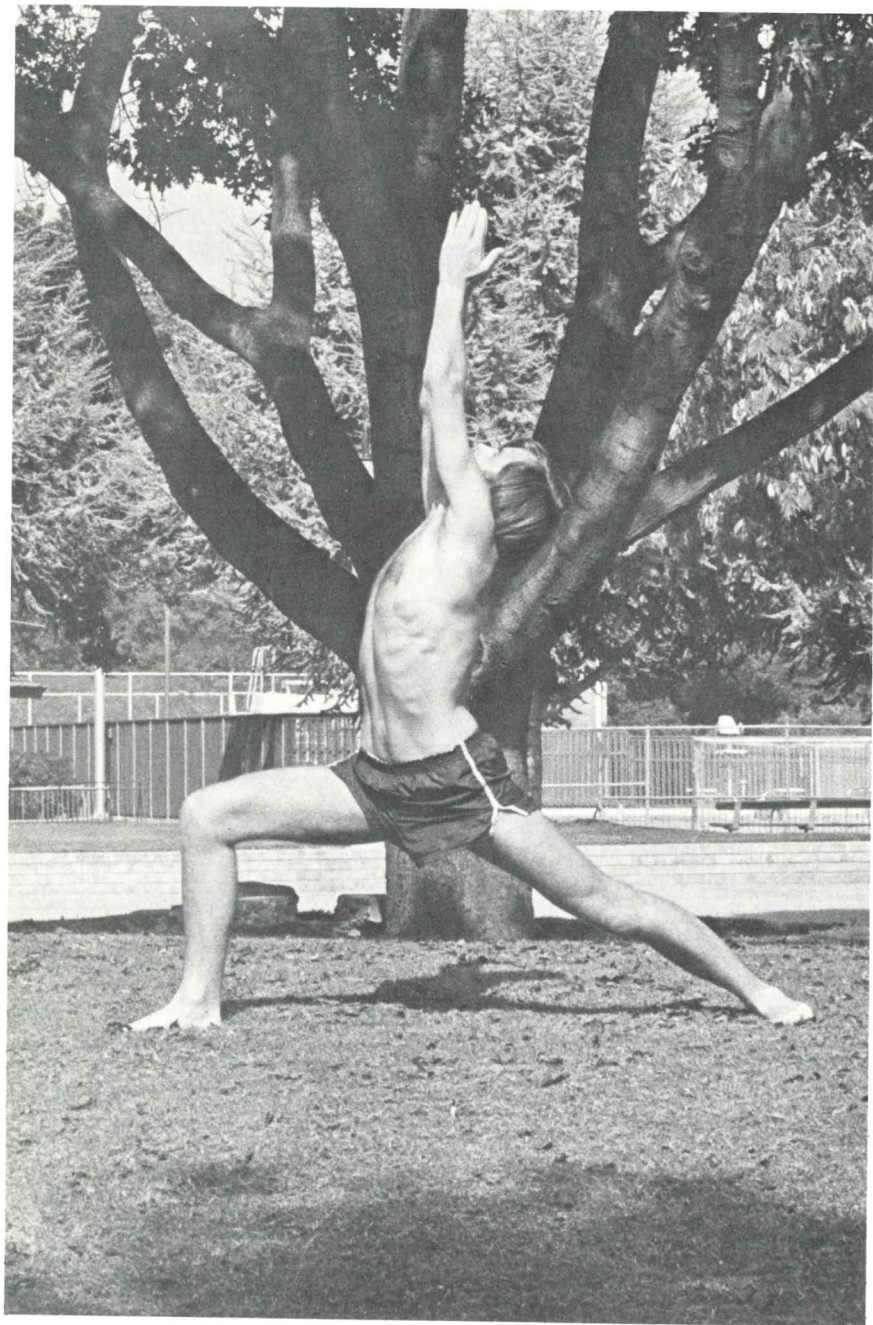
Dave Wottle, 1972 gold medalist at 800 meters, had two trademarks: his white golf cap and his scorching kick over the last half-lap. He figured a kick started with the drive of his arms, so he worked on making them more powerful.

Wottle developed strength with weight training. He could bench-press 180 pounds—which wouldn't frighten competitive lifters, but isn't bad for a 140-pound runner. He translated this strength to speed in his races.

Weight-training offers several benefits to runners—balanced muscular development, injury prevention and curing—but most important for racing is the explosive power it builds.

Sprinters and hurdlers lift regularly. Distance runners are less attracted to it, despite the fact that the two best milers of the last 20 years—Herb Elliott and Jim Ryun—practiced with weights. Elliott, under coach Percy Cerutti, probably lifted more weight than any miler before or since.

Barbells aren't the only way to build power. Running-oriented approaches do it, too. John Akii-Bua, the Olympic 400-meter hurdles champion, did much



"Not only did the muscle soreness go away, but Ian Jackson (above) found other surprises in his yoga." Here, he's in the "fencer's pose." (OMPhoto)

of his training in a 25-pound jacket. The quarter-milers at UCLA (they have included world record holder John Smith and Olympic medalist Wayne Collett) charge up hills.

However, these two methods do more for the legs than the arms. And the arms of most runners remain weak. If you want Wottle-like arm drive, weight training is the simplest and surest way to develop it.

(See related material in "Hill Training," "Stretching Exercises.")

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"Strength," Exercises for Runners, Booklet No. 29, Nov. 73, pp. 47-79.

Stretching Exercises

"There's something different in running now. It's a subtle difference, but a pleasant one. It's a 'weightlessness'—a natural, loose-swinging freedom. It feels as if running takes far less energy than it used to, and perhaps it actually does. Surely it must take less energy to move limbs well within their range of movement than in a narrow rut."

—Ian Jackson, Exercises for Runners

Ian Jackson had never thought yoga had anything to do with him. To him, "exercise" meant running—until he couldn't run anymore.

Jackson was a marathoner and ultra-marathoner, and a good one, until chronic leg soreness and tightness set in. The running caused it, since long distance work—for all its benefits—is a stiffening activity.

Ian started doing yoga out of desperation. He wanted to loosen up his legs again so he could run pain-free. And he read somewhere that the slow, gentle stretches of yoga were superior to quick, bouncy calisthenics.

At first, he tried to bend over and touch the floor, and couldn't get much past his knees. But within a few months, he could put his palms to the floor, among other stretches that were impossible before.

Not only did the muscle soreness go away, but Jackson found other surprises in his yoga. His running form improved. His stride was longer and more fluid with no attempt to make it that way. He made yoga part of his warmup and went into races much more relaxed than before. He did yoga afterwards and cut down his recovery time. And injuries almost disappeared.

Yoga, Jackson thinks, can teach runners two kinds of flexibility: looseness of the muscles, and a kind of psychological adaptability which might be even more important. Yoga teaches the difference between training and straining—a distinction every runner must learn.

(See related material in "Injuries and Illnesses," "Recovery after Races," "Strength—Training Exercises," "Warmup and Warmdown.")

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Tactics In Racing

"Tactics can still be used, but their days are numbered."

—Arthur Lydiard, New Zealand

Arthur Lydiard wrote in the early 1960s of the ultimate demise of tactics. And time has seemed to prove him right. As competitive standards go up, tricks are less a part of winning than are superior conditioning, speed and pacing.

A runner like Brendan Foster couldn't have "stolen" a race like the European Championship 5000 with a burst in the middle unless he was clearly the best man in the field. Lasse Viren won the Olympic 5000 off a slow early pace because he was the fastest runner, not simply the best kicker. Foster and Viren probably would have won any kind of race they faced.

In a race that is fast from the start, and faster still at the end, the only tactic that makes much difference is set before the race starts. That is bred-in and trained-in ability.

The runner with the fastest average pace wins. A "burn-'em-off" start does no good if you only succeed in burning yourself out—losing two seconds later on for every one gained before. A "hold-back-and-kick" tactic is useless if the field is 100 yards ahead of you when time comes to sprint.

Most middle and long distance races have a "survival of the fittest" pattern to them. The contenders bunch together at the start, then fall out of contact one by one. Say it's a mile. At the quarter, 15 runners are upfront. At the half, 10 remain. Five are still in contention after three-quarters. Three of them slip behind on the backstretch as the pace creeps up. Coming off the last turn, the two leaders sprint. The freshest and fastest one wins.

The way to win races is to go with the pace and outlast everyone else. If there's no reasonable prospect of doing that, you're better off running at your own best pace—which is an even one—for your own best time.

(See related material in "Attitudes on Competition," "Pacing," "Planning Races.")

For more information:

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Fenwick, Geoff—"Front-Runner's Role," Complete Runner, 1974, pp. 343-345.

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"Racing and Pacing," Racing Techniques, Booklet No. 13, July 72, pp. 12-26.



"Team racing is at its best in relays, where every runner contributes directly to an overall time." (John Marconi photo)

Team Racing

"The runner wants to feel apart from the mass, to be a distinct individual. But without the opportunity to share this feeling with like-minded individuals, the personal experience is meaningless. Running offers some of both—being alone and getting together."

—The Complete Runner

Runners on teams have the best of two worlds. They get to compete as individuals, taking personal credit or blame for their performances, and they also have the support of teammates.

In track, there are team scores. Points from the mile and hammer throw and all the other events are lumped together like apples, oranges and onions to produce a total which means little. Team members can succeed individually even while the team fails as a group.

Cross-country scores are a little more valid because everyone is running the same distance at the same time. But the scores are still rather deceiving. Runners' own times and places are a better measure of performance.

Team racing is at its best in relay racing, where every runner contributes directly to an overall time—which in turn determines place. The standard track relays are 440 (4 x 110) and 880 (4 x 220) yards, one mile (4 x 440), two (4 x 880) and four (4 x mile), plus the sprint medley (220, 220, 440, 880), distance medley (440, 880, 1320, mile) and shuttle hurdles (4 x 120-yard highs).

In 1970, *Runner's World* started the 24-hour relay—up to 10 runners, each going a mile at a time, around the clock. Hundreds of teams compete in the event each year. Records are maintained in dozens of categories. The best 10-man teams have covered close to 300 miles during the day. A two-man team has gone more than 180 miles. The women's record is over 200 miles. (For information on rules and records, write 24-Hour Relay, Box 366, Mountain View, Calif. 94040.)

Road relays are extremely popular in Britain, where there are national championships of this type. Teams use a half-dozen or more runners, each going several miles.

But even in relays, the individuals know how they did separately.

(See related material in "Cross-Country Racing," "Middle-Distance Racing," "Road Racing.")

For more information:

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"The Running Club," RW, Mar. 74, pp. 14-19.

"Running's Team Spirit," Complete Runner, 1974, pp. 356-361.

"Twenty-Four Hour Relay," 1975 Marathon Handbook, Booklet No. 44, pp. 104-111.

Time Comparisons

"The mathematical perfection of distances and times gives running a special character not found in most sporting activities. The distances and times themselves are the challenges."

—First Steps to Fitness

As distances go up, pace slows down in a regular and predictable way. This mathematical-physiological fact can tell runners a lot about themselves.

First, they can compare their marks with other people's—in ways more meaningful than simple time differences.

Many statisticians have reduced running times to points on scoring tables. The charts on pages 64-65, compiled by computer scientist Dr. Gerry Purdy, list the relative merits of 20 events for men (a similar women's chart is on page 79). A four-minute mile, for instance, scores 1000 points, as does a 2:20 marathon. Therefore, the two are of equal quality.

Runners can quickly see from these tables how close they come to the the leaders in different events, and in which races they score best.

The "Age-Group Racing" section of this booklet has a different type of scoring tables. These are adjusted for age, and give 10-year-olds and 60-year-olds the chance to score as well as runners in their 20s.

However, the fault of these and other scoring tables is that they compare you with world record holders. A more realistic comparison is yourself with yourself. This is quite easy to do.

Simply buy the "log-log" type of graph paper. Distances are listed on one axis and times on the other. Find your best times for various distances and make dots on the graph. Then draw a straight line connecting two or more of the dots. That line indicates your theoretical potential at any distance. Redraw the line as times improve.

If you can't find this kind of paper, a regular graph will do. Plot a curve based on each distance and per-mile averages. It will rise steepest in the early distances and level off as they get slower.

(See related material in "Age-Group Racing," "Pacing," "Planning Races," "Record-Keeping.")

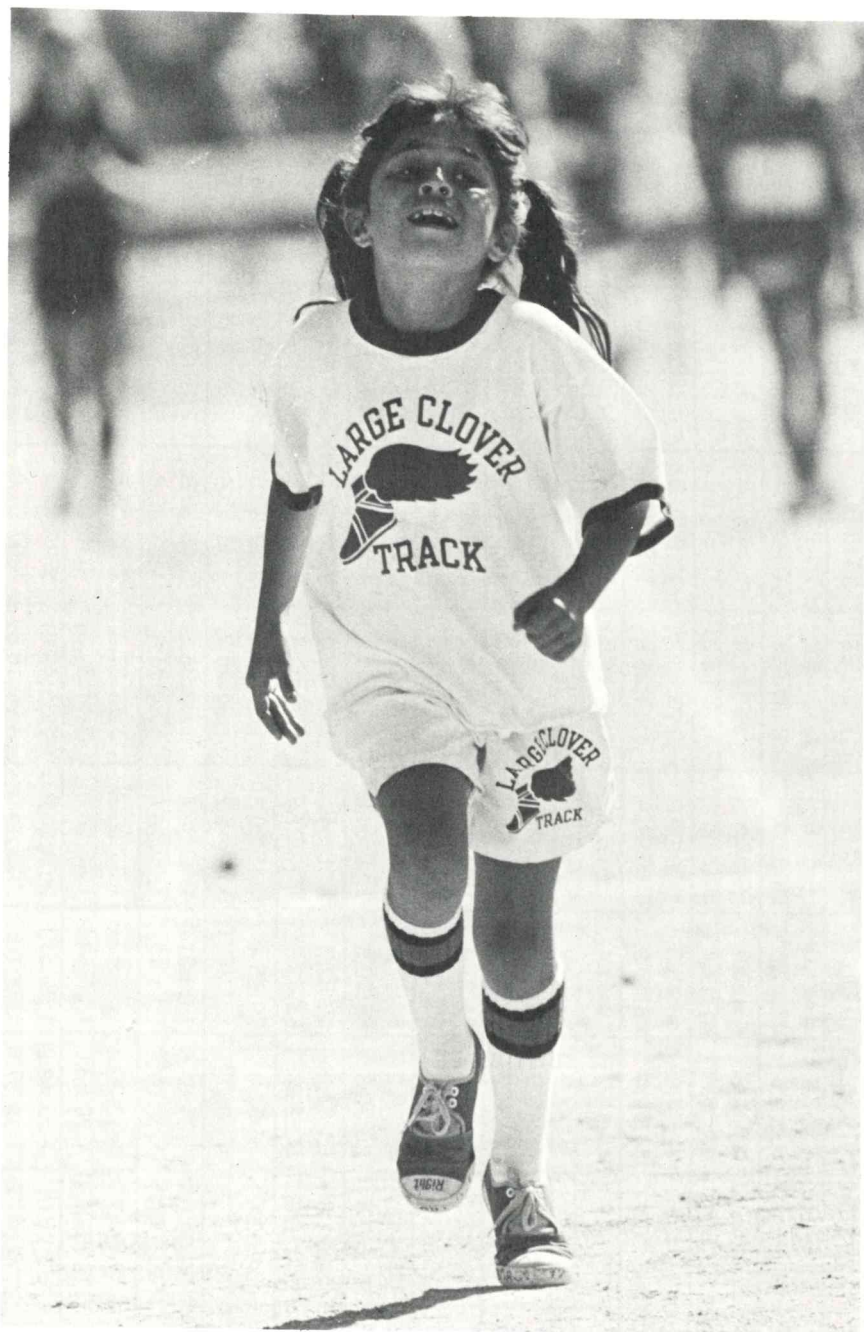
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POINTS	100Y	220Y	440Y	880Y	MILE	2 MILES	3 MILES	120y HH	440Y IH	STEEPLE
1200	9.14	20.15	45.15	1:44.5	3:53.8	8:18.2	12:51.4	13.35	49.5	8:24.6
1150	9.20	20.27	45.45	1:45.1	3:55.2	8:21.0	12:56.0	13.43	49.8	8:27.4
1100	9.26	20.41	45.75	1:45.8	3:56.6	8:24.2	13:01.0	13.51	50.1	8:30.4
1050	9.33	20.55	46.05	1:46.5	3:58.2	8:27.6	13:06.4	13.60	50.45	8:33.0
1000	9.40	20.71	46.4	1:47.2	3:59.9	8:31.2	13:12.2	13.70	50.8	8:37.2
950	9.48	20.89	46.8	1:48.1	4:01.7	8:35.2	13:18.6	13.81	51.2	8:41.0
900	9.56	21.08	47.2	1:49.0	4:03.7	8:39.8	13:25.8	13.93	51.65	8:45.2
850	9.66	21.29	47.6	1:50.0	4:05.9	8:44.6	13:33.8	14.06	52.1	8:49.8
800	9.76	21.52	48.1	1:51.1	4:08.4	8:50.2	13:42.8	14.20	52.7	8:54.8
750	9.88	21.79	48.7	1:52.3	4:11.1	8:56.6	13:53.0	14.37	53.3	9:00.6
700	10.02	22.09	49.3	1:53.7	4:14.3	9:03.8	14:04.8	14.55	54.0	9:07.0
650	10.17	22.44	50.1	1:55.3	4:17.9	9:12.2	14:18.8	14.76	54.7	9:14.2
600	10.35	22.85	50.9	1:57.1	4:22.0	9:22.4	14:35.4	15.01	55.7	9:22.8
550	10.56	23.34	51.9	1:59.3	4:27.0	9:34.6	14:55.8	15.30	56.7	9:33.0
500	10.83	23.94	53.2	2:01.9	4:33.0	9:49.8	15:21.2	15.66	58.1	9:45.0
450	11.15	24.69	54.7	2:05.1	4:40.6	10:09.2	15:54.0	16.10	59.7	10:00.0
400	11.58	25.68	56.7	2:09.2	4:50.2	10:34.8	16:36.8	16.67	1:01.9	10:19.2
350	12.15	27.04	59.3	2:14.7	5:03.1	11:09.2	17:33.8	17.45	1:04.7	10:44.2
300	12.96	28.96	1:03.0	2:22.2	5:21.0	11:56.0	18:49.8	18.53	1:08.7	11:18.6
250	14.15	31.79	1:08.5	2:33.0	5:46.5	12:59.4	20:29.8	20.12	1:14.6	12:06.8
200	15.97	36.01	1:16.7	2:49.4	6:23.4	14:24.4	22:39.6	22.49	1:23.3	13:15.2
150	18.77	42.38	1:29.2	3:14.3	7:16.5	16:16.8	25:27.8	26.01	1:36.3	14:52.4
100	23.18	52.22	1:48.7	3:52.8	8:33.2	18:48.2	29:09.0	31.35	1:55.8	17:09.4
50	30.69	1:08.64	2:20.9	4:54.4	10:27.5	22:18.8	34:08.6	39.82	2:26.8	20:26.2

MEN

POINTS	6 MILES	15 KMS.	10 MILES	20 KMS.	15 MILES	25 KMS.	30 KMS.	20 MILES	MARA.
1200	26:58.4	42:53.8	46:11.6	58:05.6	1:10:56.8	1:13:38.8	1:29:35.8	1:36:42.0	2:10:08.0
1150	27:09.0	43:12.4	46:32.0	58:33.0	1:11:32.8	1:14:17.0	1:30:25.8	1:37:37.6	2:11:32.8
1100	27:20.2	43:32.2	46:53.8	59:02.6	1:12:11.6	1:14:57.8	1:31:19.4	1:38:37.2	2:13:03.0
1050	27:32.4	43:53.8	47:17.4	59:34.6	1:12:53.2	1:15:41.6	1:32:16.6	1:39:40.8	2:14:39.4
1000	27:45.6	44:17.0	45:43.0	1:00:09.0	1:13:38.2	1:16:28.8	1:33:18.4	1:40:49.4	2:20:13.0
950	28:00.2	44:42.4	48:10.8	1:00:46.4	1:14:26.8	1:17:20.0	1:34:25.0	1:42:03.2	2:18:13.6
900	28:16.2	45:10.2	48:41.4	1:01:27.2	1:15:20.0	1:18:15.6	1:35:37.4	1:43:23.4	2:20:13.0
850	28:34.0	45:40.8	49:15.0	1:02:12.0	1:16:18.0	1:19:16.6	1:36:56.2	1:44:50.6	2:22:22.6
800	28:54.0	46:15.0	49:52.4	1:03:01.6	1:17:22.0	1:20:23.8	1:38:22.8	1:46:26.2	2:24:43.4
750	29:16.6	46:53.2	50:34.2	1:03:57.0	1:18:33.0	1:21:38.0	1:39:58.2	1:48:11.4	2:27:17.4
700	29:42.4	47:36.4	51:21.4	1:04:59.0	1:19:52.2	1:23:01.2	1:41:44.4	1:50:08.8	2:30:06.8
650	30:12.4	48:25.8	52:15.2	1:06:09.4	1:21:21.8	1:24:34.8	1:43:43.2	1:52:18.4	2:33:14.6
MEN									
600	30:47.8	49:23.2	53:17.6	1:07:30.2	1:23:03.8	1:26:21.2	1:45:57.4	1:54:45.4	2:36:44.2
550	31:30.0	50:30.6	54:30.6	1:09:04.0	1:25:01.4	1:28:24.0	1:48:31.0	1:57:33.0	2:40:40.2
500	32:21.8	51:51.2	55:57.8	1:10:54.8	1:27:19.0	1:30:47.2	1:51:28.6	2:00:46.0	2:45:09.0
450	33:26.6	53:29.4	57:43.8	1:13:07.8	1:30:02.4	1:33:36.8	1:54:57.0	2:04:31.8	2:50:18.6
400	34:49.4	55:32.0	59:55.4	1:15:50.8	1:33:02.2	1:37:20.0	1:59:06.0	2:09:00.4	2:56:21.2
350	36:37.6	58:08.6	1:02:42.8	1:19:15.2	1:37:25.2	1:41:15.4	2:04:09.8	2:14:26.6	3:03:33.2
300	39:01.0	1:01:33.6	1:06:21.0	1:23:38.4	1:42:36.6	1:46:36.8	2:10:29.8	2:21:12.6	3:12:20.2
250	42:11.6	1:06:07.6	1:11:12.0	1:29:26.6	1:49:24.6	1:53:36.8	2:18:40.6	2:29:54.8	3:23:22.8
200	46:24.2	1:12:20.2	1:17:47.8	1:37:20.8	1:58:37.6	2:03:05.6	2:29:39.4	2:41:31.8	3:37:50.0
150	51:58.4	1:20:53.0	1:26:54.2	1:48:24.8	2:11:36.8	2:16:27.8	2:45:08.2	2:57:52.0	3:57:51.4
100	59:25.0	1:32:49.2	1:39:41.6	2:04:21.8	2:30:42.6	2:36:12.4	3:08:22.0	3:22:31.4	4:28:04.2
50	1:09:37.0	1:49:57.6	1:58:10.6	2:28:14.0	3:00:18.8	3:07:04.0	3:46:13.4	4:03:26.2	5:20:47.4



The advantages of competing on the track include convenience, consistency and constant encouragement. (John Marconi photo)

Track Racing

"Many runners have told me they felt it would be boring to circle the track endlessly. But then I feel that running long, straight country roads with only an intersection every mile to break the monotony of plowed fields is pretty boring, too. Track racing is inherently different from road racing—not easier or harder, just different. It requires a different kind of discipline, has its own advantages and disadvantages."

—Ken Young, US record holder

Ken Young knows his way around the University of Chicago's indoor and outdoor tracks better than anyone. He has run several marathons indoors—almost 210 laps each time and has gone as far as 40 miles indoors. For all that, he holds a bunch of American records.

Perhaps it doesn't need mentioning that Young likes track racing. While many distance runners put the track down as a sterile place to race, Ken sees the advantages:

- Official records can only be set here.
- Comparisons from one track to another are fairly accurate because all tracks are roughly alike.
- No hills to climb.
- No mismeasured courses.
- No way to get lost.
- No more than 200 yards at a time into the wind.
- Consistent footing.
- Split times every lap.
- Drinks every lap.
- People to run with, no matter how far ahead or behind you are.
- Rest rooms never more than a few steps away.
- Spectators who can actually watch you run.

The disadvantages of running long races on the track are the limited fields ("it becomes inconvenient to have more than 20 runners on the track") and the burdens on officials ("ideally, each runner should have a lap counter").

"Road races," says Young, "are suited to large fields and those runners who like to watch scenery. Track races are meant for records, and split times give the needed interest."

(See related material in "Events to Race").

For more information:

"Running Shorts," Racing Report, June 14, 1972, p. 30.

Training Fundamentals

“Every system worth its sweat incorporates certain established principles. Knowing them and following them insures a quicker, smoother trip to the end you’re seeking.”

—The Complete Runner

Whatever the event, whatever your ability in it, the guiding principles of training for racing are the same. Only the details change to suit you and your race. The 10 fundamentals are:

1. **Stress**—Training is a courting of stress, applying small amounts of it to stimulate adaptation. Training must be stressful enough to provide that stimulus, but not so hard that it breaks you down. It’s a fine line separating the two.
 2. **Overload**—This isn’t the same as “overwork.” Overloading is taking on a little more work than is comfortable. It’s stretching your limits. Without this stretch, there can be no improvement.
 3. **Specificity**—Training must roughly resemble racing in both speed and distance. Sprinters improve by sprinting, distance runners by running distances.
 4. **Regularity**—You get in shape by training, out of shape by not training. To improve faster than you decline, train at least every other day.
 5. **Progression**—The progress curve rises quickest at the start and levels off as one approaches maximum potential. The rise is accompanied by many peaks, valleys and plateaus.
 6. **Diminishing returns**—You can set your early personal bests on almost no training, but each succeeding improvement requires more work.
 7. **Recovery**—Every bout of hard training must be followed by an appropriate period of light running or rest. The body needs time to repair itself.
 8. **Seasons**—Training is putting money in the bank. Racing is drawing on the account, which you can’t do indefinitely. Allow race-free seasons for rebuilding reserves.
 9. **Pacing**—Pace applies to weeks, months, seasons and years as well as to individual runs. The faster you go, the shorter distance you’re able to go. Take a long view of training pace.
 10. **Individualizing**—Find a system that fits your own likes and needs.
- (See related material in “Basic Training,” “Breathing,” “Fartlek Training,” “Fast Distance Training,” “Frequency of Racing,” “Hill Training,” “Interval Training,” “Peaking,” “Recovery after Races,” “Rest before Races,” “Seasons of Racing,” “Strength-Training Exercises,” “Stretching Exercises,” “Slow Distance Training,” “Training Methods,” “Training Schedules.”)

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- "Why Train?" Runner's Training Guide, Booklet No. 23, May 73, pp. 6-25.

Training Methods

"Runners can't agree on a single recipe because there's nothing to agree upon. As long as certain general routes are followed, there are an almost infinite number of ways to reach the same end. Half the fun in running is mapping out those ways, watching where they lead, and arguing with runners who come at the same place from a different direction."

—The Complete Runner

We could fill a dozen books this size with specific recipes for race training, and still not have the right one for you. Combinations of ingredients don't work the same way with everyone. Test different mixtures for yourself, weighing the results and how you feel with them.

There are two basic types of training and two supplements. The running is either (1) steady or (2) interrupted. The supplements are (1) strength and stretching exercises, and (2) technique work such as hurdling, starting, baton passing, etc.

Steady-paced running can be either slow or fast. *Slow distance training (LSD)* is generally a relaxed kind of running in which the pulse rate doesn't exceed 150 beats per minute. Times are a minute or more slower per mile than a runner's best pace.

Fast distance training is more in the nature of a time trial. Distances are usually shorter than in LSD, and effort is more intense. Pulse rates frequently go above 150, and the pace is only a few percentage points below all-out.

The change-of-pace running family also has two members—fartlek and interval training. Their structure, or lack of it, separates them.

Fartlek is a go-as-you-please style of training. Steady running, bursts of speed and recovery jogs are inserted at random, not by a schedule. *Fartlek* is usually done away from the track and without a stopwatch.

Intervals are formalized *fartlek*, done by a schedule, mostly on the track

and under the watch. The distance and speed of individual runs, and the recovery between them, is planned.

Most runners take something from each of these basic methods, and add pinches of exercise and technique training as required.

(See related material in "Fartlek Training," "Fast Distance Training," "Hill Training," "Interval Training," "Strength-Training Exercises," "Stretching Exercises," "Slow Distance Training," "Training Fundamentals," "Training Schedules," "Warmup and Warmdown.")

For more information:

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Corbitt, Ted—"Getting Behind the Times," *Guide to Distance Running*, 1971, pp. 76-82.

"One Workout with Everything," *RW*, Sept. 74, pp. 24-25.

"Training Methods," *First Steps to Fitness*, Booklet No. 40, Oct. 74, p. 57.

Training Schedules

"I tack up a schedule and leave it to the athlete to do the work. If I'm doing my job right, he will run—not because he's constantly being watched but because he enjoys running and sees value in it."

—Bill Bowerman, 1972 Olympic coach

Assuming you've already decided on methods which satisfy the training fundamentals, setting up a schedule is mainly a matter of balancing the workload.

Bill Bowerman, longtime coach at the University of Oregon, has most definite thoughts about loads. He says, "In every case, I would prefer to undertrain a runner rather than overtrain him . . . Working too hard contributes to fatigue fractures and colds and all sorts of other ailments. But, gee, even if nothing happens, how's a guy to have any fun if he's doing so much running?"

As part of his keep-'em fresh formula, Bowerman pioneered "hard-easy" training. That simply means if you run a tough workout or race today, ease off for the next day or two.

"Rest," says Bowerman, "is always necessary for the body to recover and replenish itself. Furthermore, the light days will allow more work in the training sessions on the hard days, giving greater progress in the long run. The (hard-easy) cycle is basic."

The coach once tested the system by cutting out the easy days. Most of the runners were exhausted in less than a week. Only one, an Olympic medalist, held up for two weeks of unrelenting hard work.

Now the typical Bowerman-inspired athlete schedules only about three hard days a week. Olympic marathoner Kenny Moore, for instance, may take a 30-miler on Sunday at good speed. But then he jogs only four miles or so the next two days. By Wednesday, he's eager to go long and/or fast again.

(See related material in "Basic Training," "Frequency of Racing," "Peaking," "Seasons of Racing," "Training Fundamentals," "Training Methods.")

For more information:

- "Hard-Easy, Long-Short," Run Gently, Run Long, Booklet No. 37, July 74, pp. 60-62.
- "Runners," Runners Training Guide, Booklet No. 23, May 73, pp. 76-94.
- "Shifting the Training Load," RW, Apr. 74, pp. 30-32.
- "Training Hard, the Easy Way," RW, May 71, pp. 36-37.
- "The Value of an Easy Season," RW, Nov. 74, p. 5.

Ultra-Distance Racing

"It's inevitable for runners to look to new and bigger challenges once the marathon becomes commonplace. It's commonplace now. As runners demand longer races, the events have to come."

—1971 Marathon Handbook

Ultra-distance running starts where marathoning leaves off, and several isolated events point to the eventual explosion of participation at these distances.

- In South Africa, the annual Comrades' "marathon"—actually a 54-miler—draws about 2000 runners.
- A number of 100-kilometer (62-mile) races in Europe bring out even larger fields.
- And in the US, the John F. Kennery 50-mile ranks among the three largest in the country—again with about 2000 participants.

The ultra-distances are the next logical frontier after a runner has scaled the marathon distance. The next step up in the US is 50 kilometers (31 miles), which has been a national championship race for several years. The other official AAU distance is 50 miles.

For record purposes, the standard events are 30, 40, 50 and 100 miles 50 and 100 kilometers, and 24 hours. Runners occasionally go even farther—though rarely in organized competition.

The "ultras" are like the marathon—only more so: more distance to cover during the race, obviously, but also more training to get ready for it.

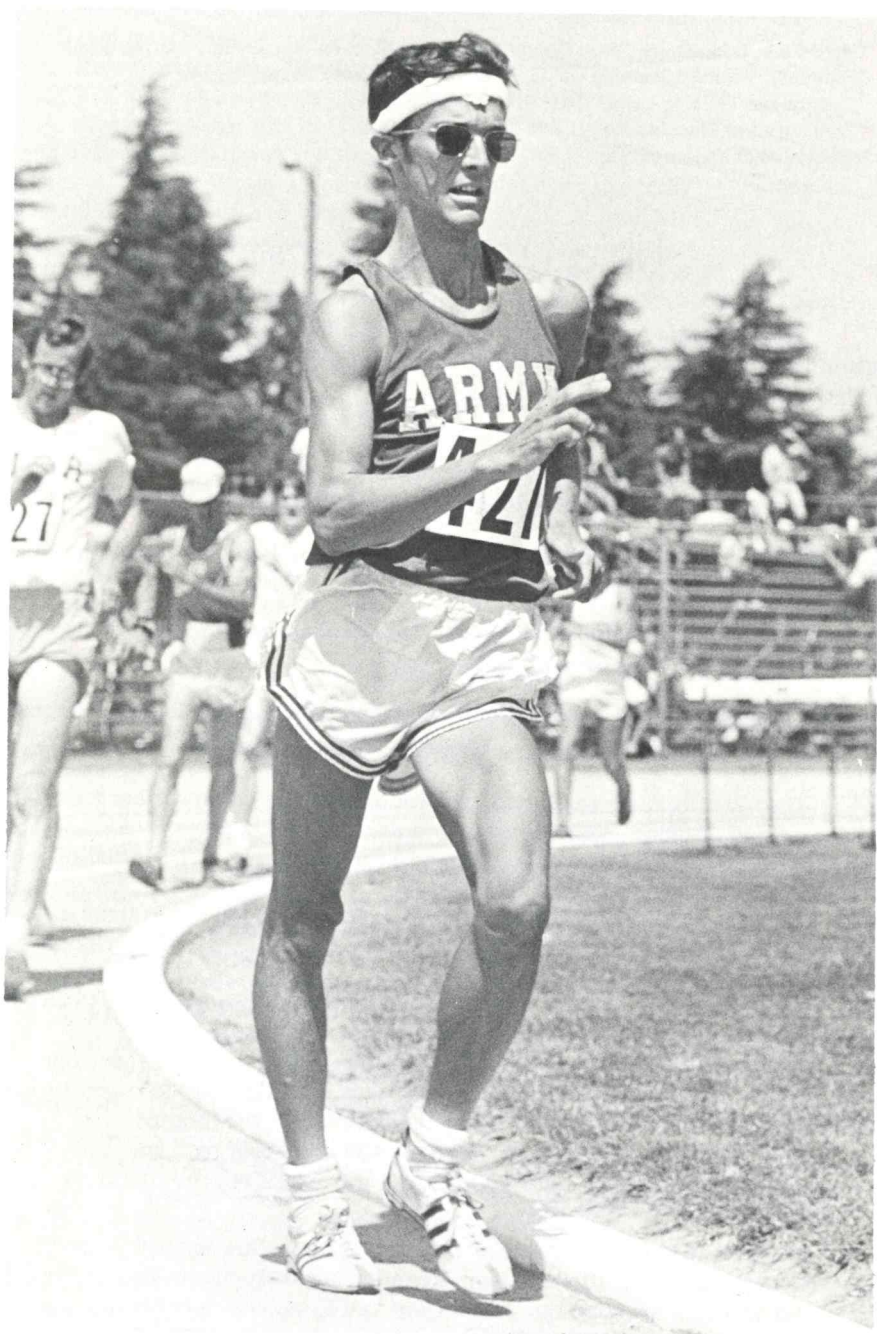
The "collapse-point" theory—a runner slows or stops at three times the average daily distance—is still valid in these events. But there comes a point where where runners simply can't do enough training to satisfy the formula.

They still finish, however, by carefully regulating their pace and fluid intake, by learning in training to run beyond "collapse" and simply by toughing out the extra distance.

(See related material in "Basic Training," "Diet before Races," "Planning Races," "Recovery after Races," "Road Racing," "Tactics in Racing.").

For more information:

- Corbitt, Ted—"Beyond the Marathon," Guide to Distance Running, 1971, p. 63.
- "The 50-Mile Boom," 1971 Marathon Handbook, pp. 42-44.
- "To the Limits of Endurance," RW, May 75, pp. 24-27.
- "Ultra-Marathons," Runner's Training Guide, Booklet No. 23, May 73, pp. 89-91.



"Walking offers most of the same physical and psychological benefits—plus some others not found in running." (Stan Pantovic photo)

Walking Races

"Far more people walk than run for exercise, so more of them should gravitate to race walking for a sport. And long, fast walking should enjoy even more status than its running counterpart."

—Race Walking Booklet

Race walking hasn't kept pace with the growth in the rest of the sport. And it's a shame, because walking offers most of the same physical and psychological benefits—plus some others not found in running.

Martin Rudow points out in his booklet *Race Walking* that competition is less severe in walking than running. A mildly talented walker has a far better chance of placing in national competition and earning overseas trips than does a runner of similar ability.

Walking also appears to be easier on one's legs than running. Many walkers are ex-runners who switched sports because of injury. Floyd Godwin, for instance, was a 2:20 marathoner in the 1960's. Now he walks with the best Americans.

A midwestern club coach, Bob Hyten, gives all of his athletes race walk training. He says it balances their leg muscle development and corrects such persistent complaints as shin splints and hamstring pulls.

There are problems with walking, too, of course. One is learning the technique. Runners with bad form can still run. Walkers who don't walk properly can be disqualified. They must learn to combine speed, mechanical efficiency and legality.

Top walkers are also facing an opportunity dilemma. The walks are due to be cut from the Olympic program after 1976, and other meets are sure to follow that example. For now, however, many races remain.

The primary distances are 20 and 50 kilometers (12½ and 31 miles). In the US, national championships for men and women, juniors to masters, are held at distances from less than a mile to 100 miles. Walkers compete on the indoor and outdoor tracks, but primarily on roads.

The track walks are usually one, two or three miles. On the roads, championships are held at five, 10, 15, 20, 25, 30, 35, 40, 50, 75 and 100 kilometers, one hour and 100 miles. Records are kept for the standard mile distances: 10, 15, 20, etc.

(See related material in "Events to Race," "Long Distance Racing," "Road Racing," "Ultra-Distance Racing.")

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Rudow, Martin—*Race Walking*, Booklet No. 43, Jan. 74.

Thompson, Don—"Comparing Running and Walking," *RW*, June 73, p. 23.

Warmup And Warmdown

"Jittery pre-racing runners concoct an odd mixture of science and superstition both to prepare themselves and calm themselves before races. It is more superstition, in most cases, than science. And the ritual probably is used more to put the mind at ease than benefit the race."

—Racing Techniques

The warmup period before races is a time for loosening up the head as much as the legs. Tension may get to be just about unbearable a half-hour to an hour before your event, when you're sitting thinking about it.

You start to move. It's a jerky kind of shuffle. You feel stiff and weak, and wonder, "Can I even get through my race?" Don't mistake the signs and imagine you're draining away precious energy now. The lethargy is a by-product of butterflies. Keep moving.

Gradually, after a mile or two of jogging, you begin feeling better—looser and more mentally tuned to the race. You jog to the nearest restroom for one final visit.

You stretch with slow, gentle exercises to further loosen the legs. No pushups or situps. This isn't the time to build strength. You need relaxing exercises.

Now you put on your racing shoes. Check the time and find out if the meet is on schedule. If it isn't, jog some more, until about 10 minutes before race-time. Then do a bit of race-paced striding. Get used to the "feel" of pace by going 50-100 yards that fast. Repeat it several times, with short walks or jogs between.

Go to the line with the sweat already flowing. It isn't bad to feel somewhat tired. Certainly that's better than starting cold. Remember how you felt 30-60 minutes earlier when the warmup began?

The amount of warmup is, of course, related to both the distance of the race and the weather. You obviously warm up more for a sprint than a road run, more when the temperature is near freezing than in a heat wave. than in a heat wave.

The running doesn't end at the finish line. Just as you warmed up before the hard effort, you should also taper down after it. Fatigue products build up during races. Light jogging, or at least walking, afterwards acts as a massage to work out the wastes and gradually bring the racing metabolism back to normal.

(See related material in "Nervousness before Races," "Stretching Exercises.")

For more information:

"The Pre-Race Ritual," Racing Techniques, Booklet No. 13, July 72, pp. 7-8.

"Stretching," Exercises for Runners, Booklet No. 29, Nov. 73, pp. 13-46.

"A Useful Kind of Fear," Practical Running Psychology, May 72, pp. 39-41.

Weather Conditions

"No runner can honestly say he enjoys all the insults and threats nature is capable of hurling at him. But if he wants to keep running, he learns to live with them. He knows the elements aren't going to change for him, so he has to adapt to them as best he can. If he won't bend, he gets hurt."

—Running with the Elements

News reports on the 1970 Boston marathon began, "Despite the cold and rainy weather, Ron Hill of England shattered the course record..."

The temperature that year was in the low 40s, and a steady rain fell. Undoubtedly, the reporter had shivered through that afternoon and had written his own misery into the story. For the runners, it was a beautiful day.

The way you judge a race day depends on your point of view. Temperatures in the 40s are ideal for marathon running. Only the spectators suffer. But when you come to the line and see the fans in shirtsleeves and sun glasses, you know a long, hot road lies ahead.

Heat kills—sometimes literally—in long distance running. Heat and humidity are such a deadly combination that the American College of Sports Medicine recommends no runs over 10 miles to be held when the wet-bulb temperature is above 82 degrees. This is a safety precaution.

However, sprinters love this kind of weather. Forty degrees is muscle-pulling weather for them, and they start to loosen up at temperatures where road runners burn out.

Likewise, rain is a mixed blessing. It cancels track meets, and turns cross-country races into mud baths. But marathoners pray for it because it solves their cooling problems.

Wind mixes its blessings in a different way. It helps the times of sprinters so much that the rules say it can't exceed 4½ miles an hour at their backs. But in races as short as one lap, the wind can wreck a time because you never gain as much with it as you've lost against it.

Weather's one of the few factors in racing that *is*. You can't change it. You can only plan for it, dress for it, adjust to it, and accept it.

(See related material in "Drinks during Races," "Planning Races," "Seasons of Racing.")

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"When It's Cold," *Running With the Elements*, Booklet No. 35, May 74, pp. 34-46.

"When It's Cold Outside," *Complete Runner*, 1974, pp. 174-177.

"When It's Hot," *Running with the Elements*, Booklet No. 35, May 74, pp. 12-33.



This long distance runner's cooling needs are adequately taken care of—inside and out. (Jay McNally photo)

Women's Competition

"It is ironic that women athletes were limited to sprint events for so many years. The sprints require power and speed—muscle-dependent attributes—more than stamina and efficiency of movement. It is in the latter characteristics that the average light-framed female runner excels."

Dr. Joan Ullyot, woman marathoner

The history of women's long distance competition is brief enough that almost everyone who has ever raced is still active. It was 1967 when Kathrine Switzer defied the males-only policy of the Boston marathon. Five years later, Boston had a women's division. Two years after that, the women had their own national and international races at this and other long distances.

Women have come a long way in a short time. And knowing what we do now about their abilities, we have to wonder about rules which limited them to one lap on the track until the 1960s.

Most of the barriers have come down, and the conclusion is that they were up for sociological, not physiological, reasons. With women competing at all distances, they're showing they are best suited physically to go long.

Dr. Joan Ullyot, a research physiologist and sub-three-hour marathoner, explains: "The average woman is 23% muscle vs. 40% in men. Thus, women have a hormonally-determined, sex-linked disadvantage in muscle-dependent activity—sprints, shot put, etc.—but a corresponding advantage in endurance activities."

Dr. Ullyot also says women have a "secret weapon"—their fat reserves, which are greater than men's. Fat is a prime fuel in long distance running, and women seem better able to burn theirs.

Given this ability, it's unfortunate that women were kept so long from the events they do best. The rationale was that they were too delicate for long distance racing. Next time you watch a race with both men and women in it, notice which sex is suffering most in the late miles. It might change your definition of "delicate."

The Purdy Scoring Tables on page 79 compare women's times.

(See related material in "Events to Race," "Time Comparisons.")

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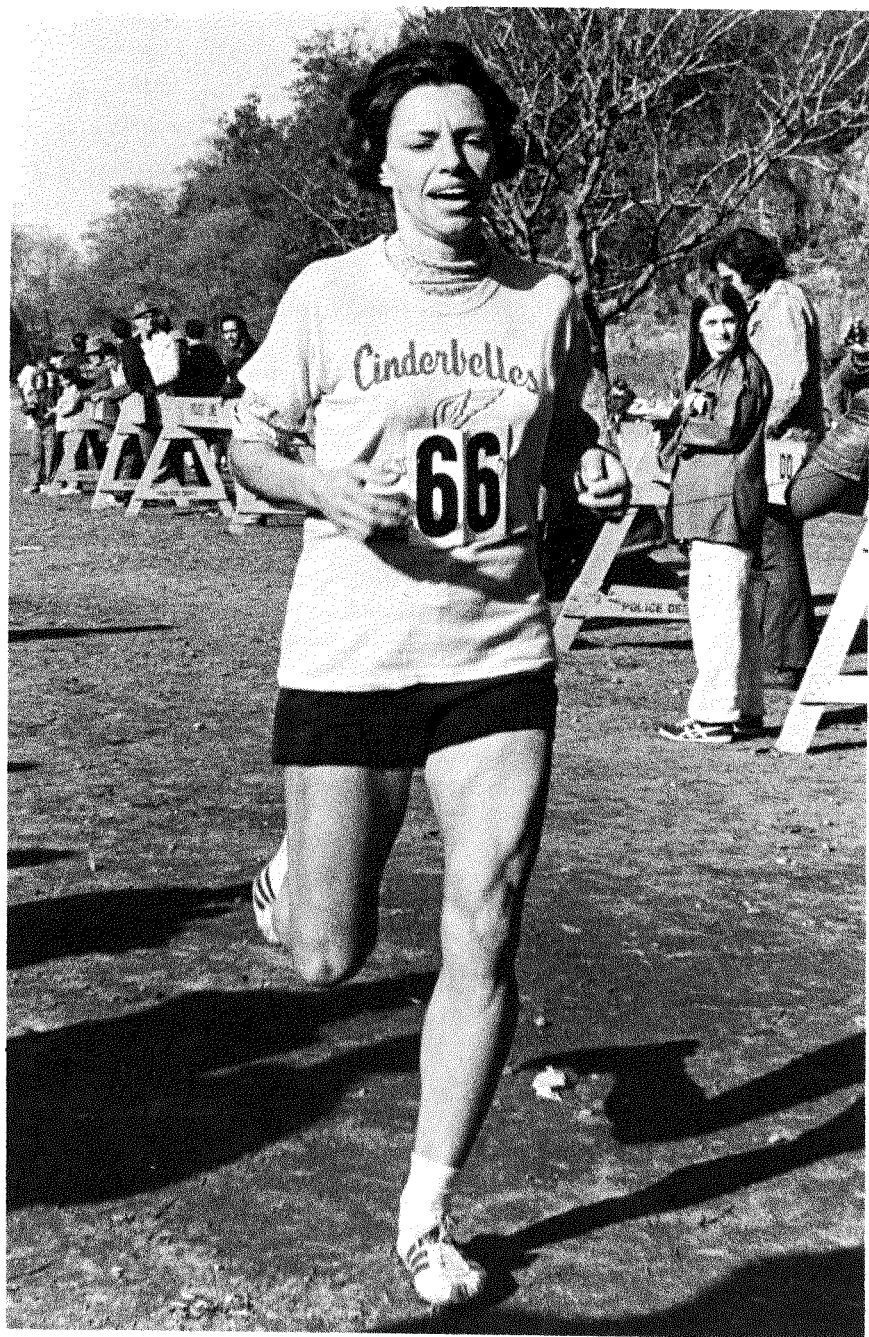
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Nina Kuscsik, a pioneer in women's marathoning, has broken three hours more often than any other female. (Jeff Johnson photo)

POINTS	100Y	220Y	440Y	880Y	1500M	MILE	2 MILES	100M H	200M H	MARA.
1200	10.33	23.15	53.15	2:03.2	4:16.5	4:38.2	10:08.0	13.45	27.16	2:34:30
1150	10.39	23.29	53.35	2:03.9	4:17.8	4:39.6	10:11.6	13.53	27.31	2:36:45
1100	10.46	23.44	53.7	2:04.6	4:19.3	4:41.2	10:15.4	13.61	27.48	2:39:15
1050	10.53	23.60	54.0	2:05.4	4:20.9	4:42.9	10:19.4	13.70	27.66	2:41:45
1000	10.61	23.77	54.4	2:06.3	4:22.6	4:44.8	10:23.8	13.80	27.85	2:44:30
950	10.69	23.97	54.8	2:07.2	4:24.4	4:46.8	10:28.8	13.90	28.06	2:47:15
900	10.79	24.18	55.3	2:08.2	4:26.5	4:49.1	10:34.2	14.02	28.29	2:50:30
850	10.89	24.41	55.8	2:09.3	4:28.7	4:51.5	10:40.2	14.14	28.55	2:53:45
800	11.00	24.66	56.3	2:10.5	4:31.3	4:54.3	10:47.0	14.28	28.83	2:57:15
750	11.13	24.95	57.0	2:11.9	4:34.1	4:57.4	10:54.8	14.44	29.15	3:01:00
700	11.28	25.28	57.7	2:13.4	4:37.3	5:00.9	11:03.8	14.62	29.50	3:05:15
650	11.44	25.66	58.5	2:15.2	4:41.0	5:04.9	11:14.2	14.82	29.92	3:09:30
600	11.64	26.11	59.4	2:17.2	4:45.4	5:09.7	11:26.6	15.06	30.40	3:14:30
550	11.87	26.64	1:00.5	2:19.6	4:50.5	5:15.4	11:41.6	15.34	30.96	3:19:45
500	12.15	27.29	1:01.8	2:22.5	4:56.8	5:22.4	12:00.0	15.69	31.65	3:25:45
450	12.50	28.10	1:03.5	2:26.0	5:04.8	5:31.1	12:23.6	16.12	32.51	3:32:30
400	12.95	29.16	1:05.6	2:30.5	5:15.0	5:42.5	12:53.6	16.67	33.62	3:40:00
350	13.56	30.60	1:08.4	2:36.5	5:28.7	5:57.7	13:33.0	17.41	35.11	3:48:30
300	14.41	32.63	1:12.3	2:44.7	5:47.6	6:18.5	14:24.0	18.45	37.19	3:58:30
250	15.67	35.59	1:18.0	2:56.5	6:13.9	6:47.4	15:29.8	19.95	40.19	4:10:30
200	17.56	39.99	1:26.4	3:13.9	6:50.4	7:27.1	16:53.0	22.17	44.62	4:25:30
150	20.43	46.51	1:39.2	3:39.4	7:40.0	8:20.4	18:37.8	25.44	51.14	4:44:00
100	24.87	56.37	1:58.4	4:17.0	8:47.4	9:32.2	20:50.6	30.28	60.74	not
50	32.14	72.14	2:28.8	5:13.4	10:20.6	11:10.5	23:41.4	37.74	75.46	computed

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Step Up to Racing

Running and racing aren't much alike. The action is the same, but not the effort and attitude.

Racing is a step up from running, and other booklets have told the difference between the two:

"Running is physical, but racing is emotional..."

"Everyday runs balance themselves between comfortable and uncomfortable. Races operate close to the jagged edge of exhaustion..."

"Running is traveling a familiar route. Racing is exploring the unknown. The runner who only runs comfortably sees only the flatlands. The racer seeks out the valleys and peaks of himself..."

But while the two are different, they go together. Running is the base which decides how high the racing peak can go. So we first published an encyclopedia-like introduction to running methods—First Steps to Fitness.

Step Up to Racing is the logical sequel, for people who want to go all-out.

Topics are arranged alphabetically (from "Age Group Racing" to "Women's Competition") and are cross-referenced to provide quick answers.

"First Steps" has one page on racing. "Step Up" splits that question into 50 parts and looks at each one carefully.