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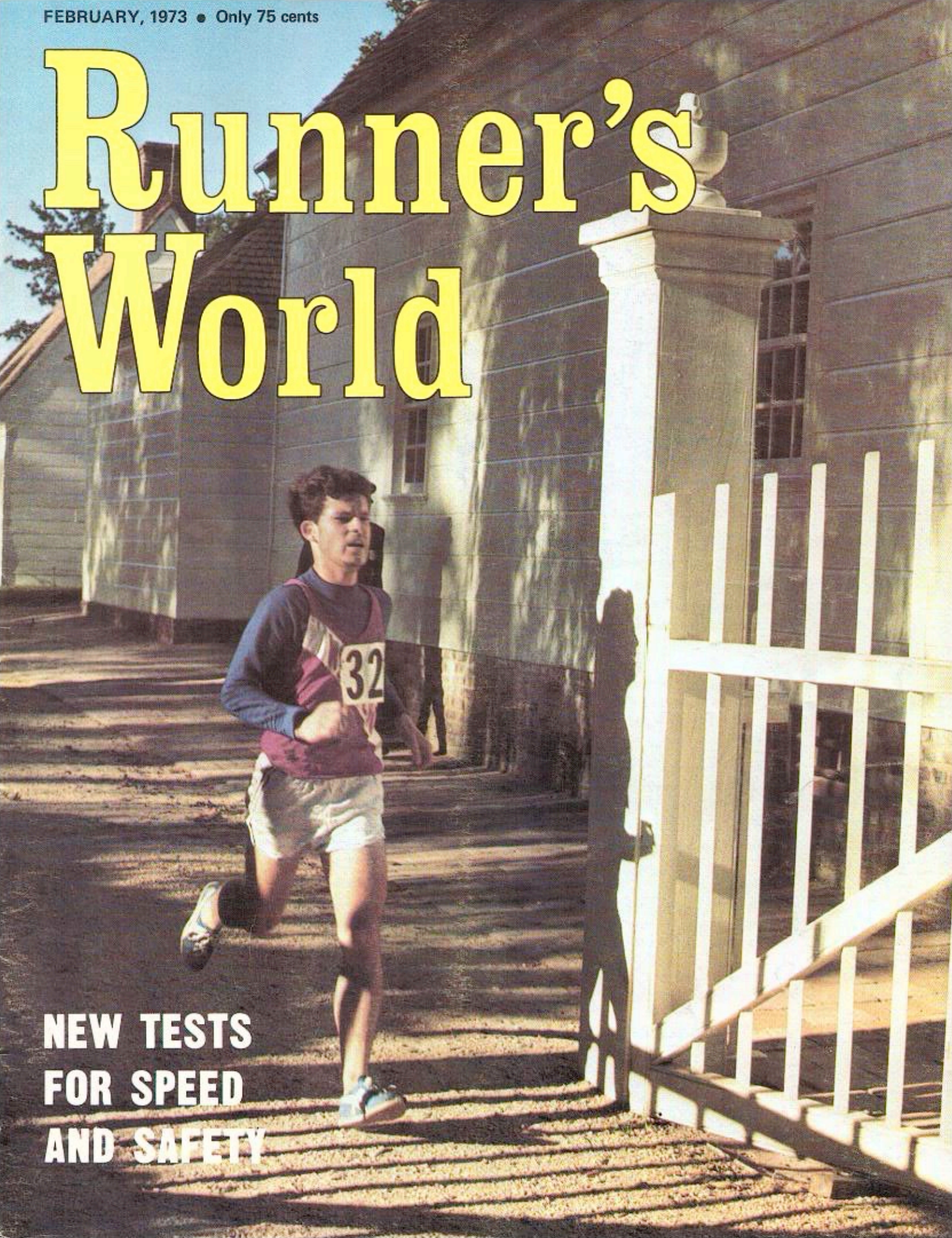
Runner's World



NEW TESTS FOR SPEED AND SAFETY

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Last year at this time we held the greatest sale in our history, the Leapin' Leap Year sale, offering you incredible savings that won't be equaled before 1976. However, something strange happens to us at the end of the year, and this year we have once again been hit by "Winter Fever" so that until March 1, you will once more be able to benefit from our annual (February) madness. THIS IS NO ORDINARY SALE!

Most sales offer little-desired items at low prices to stimulate interest. But not this one! We have carefully examined our sales records for the Olympic year and have come up with the three largest sellers, and these form our medal-winning lineup, at the kind of prices you like to see. Presenting: the shoes you want most – the champions of 1972.

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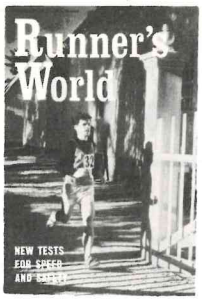
RUNNER'S WORLD

Volume — Eight February, 1973 Number — Two



COVER: There's no stiffer test of a runner's physiology than an ultra-marathon race. Here, Bill Triantos is pacing through a 36-miler in the Washington, D.C., area. (Photo by Les Swartz)

RUNNER'S WORLD
Mailing: Post Office Box 366
Mountain View, Calif. 94040
Office: 931 Industrial, Palo Alto
Phone: (415) 328-2911

PRESIDENT & PUBLISHER
Bob Anderson

EDITOR
Joe Henderson

ASSISTANT EDITOR
George Beinhorn

BUSINESS MANAGER
Jeff Loughridge

SUBSCRIPTION MANAGER
Rhonda Swan

SHIPPING CLERK
Lyman Dickson

SENIOR CONTRIBUTORS: Hal Higdon; Janet Newman; Wilf Richards (England); Martin Rudow; George Sheehan; Tom Sturak; Pat Tarnawsky.

SPECIAL CONTRIBUTORS: Richard Amery (Australia); Orville Atkins; Walter Boehm; Peter Burkhart; Bob Carman; Percy Cerutty (Australia); Nat Cirulnick; Ted Corbitt; Nick Costes; David Costill; Elliott Denman; Tom Derderian; Jim Dunne; Geoff Fenwick (England); Jack Foster (New Zealand); Fred Grace; Frank Greenberg; Roger Gynn (England); Mick Hamlin (England); William Indek; Carolyn King; Pat Lanin; Jerome McFadden; Gabe Mirkin; Des O'Neill; Tom Osler; Dave Prokop (Canada); Natalie Rocha; John Romero; Skip Stolley; Hugh Sweeny; Ken Young.

PHOTOGRAPHERS—Don Chadez; Rich Clarkson; Tony Duffy (England); Donald Duke; Bill Herriot (Canada); Jeff Kroot; Rick Levy; Jay McNally; Steve Murdock; Stan Pantovic; Mark Shearman (England); Paul Sutton; Steve Sutton; Walt Westerholm.

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CONTENTS

FROM THE PUBLISHER

Joe has been working hard on this issue's cover feature on physical testing, and I think it is a winner. Tests normally are very cold and dry and hard to understand, but I think that the contributors to this feature have come up with tests that are simple to do and explanations that are simple to understand. Let us know what you think of the tests, and for that matter the entire section on testing.

Over the years we have gotten many requests about what our offices and staff look like, so we decided to do a short feature on both. Now you'll know what we look like. I hope you are not shocked!

The color came out really good in my opinion, and we are getting many good comments on it. We will be printing a color cover each time, and we welcome color slides for possible use.

In September we will be starting a new magazine called *Nordic World*—covering cross-country skiing. If you have any interest along this line, I would like to hear from you. It will be a bi-monthly (six times a year) and will cost $4.00 per year. If you are interested in being one of our first subscribers, we do welcome your subscription.

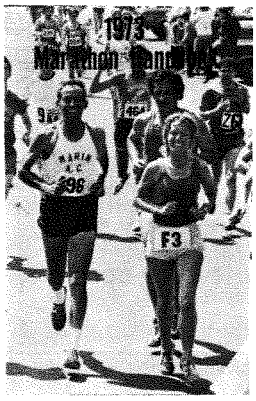
Bike World, our other magazine, is doing very well. We have a total circulation of 10,000 now, and it is beginning to catch on. It is bi-monthly, at $3.00 per year.

Our Olympic Tour to Montreal is filling up fast, and I recommend sending in your $50 deposit as soon as possible. Our trip is half full already.

Thanks for all the Christmas cards. It is a pleasure to hear from our readers.

TWO NEW BOOKLETS

BOOKLET NINETEEN IN OUR BOOKLET SERIES



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Every one of the races planned for '73 is listed here, along with full details on running it. All 1500 of the country's sub-3:00 marathoners are included, along with leaders from the world, Canadian, women's and age-group scenes.

But the booklet is a lot more than facts and figures. It has the type of feature material that has helped make US marathoning what it is. There are articles on training and racing techniques, profiles on leading runners of the year, stories of unique running events and how they got that way. This material covers nearly a third of the booklet.

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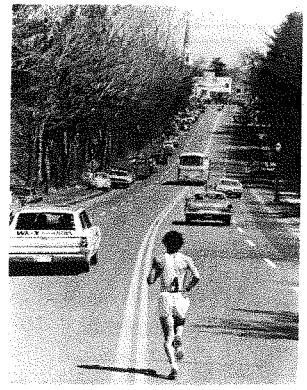
BOOKLET TWENTY IN OUR BOOKLET SERIES

1973 RUNNER'S WORLD PICTORIAL



See what happened last year. $1.75.

A WORK OF ART

Almost everything that can be said about the 1972 season of running has already been said. But there's a lot more to SEE yet.

The new Runner's World Pictorial devotes itself to the visual side of the sport during the year just past. Photographers from around the world contribute nearly 100 of their best shots, none of which has appeared previously in RW or the Booklets.

Emphasis is on picture quality and organization of photos. And the booklet is tops in both areas. There is a fine array of dramatic action from all events, with uncommon photos of common runners as well as traditional pictures of the sport's leading athletes.

The Pictorial is presented in large 8½ x 11 page size to add impact to the photography. Material is laid out so that it tells stories instead of simply showing isolated shots. Written material describes the photos without stealing the scene from them.

In all, this is much more than a "picture-book." It's a summary of a year, a collection of stories-told-through-photos, and an artistic gem.

Order yours now. 52 big pages. $1.75.

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PEOPLE BEHIND THE PRINT

This is the place and these are the folks who bring you Runner's World.

The first problem is finding the place. The familiar address is Box 366, Mountain View. But that doesn't do much good when you're driving around looking for the office that houses *Runner's World* and brother publications.

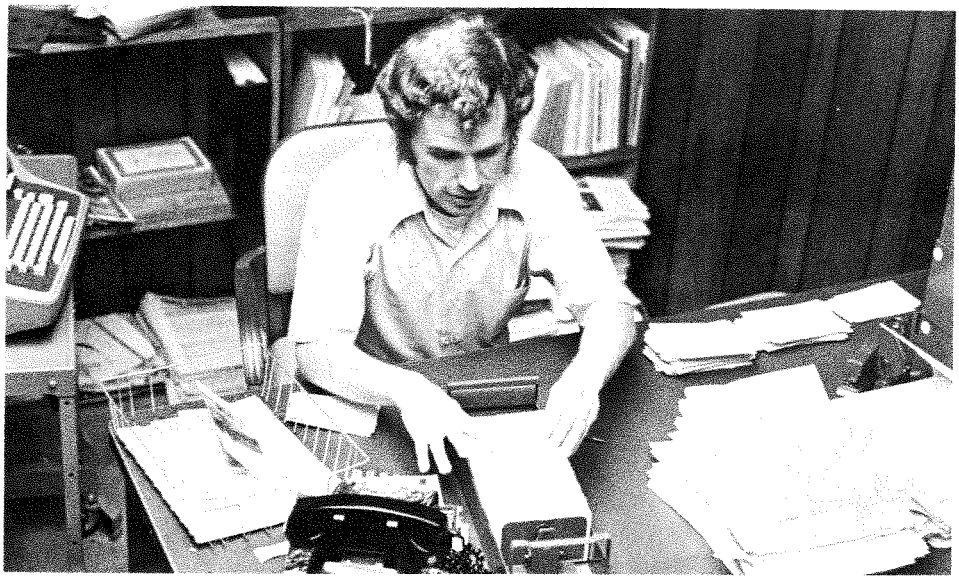
Stop and look in the phone book. Depending on what year's book you have, it may say one of three places in three different towns. In three years, we've gone from Los Altos to Mountain View to Palo Alto, and haven't traveled more than a few miles. The towns here are separated only on the map. As we've grown out of offices, we've kept the mailing address as a constant.

The present stop is on a street called Industrial, which more or less describes the area of mostly light industries. We are an exception. Another exception is the mortuary next door. Next door the other way is a machine shop, whose workers party every Friday afternoon when we're trying to finish up some magazine or other.

This office of ours isn't primarily a retail business place, so we don't really need a location on the main drag. This is mainly an editorial and mailing office, though of course we don't discourage drop-in trade.

You can drop in most anytime on weekdays. The day starts early. Mary Preston is the typesetter for all the publications, and she likes to get her work out of the way when it's quiet. She opens up at five or six in the morning and works until eight or nine.

The place doesn't start bustling until about the time Mary is going home. Then the rest of the staff comes in.

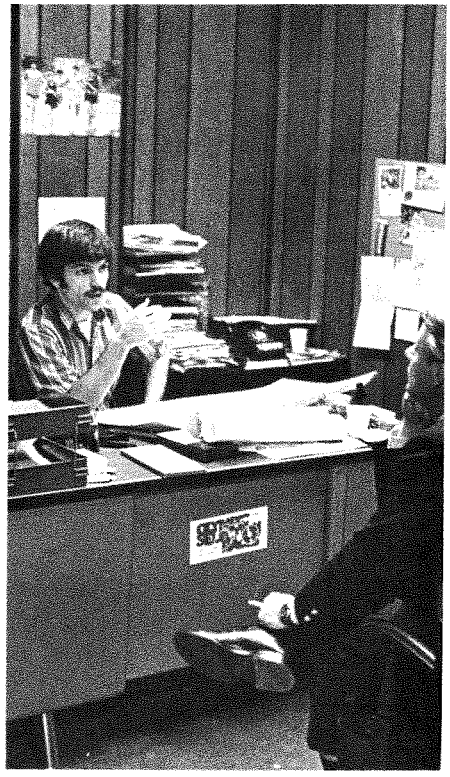


(above) Joe Henderson's desk is cluttered with the makings of the next issue. (right) Bob Anderson makes final arrangements with the printer. (Photos in this article by George Beinhorn and Bob Anderson)

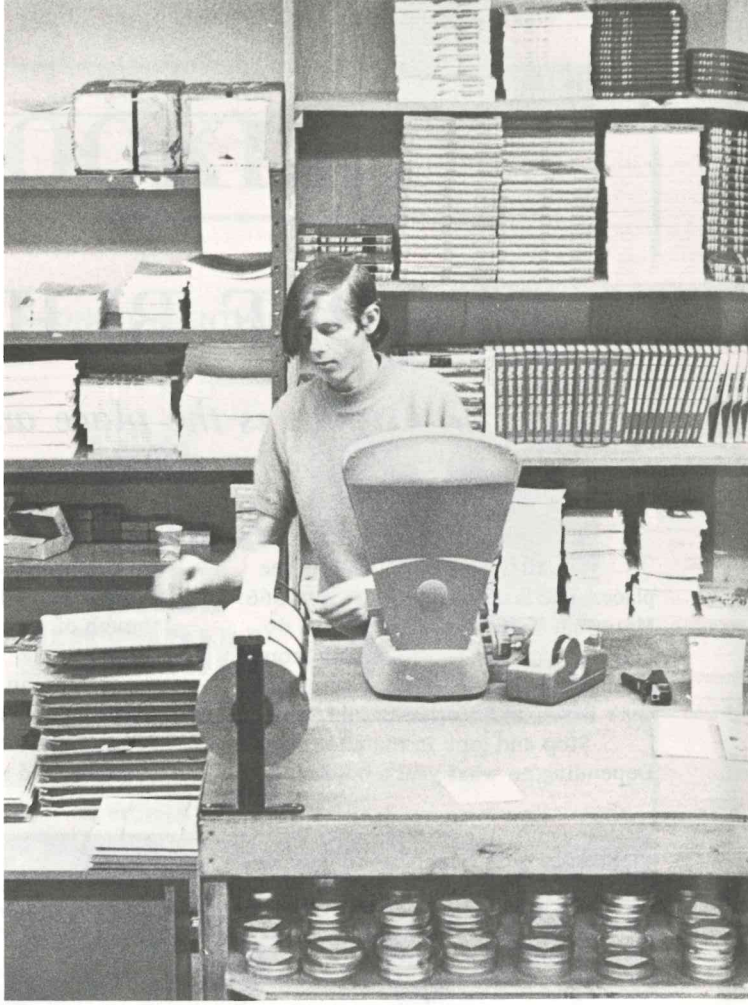
Three years ago, the staff was Bob Anderson, Joe Henderson and two part-timers. Shortly before that, it was only Bob. Now there are five people working full-time and as many as 10 part-timers.

The people are young (only one is over 30), the style is informal, the days are filled to the top with the work of getting out 2½ publications a month, and the pace is always brisk. Lunches are compressed into a few minutes most days. There is never enough time to talk as long as we'd like with visitors who drop by.

George Beinhorn used to be one of those dropping by. He occasionally did German translations for us, and he brought us some of his first pictures. He did so well that last May he was invited in to work full-time with the editorial side of the operation.



(right) Lyman Dickson in the shipping area. (middle) Rhonda Swan checks subscription cards. (bottom) Jeff Loughridge (in sweater) and Bob Anderson keep both layout tables busy.



Jeff Loughridge knows the business side from the bottom, because he started there when we had about a third of our present circulation and a tiny office in Los Altos. He was a high school junior then. He worked for almost two years as shipping clerk, went away to school in Washington for a time, and then recently came back as the new business manager.

In that post, Jeff works with Rhonda Swan (who took over as subscription manager when Rita Anderson retired to motherhood last fall) and with Lyman Dickson (who originally had taken over from Jeff himself as shipping clerk). Rhonda spends full days in the office, and Lyman—a junior college student—is here almost all the time.

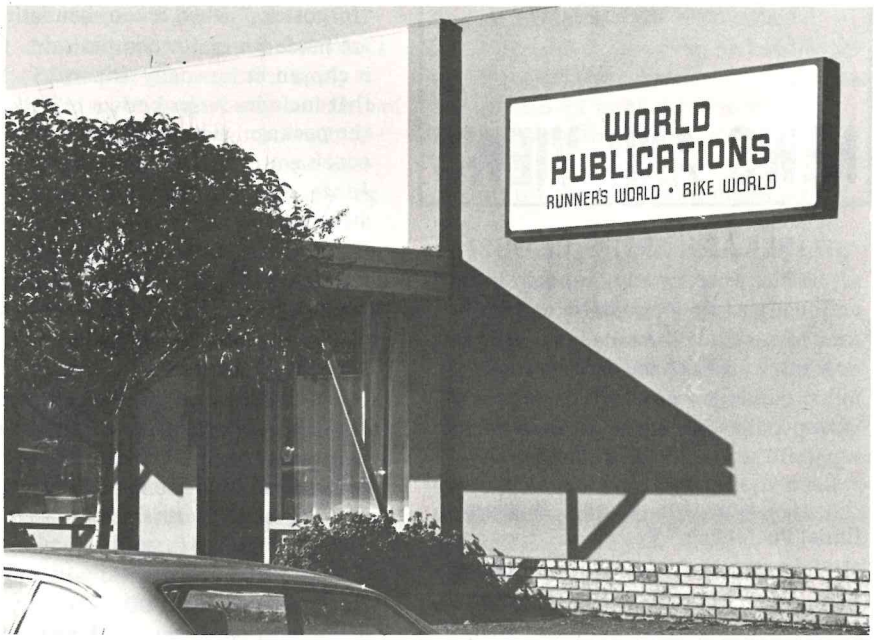
Duty lines aren't too definitely drawn when it comes to putting out the magazine. Everyone does a bit of everything, particularly when we're about to smash into deadlines. But work generally breaks down according to preferred "specialties"—the things we like and do best.

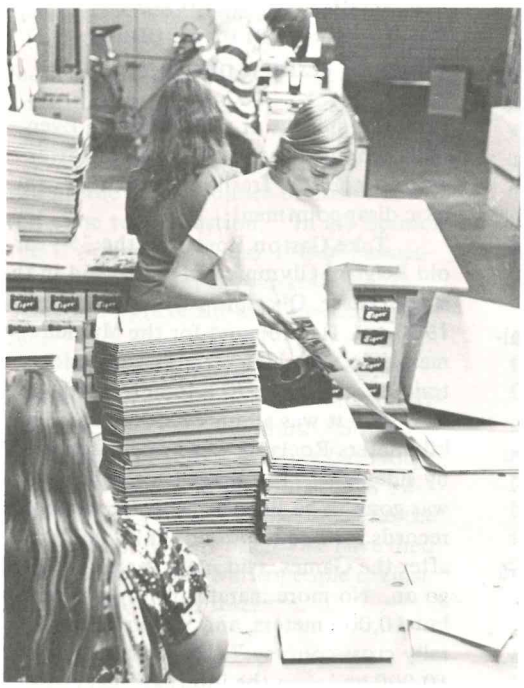
The magazines are Bob Anderson's babies. His ideas have raised them, and most of the major decisions are his. He also has a knack for layout and does most of that.

Joe Henderson works with the writing part of the magazine—gathering material for articles and putting them together. His output is considerable.

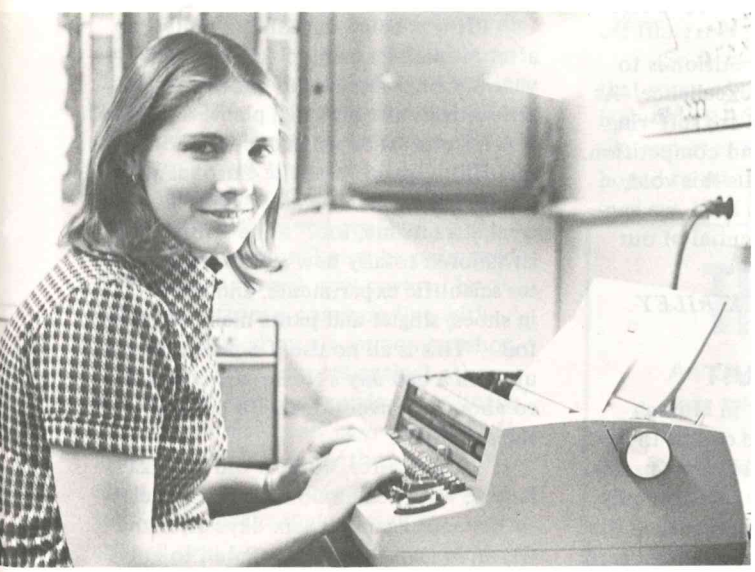
George Beinhorn was a real find, since he's quite versatile. He can translate German, Spanish and Portuguese material, and is learning French. And he has sharpened his photography to the point where we're publishing several of his pictures per issue. He writes for *Bike World*, too.

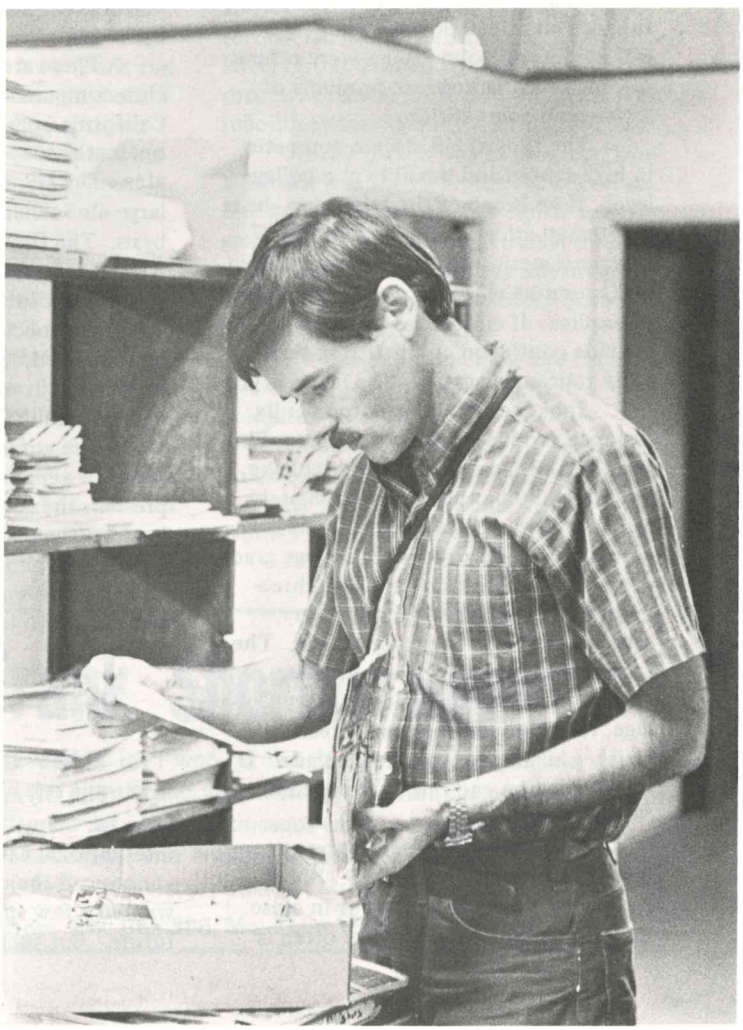
We aren't so big and specialized, though, that we don't answer our own letters, carry out our own garbage, or run with our friends on Sunday mornings. We hope we never grow that much.





The office (above), and its activity inside: (left) mailing the magazine; (lower left) Mary Preston at the IBM Composer; (below) George Beinhorn sorting photos.





NEWS AND VIEWS

PLEASE, MORE CLUBS!

Rick Riley, who competed internationally as a high schooler and broke four minutes for the mile in college, is now out of school and faced with a familiar dilemma: no coaching, no teammates, little competition. These are his suggestions for changing the situation.

Consider, for example, Belgium's Emiel Puttemans. Puttemans does not attend a university on a college scholarship. He is not a member of the armed forces. He works daily, out of doors, as a waterworks gardener. Puttemans holds the World's 3000- and 5000-meter records and is the Olympic 10,000-meter silver medalist. Puttemans is a club runner in the city of Louvain.

Rodney Dixon of New Zealand is another example. Dixon took the bronze medal at Munich in the 1500. He works as an insurance adjuster in his home town of Nelson. Rod is another of the fine line of Kiwi runners who work during the day and train after hours. Jeff Julian, Peter Snell, Murray Halberg, Bill Baillie and John Davies were others. All, including Dixon, are products of active club competition.

The typical US athlete competes in high school and possibly at a college level. If he is one of the lucky few, he is granted an athletic scholarship. The average American track participant then quits running when his college eligibility expires. If clubs were available to provide continued competition, this early retirement may not be necessary.

Spokane, Wash., is noted for its distance products. Gerry Lindgren, Phil Burkwist, Randy James, Paul Schlicke and I are among them. Unfortunately, Spokane does not have a club that encourages participation after college graduation. Unless you are a 12:53 three-miler or a 3:59 miler, you have to search and scrape for competition. The typical Spokane athlete meets after work at Spokane Falls Community College, runs through the pine forests or finishes his intervals in the darkness. If he is lucky, he can run unattached in a college meet.

The same athlete might be a member of a university track club. But if he does not live on campus or in close vicinity to the institution, he often is "forgotten," when recommendations are made for major competition. If he is chosen, it is usually as part of a deal that includes lesser known athletes in the package. The usual line from the coach goes, "If you'll take Smedley Jones, we'll give you Phil Dirt." The athlete in a university club soon finds that though his eligibility to score points is gone, he is still good bargaining power. Often, too, the coach at a college or university is much to busy to adequately manage a good club.

Club competition has thrived for decades in Great Britain. Cross-country is extremely popular and competition between clubs is keen for county and national honors. It is not unusual for 700-800 runners to contest a county championship. The national event attracts upwards of 1000. The only event in the US that draws numbers like this is the Boston marathon, and perhaps 300 of these entrants do so to satisfy a bet or on some other lark. Considering this, it is not hard to determine why the British Isles produce top class cross-country runners and the US does not.

Continental Europe also has active club participation. Industrial concerns often sponsor clubs and encourage their sportsmen to compete. Germany has many such clubs, and nearly every town or hamlet has a track of good quality.

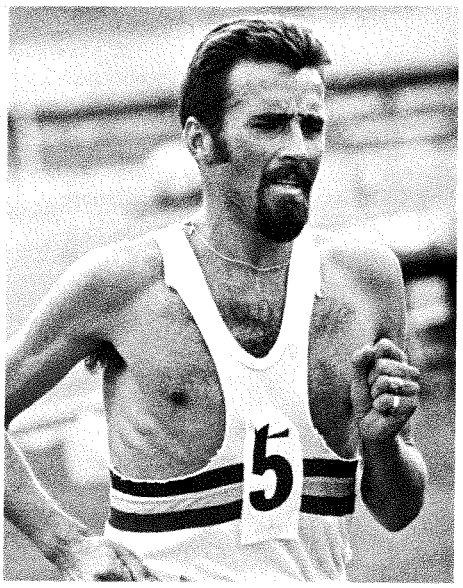
There are areas in the US where club competition is fairly successful. California boasts several clubs that serve open athletes and welcome post-graduates. The US also can point to several large clubs that operate on a regional basis. The Pacific Coast Club, New York Athletic Club, Florida Track Club, Oregon Track Club are good examples. These are successful, but there is a problem involved: if you don't live in Florida, it's tough to compete for the Florida Track Club.

The aim of all competition is to produce a higher level of excellence. At present, the good athletes are suffering because they lack clubs and competition. Until the United States fills this void, and the club system takes hold, we cannot expect to tap the potential of our athletes.

BY RICK RILEY

THEY CAN'T QUIT

The Olympic Games in Munich were for many athletes the end of their international careers. Well-known names announced their departure. Others only wanted a few smaller competitions in the future. But such things were rarely heard from the mouths of marathoners. Even older vintages were not moved to bitter words under the fresh impression of athletic disappointment.



At age 35 and after a disappointing Olympics, Gaston Roelants has no intention of stopping. (Mark Shearman photo)

Take Gaston Roelants, the 35-year-old Belgian, Olympic victor in 1964 in the steeplechase, Olympic participant from 1960 on. He prepared for the Munich marathon with high elan, did altitude training, ran up to 70 kilometers a day. And then it was all unrewarded. At 20 kilometers Roelants was beaten, tortured by side pains. The longed-for gold medal was gone. The Belgian, who set world records for one hour and 20 kilometers after the Games, said nevertheless, "I'll go on. No more marathons to be sure, but 10,000 meters, and in winter naturally cross-country." (He ran his best 10,000 and won the international cross-country race in 1972.)

It was being said of Ron Hill that after Munich he wanted to stop. The 34-year-old Englishman was depressed and self-critical over his sixth place. But stop? No. "I was probably misunderstood," said Hill. "In 1974 at the European Games I'll be there again. And Montreal attracts me, too." The British chamist tailored totally new running gear after scientific experiments, and appeared in shoes, singlet and pants made of metal foil. "This is all no use if a person shows up with a bad day's form," he commented about his inventions with a shrug of the shoulders.

Jack Foster, 40-year-old New Zealander, was even anxious to run the classic distance again just six days after the Olympic marathon. He wanted to enter

the veterans' championships near Cologne, but had to return home because he couldn't take more time off. "I can't stop," Munich's eighth placer said in good humor. "I've been given such a mountain of various brands of shoes. First I'll have to run out the shoes, and that'll take at least until '76."

BY MANFRED STEFFNY (from "Condition" magazine, translated by George Beinhorn)

BALANCING

In the late '60s, doctors rushed to praise running as the panacea for ailments—physical and mental. In the early '70s, other professionals have rushed in to condemn it for various reasons. Per-Olof Astrand, the eminent exercise physiologist from Sweden, gave a balancing opinion on the values and drawbacks in a recent *Medical Tribune.*

"Training must not be a collective (activity)," Astrand said, "but individual, according to the capacity of each person."

He disagrees with methods that call on the health-runner to push himself close to exhaustion. "In my opinion this is overdoing things. It is not necessary to perform at maximum speed in order to improve the cardiovascular system."

Though Astrand disagrees with maximum exertion, he's for individually-patterned exercise programs. "Some cardiologists say that patients have died because of such training, but this is difficult or impossible to prove because the same patients might otherwise have died in bed... Who ever warns people against the hazards of bed rest?"

HOW WOMEN WON

The AAU finally backed down on the last festering issue of women's long distance during the national convention at Kansas City. In a ruling now in effect, the women's track and field committee voted to accept long distance subcommittee chairman Ken Foreman's recommendation solving the problem. Foreman said women will now be permitted to "run in races not now covered by legislation, from a common line with men and started by a common gunshot, so long as they compete against other women and receive awards accordingly."

Since races now covered by AAU legislation include only those up to 2½ miles in cross-country and two miles in track, this means that women can compete in men's races at any distance above these—as a separate but equal section.

Also out the window is last year's AAU policy that women must apply personally to national women's chairman Pat Rico for permission to run such races as marathons. Under the new Kansas City rule, any race director wanting a women's section in his long distance race may simply apply to his district association for the sanction, the same as he does for the men's sanction.

The festering, during the past year, was caused by Pat Rico's insistence that, while women could now run with men, they had to start at a different time and from a different starting line. For instance, at Boston she wanted the women started 30 minutes ahead of the men. She threatened to suspend any runner who disobeyed.

Rico's ruling made little sense to many runners and race directors, who felt that separate scoring was enough to make the women's event separate. Many openly flouted her ruling, following Thoreau's wonderful idea of the right to civil disobedience. Even the Boston marathon flouted it, and started the women grandly from their won little strip of the historic starting line last spring. Nobody, curiously, was suspended.

Most of the big starting-line hassles centered in the East, around the Boston, Yonkers, Syracuse and New York City marathons. At the New York run on Oct. 1, Nina Kuscsik and five other women staged a starting-line sitdown protest against the rule. They made a big picture in the *New York Times* and the nationwide TV news (see "News and Views" Jan. 1973).

Finally another Eastern woman runner prepared to file a complaint against the AAU with the American Civil Liberties Union. But, with the convention coming up, it was decided to hold off filing and see what developed.

So it was with blood in their eye that some of the Eastern AAU delegates, including RRC national co-delegate Kuscsik, departed for Kansas City. They hoped to set the legislation right, but feared stiffening AAU resistance.

The AAU, however, had suddenly mellowed on the subject. Possibly it was the unpleasant publicity, the troubles it is having with athletes in other areas, the threat of lawsuits that it can't afford to fight and that it might well lose.

At any rate, "When we arrived in Kansas City on Tuesday for our first committee meeting," Nina told me, "we went to this wine and cheese party, and I was surprised to find so many delegates who, unlike last year, understood the issue and sympathized with the women."

At the women's track and field committee meeting, Ken Foreman got up and delivered a memorable speech. Still cautious last year about women running in marathons, Foreman has evidently since shifted to 100% support of the women. His speech, put in a nutshell, went more or less as follows:

Women marathoners, he said, come into running from a different point of view. They don't come up through the age-group ranks. They often are wives of marathoners. They are a different breed of cat. It is hopeless for the women's track and field committee to try and control them, as they will run with the men regardless. The issue is not their running the distances any longer, but simply the organizing of the races themselves. He had, Foreman said, received letters from women all over the country protesting the current policy. His recommendation was therefore, etc. etc.

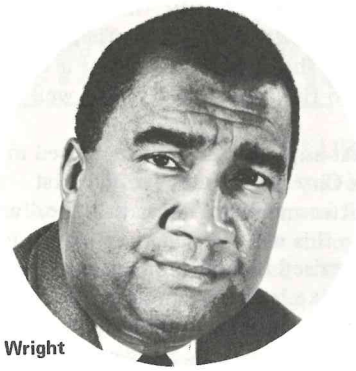
As the speech was in progress, Doris Brown was sitting beside Nina Kuscsik. She nudged Nina with her elbow and grinned, "Well, did you get what you want?" Pat Rico didn't say anything. The committee voted to accept Foreman's recommendation.

"We came up smelling like roses," said one pro-woman male Eastern delegate.

Hopefully everybody can now get down to the business at hand, which is building up a solid national program in women's long distance.

BY PAT TARNAWSKY

STAN WRIGHT & EDDIE HART


Wright


Hart
(by Stan Pantovic)

The first statements on the now-famous Munich sprint incident came in the heat of the moment, amid anger, tears, recriminations, the glare of world-wide publicity created by more than a few self-serving hatchet men.

Stan Wright, the US coach, shouldered the blame. I messed up, he told the press. I read the wrong schedule and got the sprinters to the line too late for their second round races. Co-world record holders at 100 meters, Eddie Hart and Reynaud Robinson, got bumped that way. Valeriy Borzov went on to win unchallenged.

Time and distance have helped put the matter in less earth-shaking proportions. Compared with the real tragedy at Munich, this remains as only one of many minor problems of the Games—except to the three men most concerned.

Months later, Stan Wright still isn't trying to duck responsibility for the incident as he quietly explains it for the hundredth time.

Eddie Hart regrets missing the 100, of course. But he says if he had it all to do again, he would trust Wright to get him to the race on time.

The thing that perhaps soothed them most was the US victory in the 400-meter relay. With Hart anchoring, the team tied the world record and beat the Soviets with Borzov.

Sam Skinner, a radio and TV sportscaster from the San Francisco area who was in Munich for the Games, recently interviewed both Wright and Hart for his "Black Renaissance" program on KBHK-TV.

Wright is chairman of the AAU's track and field committee and head track coach at California State University in Sacramento. Hart is finishing master's degree work at the University of California's Berkeley campus. He's undecided about continuing competition, but is planning a coaching career.

Skinner: *Eddie, Stan Wright has been working with you and the other sprinters from the Trials in Eugene on. What had been his attitude toward you during that time? Was it very regimented, as far as scheduling was concerned?*

Hart: I don't know if I can use the word "regimented," but this was the situation. We were told all the schedules, which is what I prefer since this is Olympic caliber competition. You're running with the best, and your mind is spinning like a top. As an athlete, you don't even want to think about such things (as schedules). It is perfect for someone else to handle this part of the situation. I think, well, if I had it to do all over again, this is the way I would have it. I don't think there was anything wrong or bad about the way Stan Wright handled us.

Skinner: *Didn't you think it was a little bit funny that after having you to practice and to meets on time all those weeks, he didn't have you on time for the biggie?*

Hart: I can only say that I feel that there was more to it than just Stan Wright. There was more to blame than him. For a person who's as punctual as Stan Wright, I feel something else had to happen to him. I don't feel it will happen again. As I said before, if I had it to do all over again this is the way I would choose to do it.

Skinner: *Eddie said this to me in Munich: "I don't think it will ever happen again." But it did happen—three more times. However, it didn't get as publicized as this. The 5000 meters was off by an hour from the time the United States Olympic Committee had...*

Wright: The best Ethiopian (Miruts Yifter) missed his heat... What disgusted me about the whole thing was the changing of the schedules by the German organizing committee. I was in Japan and I was in Mexico City. The schedules were set for a year and they were never changed. The Germans changed the heats and times in the 5000 meters. They changed the heats and times in the 100 high hurdles.

I don't know if you've heard this because it's been kept very quiet. But a West German high hurdler missed his heat because the Germans themselves didn't tell him and he got mixed up. There were some other changes. They took it upon themselves to change without consulting anybody. I guess this is their prerogative, I'm not sure.

I'm not trying to minimize our unfortunate situation. Don't misunderstand me. But there were some other countries that fell into the same situation.

Skinner: *If they took it upon themselves to make these changes, did they have a standard method of making these known to all the athletes?*

Wright: The only place that we could get materials was at an information desk at the information center. Anyone could walk in there and pick up anything. If we didn't get over there within an hour, they were gone. We didn't get them. Nobody gave them to us. At Mexico City, for example, each country had a box that had a lock on it. The material was put into the box, and it was the head manager's responsibility to pick up materials for the next day. He was the only one who had a key.

Our people never picked up the revised schedule. To this day I've never seen the heat sheets at 4:15 p.m.—1615—that was related to the second round. When I left that morning after the first round with Eddie (Hart) and Rey (Robinson) and Bob Taylor, I went down to the assembly area where the guys check in and asked the officials if they were going to run on the schedule I had. They said that was it. You must understand, *Stars and Stripes*—and I checked it again last night to make sure—had the same schedule I did.

Skinner: *Stars and Stripes is the English-language newspaper we had over there, published by the armed forces. Ironically, it was Howard Cosell who mentioned the Stars and Stripes as having the right schedule. We found that to be wrong.*

Wright: The afternoon session started at 3 o'clock. If you look at the schedule, you'll notice that the 100-meter second round was to follow three heats of the 10,000 meters. I felt, and the guys had confidence in me as their coach, which I can appreciate, that I was on the right schedule. I told them we'd leave around 3:30, 4 o'clock, after the 20-kilometer walk had started, because it would take a long time for the three heats (of the 10,000). This would give us plenty of time to go over leisurely, and warm up and get ready for our heats. Unfortunately, this was not the right schedule.

People have criticized me, and I'm willing to take the criticism. I want everybody to understand that the reason I took the responsibility was to take the onus off the athletes. I feel that my duty as a coach was to be loyal to them. As you know, Sam, there were a lot of accusations going on in the Village that the athletes were sleeping, that they were irresponsible, that they were lazy—which was ridiculous. They were on their way (to the track) as soon as they realized the mistake. I want to make it crystal clear that it was not their fault. I'm not going to sit here and say that I should be exonerated. Some people have told me, "Stan, you're the scapegoat. You're taking the blame for this. You don't have to take this." I think some black people are mad at me because they think I'm taking up the white man's burden. I'm not taking anybody's burden.

Skinner: *You mentioned the West German almost missing the heat in the high hurdles. There was another German who lived in Munich and had gone home after the swimming, thinking he hadn't qualified. The only reason he got to the race was that they announced his name over and over on television. People will immediately ask, "Why didn't they do the same thing for Eddie and Rey, who were watching television?"*

Wright: It wouldn't have done us any good, because we could have been sitting there in our rooms looking at it and not known what was going on. If you don't understand German, you have a very difficult time.

Skinner: *Eddie, you told me you've received dozens of telegrams. Has this given you some kind of reading on how people feel about you?*

Hart: It helped me to think things out. Right after I missed the race, I didn't know what to think, and I didn't know what the people were thinking. I'm not really hung up on any belief that I owe anything to anybody, or anything like that, but I am concerned with what people think. I was more concerned with what was going on at home with my parents and friends. They sent me telegrams. I think this helped restore my faith, and give me the little extra I needed to go on and compete in the 4 x 100 relay.

Skinner: *You ran 38.2 in that race to tie the world record, but you let up 20 meters from the tape. Why did you let up?*

Hart: I realized about five or 10 meters after I got the baton that we had the race won. I pushed it in the middle, but towards the end of the race—I don't know why, I didn't plan it or anything—I did ease a bit. I think we could possibly have broken the world record.

It was a double feeling, I guess, realizing that we did tie the world record—which is nothing to shrug your shoulders about—but also realizing that we could have *broken* the world record. But it was good. I was very pleased and happy with that.

Wright: May I comment about Eddie and the guys. This 400-meter relay win was the finest I've ever had in international competition— or ever—because of what had happened. Eddie was our leader. We disagreed, we argued with each other. After the traumatic experiences, Eddie could have said, "Well, Stan, I'm going to kiss this goodbye and go home." But he didn't. I'm saying that Eddie Hart is a man, a fine young man because he not only stuck with me but he stuck with the other guys. He's the guy who pulled us together—not because he ran the anchor, but because of his attitude, his feelings, his leadership and his dedication. I want to say that this win was to me just sensational, especially when it was negotiated in lane one.

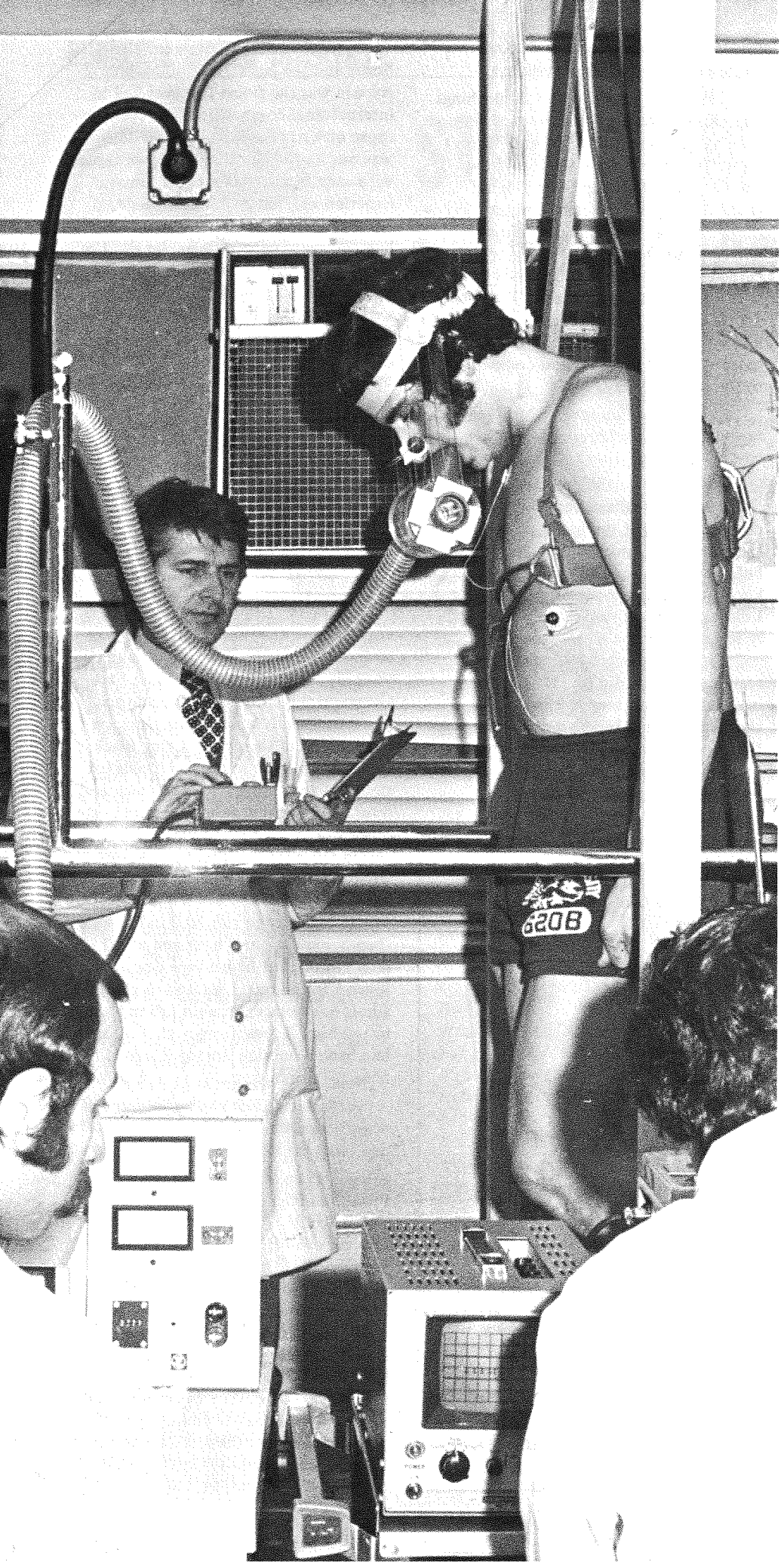
Skinner: *Coach, lane one was the property of the United States. It seemed that the US Olympic Committee could not afford any other real estate but lane one.*

Wright: I don't really need to comment on that except to say it was strange to all of us how we got lane one so many times, while Russia and East Germany stayed in four, five and six.

In the Olympic Games, they go by the luck of the draw. Larry Black had the best time in the semifinals (of the 200) with 20.2. He came back and hour and 30 minutes later and had lane one again in the final. (Valeriy) Borzov was in the middle. It's all conjecture what might have happened, but I would say it's very difficult for a man to get up psychologically to run 20.2 in the semis, then come back and hour and a half later to find out he has lane one again. When I found out, I wanted to go dig a hole someplace, because I didn't want to tell him. I feel strongly that if Larry had been alongside Borzov it would have been a different race.

Skinner: *Eddie, what about pro track? Are you interested in that?*

Hart: I haven't gotten completely calmed down after the Games. I think I'll rest a little longer and then decide. I don't know for sure if I'll continue running or not. I'm now going to the University of California in Berkeley, where I'm majoring in physical education. I hope one day to coach. I like track and field, and this is a way that I can stay in it, all my life. I've been running for a long time, and I know that the sprint is a type of race where you can't stay in it too long. If you do, you'll get pushed out. I think it's better just to bow out gracefully. But I haven't completely decided yet.



Treadmill stress testing at Long Island University. (Steve Sutton photo)

WHAT GOES ON INSIDE

Exercise physiologists are uncovering ways to make running safer for beginners, faster for veterans.

This special feature section has a number of contributors, most of whom are specialists in the field. Ned Frederick, who writes the introduction, is a graduate student in exercise physiology at California State University/Humboldt. Gerry Purdy is in charge of computerizing Dr. Kenneth Cooper's massive amount of research data on exercise and writes here of Cooper's work. Drs. Michael Pollock and Henry Miller work in the exercise lab at Wake Forest University. Tony Sucec teaches and coaches distance runners at California State University/San Diego.

WHAT DO THEY TEST?

BY NED FREDERICK

This is an exciting time to be alive and running. Man's knowledge of himself is expanding at unimaginable rates. Information is perpetually accumulating, which allows us to methodically push back the limits of body and mind. Nowhere can the effects of this exponential learning be better seen than in the blossoming field of running physiology. New facts, skills, techniques and instruments are appearing daily, advancing our comprehension of what we see.

The research physiologist is unlocking the doors of our perception, allowing us to better define and understand the factors which limit running performance. As our understanding of these limits increases so do performance levels.

Modern physiological research has given us a broad picture of the limiting factors of running performance. These factors provide a framework within which to discuss methods of physiological testing and their meaning to the individual.

Oxygen uptake: The maximum amount of oxygen that a runner can take in and transport to the various tissues of the body is the most basic factor limiting running performance. The measurement of this overall ability is called the *maximum oxygen consumption rate.* It is calculated by having an individual run at a given rate on a treadmill while breathing into a closed system which is designed to measure the amount of oxygen taken into the body and not returned, i.e. consumed.

These measurements are standardized in milliliters (ml.) of oxygen consumed per kilogram (kg.) of body weight per minute. This information tells the physiologist a great deal about the runner. It indicates the level of fitness. (Distance runners can have twice normal levels, e.g. 80 versus 40 ml./kg./min.). It allows reasonably accurate predictions of performance. And it reflects the relative effectiveness of various components of the oxygen transport system. These components are subject to further tests which give us more detailed information on the oxygen transport system.

The maximum oxygen consumption rate is directly dependent on several factors: the ventilation of the lungs, the oxygen carrying capacity of the blood, the unloading of oxygen at the tissues, and the pumping capacity of the heart. The accurate measurement of each of these factors also is important in evaluating different training methods and defining the capacities of the individual. Each measurement gives us a different point of view in assessing oxygen uptake.

Lungs: Looking from the angle of lung ventilation, we can measure the maximum amount of air which can be moved in and out of the lungs (*vital capacity*). This is a function of the total volume of the lungs. And as you would expect, runners have much larger vital capacities (e.g. 5.7 liters) than average untrained individuals (4.8 liters).

Besides the volume of the lungs, we are also interested in the strength and endurance of the respiratory muscles. This is assessed by measuring the maximum amount of air which can be breathed in one minute. It is referred to as the *maximum breathing capacity* and again we find runners superior in this capacity. Whereas an untrained individual may have an MBC of from 125-170 liters a minute, figures well over 200 per minute are regularly recorded for runners. Even more significant is the fact that runners can sustain a large intake (over 120 per minute for more than 20 minutes) while the untrained individual can sustain this large minute volume for only a few minutes.

Blood: The lungs supply a place for the oxygen in the air to come in contact with the blood. The amount of oxygen extracted from the air is dependent on a number of things. Of major importance is the capacity of the blood to carry oxygen. This is measured by determining the hemoglobin content of the blood since hemoglobin does the carrying. Distance training increases the hemoglobin count, so runners have a greater oxygen carrying capacity than non-runners. It is also interesting to note that altitude training can cause further increases in this capacity.

We need to know, too, how much oxygen can be unloaded at the tissue level. This can be measured by the difference in oxygen concentrations between arterial and venous blood. This function is greatly enhanced in the distance runner due to the presence of more extensive capillarization of the active muscles.

Heart: Having a large vital, maximum breathing and oxygen carrying and unloading capacities is not enough if the blood is not circulated rapidly and efficiently. Therefore we need to assess the pumping ability of the heart. Two measures of this ability are the *stroke volume* (the volume of blood pumped out of the heart with each beat) and the *minute volume* (amount of blood pumped in one minute). The stroke volume of the distance runner's heart is nearly twice the normal value, and minute volumes are also correspondingly higher.

Heart rates reflect this increased capacity of the runner's heart. If your heart has a greater capacity to pump blood, it stands to reason that it will have to pump less in a normal resting state. This is true for runners who regularly record resting heart rates near 40 beats per minute.

Besides having low resting rates, the runner's heart can beat faster for longer periods of time. Say a runner has a maximum heart rate of 240 beats per minute. He can maintain 60% of that maximum (144) for a much longer time than an untrained individual. It is also significant to note that, due to increased cardio-respiratory efficiency, the trained distance runner can perform the same amount of work at a much lower heart rate than an untrained individual. This all adds up to an increased capacity to do work, which is the definition of fitness.

Fat: A more indirect factor affecting oxygen uptake, and performance in general, is body composition. Researchers have shown high degrees of correlation between percent of body fat and performance.

Figures close to zero have been recorded on distance runners. And most college-class distance runners average around 8% body fat, as compared to 15% for males in the same age group.

Body fat determinations can be made in a number of ways but the most accurate and most commonly used is the "densitometric" method. An individual is weighed in air and then weighed submerged in water, and fat figures are calculated from the difference in the two weights.

Body fat calculations and other determinants of body composition emphasize the importance of diet to the the runner. Not only is it helpful to maintain low body fat by eating less but also it is advantageous to control the types of food eaten.

Glycogen: Using a small needle and syringe, it is possible to take a small sample of muscle tissue and analyse it for glycogen content. Glycogen is a small starch molecule which is the major energy storage unit of muscle. Many researchers feel that the depletion of

these energy stores is the major limitation to performance in long distance events.

A system for increasing the prerace glycogen content of muscle is currently in use by many runners (glycogen loading). It shows great promise in improving future performance.

Fluids: Even if we can increase glycogen storage significantly, the problem of dehydration and its resulting problems (overheating, circulatory strain and electrolyte imbalance) must be overcome. By weighing an individual before and after a run, we can estimate the amount of fluid lost. And by analyzing perspiration we can predict electrolyte losses and their subsequent effect on hydration.

Besides the problems of dehydration, depletion of energy stores and electrolyte imbalance, there are the more subtle effects of depletion of vitamins and essential minerals. Analyses of blood, urine, feces and perspiration have revealed significant alterations in the amounts of various vitamins and minerals during running. We are just beginning to understand the effects of these changes.

As time and information accumulate, the research physiologist, through the use of these tests and measurements, will gradually help the world class runner overcome those factors which limit performance. But, best of all, this new information will allow runners on all levels to make the most of running.

HOW DO THEY TEST?

BY JOE HENDERSON

In October, an experienced distance man named Larry Vollmer collapsed after a half-marathon race in Eugnee, Ore., and died before reaching the hospital. He had a heart ailment that was symptom-free until the fatal day. Vollmer was 31.

In November, police found a body in a park near my home where I often run. They learned that the man was a regular jogger with no previous history of heart disease. He was 29.

Physiologists have devised tests to spot these latent problems in a large percentage of cases. They call it "silent heart disease." The preventive is the "stress test." Kenneth Cooper writes of it in *New Aerobics,* and uses it in his aerobic testing facilities in Dallas, Tex. (see accompanying story). It involves taking electrocardiogram (EKG) readings while exercising—generally either walking-running on a treadmill or pedaling a stationary bicycle. This method is far superior to a resting EKG as a gauge of heart capacity. Dr. Cooper estimates it is 85% effective in detecting silent heart disease.

Stress testing facilities are mushrooming. The National Jogging Association's newsletter recently published names and addresses of nearly 100 offices equipped for such testing. Medical doctors or exercise physiologists are in charge. These laboratories, it turns out, do more than look for dangerous lines on the EKG graph. They are pioneers in preventive medicine—the basis of health and fitness.

Jack Wilmore is a slim, intense exercise physiologist-in-residence at the University of California's Davis branch. Wilmore is a marathoner ("I've run two of them") whose main exercise interest is running. He has tested top international runners and has taken measurements on most of the country's best over-40 athletes. But Dr. Wilmore's big push is in the area of adult fitness. In the last year alone, he has run some 500 beginning exercisers through his "Human Performance Laboratory." Based on the test data, he prescribes individual programs.

Wilmore is in the treadmill room. Surrounding him are a cardiologist (who monitors every second of every treadmill run), a graduate school assistant, and about a million dollars worth of gadgetry ("most of it is on loan," the assistant says). A computer gushes out great typed bursts of information on heart rate, respiration and the like. An EKG keeps a constant tracing of heart activity.

A 61-year-old is on the treadmill. He has a half-dozen leads attached to his shaved, shirtless chest. An air collection mask is on his face, and he's beginning to labor.

The graduate assistant, steeplechaser Ed Haver (a one-time NCAA college division champion), watches the computer print-out with one eye and the 61-year-old with the other. Ed shouts encouragement like a cheerleader. Dr. Wilmore is more subdued, but he urges the man on, too.

"Okay, that's good," Wilmore says as he shuts down the machine that was traveling uphill at brisk walking pace. The subject slumps to a stool to recover.

"Very good," Wilmore says as he holds the corner of the printout. "You're in great shape. Either you're doing more than you think you are, or you chose your parents wisely when you were born." The old man beams, as if it were the first time in years that anyone had praised his physical capacity. Wilmore sends him off to be tailored for an exercise program.

The next subject has just come from the water. There's an oversized wine vat at the other end of the room. Wilmore's helpers weigh people there by dunking them in the warm water. That tells them how much of their weight is expendable fat.

"This man had a heart attack several years ago," the cardiologist says. "He has been on a closely supervised exercise program since last year." The 50-year-old goes through the treadmill routine. "He has no symptoms now that would prevent him from exercising," the heart doctor says as he watches the green line on his EKG.

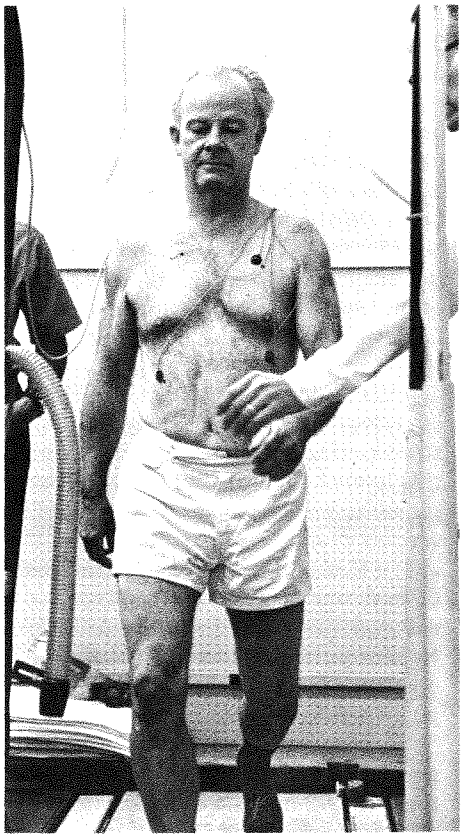
Weight itself is a myth. Alone, it doesn't say much about the person carrying it. Fat percentage gives a better picture.

Dr. Wilmore says, "Such an assessment allows an accurate estimate to be made of what an individual's ideal weight should be. This is important since the traditional approach of using standardized weight tables adjusted for sex, height and frame size has been shown to be grossly inaccurate for a rather large percentage of the population. The 'ideal' weight within any one category of these tables can vary up to 22 pounds... It is not unusual for an individual to fall within the normal range for his or her category but actually to have 10-30 pounds of excess body fat."

Ed Haver adds that while testing the San Francisco Forty-Niners football team, the "gargantuan linemen weighing 250, 300 pounds" had almost no body fat. If anything, they were overmuscled, but they were solid.

The first phase of the testing is a submerged weighing in the vat. This simply gives absolute lean body weight. This is compared with normal weight to find the fat percentage. For instance, a wet weight of 100 pounds and an actual weight of 120 equals 20% fat.

"Standards will vary from one clinic or laboratory to another," Wilmore says, "but it is generally accepted that men and women should not exceed 15-20% and 25-30% respectively." He says most trained runners go under 10% fat, and some—because of heavy bone struc-



A 61-year-old, wired for EKG readings, begins a stress test. (Joe Henderson photo)

ture—actually register "negative" fat. Their submerged weights are higher than their actual ones.

Wilmore remembers testing women runners Doris Brown, Francie Larrieu and Cheryl Bridges. Since women tend to test considerably higher than men, he was impressed by the fact that they all had about the same fat content as male runners.

"Cheryl Bridges," he says, "had only 7% fat. She had lost something like 30 pounds when she became a runner. Now she's a very well put together girl."

I always thought I was skinny. The weight charts say so, and so does the mirror. But apparently they lie. I came out of the tank to the news that I'm carrying about 14% fat—average for an average healthy person, yes, but twice normal for runners.

Ed Haver types at the top of the computer sheet: "FAT MAN TEST."

"Relax," Dr. Wilmore says as he switches on the treadmill to gentle walking pace. "You have your fists clenched, and it makes General (the cardiologist) nervous. He thinks you're going to hit him."

The EKG silently traces its heartbeat line. The computer clatters out heart and respiration readings every 15 seconds. Wilmore gradually boosts the "hill" on the treadmill, then kicks me into running pace, gradually taking the breathing and pulse up to their maximum while the machines record them. After 10 minutes, as I'm about to gag on the air tube, he shuts down the moving belt.

He explains that maximal oxygen uptake is the most important thing he's measuring on me. This tells the body's ability to take in and use oxygen. Normal for runners is in the range of 56-81 milliliters per kilogram of body weight per minute. Jim Ryun and Kip Keino have registered about 85. Mine is in the mid-60s.

Oxygen uptake relates directly to weight. I ask Ed Haver what a 5% loss in body fat would mean.

"About a 5% rise in oxygen uptake," he says. "Just flip-flop them." Since weight is part of the oxygen uptake formula, fat loss means one can run easier at a higher level of efficiency.

"Weight really has a big effect," Ed explains. "We had one runner here—I won't mention his name because he'd hang me—who was an All-American cross-country runner as a freshman. He had a maximal oxygen uptake of about 80, and only 6-7% fat. He laid off of running for one semester and his fat percentage doubled. He hasn't run well since."

Haver tells of a current runner at UC Davis whose oxygen uptake measures 81. "It is almost as high as Ryun and Keino. But others who test lower run faster. He doesn't have it up here (pointing to head)."

There's a "basic speed" factor involved, too. But Haver says that in five-mile cross-country races at Davis, the runners place according to their maximal oxygen uptake capacities almost right down the line.

How much can it be improved? Dr. Wilmore says, "We're still trying to resolve that. We know you can't take everyone and make him a runner. Heredity has a lot to say about it."

Running performance capacity is predictable. Body fat and oxygen uptake capacity have a lot to do with it. But Wilmore isn't primarily concerned with people who have half the normal quota of fat and twice normal uptake volumes. He mainly operates down around the minimum standards, with people who need his advice most. These are the beginners. They get the real value of his testing.

"About 10-15% of the population has abnormalities of one sort or another in the heart," Wilmore says. "This doesn't mean they can't exercise. But the exercise has to be well within their capabilities."

His main job is spotting the abnormalities and handing out customized programs based on measured work capacity. His main tool is the stress test on the treadmill.

"In the adult fitness program (at Davis)," Wilmore advises beginners, "we use the level of 75% of your capacity as the intensity level. If you have a maximal oxygen uptake of 40, you exercise at 30. But since you can't easily monitor oxygen consumption during routine exercise, the same concept has been applied to a related physiological variable—your heart rate. You can easily monitor your heart rate by taking your pulse periodically during the exercise session and then adjusting your intensity to bring your heart rate either up or down to the 75% level. This is referred to as the 'training heart rate'."

Wilmore says 500 people have gone through his stress testing in the last year—including heart patients and "silent" heart disease sufferers. There have been no coronary accidents.

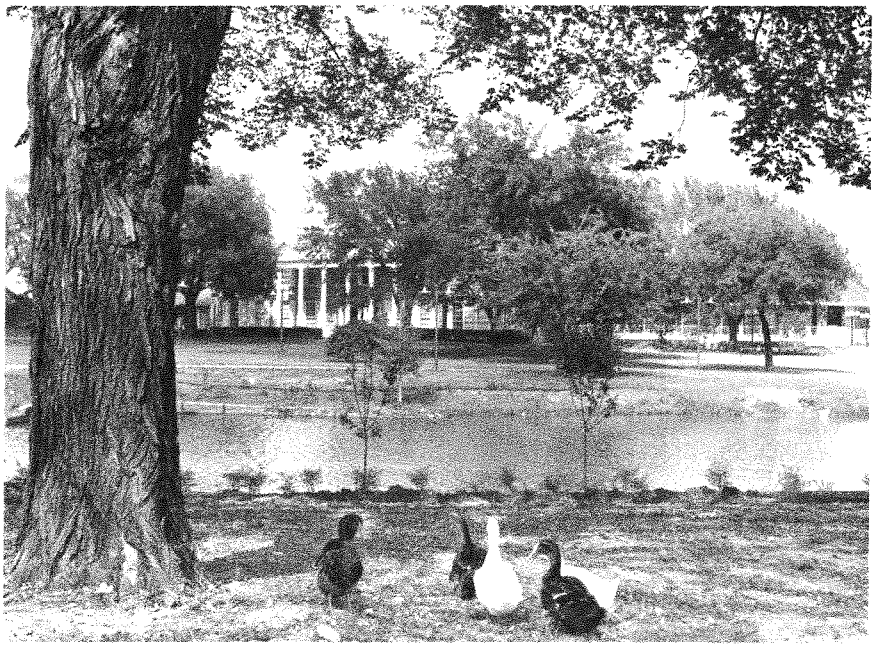
DR. COOPER'S AEROBIC CENTER

BY GERRY PURDY

In the September 1970 issue, *Runner's World* interviewed Kenneth H. Cooper, M.D., author of *Aerobics, New Aerobics,* and (with his wife Millie) *Aerobics for Women.* During the interview, Dr. Cooper described a clinic, exercise facility and research foundation he was organizing in Dallas to specialize in preventive and rehabilitative medicine.

Dr. Cooper has since established The Aerobics Center on a beautiful 8½-acre estate in a residential area of north Dallas. The Aerobics Center is composed of three separate and distinct organizations: (1) the Cooper Clinic which performs health examinations; (2) the Institute for Aerobics Research which analyzes the data from the clinic and performs research in aerobics, and (3) the Aerobics Activity Center, which provides exercise facilities under a medically prescribed and supervised program.

With the official opening last August of the Aerobics Center, Dr. Cooper began a long term investigation into the



The Aerobics Center is housed at this picturesque estate on the outskirts of Dallas.

relation between aerobics exercise and the prevention of cardiovascular disease. The three divisions of The Aerobics Center are working together to find out how cardiovascular fitness—achieved through aerobic exercise—can prevent or delay the onset of heart disease.

Other researchers have examined the health benefits of physical activity, but Dr. Cooper's longitudinal research program—called the "Dallas Study"—will be the first to attempt to relate specific amounts of exercise to reduced incidence of particular ailments. Comparable studies in the past have been retrospective in that their data has been developed after the fact, comparing the physical condition of individuals at the end of a period of activity rather than during it.

Dr. Cooper believes that by following 1000 men and women through the aerobics program, along with a control group, for at least 5-10 years, he should have enough statistical evidence to document whether programmed exercise can help reduce not only heart disease, but many pulmonary ailments, ulcers and even various mental disorders.

Dr. Cooper has surrounded himself with a staff of experts within the organization of The Aerobics Center. Acting as director of the Cooper Clinic is Dr. Gene R. Profant, cardiologist who was in private practice in Newport Beach, Calif., before joining the Clinic last September. Dr. Randy Martin, recently secured from Miami, Fla., joins Profant and Cooper as the third staff physician.

Russell A. Harris, former physical and athletic club director of the Canton (Ohio) YMCA, heads the Aerobics Activity Center. Harris is assisted in implementing the exercise prescriptions by physical educators Don Kanagy and Greg Pape. Each staff member of the activity Center has college training in exercise physiology and physical education.

The Institute for Aerobics Research is a chartered public non-profit organization. Dr. Richard L. Bohannon, former Surgeon General of the US Air Force and founder of the National Jogging Association, serves as executive director.

The Cooper Clinic gives comprehensive health examinations, including a maximal performance treadmill stress test under multi-lead electrocardiographic (EKG) monitoring. Testing in the clinic includes blood analysis, urinalysis, chest x-ray, vision examination, hearing test, pulmonary function studies, lean body mass determination (body fat percent), physical examination, resting EKG and the maximal performance treadmill stress test. The complete examination takes approximately four hours and is followed by a half-hour consultation in which the patient receives the results of the examination, diet recommendations and a personalized aerobics training program.

The Clinic has given more than 2500 examinations of some 2000 patients during the last two years. Thirty-five percent of the people examined are from out of state and foreign countries. Most patients return for yearly re-examinations and will be followed in the Institute's longitudinal study. Local patients, after receiving their examinations and treadmill stress tests, become involved on a membership basis in the exercise facilities provided by The Aerobics Center.

Dr. Cooper states the desirability of evaluating the patient's condition by stress testing is to: (1) determine the initial level of fitness; (2) observe the response to exercise; (3) evaluate the severity of existing coronary disease, if any; (4) objectively determine the level of work one may perform safely in his daily activities; (5) prescribe an aerobics training program which will take an individual to at least a "good" level of physical fitness.

The "good" level of physical fitness is defined as the ability of the body to absorb 42 milliliters of oxygen each minute for every kilogram of body weight, with adjustments for age.

The aerobics system says one should achieve 30 aerobics points per week in order to maintain a "good" level of fitness. The aerobic point system is based on the amount of oxygen one consumes while exercising. Long slow distance (LSD) type running is excellent since large volumes of oxygen are consumed during long runs. For instance, 10 points are awarded for two miles in 13-16 minutes, 15 points are given for five miles in 50-60 minutes, while a whopping 100 points are given in marathons in 3½-4 hours. The points system is a simple way of assuring that minimum oxygen consumption is achieved.

The treadmill stress test is an excellent evaluator of one's cardiovascular fitness. Through the stress test one can determine the level of fitness so exercise programs can be constructed. But using a treadmill for testing is not always practical. This is why the 12-minute and 1½-mile field tests were developed. After one has been examined by a physician and is exercising regularly, he can run for 1½ miles or 12 minutes to determine his present level of fitness. To be in the "good" level of fitness, one should be able to do 1½ miles in 12 minutes (8:00 mile pace)—age-adjusted to 1.25 miles in 12 minutes or 14:30 for 1½ miles for those over 50.

The combination of the treadmill stress test, field test and the aerobic point system provides a means to show

presence or absence of disease and to maintain adequate fitness.

The facilities of the Aerobics Activity Center include a quarter-mile jogging trail with night lighting, a half-mile jogging trail (both composed of Resolite), a 25-yard heated six-lane swimming pool, air-conditioned Tartan banked indoor track, bicycle ergometers, treadmills and weight lifting equipment. There are complete locker room facilities, including a laundry service, steam room, whirlpool and showers.

The staff of the Activity Center helps each member with his exercise program. Exercise "classes" have been established at 6:30 a.m., 7:15 a.m., 9:30 a.m. (women), 12:15 p.m. and 5:15 p.m. A staff member leads the class in calisthenics for 10-15 minutes. Then the members break up into small groups to do their aerobic exercises. The Activity Center provides a medically prescribed and supervised program for the members. There is always an M.D. on the grounds whenever the Center is open.

Membership of the Activity Center is presently 450 with a maximum of 750 expected to be reached by late spring this year. Dallas Cowboy Quarterback Roger Staubach is a member and regularly runs two miles under 14 minutes.

The primary goal of the Institute for Aerobics Research is to determine the relation between fitness and the prevention of cardiovascular disease—particularly ischemic heart disease. This goal will be accomplished through a longitudinal study carried out from 1975-85—the Dallas Study.

At present, the primary research project of the Institute is to establish an automated data repository (ADR). A data repository was mentioned in the September 1970 *Runner's World* interview with Dr. Cooper where he said, "At our (center) in Dallas...we'll have a research institute, and one of our objectives there will be to establish a data repository...(so) we can scientifically show the relationship between exercise and disease prevention and rehabilitation."

Since joining the staff of the Institute last July, I have been working primarily on the establishment of the data repository, which will make all the medical data generated in the Cooper Clinic available in a computer for future analysis. This project is now going full-steam due to a $60,000 grant from the Moody Foundation in Galveston, Tex. Later in 1973, analyses of the ADR will be made through another grant.

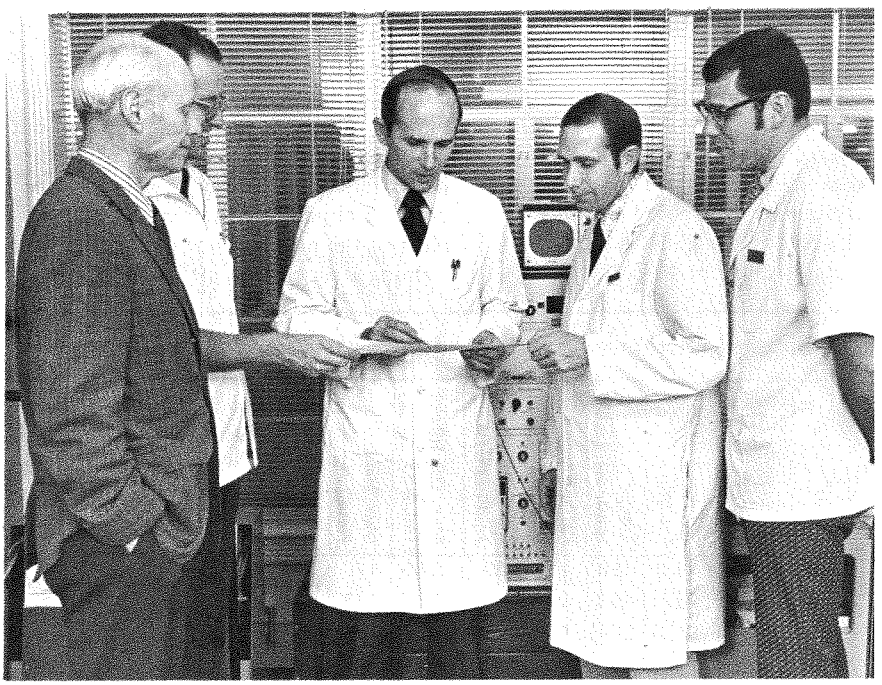
There are other projects that the Institute is carrying out. This spring, an aerobics physical education program for blind students will begin at North Texas State University in Denton, Tex. This program will be funded and monitored by the Institute, and it will provide each visually handicapped student with an opportunity to develop and maintain good cardiovascular fitness.

The Institute is now into the second year of an aerobics program being implemented in the Ft. Worth Public Schools. By 1975, each boy and girl in grades 6-12 will be required to participate in aerobic exercise (mostly jogging) all year as part of physical education classes.

In order to carry out these and all future research projects, the Institute hopes to obtain funds to build a 30,000 square foot research facility on the 13 acres adjoining the present complex.

The exciting, far-reaching work is really just beginning.

The Aerobics Center staff (l-r): Richard Bohannon, Gene Profant, Kenneth Cooper, Gerry Purdy, Russell Harris.



YOUNGER THAN THEIR YEARS

BY DR. MICHAEL POLLOCK & DR. HENRY MILLER

There is much research information available concerning the effects of various exercise regimens on young, middle-aged and older men and women. Most of this information deals with either the effects of short-term training investigations conducted over a period of four weeks to six months or with special groups or persons, such as highly trained Olympic athletes.

The recent boom in masters (over age 40) track and field competition has raised many questions concerning training and competition in middle age. Are there harmful effects related to training for competition after 40? Are there certain precautions one should take prior to joining an endurance training program? What kind of physiological changes can be expected? What are some of the differences between trained and untrained young and masters athletes? We have tried to answer these questions in several research investigations conducted at the Wake Forest University physical fitness research laboratory.

• What preliminary precautions are needed for a middle-aged or older runner just beginning an endurance training program?

In order to properly prescribe a training regimen, a thorough physical examination and physical fitness appraisal are important. The fitness appraisal should include a variety of tests evalua-

ting the areas of cardiopulmonary function, body composition (bone-muscle-fat relationships), and certain aspects of motor fitness, such as strength, muscular endurance and flexibility. (Many of these are described in other parts of this series.)

To support the fact that masters competition participants should all be evaluated, the following study is presented. Four years ago, in our initial evaluation of approximately 40 masters runners ages (38-65) from the track club at North Carolina State University, we found 25% to have abnormal EKGs at maximal stress. Most of these abnormalities were associated with a flattened ST segment depression which became normal again after 1-2 minutes of rest. ST segment depression is primarily associated with a relative lack of circulation to the heart muscle (ischemia). The exact significance of ST segment depression with maximal exercise and its potential danger to trained competitive runners is questionable.

Our recommendation is if one encounters more than 1.5 mm. flattened ST depression at maximal stress then competition should be avoided. It is safer to train at a heart rate level at which one knows his heart and its circulation is functioning properly.

Within this group, one runner had aortic valve disease with an enlarged heart. When asked about medical supervision (physical examination, etc.), it was found that he had had none. His performance on the treadmill elicited multifocal premature venticular beats as well as 3-4 mm. ST segment depression. Multifocal premature ventricular beats are beats which originate from different areas of the heart muscle, and occur before and replace the normal beat. This phenomenon is potentially dangerous during exercise and can trigger the heart into fibrillation (uncontrolled beating). Unless remedied quickly, this results in sudden death.

Heart valvular problems are also potentially dangerous and can result in sudden death under stress. In this condition, the amount of blood leaving the heart may be greatly reduced, thus reducing the blood supply to the heart muscle and the body. This will cause the heart to be constantly overworked and result in an enlarged heart. Under exercise conditions, the work of this type heart frequently exceeds its blood supply, at times causing ischemia, premature beats and possible sudden death. The man with this problem was referred to his local physician. It was recommended that he avoid competition and moderately stressful activities.

John Kelley has run nearly every Boston marathon since the 1920s. He recently turned 65. (Rick Levy photo)

• **What are some of the physiological characteristics of champion masters runners?** The table below illustrates data collected on 26 champion American runners from 40-75 years of age. All subjects had recently placed in a regional or national meet.

All groups have excellent cardiopulmonary function and body composition characteristics. It is particularly interesting to note the high maximum oxygen intake results of the men over 60 years of age. One of these men, Dr. William Andberg (age 61) had the highest on record for his age group—61 milliliters per kilogram per minute. Young champion distance runners generally go over 70, while young, middle-aged and older sedentary men have values averaging 45, 37, and 30, respectively. Moderately trained middle-aged joggers average about 40-50.

Resting heart rate, body fat and serum triglycerides (fats in the body fluids) were much lower in the tested runners than in the sedentary population, while blood pressure and serum cholesterol were approximately the same. The latter agrees with other research findings in that serum cholesterol appears to be affected more by diet than exercise per se, and normal resting blood pressure values are not usually affected by exercise.

The masters champions' per cent fat was comparable to that of college-age men, while sedentary middle-aged men average 22%. Total skinfold fat was determined by measuring skinfold fat at six sites (chest, side of chest, back of arm, abdomen, above hip and thigh) with a skinfold fat caliper. Young college men at Wake Forest University averaged 105 mm. while sedentary middle-aged men averaged 145 mm.

It is evident that the masters athletes possess extraordinary physiological capabilities for their age. The question arises as to whether these characteristics are a result of heredity or from years of continued physical activity, or both. In looking over the questionnaires filled out by these men concerning their past training experiences, most of them had some previous experience in competitive track. Most of the men had not continued their training after college age but resumed

Physiological characteristics of champion Masters track athletes.

Age (Years)	Number of Athletes	Height (inches)	Weight (pounds)	Percent Fat	Skinfold Fat (millimeters)	Max. Ox. Intake (ml./kg.)	Max. Heart Rate	Resting Heart Rate	Blood Pressure	Miles per Week
40-49	11	72.3	158	11	59	57.5	178	49	117/76	40
50-59	6	68.1	150	12	51	54.4	178	42	129/81	40
60-69	6	69.3	147	11	53	51.4	163	46	122/78	30
70-79	3	69.3	147	14	70	40.0	166	60	141/83	20

training again only after many years of sedentary living.

The runners described in the table were mostly distance runners, with a few walkers and sprinters included. In further analysis of the data, the walkers and sprinters were shown to be lower in cardiovascular function and higher in fat. This was not surprising since their training routines were less demanding. They trained fewer miles per week and, in the case of the walkers, at a lesser intensity. The sprinters trained approximately 8-10 miles per week compared to 60-80 miles per week for many of the distance runners.

• What effect does the aging process have on training and performance?

Many physiological functions have been shown to be affected by the aging process. As mentioned earlier, working capacity and cardiopulmonary function show marked reductions and fatness increases to alarming proportions. Many studies have shown that these deteriorating effects of sedentary living can be reversed with endurance training.

But the question as to what extent training can slow down the deterioration processes of aging has not yet been quantified. Until data can be obtained from large groups of people over a period of many years, this question cannot be answered. This is one of the reasons why this laboratory has been encouraging a cooperative effort to evaluate and study the training characteristics of masters athletes.

As shown earlier in the table, although masters champions possess extremely good physical fitness characteristics they are significantly lower than younger champions. Other factors are involved, but the differences in training regimens associated with age would account for some of this. The fact that the 70-year-old group shows much lower fitness status than the other groups could be partially a result of their training characteristics.

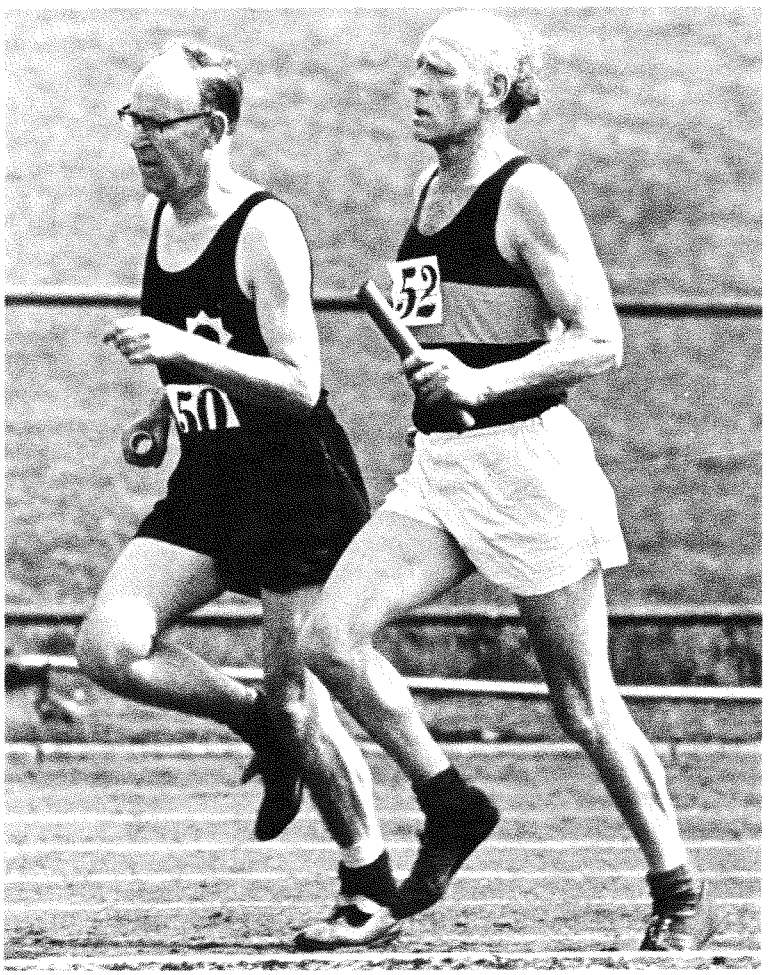
In analyzing the many questionnaires we have received concerning training characteristics of masters athletes and in discussions we have had with many of them, it appears that the aging process eventually limits the amount and type of training one can adjust to. Athletes of all ages have to design their training regimen in accordance with how their body can adapt to the training stimulus. We all have a point in which training becomes straining. When the straining stage is reached, athletes often experience a regression in performance and/or become candidates for an orthopedic disorder.

In our experience with masters runners, intensity (speed) and duration (mileage) of training are the two big problem areas. As one gets older, and in the case of most of the masters runners who have had many years of sedentary living prior to resumption of training, the joints do not adapt as well to speed work or marathon training. Variability as to what type and how much training one can adapt to is quite wide. Thus training regimens should be adopted on an individual basis. The notion that a runner must train 100 miles a week to be a winner may be true for some individuals but may not be a realistic goal for many masters runners.

• Should sprinting events be eliminated from masters track competition?

We have heard many comments conerning the possible safety of older runners competing in sprint type events. Sprinting requires a tremendous amount of energy over a short period of time. Most of this energy is derived anaerobically (without oxygen) and thus places the heart and circulation in great demand. The question arises as to whether or not the heart can cope with this stressful exercise as one gets older. The data at hand cannot answer this question completely. The questionnaires on training characteristics which we received from sprinters revealed the lack of year-round endurance training regimens. In fact, some of the sprinters had no regular training program but just ran occasional sprints to get ready for a particular race. It would appear that sprinters should maintain a year-round program for improvement and maintenance of good cardiopulmonary efficiency. Keeping the heart and circulation in good condition may help to improve the safety of sprint events. Certainly, adults should be discouraged in entering sprinting events without previous conditioning. Another important point would be to be sure and have a stress test. This, of course, is the main prerequisite for all older persons entering running.

Sydney Wooderson (left) set a world mile record over 30 years ago. He's in his 50s now, and still running. (Mark Shearman photo)



SIMPLIFIED SELF-TESTING PLAN

Physiologists are precise scientists, and as such are skeptical of self-testing methods outside the laboratory.

"Most self-type tests," writes one of the country's leading running researchers, David Costill, "are inaccurate and often misleading."

Of course nothing can replace the controlled conditions and apparatus of the lab, and the trained judgment of the physiologist. Exact measurements of physical capacity can only be made under those conditions.

But physical feedback is too important a body of information to stay in isolated testing centers. So certain field have been devised to give approximate data. A runner can do these himself, with little or no equipment or special technical know-how.

Actually runners are self-testing every time they run. It's them against time. The most obvious and reliable test is how well you, the runner, run at the distance you choose. Timed distances put the whole system on trial.

We have isolated four factors which contribute to running performance or block it. All of these can be self-tested fairly objectively and with a reasonable degree of accuracy.

The first two—oxygen intake, body fat percentage—measure running capacity. The last two—strength-flexibility and stress load—are safety checks.

Remember that no testing program, in the laboratory or on your own, can precisely predict running ability. There are too many intangibles involved on the emotional side acting as modifiers.

OXYGEN INTAKE

Maximum oxygen intake rate (often called "maximal uptake") is one of the key tests of endurance fitness. Readings are taken in the laboratory from controlled treadmill runs.

Champion distance runners have readings of 70-80 (milliliters per kilogram of body weight per minute) or sometimes higher. It does not necessarily follow that the people with the highest oxygen intake levels make the best runners, but this is still a reliable indicator of personal fitness. The higher *one's own* reading, the faster he should be able to run.

Exercise physiologist Jack Daniels supplies the following self-test devised by Bruno Balke.

1. Run as far as possible in 15 minutes.

2. Record the distance run in meters (*one mile=1609.334 meters*).

3. Divide total metric distance by 15 to find speed in meters per minute.

4. Compute maximum oxygen intake using this formula: *(speed minus 133) x 0.172 + 33.3*

(For example, a runner does 5000 meters in 15 minutes. This is 333 meters per minute. Subtracting 133 from that gives 200. Multiply by 0.172 gives 34.4, plus 33.3 is a final estimated oxygen intake of 67.7 milliliters per kilogram per minute.)

A level of about 40 (depending on age) is considered a minimum standard of everyday fitness, but even casual joggers tend to score much higher than that. Increased aerobic training adds to this capacity, as does lowered body fat.

Jack Daniels warns, however, that "this formula underestimates oxygen intake for some people and overestimates it for others. This is particularly true for growing youngsters, since it will probably underestimate his aerobic capacity—which could be discouraging."

BODY FAT LEVEL

Body fat, translated into extra weight, has a limiting effect on running. Since weight is part of the oxygen intake formula, it stands to reason that a 5% increase in body bulk shows up negatively in the oxygen system's efficiency, and vice versa.

Average mature men have 15-20% fat. For women, the figures are 25-30%. Runners of both sexes, however, tend to be below 10% fat. This is tested in the laboratory by weighing people underwater.

Ned Frederick, who wrote the introduction to this feature, has come up with a mathematical method of measuring a runner's fat content. He says it appears at best to vary about 2% either side of actual figures, but that it gives a ballpark estimate of body composition. It comes closest with individuals of average bone structure and proportions and is least accurate for extremely lanky or portly persons.

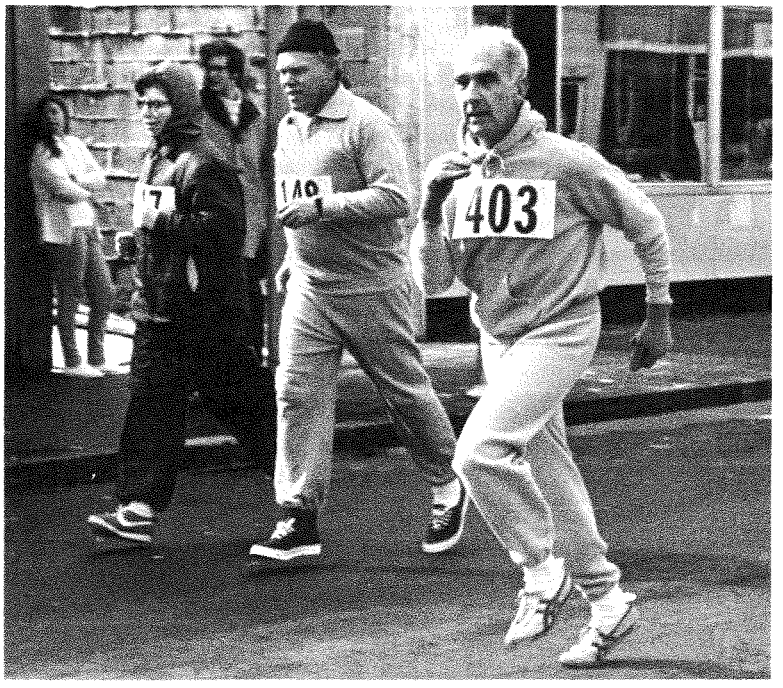
It is based on the "ponderal index," which is a ratio of height to weight. This is calculated by dividing the height (in inches) by the cube root of the weight (in pounds). Here is a chart of cube roots for various weights.

91 lbs. = 4.5	133 lbs. = 5.1	175 lbs. = 5.6
97 lbs. = 4.6	141 lbs. = 5.2	185 lbs. = 5.7
104 lbs. = 4.7	149 lbs. = 5.3	195 lbs. = 5.8
111 lbs. = 4.8	157 lbs. = 5.4	205 lbs. = 5.9
118 lbs. = 4.9	166 lbs. = 5.5	216 lbs. = 6.0
125 lbs. = 5.0		

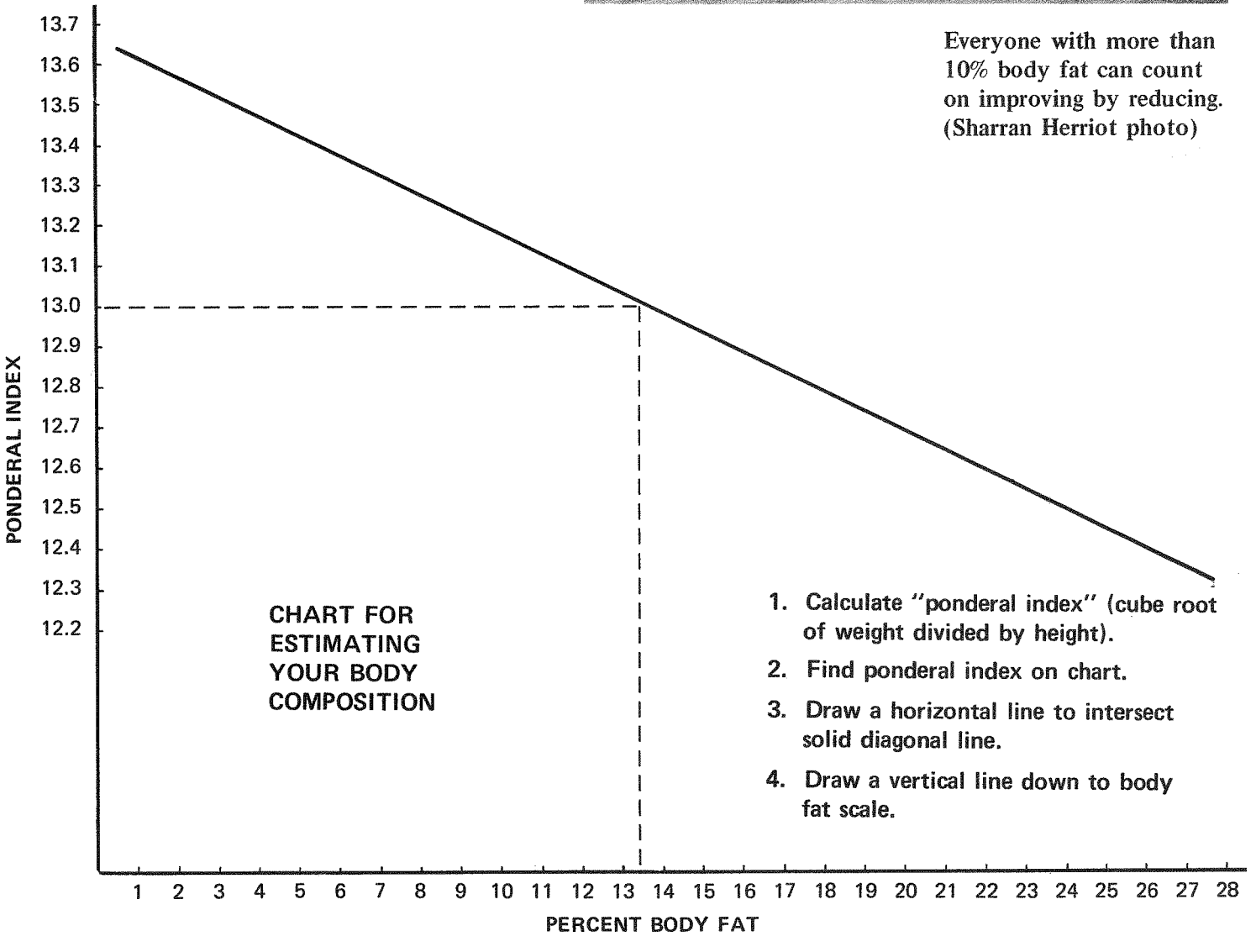
Once the ponderal index is calculated, find it on the vertical axis of the graph. Slide left to the diagonal line. Then go down to the horizontal axis to find estimated body fat. It's charted here for a runner with a PI of 13.0.

Runners showing fat percentages over 15% (and particularly if they have thick waistline skin-folds to match) could profit by reducing their weight. Most runners, regardless of body build, do better when they cut down their fat levels.

Even healthy, fit women like this one average 10% more fat than men. (Beinhorn)



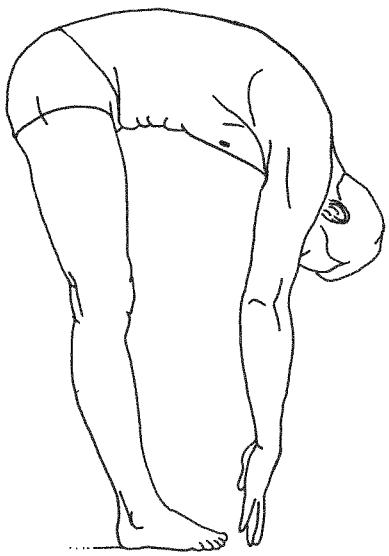
Everyone with more than 10% body fat can count on improving by reducing. (Sharran Herriot photo)



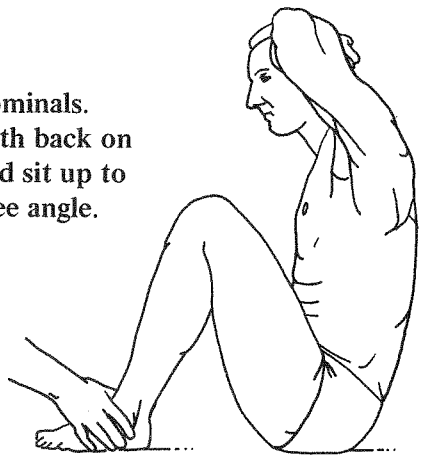
MUSCLE TONE

Runners as a group are overspecialized structurally. They give almost all their attention to their legs and little or none to their upper bodies. The legs are quite strong from constant use, but also are stiff from pounding. Certain imbalances in development are created. These can lead to muscle and tendon pulls, shin splints, etc. Muscles not primarily involved in running—mainly those in the upper torso—grow weak when ignored. Back injuries are thought to result from underdeveloped trunk muscles.

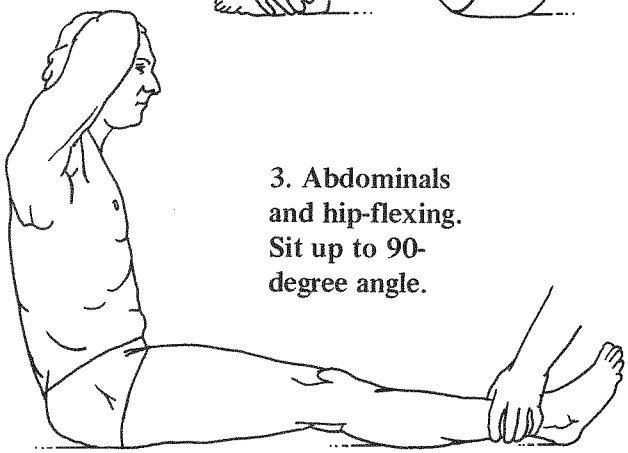
The six Kraus-Weber tests measure minimum strength and flexibility of key muscle groups. They're illustrated below:



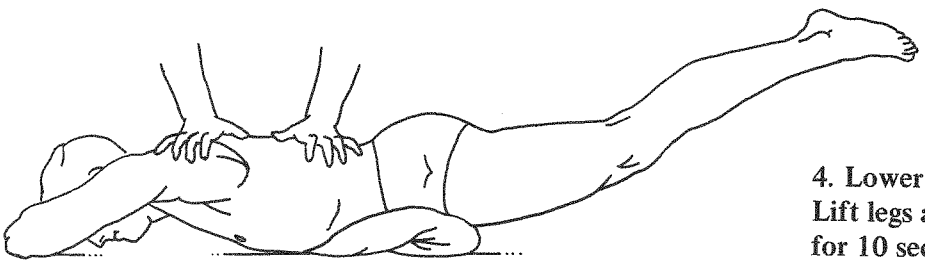
1. Hamstrings and calves. Lean down slowly and touch floor with fingertips.



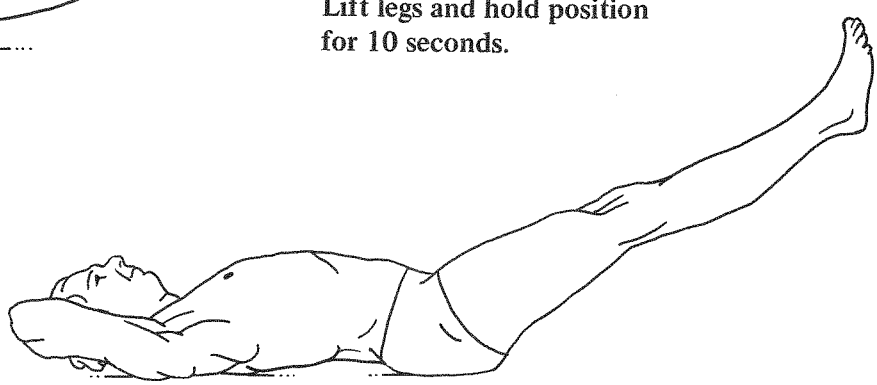
2. Abdominals. Start with back on floor and sit up to 90-degree angle.



3. Abdominals and hip-flexing. Sit up to 90-degree angle.

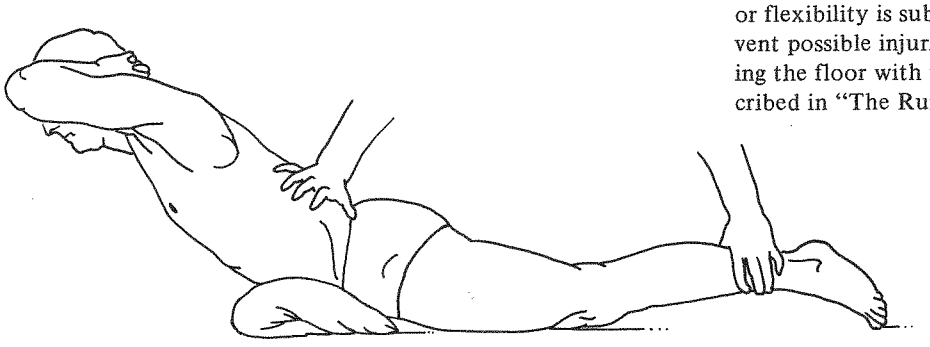


4. Lower back muscles. Lift legs and hold position for 10 seconds.

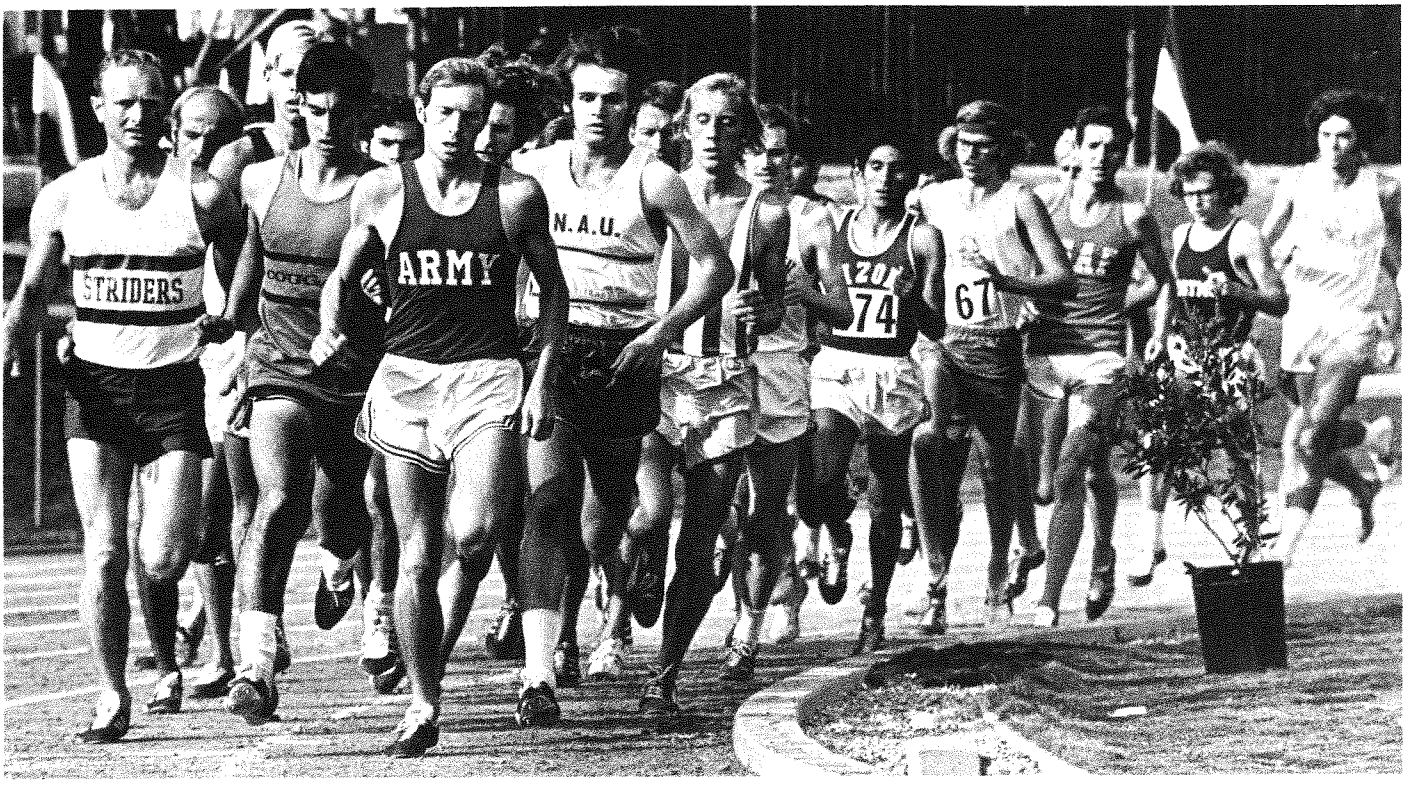


5. Hip-flexing. Lift legs and hold position for 10 seconds.

Failure in any of these areas indicates that strength and/or flexibility is sub-par. Corrective exercises are advised to prevent possible injuries. (Runners are likely to have trouble touching the floor with their fingertips. Stretching exercises are described in "The Runner's Final Stretch," Jan. 73.)



6. Upper back. Raise trunk and hold position for 10 seconds.



1972 Mt. San Antonio Relays 5000. (Stan Pantovic)

STRESS LOAD

The ailments of runners are the result of overwork coupled with neglect. The body gives off definite, and often measurable, early warnings that something is wrong. Continually ignoring them is asking for lowered running ability at best, and disabling injuries and illnesses at worst.

Dr. George Sheehan identified the measurable signs in his *Encyclopedia of Athletic Medicine:*

1. **Performance.** Sudden drops in ability to handle normal distances and paces.

2. **Weight.** Drastic losses of several pounds in a day or two. (This is often a sign of dehydration.)

3. **Pulse.** Sudden increases in normal resting rates. (Jumps of 10-15 beats per minute are considered abnormal.)

4. **Breathing.** Anaerobic (forced breathing) running beginning at a considerably slower pace than usual.

4. **Elimination.** Any major deviation from normal schedule of urination and defecation.

5. **Sleep.** Extreme difficulty in getting to sleep, or staying asleep (especially the latter).

A training diary is a good place to keep track of these things. Other more subjective factors—pain, fatigue, appetite, thirst, psychological symptoms—are equally important but less easily measured.

The cure in almost all cases when stress loads are too heavy is cutting back on running and other stresses until the symptoms disappear. Nearly all running-related ailments are preventable if caught early.

No matter what the runner's age and ability, reactions to training are similar. Specific results can be expected from specific types of training. These are spelled out on the next four pages. (George Beinhorn photo)

PUTTING TESTS INTO PRACTICE

BY TONY SUCEC

How can we best improve the performance of a distance runner? What physiological factors limit the performance of an endurance task?

Perhaps the best way to determine an endurance training program is to look into the physiological changes that take place with endurance training, and then decide which training procedures are most effective in producing the desired results.

The performance of a distance runner is limited by the capacity of various physiological functions. The primary consideration is with the body's ability to transport oxygen to the working muscle tissues. While oxygen is not needed to produce muscular contraction, it is required if work is to continue.

The body is able to provide energy for muscle contraction in one of two ways. When oxygen is available, *aerobic* processes (oxygen intake) are used. (This process is preferred.) When oxygen is not available, then *anaerobic* processes (oxygen debt mechanism) are used.

Both processes may take place concurrently during heavy exercise, and usually do. Both depend on the capacity and efficiency of the cardio-respiratory systems—that is, the ability of these systems to supply oxygen to the working tissues and to carry away carbon dioxide and other wastes such as lactic acid. The respiratory system is responsible for bringing oxygen into the lungs. The cardiovascular system brings the oxygen to the heart and sends it out through the arteries and capillaries to the working muscles.

It is apparent that many physiological factors are involved in the performance of endurance running, and that the capacities of these factors as well as how they are integrated will ultimately determine an athlete's physiological capacity. Other considerations (psychological, etc.) also play important roles in an athlete's performance.

The following summaries of physiological experiments concerned with training indicate that improvement of distance running performance may come through increasing:

- *Muscular strength and endurance.*

• *Oxygen transport to active tissue.*

• *Ability to use more of the available oxygen.*

• *Efficiency with which work is done.*

• *Size of the oxygen debt (this mechanism may be entirely psychological).*

(See chart on next two pages.)

Some conclusions that may be drawn from physiological studies of endurance performances:

1. Maximal physiological function can be maintained over long periods of time (i.e. there is no physiological peak as far as performance is concerned).

2. Increase in muscle function will lead to improvement of performance.

3. Interval training primarily improves central circulation.

4. Steady running primarily improves peripheral circulation and efficiency.

5. Training with weights and pace running appear to be specific. Therefore, it is most efficient to employ training activities that are similar to the actual movements or pace of the runs.

6. Oxygen intake becomes more important in training as the length of the race increases, and oxygen debt becomes less important as the length of the run increases.

7. Training for distance running must necessarily include both steady running and interval running, as well as strength training, if maximal performance is to be obtained.

8. The type of activity to be used in training should depend on what the athlete wants to accomplish in each practice session.

9. Training programs should be designed to fit individual needs and should show a gradual increase in the load as well as intensity of the work.

10. Even pacing appears to be the most economical use of oxygen, and thus should produce the fastest runs as well as make it possible to accomplish the most work in a given training session.

11. To get maximal stress of the circulatory and respiratory systems, an interval run of 1½-3 minutes is required.

12. Sprints of 30-60 seconds can produce maximal stress of the muscular system as well as the anaerobic capacity.

13. As conditioning improves, the intensity of the runs must be increased to attain further improvements.

CHARTING THE TRAINING EFFECTS

Type of Activity	Results	Implications for Training	Reference
Treadmill Running	Increase in ligament strength due to training.	Ligaments and other connective tissues gradually increase in strength with training. Training loads should be increased gradually.	Schild, Tipton and Tomanek, AAHPER Convention (Las Vegas) 1967.
Oxygen Consumption Tests	Oxygen consumption capacity was higher among long distance athletes.	Training should be directed toward activities that will best increase oxygen consumption capacity—i.e., long intervals and fast steady running (heart rate 160-plus).	Saltin and Astrand, Journal of Applied Physiology 1967 (3).
Steady Running			
30 minutes running at a heart rate of 115-130	Resting heart rate dropped but no changes in heart volume or maximal oxygen intake.	Running at a pace that requires a pace that requires a heart race of only 130 beats per minute will not improve heart function or oxygen supply. Therefore, steady running must be at a faster rate.	Hollman and Venrath, Der Sportartzt 1963.
Running at a heart rate of 150	Improvement in peripheral circulation by better regulation and blood flow—more of the available oxygen is used.	Low intensity training (steady running) improves peripheral circulation, but not central circulation.	Karvonen, Clinical Phys. 1958.
Low intensity training as in steady running	Same result as above.	Same implication as the above study—improvement of peripheral circulation.	Holmgren et al, Acta Med Scand. 1959
Endurance training	Increase in capillarization of the working muscle tissue.	Muscle vascular bed improved rather than cross-section of the actual muscle fibers. Training with steady running will increase oxygen supply to the muscle but will not increase muscle strength very much.	Perten et al, Arbeitphysiol. 1936.
Interval Training			
Repeated treadmill runs	Heart was able to make a more economical adjustment to the work as it was repeated. Recovery was also improved.	Running at a given pace will become very economical. Thus training at race pace should be part of the runner's program.	Nenomeya and Wilson, Journal of Applied Physiology 1966.
Intense interval runs	Improvement of heart function (stroke volume, heart rate and cardiac output) takes place.	The greatest improvement in heart function takes place with runs that require maximal heart rate and cardiac output.	Roskamm et al, Leichtathletik 1962.
Length of training intervals (30-60 seconds)	Maximum work loads did not produce maximum stress of respiratory and circulatory systems.	Periods of 1½ to 3 minutes are required to attain maximum stress of respiratory and circulatory systems.	Astrand et al, Acta Med Scand. 1960.
Duration of work loads	More work may be accomplished by using shorter runs.	Young runners or unfit runners will be able to accomplish more work when intervals are kept relatively short (no longer than one minute in duration).	Lehmann, Arbeitphysiol. 1962.
Muscle contraction force	Blood flow is proportional to the strength of contraction.	To get maximal local circulation, contractions must be relatively intense.	Concordiles, et al, Journal of Applied Physiology 1964.

Type of Activity	Results	Implications for Training	Reference
Intervals vs. Distance			
Oxygen intake differences between the two training schedules	No differences between the groups after three months of training.	No differences (training period too short to show trends—if any).	Hinsdale, CAHPER Convention (Fresno) 1966.
5000-meter run time after one group had speed trained and the other group had distance trained.	No differences were found between groups after 12 weeks of training.	No differences in results due to the two types of training, or perhaps training was not long enough to show trends—if any.	Noon, Unpublished Thesis, San Diego State 1963.
Warmup			
Effect on oxygen intake rate	Increased oxygen intake level and rate of increase to maximum level.	With warmup, the increase of oxygen is more quickly reached so that demands of race are better met. Thus faster times could be possible.	Astrand et al, Acta Med Scand. 1960.
Muscle temperature	Increase of muscle temperature to optimal levels.	Muscle temperature is at its optimal working temperature after 10-15 minutes of moderate work.	Asmussen and Boje, Acta Physiol Scand. 1958.
Effect on endurance performance	2-3% increase in the amount of work down following a 10-minute bike ride at two different work rates.	A warmup of moderate intensity for 10 minutes can improve endurance performance.	Sucec, unpublished disertation, UC Berkeley 1967.
Recovery Activity			
Jogging and walking vs. sitting or standing	Lactic acid was dissipated faster when walking or jogging.	To recover faster between races or repetition running, walking and jogging is best.	Robinson et al, Journal of Applied Physiology 1958.
Pacing			
Oxygen cost of steady pace vs. slow-fast or fast-slow pacing	Less oxygen was required to run a mile in 4:37 when a steady or even pace was used as opposed to a slow-fast or fast-slow pace.	Fastest times should be produced when pacing is even. Also, more repetitions are possible if runs are as even as possible.	W. Adams, CPEA Convention (San Diego) 1966.
Weight Training			
For endurance and and strength	Endurance training (high repetitions) produced an increase in the sarcoplasmic proteins.	Endurance training increases the metabolic constituents of muscle. That is, more energy-producing materials are stored in the muscle and are also more rapidly supplied to the muscle.	Gordon et al, Journal of AMA, 1966.
	Strength training (low repetitions) produced an increase in the contractile fibers (actomyosin).	Strength training increases the actual muscle fibers. This means that the muscle can produce more tension but not necessarily for a longer period.	
Isometric and isotonic training for speed	Both programs produced a 22% increase in strength and a 6% increase in speed after 10 weeks of training.	Strength training can increase speed of movement. Isometric training seems to be more effective.	Smith and Whitly, Arch. of Phys. Med. 1965.
For endurance or speed	Endurance weight training improved strength as well as endurance while increasing the capillary bed and blood flow through the muscle during work.	Weight training designed for endurance can increase strength as well as endurance by an increase of oxygen via blood.	Vanderhoof et al, Journal of Applied Physiology 1961.
For strength	Strength changes found to be specific to the exercise.	Weight training exercises should be similar to actual running movements whenever possible.	O'Connell, CAHPER Convention (Fresno) 1966.
For endurance	Improvement in glycogen and myoglobin (muscle oxygen) due to training.	Endurance and weight training improves muscle function by increasing energy supply.	Gradjean, Arbeitphysiol. 1960.

RUNNING'S FIRST COUSIN

Cross-country skiing can be a winter running supplement — but it takes time to master the sport.

by Joe Henderson

We stopped at the first ski shop we spotted beside the highway.

"Do you rent cross-country skis?" Jim Howell asked the clerk. Jim is a marathon runner (he was in the Olympic Trials last summer), and he once was a top high school ski-runner in Maine. I say "ski-runner" to distinguish this kind of skiing from downhill, where gravity and lifts do all the work. There's a vast difference in the two types.

The salesgirl in the ski shop was young, single, pretty and well-dressed. There are a lot of girls like this in ski areas. They are attracted to the downhill sport and are one of its attractions.

"No, we don't have that kind of skis," she said. All around here were plastic red-white-and-blue skis and bulky black boots with $100 and $200 pricetags. "But I can tell you where you might find some. Go north about two miles (past the biggest ski resort in the area). It's on the right side of the highway, between the road and the creek. You have to look carefully 'cause you might miss it. It doesn't have a very big sign and doesn't look like much. It's kind of a dump, but maybe they can help you."

Traffic was heavy into and out of the big resort up the road. It was Christmas Eve day and lowland Californians were coming "up to the snow" in their cars with ski racks on the back. As the skiers in their tailored outfits lined up to buy lift tickets to wait in line at the lifts, they were reaching into their wallets to pay $15 for the privilege.

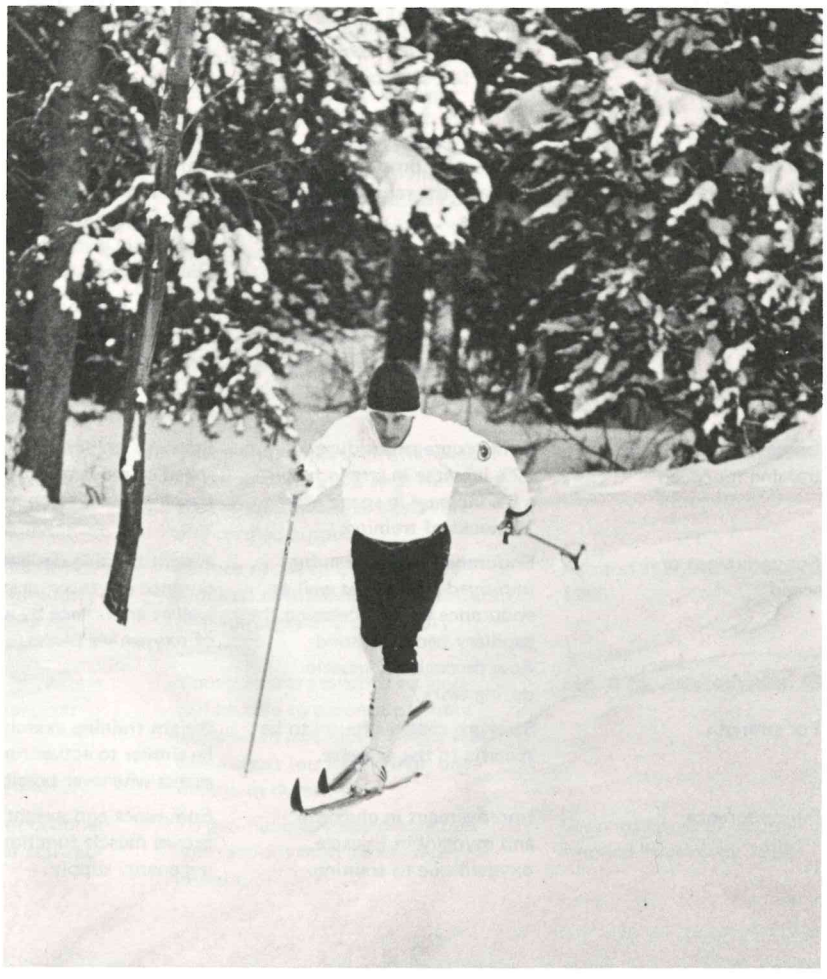
Jim Howell hadn't cross-country skied since high school, a dozen years ago. He wanted to go again, and to teach his wife and my wife (who are sisters) and me about this.

We drove past the big resort and on north two miles, looking for the "dump." We almost overshot it. We had passed it a half-dozen times before, on other trips, without noticing. Only a three-by-two-foot sign, yellow with hand-painted black lettering and nailed to a tree, warned that this was anything but a string of private cabins. The sign said "Ski Touring School." Cross-country is more a racing term. Touring is a milder form, something like hiking, or maybe jogging. Overall, this is known as Nordic skiing, as opposed to the more glamorous and popular Alpine type.

Cross-country skiing is running's closest cousin—even closer than walking, because the movements and effects are almost identical. Cross-country skiing is simply running with skis. It's said to be the best winter substitute for running, and many top European distance runners use it that way. The cross-country ski racers do the same with running in the summer.

In some ways, this kind of skiing looks even better than running. The snow smoothes out the rough spots in

Art Stegen—one of a growing number of runners turning to skiing in the winter. (Peter Hale photo)



the countryside and lets you go places you can't go running. And the snow covers up human garbage, leaving at least the impression that you're in unmarred wilderness.

This is why we were anxious to try it.

What makes a place a "dump" is a matter of definition. If it's the absence of plastic trimmings, haughty salespeople, crowds and high prices, then the Ski Touring School qualifies.

The headquarters is a converted woodshed, about the size of a bedroom and A-frame shaped. Firewood is piled to the roof on both sides of the front door. Inside, there's a rough wood floor and walls. Skis, poles and boots are scattered informally. Back in the corner sits a pot-bellied stove. Behind it is a window overlooking a narrow river, with a snowy meadow on the other side. The place has a crowded, homey, warm feeling. It smells of wood smoke, melting snow, coffee and fresh date-nut bread.

To get to the headquarters, you come around behind the restaurant-store. This is where you stock up on food for long tours and come to eat and talk afterwards. The owners—two bearded skiers in their late 20s—live here. The restaurant is their living room, with solid oak tables. There's a fireplace dominating one wall. A collie sleeps near a sign saying, "No dogs allowed—by order of Health Department." When we were there, no one else was.

We never could separate the workers from the guests. Guests pitched in to help at the woodshed while the workers went off for a tour in the mountains.

No one but the owners wore special ski clothes. Those two had on knickers and knee sox—the traditional cross-country costume. The rest wore floppy everyday things. Nothing special. Utility and free motion, not color, are what matter in cross-country.

"Skis, boots and poles are $5.00 a day," the girl said. "Keep your receipt. If you want to come back someday and buy your own equipment, you can apply all of this to the cost."

The cost of cross-country isn't much. At first, it's about the same as buying a low-priced 10-speed bike—a bit under $100. (Outfitting for downhill costs two or three times that much initially, then has the continuing cost of lift tickets).

The skis cost about $50. They are light, long, skinny and are made of hard wood. They're fitted at arm's length. The right skis are the ones that hit you at the wrist when you hold your arm up.

Boots cost somewhat more than running shoes, and they look and feel somewhat like high-topped flats. They come to the ankle bones. Sticking out in front is a square lip of sole. This is the only place the boot is clipped to the ski. The rest of the foot is free.

Poles are bamboo, and are longer than downhill poles. They are as tall as the skier's armpits.

The girl in the woodshed put the boots on our feet, skis on our shoulders, poles and wax in our hands and said so-long. She never asked for identification or a deposit, never asked where we would be skiing or when we'd be back.

"Don't put on too much wax," Jim Howell warned the rest of us, "or you'll be all day rubbing it smooth." Jim was ready to go skiing. The art of waxing had come back to him quickly, as the art of cross-country skiing would later.

Waxing is all-important. It determines whether you grip or glide enough, too much, or not at all. The waxes work sort of like spikes on a track shoe to give traction that can be translated into forward speed.

There's a right wax for each weather and snow condition. This was a warm day and the snow was heavy. It called for a violet or red wax. Jim had warned us about it too late. The wax had strung out on the cold skis in great soft globs, turning hard as hot chocolate sauce does when it hits ice cream. Jim paced impatiently as we tried to smooth out the solid lumps, first with a cork and finally with our fingers.

For all that, my wife's skis refused to go downhill. Mine were too willing. They slid downhill backwards. Waxing makes all the difference.

"Ah, so you're all runners," the instructor at the ski school had said. "Then you're in good enough condition to handle the course over there." He motioned across the highway, to a snow-clogged path climbing a mountain.

Yes, runners. But running condition doesn't do much good when you can barely stand. The last time I felt this out of balance was 25 years ago, when my dad was trying to teach me how to stay upright on my first bicycle.

Well, it was no trouble standing up on skis as long as I stood still. But moving was something else. It takes time to bring the slipping under control.

The instruction books say the poles supply only about a tenth of the driving force in cross-country skiing. Most of the power comes from the gliding strides of the legs. The books say cross-country skiing is "as simple as walking." The arms and legs are synchronized the same way as in walking or running, with the left arm swinging in time with the right leg, etc. In Nordic skiing, the left arm plants the pole as the right ski slides forward, etc. Nothing to it, they say.

I tried. It took long seconds to start as I tried to do consciously what the unconscious does so well—swing one arm and the opposite leg in rhythm. One ski slid over the other's tip. I leaned heavily on the poles, as if they were training wheels on my bike 25 years ago. I crashed to the crusty snow before going 10 feet.

"That's good," Jim laughed. "Falling down is a good way to start. You learn that it doesn't hurt. Then you can relax." That was my main lesson the first day. How to fall.

Cross-country skiing is like walking and running, but not exactly like them. It's enough different that it's wise at first to forget old habits.

The short, quick, choppy stride is out. "Glide," Jim said as we started up the hill from the road. "You aren't making use of your skis. Glide on them."

The gliding strides started coming together. The poles began taking the right pattern. I started to see why cross-country skiers get hooked on the nature trip. They can go places in the winter where no one else goes except wolves, jackrabbits and other skiers.

The hill climbed for miles into the quiet pine woods. We made slow progress to the top, picking up rhythm on the way. Looking out from there, I dared think,

Announcing... NORDIC WORLD

Another publication, this one on cross-country skiing, is in the preliminary planning stages. Nordic World is due to join the World Publications family this fall. Current plans are to publish the winter sports magazine six times yearly, starting in September 1973. Right now, we need contributors who want to help get the publication on its feet. **Write to Bob Anderson, Publisher, Box 366, Mountain View, Calif. 94040.**

"By God, I think I've got it."

Now to come back down. Shouldn't be much to that. Just an easy slide. The easy slide quickly picked up momentum.

"How the hell do you stop these things?" I yelled at Jim as I realized skis don't have brakes. I stiffened and crashed before he could describe the pidgeon-toed snowplow stop.

It took a crash, too, to learn that skis have no steering devices. I came to a bend in the trail and said, "Okay, take a left." My feet were willing, but the skis weren't. I headed for the trail rim and the trees beyond. I had to employ the ultimate weapon again—the fall.

Amid the falling and swearing and laughing, a 16-year-old girl skied past, looking like a pro by comparison. She pulled up smartly to see what was happening. My wife couldn't move. I couldn't stay on my feet.

"Oh, don't be discouraged about that," the girl said. "After four or five days of this, you'll be experts."

"Oh sure, that's easy for you to say. How long have you been cross-country skiing?"

"This is about my fourth or fifth time."

This first day's skiing hadn't had much to do with running. It was more like relearning walking. But the prospects beyond the first halting steps were there to see.

WINTER WEATHER INDEX

Runners dressed properly can stand to train in temperatures as low as 20 below zero. It may be uncomfortable, but it's fairly safe. J. Karr Taylor, a doctor from Montana, wrote in the *Runner's Medical Encyclopedia* that he trained on a minus-72 day, though he doesn't recommend it.

But Dr. Taylor warned that temperature is deceiving. It could be a lot colder and a lot more dangerous than the thermometer shows. A minus-20 day can be relatively safe, threatening, or extremely dangerous. It all depends on the wind.

The wind creates a "chill-factor." At freezing (32 degrees F.) a 10 mile per hour wind chills the air to half its face value. A zero temperature and 10 m.p.h. wind combine to produce minus-24 air.

The chart below, courtesy of Dr. Taylor, indicates that wind-chill readings down to about 20 below zero pose "little danger." There is "increasing danger" in those down to about minus-60. Lower readings carry "great danger."

WIND CHILL FACTOR CHART

Estimated wind speed (in mph)	Actual Thermometer Reading (°F.)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT TEMPERATURE (°F.)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
	Green				Yellow			Red				
(Wind speeds greater than 40 mph have little additional effect)	LITTLE DANGER (for properly clothed person). Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh.			GREAT DANGER				
	Trenchfoot and immersion foot may occur at any point on this chart											

Properly bundled and with an eye on the wind readings, runners are safe at extremely low temperatures. (Beinhorn)

Profile of international skier, international runner Trina Hosmer.

WOMAN FOR ALL SEASONS

by Sara Mae Berman

If you're an international class athlete in any sport, that is quite an accomplishment. Trina Hosmer, 27, is an international class athlete in *two* sports: cross-country skiing (Nordic skiing) and cross-country running.

She began cross-country skiing in 1968 while a graduate student at the University of Vermont where she met her husband, who was one of the school's best skiers. By 1970, Trina was the second best woman skier in the country. That year she earned a place on the three-member US Nordic team which competed in Czechoslovakia in the International Ski Championships (FIS). This was the first US ladies team ever to compete internationally in cross-country skiing.

Trina did not start running until she moved west after her marriage in the summer of '68. She ran only to keep in shape for skiing. (Women's cross-country ski races are five and 10 kilometers.) However, when you live near Seattle, you are in Falcon country. The Falcon Track Club, known for running stars Doris Brown and Vicki Foltz, is coached by Ken Foreman. The team won the recent AAU women's cross-country race with five runners in the top 10.

"Dr. Foreman is wonderful," Trina said. "He's so knowledgeable. He gave me confidence. I owe everything to him."

At first running was a duty, but under Foreman's guidance Trina soon became a nationally ranked middle distance runner. She placed fourth in the national cross-country championship in 1970 and was named to the six-member US team to compete in the International championship in Spain in March 1971.

That same winter she competed in the pre-Olympics at Sapporo, Japan, and on the European Nordic racing circuit. When March came, she sent her skis home from Europe and took her running shoes down to Spain.

Last winter Trina was a member of the first US women's Nordic team ever to compete in the Olympics.

She says it is difficult to maintain best form in both sports, and feels that she really can't train enough in both sports. But she does not want to give up either in favor of the other...yet.

"Cross-country skiing is a good winter alternative to running," she said. "You can gain so much from the skiing. But to do both at top level is very hard."

Her running training: three days a week on the track—short, fast repeats (220s, 440s, 880s, some 110s and 220s alternating). At the height of the track season, 4-5 days at the track; on the other days fartlek distance, or race. During the foot racing season, her training is directed toward running. By the end of summer, she does 60 miles a week including hill intervals on a half-mile hill or rolling terrain; later on, 3-6 intervals on a mile circuit. She trains twice a day, her hard workout in the morning.

Weight training continues year round—twice a week in spring, three times a week the rest of the year. In late summer, she starts more specific ski training such as striding with poles (uphill running done in a special way to simulate the ski stride action) one day a week, also one day a week track work. At this point her training is about 80 miles a week. This program goes on through fall with a cross-country (foot) race every week.

When snow comes, she switches to skiing. Last year the US women's Nordic team trained in Montana during November. At the end of the month a race circuit provided the team a race every other day for more than a week. Since cross-country skiing is like interval running (you can rest on the downhills and also have no leg pounding in skiing) recovery is somewhat faster than if you had a footrace every other day.

As the season progresses, Trina does tempo training twice a week, and foot running once a day no matter what she does on skis. Harder workouts on foot than on skis keeps up her condition. Trina feels that she is "technique limited", not "foundation limited." Right now she says she can't ski hard enough to stay in condition without the running.

Cross-country skiing and distance running are complementary as well as supplementary. To be a good cross-country skier one must be in excellent cardiovascular condition, but must also have good ski technique.

The women's Nordic program in the US is only five years old. At first, those who were in good shape had an advantage. Now it's even, or slightly tipped in favor of those who have good technique. Running is a good way to build condition during the off-season and a good way of maintaining it during the ski season. However, it doesn't train the specific muscles needed for skiing.

This is why it is unusual to find a Trina Hosmer, who combines the two well enough to be an internationalist in both. She's truly an athlete for all seasons.

RUNNER GOES TO THE DOGS

A marathoner applies his methods to his dogsled team, with startling results.

by Lloyd Slocum

Lloyd Slocum, a professor at the University of Maine, is a marathoner of 2:30s class as well as a champion sled dog racer. He is considered a pioneer—or something of an oddity—in dog racing circles because he trains his animals the same way he trains himself: with carefully planned year-round endurance work.

For 25 of my 39 years I have been a runner, and have become emotionally dependent upon the anticipation which precedes competition and the tranquility which follows. Having no desire to spend my remaining winters in a state of athletic depression, I decided six years ago to tie together three separate things, all of which I am very fond: running, cold weather and dogs. The integration led to my first sled dog racing team, five Siberian Huskies. Despite our inexperience, that team, with me running behind, was good enough to win the Maine state five-dog racing championship in our first year of competition. Since then my wife and I have added new dogs and new titles, including the Laconia, N.H. world championship sled dog derby last year.

I prefer small, easily manageable teams as my light weight and running style do not require the power of a large team. Heats range from 10-30 miles per day, with the combined time for the two (sometimes three) heats on consecutive days determining the winner. A good team on a packed trail can run sub-four-minute miles for 30 miles, finishing the distance in under two hours

Above: Lloyd Slocum and his dogs in action. Below: Canadian racing. (Photos below and on page 31 by Bill Herriot)

while pulling a sled. The pace can get much faster in shorter races.

The sense of pace which most distance runners acquire is invaluable when driving a sled dog team. The dogs must be kept from over-extending, particularly during the first heat of a three-day race. Siberian and Alaskan Huskies are easy to pace, whereas hounds (which are sometimes used in this sport), tend to burn themselves out with too fast an early pace which their drivers do not seem to be able to reduce.

Year-round conditioning is essential for best performance from man or dog. With this conviction, my wife and I train our dogs throughout the summer. We jog with the puppies as soon as they are weaned. As they mature, they adopt me as the pack leader and are conditioned to stay near me when I run. This allows me to let from 10-15 dogs loose simultaneously and know that they will accompany me as I run through the hundreds of acres of woods behind our farm in Gorham, Maine. Two such runs each day takes care of the summer conditioning. This non-stress "fun running" will last from 20 minutes to one hour. Summer is also the time to teach promising young lead dogs the necessary verbal commands, which include: gee (turn right); haw (turn left); woah (stop); go ahead (start running or pass a team); no (whatever you're doing, don't), and a few others. "Mush" is no longer used as a command.

During the winter racing season, dogs can sour in a manner akin to a stale road runner. It is emotional, not physical. A break of severals days usually rekindles enthusiasm. Running the dogs loose rather than making them work in harness has much the same rejuvenating effect as a fartlek-type workout has on a souring distance runner.

These two drivers let the dogs do the work. It isn't always so easy.

For the most part, sled dog drivers tend to be rugged individuals, as the sport is physically very demanding. Only the tough endure. Seldom are dog drivers fast of foot. This is where a road runner gains a tremendous advantage in the sport. It is my opinion that a fit runner can increase the speed of his or her team by 1-2 miles per hour. My own technique is to run hard when I feel the pace is dropping below what it should be. The team immediately accelerates when they realize I am off the sled and running with them. I also run hard up all hills, and peddle (scooter fashion) whenever I am not running. The only running rule which must be observed is that the driver may not run ahead of the front part of the sled. This is considered pacing, which is illegal.

My major problem is staying warm while training several teams. Like most runners, I carry very little excess fat. Consequently, four hours on a training sled at temperatures as low as 30 below can get to me. It's no problem in a race because I constantly run or peddle and thus sweat freely. But I prefer to stand on the sled in practice and teach the dogs how to work. Then the races seem easy to them. Practice runs vary from 10-20 miles per day, five days a week or as the weather permits.

A few words of advice for any runner considering this sport. Buy the best female you can find and get her bred to the best running male available. Twelve months later you should have a class A team. Remember it costs as much to feed and care for a poor dog as a good one. Bargain dogs are seldom that in racing. Good team dogs cost from $300-500, and top leaders now bring $1500 if you can find one for sale. When a dog is that good, its owner usually does not want to part with it at any price.

Unlike road racing, the prizes for sled dog racing are in cash rather than inventory clearing merchandise. Although most races pay under $1500, there are at least eight races in the US and Canada with purses between $5000 and $10,000 (one pays $50,000), with the winner receiving about one-third of this amount for a weekend of racing. However, kennel expenses and time demands are high, and I strongly advise against entering this sport with any illusion of making a financial killing. Those who manage to cover expenses are a fortunate minority.

The problems that still hold back the "nation of sprinters."

ARE U. S. SPRINTS AILING?

by Alphonse Juilland

French-born Alphonse Juilland is an internationally prominent linguist who teaches at Stanford University. He is also a sprinter of some note ("the fastest man who has been around a half-century") and authority on the sport, having competed and observed techniques in a number of countries. His times have come down steadily the last five years. Using many of the ideas described here, Juilland last year improved to 10.6 for 100 yards and 11.5 for 100 meters at age 49. The point he makes is, "So much of good sprinting is part of technique, training and learning—not natural ability. People have to get out of their heads this idea that they can't improve in sprinting because they don't have good 'basic speed.' "

There are few troubles at the top in US sprinting. Herb Washington (above) holds the world indoor 60-yard record. The problems are largely below the surface. (Stan Pantovic photo)

Many people would have a hard time believing that US sprinting is indeed ailing. They would point to the Olympic results: second in the 100 meters, second, fourth and fifth in the 200, and first in the 400-meter relay. They would note that it might have been better but for the unfortunate schedule mishap in the 100. They would say, "That's not too bad for one country."

A case can be made that the US performed according to expectations in the Olympic sprints. But I think there is a much more crucial question. Namely, did the sprinters run up to *potential*? This is a different question, a more difficult question. And here the answer is decisively no.

Sprinting was primarily an American discipline two decades ago. It no longer is. The problem is, we don't realize to what extent we're falling back in sprinting precisely because of our concentration at the top. If we stay on the top of the iceberg, we appear to be doing okay. But we don't realize the progressive erosion that is taking place farther down.

Something is wrong, and there are plenty of criteria to indicate it. Whatever the experts say, the others are catching up with US sprinters. The rate of progress in many other countries is far greater.

If you go back to the 1952 world list and compare it with 1972, you see that the slip is much more considerable than suggested by the number of medals.

Here's a simple test. Take the average of the first 10 Americans for 100 meters 10 years ago and now, and the averages for the first 10 French. I don't have the exact figures at hand, but would say that the French have improved by about three-tenths. I doubt that the Americans improved by more than one-tenth.

Take other criteria—the top 50 times for the year. Looking at that over the last 10 or 20 years, we see that the erosion has been much more considerable than imagined. The first 50 for the year has been invaded to a great extent by

non-Americans. Twenty years ago, most of the runners on the world list were Americans (considering a combined list of 100 yards and 100 meters, adding nine-tenths to yard times). This percentage has been steadily reduced, though US runners still have a bigger cut than any other country.

Let's assume that the American sprints are ailing. What are the causes of the sickness?

First, there are general symptoms causing US track and field as a whole to lose ground in relation to the rest of the world:

- **Coaching.** I suggest that our coaching is much less competent than the coaching now provided in Europe. This is because we do not have appropriate institutes to train teachers in sound basic knowledge of track.

- **Research.** We do not do research in track and field. We have no research institutes which can compare with what the East Germans have, the French have, what the West Germans have, and most of all what the Russians have. (The Russians have four such institutes.)

- **Longevity.** Our system is such that it does not encourage people to stay in track. This particularly affects sprinters, who rarely stay in the sport past age 20.

There is nothing that has hurt more the development of American sprinting than the notion that sprinters are born, but that middle and long distance runners are made. We think that sprinting is a natural talent. Yet among all the races from 100 yards to the marathon, perhaps the most *unnatural* race is the 100. Let me explain by breaking good sprinting into components.

What is required of an athlete to be a good sprinter? First is something I would call natural rhythm. This, up to a point, is inherited. But even if it is inherited, the question remains open whether we can do something to improve it or not.

The second component is power. Third is form. Fourth is relaxation. Fifth is start technique.

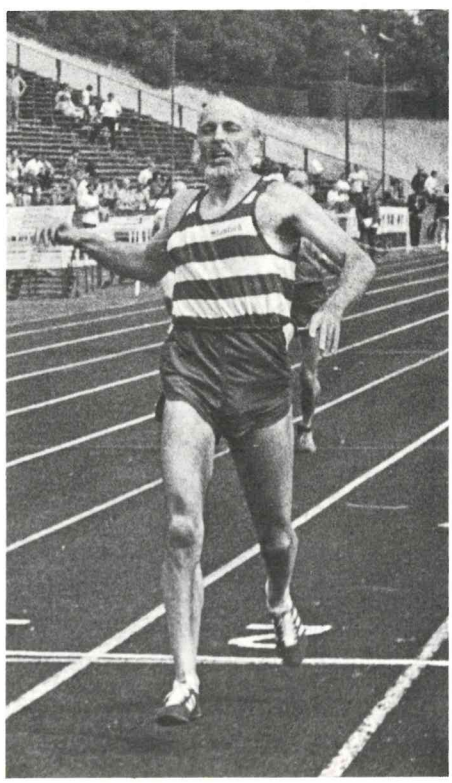
Of these five factors, only one can be said to be natural—rhythm. Power can be improved immensely. I have improved my power on leg presses from 300 to 500 pounds. Form obviously can be improved, as can relaxation and starting technique.

This brings me back to my contention that sprinting is the most unnatural kind of running. In a marathon you have accumulated a certain amount of power and you expend it in 2½ hours. If you run the six miles, you expend it in a half-hour. But in the 100, you expend it in just 10 seconds. You have accumulated all that power, and you have to burn it all in 10 seconds. Body physiology is such that when we explode like that, our muscles contract and get tense. This is not the case when we expend our energy in a half-hour or an hour.

So the point is, when you give it all in a 100-yard sprint, your muscles tighten. Sprinting is unnatural because you have to learn to expend all your power while keeping the muscles relaxed. This is learned.

Sprinters give up much too early in the learning process. Those who give up sprinting give up in two ways. One is that they give up track altogether. But they also abandon sprints by moving up to longer distances. This apparently is related to the idea that sprinting is inborn and natural, and that you can't do very much about speed. As soon as a young runner fails at sprinting, he moves up to the 440, or 880, or mile, assuming he will have enough speed there. He never gets a chance to realize his potential as a sprinter by developing power, learning to relax, and by sharpening his technique and form.

Related to this is a psychological factor. In sprinting it is very difficult to see improvement. Take, for instance, 100 yards. To improve your personal record, starting from a base of 10 seconds, you have to go a tenth-second faster. That's one per cent. But in 10,000 meters if you improve by one percent, you go about 20 seconds faster. You can improve your personal record here by dropping just one-tenth of one percent. In the sprints you can't do this. Progress is not so visible because the time period is so short.



Alphonse Juilland. (Beinhorn)

When you're a 10-flat sprinter, improving by any measurable amount may be a matter of one or two seasons' work. It may take years to come down by only one-tenth of a second. This seems to discourage sprinters and makes it much more difficult to sustain effort.

It is assumed that sprinters reach their peak around age 20 and from there go downhill. But look at the runners who have done 9.1 for 100 yards. The first ones ran it at the age of 20, three guys—Bob Hayes, Jim Hines and Willie McGee. Then at 21, you have only Bob Hayes, At 23, Charlie Greene and John Carlos. At 25, there is Harry Jerome.

I believe our notion that the peak is around age 20 is related to our assumption that sprinting is a purely natural talent that declines early. But Valeriy Borzov will be 26 at the 1976 Olympics. I see no reason why he can't run 9.9 or 9.8 for 100 meters in Montreal. Most Americans give up sprinting long before they have reached their potential. Most Europeans don't.

The English housewives have a saying, "Take care of the pennies and the pounds will take care of themselves." In track terms, this would be "take care of the base." Never mind Olympics—how to get many medals in the next Olympics. Concentrate instead on creating as broad and sound a base as possible, and the top—the Olympic medals—will follow as an automatic by-product, as they have in US marathoning.

The US system in sprinting is essentially pound wise and penny foolish. Americans are concentrating on building an Olympic team. The feeling is that in process of preparing for the Olympics, track and field interest and knowledge is going to spread all over the country.

They've been following this approach for many, many years and it's beginning to catch up with them. The abundance of talent has allowed them to get away with this. Now the other countries which have followed more consistently the "pyramid" approach—working up from the bottom—are making faster progress.

The US is at the point where it can no longer live on talent. Every year it has almost 100 runners who can do 100 yards in 9.5 or faster. When it comes time to pick a national team, these 100 guys butcher each other, Roman Circus fashion. The survivors are the team. This is fine for the team. But with this kind of approach you make very little effort to develop techniques.

You can take a man of 9.5 ability and work him down through this Roman Circus approach to 9.3 But I don't think you can take him from 9.3 to 9-flat this way. When a runner pushes 9-flat, he can no longer rely on talent alone. He has to exploit every kind of advantage in training and racing technique. This requires research, testing, experimentation.

Americans aren't doing this work on technique. This, I contend, is why they have been stuck at the same level for a number of years. They have done as much as they can on natural talent.

It is a paradox of riches. US international sprinters do reasonably well. Why do they do well? Not because of our policies. Not because of our coaching. Not because of our techniques. Not because of things we are doing more or less consciously. They do well because there is such a wealth of talent, and where there is such a wealth of talent the Roman Circus approach can work.

The paradox is that this talent which gives superficial success allows the sprinters to be complacent and not to work on technique, on coaching, on broadening the base. One of the reasons Americans are not doing better is that they are doing reasonably well.

My guess is that the US is getting close to the bottom of the talent barrel. The talent in the past has allowed Americans to get away with murder, but the margin for error is steadily shrinking. Countries with fewer natural resources but better development of available sprinters are closing in.

What can be done to correct these things?

The argument is "We don't have any money for coaching institutes, for research facilities. We don't have any money to support athletes after they leave school." It's very easy to say, now look how the Russians do it, look how the East Germans do it. They have political systems which allow the state to step in and control track and field. Is the US political system incompatible with this kind of arrangement? Do we want to "socialize" track and field? We may not want to even if it would improve our performance and gain all the Olympic medals.

I have two specific suggestions for helping sprinting (and track in general) *within the US system*:

1. **Research foundations.** We already have a tradition in which foundations help financially certain disciplines which are not self-supporting. For instance, poetry. In our society as in most societies, the writing of poetry cannot support a man. But we feel that it's important that people continue to write poetry, so a foundation supports poets through grants. Why can't we have a foundation that would support researchers, scholars who would study track and field—the physiology, the mechanics, starts, finishes, oxygenation, etc. There are many people in this country who have money to give away and are looking for places to give it. Why not go to one of them with an interest in sports and ask for money to establish an institute for track? This would be something that would fit into our academic and political tradition.

2. **University-related institutes.** Our universities often specialize in certain areas of study. I suggest that a university like Villanova should seek support for developing a track and field institute on the east coast. In the midwest, how about Kansas? In the south, Florida. On the west coast, Southern Cal. These departments could give coaches really thorough training in the sport, as well as conducting basic research.

The type of research—years of close scrutiny and testing—that developed Valeriy Borzov's technique (see "Scientific Sprinting," Jan. 73) isn't being done in the United States.

SENATOR WHO RUNS FASTEST

by Jeff Darman

Up on Capitol Hill, which some Washington political observers describe as an old age home for elected officials, roam a number of exceptions to this rather disparaging description. One is the senior Senator from California, Alan Cranston. Cranston, a two-time letter winner at Stanford in the 1930s and a member of the nation's fastest mile relay team in 1935, has been making his presence known in masters track circles.

Senator Cranston returned to running in 1963 after a 27-year layoff. The 58-year-old lawmaker just jogged to stay in shape until 1969, when the advent of Masters competition beckoned him. Before long he held the world record for 55-year-olds in the 100-yard dash—12.6 seconds at that time. Although far off his collegiate best of 9.9, this was still a creditable performance.

Cranston usually runs in the early morning hours, since his heavy work load precludes that sort of thing during the day or in the evening. By 6:30 a.m. he is running around the track at Georgetown University in Washington or running along the banks of the Potomac. He usually starts with a mile warmup and then does speed work—100s and 220s and recently 440s to improve on his endurance. The workouts last no more than an hour.

The Senator works out about six days a week alternating between the running and weight training. When traveling and his schedule doesn't permit regular training sessions, he has devised a unique method for retaining his fitness. He does as many push-ups as he can in a minute's time. Cranston repeats this procedure for 10 minutes—having attained the mighty figure of 265 in one of these push-up orgies. The Senator feels his mini-workout gives invigorating and necessary stimulation to the heart, lungs and muscles, although it doesn't do much for the legs.

Senator Cranston toured Europe with the US Master's team during August (see "Masters of the World," Jan. '73). Although he didn't place individually in any of the meets, he ran on the mile relay team which placed second in London and first in the Olympic stadium in Helsinki.

Asked about the highlight of his running career Cranston returns to his college days at Stanford when he beat 1932 Olympian Ben Eastman twice in the quarter-mile. However, the Senator adds that Eastman was a little beyond his peak and he was not at the top of his form.

Senator Cranston feels that "there is not enough attention being paid to physical fitness in the United States today," but thinks some increased effort to improve the situation is now taking place. He feels programs like masters running are a good incentive for others to attain or retain fitness.

After spending years in the Capitol and hearing about the oil lobby's Senator or the cattle lobby's Congressman—it's nice to know that in the Senate Alan Cranston is looking out for the runner's interests. One of his proposed bills would set aside 1% of the highway trust fund money for construction of bike trails. Obviously additional bike paths can be put to good use by runners searching for new places to train.

Alan Cranston, the Senate's sprinter, racers here in the 1972 Penn Relays 100. Cranston loses narrowly to George Braceland (r) in 12.4.

An Austrian professional's love-hate affair with the California inferno.

by Bill Emerton

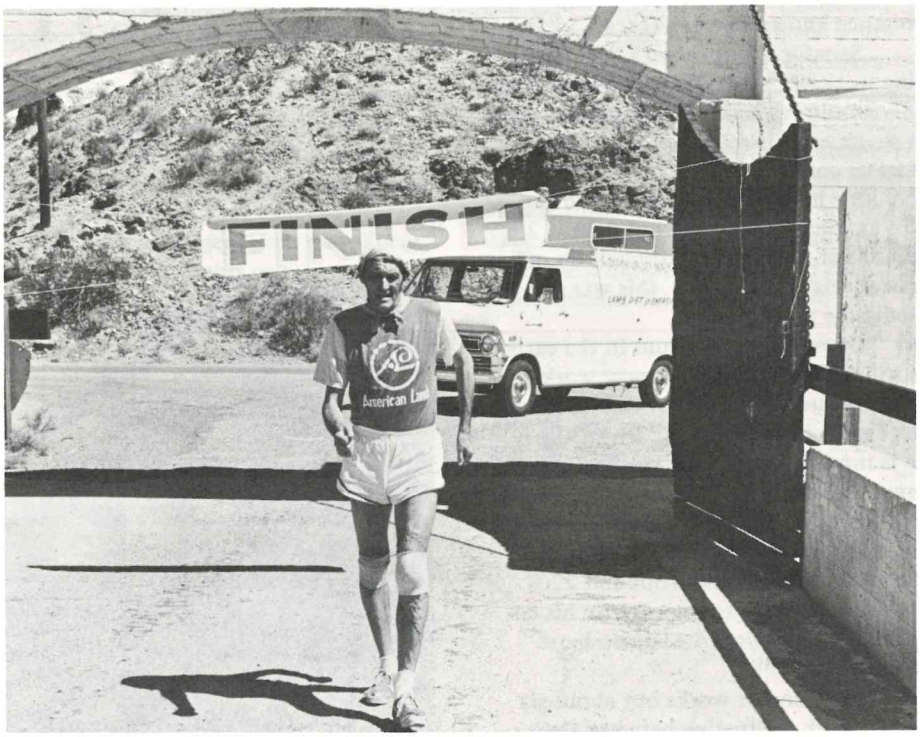
WALK IN "VALLEY OF DEATH"

I had run the 120 miles through Death Valley on two previous occasions, once continuing on to Las Vegas, a distance of 211 miles, in three days 15 hours, fighting temperatures that reached 120 degrees. With the condition I had built up over the years, I knew my stamina would be okay for the Death Valley walk I planned. I had further prepared myself with some hard heel-and-toe workouts—from 100 to 200 miles each week, varying my workouts between a hard 10 miles at the UCLA track, and stamina-building 20 and 30 mile walks over the Hollywood Hills.

In Australia, I had once won several Tasmanian amateur walking championships, so this sport was nothing new to me. I realized that shin splints could be troublesome if one was not in top condition, but that would not be a problem on this walk. I have never attempted any endurance feat unless I was in top shape, and I had subjected myself to plenty of punishment in workouts to be ready for this walk.

A few weeks before I was to begin the 120 mile "fire walk," I was allowed to compete by invitation in the Southern Pacific AAU 40-kilometer walking championship, approximately 25 miles. I felt very pleased with my performance. Out of a large field of starters I finished in fourth, in a tick over four hours. The first three finishers were all US representatives in international competition, so at almost 52 years of age I felt confident about putting on a good performance in the Death Valley walk.

Death Valley is certainly a name worth of its structure. It reminds me of giant dragon's lair. It claims lives with predictable frequency among those foolish enough to challenge its power by leaving their automobiles or to go walking this furnace-like heat without proper care and attention. Very few people are fit enough to attempt a six-mile stroll in what weather experts consider the hottest part of the world during the months of July and August. Air temperatures reach 125 degrees, ground temperatures 200 degrees. Only two weeks before my record walk attempt, a 48-year-old woman had died very close to Death Valley. Her car had overheated, and she made the fatal mistake of leaving her car to try and walk for help. She had gone less than half a mile when she collapsed and died.



With 27 miles down (according to the highway sign), Death Valley's heat is already affecting Bill Emerton.

With these thoughts in my mind, and the start of the walk just hours away, we all arrived at the Indian Village of Shoshone, just outside Death Valley National Park. The walk was to be sponsored by the American Sheep Producers Council, and several timekeepers and press people were on hand to follow me through this attempt.

My plan was to cover 40-50 miles each day, but on the morning of July 24 I had my doubts about keeping that pace. By the 8 a.m. starting time, the temperature was close to the century mark, and was predicted to reach at least 118-120.

In the first two hours, I put 11 miles behind me in temperatures that had now soared to over 110 degrees (with ground temperatures upwards of 150 degrees).

The Highway Patrol was keeping an eye on me and the Death Valley Park Ranger slipped past a couple of times just to check. A quick stop for several glasses of water and my cap soaked in cold water to keep me as cool as possible, and the hips were swinging along once again.

The 25-mile marker soon appeared, and in the distance I could see Death Valley Junction several miles away. I was suddenly very lonely. The officials had gone ahead a couple of miles as the cars were starting to boil from overheating, air conditioners were giving out in the heat, and by now I was cursing the weather with all the "bloodies" and "bastards" I could think of.

Reaching Death Valley Junction,

I changed socks and had my feet cooled by rubbing alcohol, but none of that could prevent the blisters that now started to appear. I had gone 30 miles in 6 hours 45 minutes. The next 40 miles were going to be rough. The air temperature was 116 degrees, ground 176. The ground felt like hot coals under my feet all the way up the long hill from Death Valley Junction into Death Valley itself.

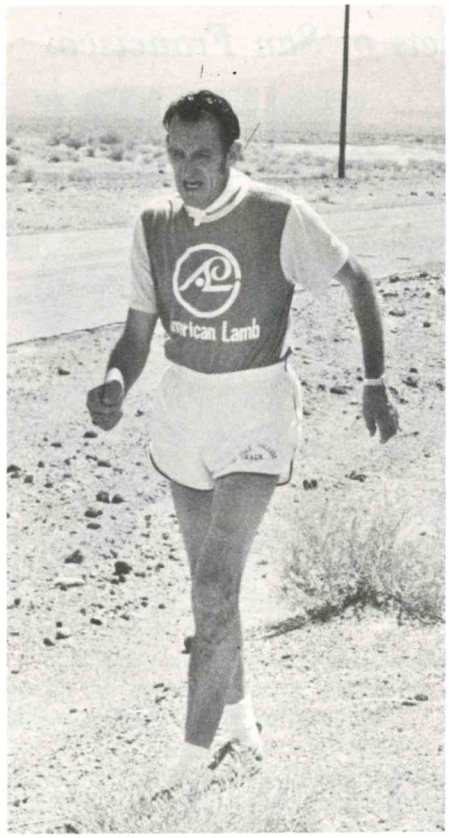
The 20-Mule-Train Canyon sign was a brief resting stop, complete with photographers. There I gave some attention to blood blisters that had formed. I had already cut the front out of one pair of shoes to allow my feet to expand more and for some air to get to them.

Fifty miles were behind me in a little over 12 hours on pavement that was hot enough to cook on. By now, some of my toenails were turning black, the blood blisters had broken, and the white socks had turned red with blood.

Ten more miles and at last I reached Furnace Creek Ranch, the halfway mark, in the heart of Death Valley. Several of the officials who had never been to Death Valley before were taking punishment from the dreadful heat. We were 250 feet below sea level, and even though it was 11:30 at night, the temperature was still 110 degrees. I rested for a few hours, but it was impossible to sleep as my nerves were jumping and the pain from the blisters on my feet was becoming unbearable. I felt the second day was going to be even rougher than the first.

Early the second day, after I had been on the road for seven miles, Cliff Giewecke, sports writer from the *Christian Science Monitor*, joined me for less than a mile. He seemed amazed that anyone could even be out in such heat, let alone do vigorous exercise in it.

Trying to ignore the heat, I continued. I could only shake my head as I



Emerton's finish at Scotty's Castle—after two days 15 hours.

passed a roadside grave which simply said on the thick headstone, "Van Nolan Died, a Victim of the Elements." I was now five hours into the second day of this walk. Not a breath of wind, the air completely still, the sun beating down on me as though I was trespassing on forbidden territory. The cartilages in both my knees were giving me trouble. My shoes were leaking blood from the blisters. And the battle was really just beginning as I started the long 36-mile climb from 280 feet below sea level to 3000 feet above.

I kept pressing on mile after mile, passing one pain barrier after another. I was determined to finish inside three days if it killed me—which, by the beginning of the third day, I was afraid it might. The last 20 miles were sheer agony. By then it was important that I stop every three miles for a drink, as my body was quickly dehydrating.

I kept saying to myself, "Never again do I want to see this bastard of a place." To me, God has only made one mistake, and that was creating Death Valley.

I passed the sign that read "Six Miles to Scotty's Castle" which was to be the finishing point. It was then I yelled out, "I have licked you again, you bastard!", for I would have crawled the last six miles had it been necessary.

Just then I had a hell of a fright. As if from nowhere, a wild coyote ran across the road a few feet in front of me. Fortunately for me it kept on going, as by then my body didn't have the strength to fight any coyote.

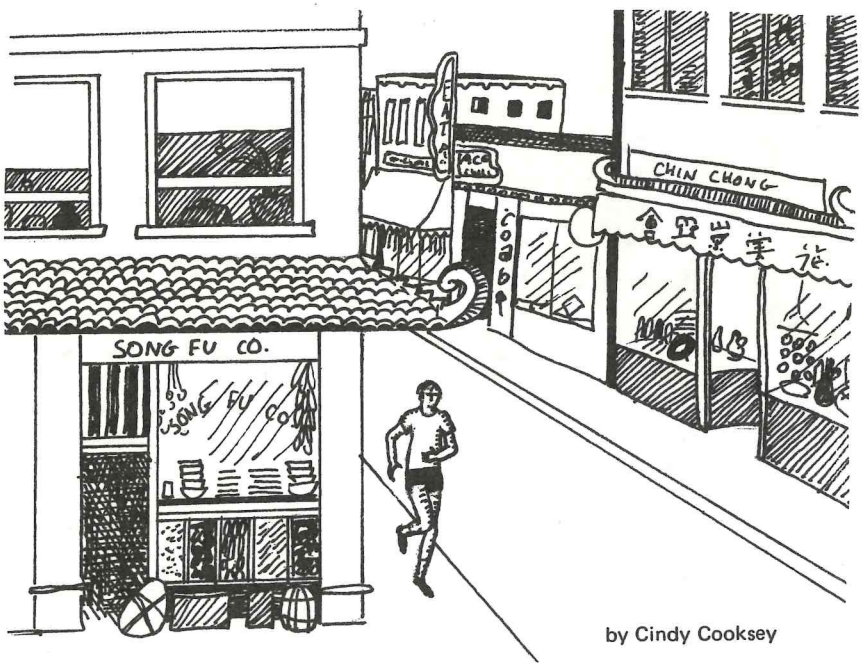
I could hear the officials urging me along to the finish line, but every step was still bloody agony. The castle loomed into view 600 yards ahead. Although completely buggered, I drew on my last remaining reserves of energy and pushed out that last little effort.

Through the huge gate at Scotty's Castle I went. Overhead hung the finish sign, a most welcome sight, and I said quietly to myself, "Beat you again, you bastard—hot weather, coyotes, rattle snakes and all."

My time was 2 days 15 hours 51 minutes for the 120 miles. Under conditions such as I had experienced, I was very happy with the performance. For those who would like to follow in my footsteps, I have a word of advice: If you must, do it in the cool weather.

Now I have run it both ways and walked it. I say good-bye forever to Death Valley.

Touring the strange streets of San Francisco.



by Cindy Cooksey

THE CHINATOWN RUNAROUND

by Jack Knebel

I thought I might win the Chinatown marathon from the moment I saw the notice on the bulletin board of the Chinese YMCA, hidden among the advertisements for swim lessons, karate classes, and the Tai Chi Chuan Way to Good Health. This was my kind of "marathon"—three miles long, around the familiar streets of San Francisco's Chinatown, where I take my lunch hour runs. I became even more confident when I checked my road race schedule and found there was an AAU sanctioned race on the same day, which would draw off the 200-300 runners, joggers, walkers and housewives who would be expected to beat me on any given day.

Sunday morning, Aug. 6—race day! I arrive early to learn the course. It is a Chinese puzzle, doubling and tripling back on itself. The first half of the race will take us through heavy traffic on Kearny, Columbus and Stockton streets. The survivors will then make several loops through the Financial District before returning to Chinatown.

An hour before the race, as I finish writing the route on the back of my hand, the competition begins to arrive. The first two are a father-son team. The father doesn't worry me. At 35, he is two years older than I. The son is a different matter, though. He is only five, but he looks suspiciously like the kid who outkicked me for 438th place in the Bay to Breakers race. I know the next runner. Each day he does hundreds of chinups at the Chinese Y. I wonder if he will run the race on his hands.

Realizing that the competition is starting to psyche me out, I leave the Y and start to jog the course. My morale is not improved when I am quickly overtaken by the chinner (on his feet, thank God) and another Chinese boy in street clothes. They lead me through the course at a pace only slightly faster than I intend to run the race. I finish, weak-kneed but satisfied that I will not get lost, no matter how far behind I finish.

On our return, we sign up at a card table at the corner of Sacramento and Grant, in the heart of Chinatown. A crowd of tourists quickly gathers, then dissipates as they learn that the man behind the table has nothing to sell. It does not take long to see that I will be the only non-Chinese in the race, and that only three of us are over 18. The others look cocky in their high school track uniforms.

The race is not to start until 11:00, presumably to allow the traffic time to build up. At 10:50, the race director explains the course to us. It is complicated, he admits, but there will be monitors stationed around the route to direct us. The course is re-explained to the monitors, who are then sent to their posts, never to be seen again. At 10:55, two of San Francisco's finest arrive on their motorcycles. They are to lead us around the course, stopping traffic. They are given maps of the course, and told what to do. They joke about the nutty kids in their underwear, and plan their own race tactics. This must be when they agree that they cannot get lost if they follow the runners.

At 11:00 about 20 runners line up. On our marks, set, bang. We start. Another bang. I slow down; false start. A third bang. What does that mean? And then the rest of the string of firecrackers lets go. The first annual Chinatown "marathon" is underway.

Up Sacramento Street, left on Stockton, and into the tunnel. The early leader is a surprise. It's the chinner. One hundred yards later he is out of contention, having tied up with only 2.9 of the three miles to go.

And then, suddenly, it happens. For the first time in any distance race, I am in front. I will set the pace, and the others will lope at my heels, waiting to pounce at the first sign of weakness. Will my sense of pace be true? Can I take the strain of not knowing where the others are?

But there is no time for self-doubt. I am the leader. What's worse, the motorcycle escort drops out of contention and falls in with the pack, leaving me to face the traffic alone. Who says the long distance runner is lonely? Nearly every car in San Francisco seems to be honking its horn for me, and the cheers from the pedestrians in the crosswalks are unprintable.

I pass my wife and children as I lead the pack down Clay Street. They yell that I am several blocks ahead and watch me weave through several cars whose drivers think that a green light gives them the right of way. (Several blocks later I am overtaken by one of them, a kid on a motorcycle, who is rewarded with a groan when he calls out that I have "run" a red light.)

As I round a corner at the foot of Clay Street, I look back. The rest of them are out of sight. All I have to do now is more of the same. Up Pine Street, and right on Sansome. Now all

that is left is a series of parallel passes along Sansome, Montgomery and Kearny, then the final triumphant sweep up Grant.

At each intersection I yell wildly, hoping to stop traffic. Many drivers probably do not know the meaning of "Track!" but they realize from the way I am running that whatever "Track!" is, it is serious. The only ones who refuse to give way are part of a funeral procession. Out of respect, I let the hearse and a few cars pass, thinking all the time of my rapidly evaporating lead. Then, unable to bear the strain, I break through the line. Death, I decide, is hardest for those who are left behind.

I dodge a cable car at Montgomery and California. With only nine blocks to go, I must have an eight-block lead, so I begin to plan my trophy acceptance speech. As I head up Pine, and turn into Kearny, I plan a non-acceptance speech. I will decline the trophy, I think. After all, I am the only non-Chinese running, and it is a local race.

No, that's condescending. We all tried and I won. And besides, a Chinatown marathon trophy will make a good conversation piece.

It is probably because my thoughts are on the inevitable victory and my glasses are back in the car that I do not immediately appreciate the significance of the shorts-clad figures scurrying across my path a block and a half ahead. When I recognize the other runners, it is too late. They have overcome my lead by overlooking 20 blocks of the course.

Suddenly, I feel like I'm taking part in a Keystone Kops re-run, with the cops and robbers racing wildly in different directions, converging and diverging, but never making contact. I must be playing one of the cops, because there is no doubt who the robbers are.

I step up the pace and overtake one of the real motorcycle cops, but it is too late. As I cross the finish line, and dodge several gagging runners, I learn that I have finished ninth.

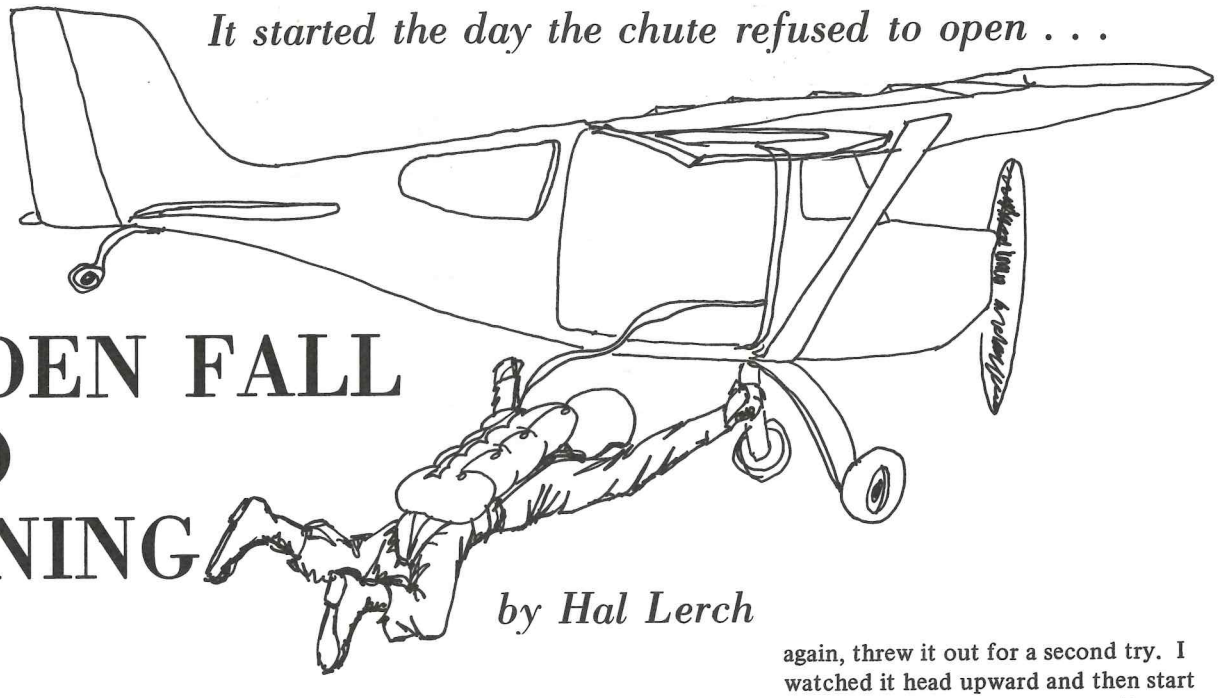
Disappointed but not yet defeated, I quickly round up my evidence and present my case to the race director. The policemen tell him that I was far ahead and that the other runners had taken a short cut. Many of the competitors agree. Without hesitation, the director rules the testimony irrelevant. "After all," he says, pointing to the other runners, "they crossed the finish line first."

The story ends well though, and there is even a moral. Several days after the race, my law firm presents me with a trophy. It is an incense burner, decorated with the hear no evil, see no evil, speak no evil monkeys mounted on a block of wood. The top lifts off to display an erect middle finger. The large gold plaque reads:

"CHINATOWN MALATHON
YEAR OF THE RAT
CONSORATION PLIZE
JACK G. KNEBEL
'NICE GUYS FINISH RAST'
—REO DULOCHER"

San Francisco attorney Jack Knebel is a son of Fletcher Knebel, best-selling author whose books include "Seven Days in May."

It started the day the chute refused to open . . .



SUDDEN FALL INTO RUNNING

by Hal Lerch

Who could have known that on my ninth parachute jump, from 3200 feet, my main and reserve chutes would fail to open, but yet I would still be here to tell about it? Or that I would have taken up marathon running as a result, and found it harder than jumping?

It all goes a long way back to my boyhood when I used to find a square piece of cloth and tie a string to each corner. Any nut or bolt served as the "jumper" for my parachute and I, of course, climbed to great heights in trees to throw this extension of myself into the air to watch me float gently back to earth.

As a boy I was also forced on countless occasions to elude my would-be Indian captors by running long distances which took the form of around the block in South Akron, Ohio.

So much for imagination. It was time to experience these things for real after 32 years of living.

July 18, 1970 was a hot, humid day of 95 degrees in Gainesville, Fla. It seemed even hotter inside the Cessna 180 as the pilot skillfully taxied his plane across the grassy runway. I knew it would be much cooler at 3200 feet. Anyway, I was preoccupied with mentally rehearsing what I needed to do on this jump in which I was to free fall five seconds before opening.

"Remember...arch your back and get stable before opening. Look at your rip cord when pulling. Check your canopy after opening. What do you do in case of malfunction?"

I was ready. Suddenly the door of the tiny craft was open, filling the cockpit with a roar caused by the single engine and the cool blast of rushing air.

"Get ready!"

I swung my legs outside the plane and sat in the doorway visually spotting my position in relation to the small airport we had left minutes earlier. The tiny green and brown postage stamp patches 3200 feet below were waiting to greet me once again.

"Get out!"

I held onto the wing strut with both hands and stood perched on the tiny step attached to the fusilage. I was now completely outside of the plane facing in the direction we were flying.

"Go!"

Free at last...hurtling through space...spread eagle...falling...thousand one...rushing silence...gale winds in my face...thousand five. It was time to slow down and float gently pack to earth.

"Ah, good pull. Now, look up and check your canopy. Oh no!"

I was still rushing through space. There was nothing overhead except a parachute that looked like a long thin line of cigarette smoke. My chute had failed to open and I was streaming feet first straight to earth doing about 80 miles per hour. I had approximately 25 seconds left in which to do something constructive.

"Okay, use your reserve!"

I manually threw my reserve canopy out and away from me to avoid tangling it with my "streamer." It was a good throw. I watched and waited for it to open. It didn't. Quickly I pulled in my lines and, grasping the reserve again, threw it out for a second try. I watched it head upward and then start to entwine itself with my main "streamer." What else was there to do? Pulling the lines in even quicker this time, I held the chute in my hands for a third throw. Glancing downward, the ground was swiftly coming up to swallow me.

"Time's up! Get that reserve out of your hands and do a regular parachute landing just like you've done before on normal jumps."

Then something happened with about 700 feet to go. I felt a slight slowing down. Glancing upward, I saw that my main canopy had blossomed slightly, providing me with a chute about eight feet wide and two feet deep. "That's better yet. Stick with it. Hit and roll."

Hit I did at approximately 50-60 miles per hour. Hurt...couldn't breathe ...couldn't get up. People thought I was dead. I was alive.

The next 60 days were spent in the hospital recovering from a compression fracture of the back and two cracked ribs. There was no neurological damage.

It felt good to be able to walk again by the end of September and to jog two laps around the football field by the middle of October. With patience and effort, those two laps became four and before long I was out on the two mile cross-country jogging path at the University of Florida. And that's when it all began.

In September, 1971 a Florida Track Club runner named Jerry Slaven was a student in a graduate course I was teaching. One thing led to another and before long I was part of the 6:30 a.m. nine-mile run founded by Jack Bacheler and company. Maybe I could run

> ". . . For me at least, my first marathon was far more difficult than my first jump. Once you exit the aircraft, that's it. There's no turning back. . . But on the run I came up with a thousand reasons for quitting, and the opportunity for doing so came with each step."

in a marathon. Why not? I had two full months of training behind me!

"Hey, anybody know of a marathon I could enter?"

"Yeah, there's one in Atlanta the end of December."

Atlanta never looked so hilly or felt so cold before. The starting field of 150 runners was indeed a warm and colorful one, dotted with bright red stocking caps on heads, multi-colored socks on hands and an assortment of long stockings on legs. My naked head, hands, and legs were already feeling the cold. Obviously, I was underdressed and lacked color.

I listened eagerly to the starter's last bit of encouragement.

"...and everyone who finishes in under four hours will receive medals..."

I turned to my wife and said smugly, "Look for me in about 3½ hours. That medal is mine."

We were off—one lap around the track and out onto the streets of Atlanta. I passed the mile mark—"7:15." I was breathing easy and running light.

"This is going to be simple."

It was actually fun running those first 13 miles and chatting back and forth with other runners. My time of 1:40 sounded good.

"Let's see, doubling that will give me a 3:20. Hey, that's not bad first time out."

Then it happened with 11 miles to go. Sharp, stabbing pains shot through my legs and all of a sudden I was very cold. My nice easy gait was now reduced to a staggering stiff-legged shuffle. A middle-aged woman drove by dressed in a giant fur coat. Our eyes met. Her look was one of utter stupidity towards me. I agreed with her completely.

"How much farther, can't take much more, oh no, not another hill, when will these curves end! I want to cry."

With four miles to go I was now reduced to the old Boy Scout tactic, jog 50 steps, walk 50 steps. A young pretty woman drove up alongside me and said softly, "Want a ride?" I can't believe I said no to that sweet young thing.

I stumbled through the last mile thoroughly cramped, frozen and demolished. My finish lap around the track was greeted by a silent crowd of one—my wife. Well, I did finish.

For me at least, my first marathon was far more difficult than my first jump. Once you exit from the aircraft that's it. There's no turning back. You only have to say "no" one time to save a step. But on the run I came up with a thousand reasons for quitting and the opportunity for doing so came with each step.

by George Sheehan M.D.

MEDICAL ADVICE

CHEST PAIN

Heart attack deaths do not just happen without warning. Careful questioning reveals that almost all heart-attack patients had chest pains prior to their heart attacks.

The pain can range from a dull fullness to a sharp cutting sensation. It can occur at rest or with exertion. It is usually in the left chest, but can be in the mid-chest, right chest, or upper abdomen. The classic pain is in the left chest, radiating down the left arm, and is brought on by exertion. (But not all chest pains are associated with the heart.)

I am amazed at the number of people who start to run after having chest pains. Evidently, chest pain is a major stimulus for people to start thinking about heart attacks. They read about causative factors in heart disease, and after rejecting diet they take up exercise. I don't know why exercise is easier than dieting.

Whenever a middle-aged man calls me about starting a running program, I always carefully question him about chest pain. Invariably, the person had chest pain and went to his physician for a resting cardiogram. He was told not to worry, as his EKG was normal. (A resting EKG has little value. A more valuable test is done when the person is exercising vigorously.)

Among the hundreds of middle-aged men who have started running in the Washington area Run for Your Life program, I have seen only one death.

A 50-year-old man who sold gourmet foods for a living (and ate rather well) joined our program after a lifetime of inactivity. He denied any abnormalities or symptoms and said that he had a normal cardiogram.

After running in the RFYL program for a couple months, he told me that prior to running he had had nightly sharp pains in his chest radiating down his left arm. He also said that he was formerly short of breath even with minimal activity. He told me how pleased he was with the program as now he was able to break 17 minutes for two miles and didn't get the sharp pains anymore. (Looking back I don't believe he ever stopped having pains.)

Six months later, he died while jogging in the garage under his apartment house. An autopsy revealed that he had had at least two heart attacks previously and all his coronary arteries were almost completely obstructed by fat.

I am fully convinced that his basic problem was his fantastic appetite for gourmet foods, not running, and that he would have died had he run or not. I am also convinced that running made his last year more meaningful.

I now question every middle-aged man who wants to start jogging about chest pains and encourage exercise cardiograms. *(Gabe Mirkin, M.D.)*

IRREGULAR HEART BEAT

Q: *One very hot day last August while I was running, I suddenly felt a strange sensation in the center of my chest. I can only describe it as a bubbling or gurgling feeling. To my shock, I discovered that my heart apparently was skipping a beat, since there was no pulse beat when it happened. I am fearful that I may have done some damage to my heart, although a cardiologist can find nothing wrong with me. (Sid Kreitzberg, Cinnaminson, N.J. 08077)*

A: It so happened that the day your letter reached me I was having the identical symptoms. My normal pulse is 48, and the skip (which is really a quick beat with a delay) cuts my effective pulse abruptly to 24.

For me these episodes are infrequent and occur usually when I push my speed training. I use them as evidence that I am at and about to pass my peak, and I slack off on speed. I have them almost always at rest, although if I start with a fast pace my heart starts to jump all over the place. For this reason I jog my first 6-8 minutes very slowly and don't increase my pace until I start to sweat.

I am not sure of the cause of this. It could be almost anything. Possibly too low potassium or excess of salt. At any rate, it is more alarming than serious, and seems to be handled fairly easily by suitable warmups and backing off the heavy training.

Incidentally, I have a feeling that seven-day-a-week running will eventually end in some failure of adaptation. I would suggest taking one or two days off to split the week and allow your body to recoup.

HARD SURFACES

Q: *There are six of us that run from six to eight miles during our lunch hour. The course is concrete. On weekends, when we have the opportunity, we run 12-18 miles on paved roads. Four of the six runners are experiencing knee problems—i.e., stiffness and sharp pains in the joints. Our questions are: (1) Does concrete running surface cause knee problems? (2) What do you suspect the knee problem is? (3) What can be done about it? (Paul Graf, Houston, Texas)*

A: Given normal feet and arches, the relative hardness of the surface relates directly only to muscle fatigue. The problem of shock has not yet been

worked out, but a short gliding style plus sufficient cushion can handle almost any surface.

Most runners use roads and handle the shock well. However, if you have an arch or foot problem, long distances on concrete will cause the foot to decompensate (flatten or pronate, which is to say run over on the inside). This transmits a torque of 6-7 degrees to the knee. The result is that the kneecap moves to the side instead of sliding up and down in the groove, and the underside of the kneecap rubs on the knob of the thigh bone. This condition is known as "runner's knee" (technically, "chondromalacia").

The treatment is correct foot support. You can start with a store-bought Dr. Scholl's longitudinal arch. But many runners need a full foot-mold. An expert podiatrist clued into sports medicine may be needed to help you. Do not see any doctor who wants to inject the knee but does not offer help where it is needed—your feet.

One other point: The crown of the road can cause difficulty with the foot nearest the center. Running with traffic will throw you over on the inside of the left foot and to the outside of the right one, giving you pain in the left knee. Simply crossing over to run against traffic (or vice versa if your problem is in your right foot) may be sufficient, with the standard drug store arches, to give you relief.

WINTER TRAINING

Q: *How do runners manage to stay in condition during the winter and run a marathon in the spring? My goal is a full marathon, and I reached 22 miles before it was too bad to run outdoors. Now I'm afraid I'll lose everything I've gained. Would there be any risk involved in running a full marathon on a banked track, 33 laps to a mile? (Harry Dykto, Wheeling, W. Va.)*

A: While long training pays off in good marathon performance, an adequate marathon can be run off relatively small mileage. Art Coolidge placed sixth at Boston (in 1971) after devoting his winter to cross-country skiing. He used a mere six weeks to tune up for the marathon.

You can probably run a creditable marathon working out one hour a day, five days a week, with a long run on Sundays. These requirements do not seem excessive whatever the weather condition.

I've heard Canadians put on so much gear they have looked like visitors from another planet when they get on the roads. It doesn't seem likely that your winter weather exceeds that of Guelph, Winnipeg, Fairbanks and other places where people run outdoors regularly.

Forty percent of heat is lost through the head. Attention to that area, with a ski mask, thermal underwear, and a few layers of light gear, followed by a nylon shell will handle almost any weather.

Thirty-three laps to the mile can put a strain on the feet and knees. However, if it does you would be aware of it and could desist. Running a full marathon on a 33-lap track has one other risk. You could go nuts keeping count of the laps. I suggest you get a counter that you can slip on your finger.

After establishing a winter base, a few races at 10-15 miles in the six weeks prior to the big race are a big help to performance.

CLASSIFIED NOTICES

Reach over 12,000 subscribers with your advertisement in Runner's World.
Rates: meet/race notices 15 cents per word; general notices 20 cents/word.
Deadline for March issue was Feb. 5; April deadline is March 5.

EASTERN MASTERS INDOOR CHAMPIONSHIPS, Peddie School, Hightstown, N.J., March 10 (12 noon). Full schedule of sprints and flat races up to two miles, plus mile relay and two-mile relay. Five prizes per event in each age division. Also some sub-masters (30-39) events, and field events. Entry fee $4.00 for first event, $2.00 for each additional one. Contact: Masters Sports Association, 11 Park Place, New York, N.Y. 10007, room 1400. (212) 227-8582.

PACIFIC NORTHWEST AAU 5th ANNUAL BIRCH BAY MARATHON, Blaine, Wash., Saturday, April 14 (noon) Awards to all finishers. Jim Pearson, 521 17th St., Bellingham, Wash. 98225. Phone 734-2311.

ALOHA—2nd ANNUAL HAWAII MASTERS TRACK & FIELD CHAMPIONSHIPS. April 19-21, 1973. 5-year age groups 30 & up. Standard events, including 3- & 6-mile and mini-marathon. Write: Bob Gardner, 4504 Kahala Ave., Apt. A, Honolulu, Hawaii 96816.

NATURAL VITAMIN E at wholesale prices. 100 capsules 400 I.U. $6.00, 1200 capsules 400 I.U. $60. 250 capsules 200 I.U. $7.00. 3000 capsules 200 I.U. $70. Vitality Company, 1122 Spruce St., Berkeley, Calif. 94707. Postpaid.

NATURAL - ORGANIC VITAMIN C from rose hips, 500 mg. 100 tablets, $1.35 postpaid. 30 day money back guarantee. Send check or money order to: Vitamex Products, P.O. Box 1173, New Canaan, Conn. 06840.

BIKE WORLD MAGAZINE. RW's sister magazine on bicycling which covers both racing and touring. Our first year proved a good one and an even better second year is planned. Will you be with us? $3.00 per year (bi-monthly) BW, Box 366, Mountain View, Calif. 94040.

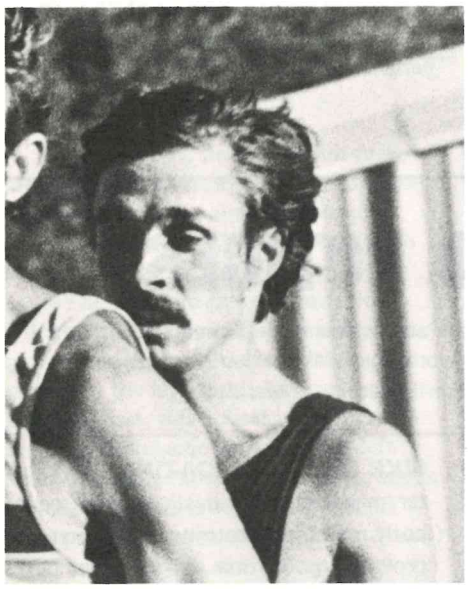
MAKE MONEY selling Tiger shoes and/or books on running. We have a good plan set up, and you can earn $6000 or more per year for your efforts. Write Starting Line Sports, 1142 Chestnut, Menlo Park, Calif. 94025.

THOUGHTS ON THE RUN, by Joe Henderson. One runner distills the thoughts that go through every runner's mind as he logs his miles. As the author says, "Running is easy. Getting out to do it is hard." This book will help you get out and run; similar thinking and experiences of your own will keep you there. 116 pages. $2.95. RW, Box 366, Mountain View, Calif.

FEEL BETTER about the food you eat. New book, "A Consumer's Dictionary of Food Additives," describes thousands of common food additives in simple, everyday terms. Written by Ruth Winter, prizewinning health columnist. Only $3.95 postpaid. Country House Books, P.O. Box 191-R2, Cliffwood, N.J. 07721.

TIGER SPORT SHOES, the largest supply of Tigers in the Midwest. Call or write: Tiger Sport Shoes, Phil Nabil, 1645 Franklin Ave., Kent, Ohio 44240. (216) 673-3431.

PROFILES



RICK WOHLHUTER

He had been badgered by injuries through most of his career. Rick Wohlhuter was always just this far from greatness when he ran at Notre Dame, then he'd get hurt.

"I had trouble with the achilles tendon in my left foot every year," he said, "and that forced me to take time off and miss some of every season. This past year I was fortunate enough not to have any troubles with the injury. Hence I was in better condition. With the increased competition of an Olympic year, I was able to reach closer to my potential."

That meant surprising almost everyone (including fourth-place Jim Ryun) at the Eugene Trials. Rick made the Olympic team in the 800 with 1:45.0—one of the fastest times every run.

But troubles revisited him at Munich. Halfway through the first lap of the first round, he tripped and fell.

He said, though, "I have continued training after the Olympic Games and plan to keep going through the upcoming season, beginning indoors."

Richard C. Wohlhuter: Chicago, Ill. (University of Chicago Track Club). 25 years old (born Dec. 23, 1948, at Geneva, Ill.). 5'9", 130 pounds. Single. Occupation: insurance. Began racing in 1963 at age 14. Coached by Ted Haydon.

Racing: 800 meters—1:45.0 (1972); 1500m—3:47.5 (72).

Training: once a day (twice a day, 3 times a week in early spring), 7 days a week, 10 months a year; 45-50 miles a week. "I feel that I get the most out of repeat work. That is, I like to run 20 x 220 with a 220 jog between. Around 29.0-29.5 is the pace I try to hold. I prefer this type of workout. At times I vary the distance and rest, but never go over a 440 for either. I'll never do this (short intervals) more than twice a week.

"One other day during the week I'll do a distance workout, usually halves, or varying the distance over three-quarters, halves and quarters. Getting in a day or two of road work generally finishes out the week.

"I never try to run all-out speed work—more around (race) pace or just a little faster. I also feel the most important thing is to get out and run every day, to run day in and day out."

BRENDA WEBB

Women's standard distance racing stops at 2½ miles, which is something of a shame because that's also about where Brenda Webb's best racing begins. There must be others like her, although no other has run as fast as she has at certain "non-standard" distances.

First off, it should be established that the little Ohio girl gives away little ground on the track and in cross-country. She runs around 4:30 for 1500 meters, and well under 5:00 for the mile. She won the national AAU junior cross-country championship in November.

But at 10 miles and one hour, she holds what would be a world record if there were official women's records in these events. Last winter she went 9 miles 1625 yards in an hour and finished 10 miles 30 seconds later.

Brenda G. Webb: Kettering, Ohio (Kettering Striders). 18 years old (born May 30, 1954, in Tennessee). 5'1½", 95 pounds. Began racing in 1970 at age 15. Coached by Steve Price.

Training: usually once a day (twice a day twice each week), 5 days a week, 11 months a year; about 50 miles a week. "Average week includes: Sunday—race. Monday—rest. TuesdayAM—3 miles; PM—10 x 100 buildups, 20 x 220. Wednesday AM—3 miles; PM—2 hours straight running. Thursday—6 x 220, 75-minute run, 6 x 220. Friday—10 x 150, 4 x 1320, 10 x 150. Saturday—45-minute jog. In addition I do these daily exercises: 50 pushups, pull-ups, chin-ups. I do quarter-squats with 90-pounds weights once a week."

FRANK PFLAGING

Frank Pflaging's name surfaced briefly in national track news about four years ago. He broke nine minutes for two miles, ran his fastest six-mile and his fastest marathon at age 36. A few years before that, he had been a national road racing champion.

After the 1969 fling, Frank maintained a low profile as the years accumulated, competing mostly in local races.

Then he turned 40 and entered the national AAU Masters cross-country championships. He made no special training push for it. "Most of the submasters races I ran previously were rather dull," he said, "so I couldn't get excited about the race—until I got there. I was very impressed by the field and the stature the race is achieving. I believe masters competition could really grow into something great."

The fact that Pflaging won, after a highly competitive race with Hal Higdon, helped establish the favorable impression. "I'll try to make some more of the big ones," Frank said.

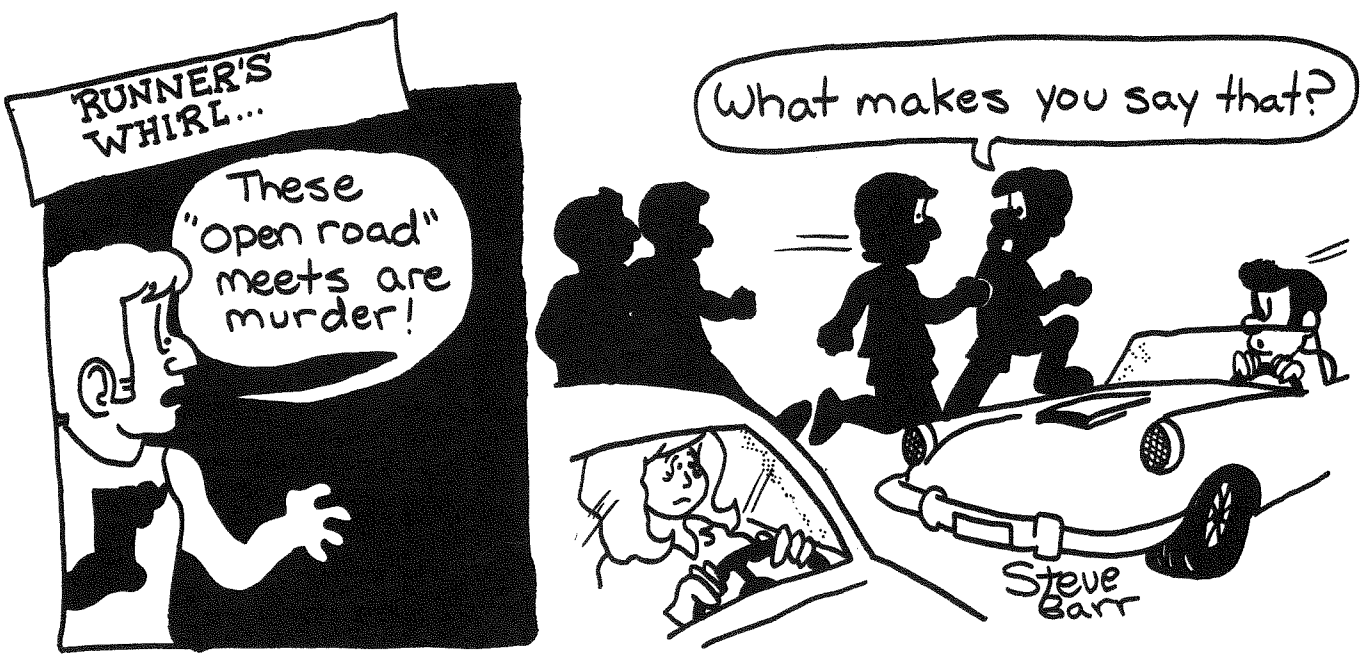
Frank Pflaging: Reisterstown, Md. (Baltimore Olympic Club). 40 years old (born Oct. 26, 1932, at Baltimore). 5'11", 135 pounds. Married, 2 children. Occupation: teacher. Began racing in 1947 at age 14. Self-coached.

Racing: 880—1:58 (1965); mile—4:17 (65); 2 miles—8:54 (65); 3 miles—13:49 (65); 6 miles—29:13 (69); hour—11 miles 877 yards (64); marathon—2:30:43 (69).

Training: once a day, 7 days a week, 12 months a year; 60-70 miles a week. "I do quality workouts usually three times a week, or four every 10 days. These consist of a long run (usually 20 miles at 6:00-7:15 pace), one or two 880 interval workouts (6-10 repeats at a predetermined pace, when in good shape 2:25-2:30) and one day per week 'tempo' (3-4 x 440 in 63 seconds, or 3 x 880 in 2:10-2:15, or 2 x mile in 4:35-4:45). My progress relies pretty much on my 880 intervals. I believe they are the key to my success in recent years.

"The method by which I progress in my 880 intervals is unique as far as I know. I have used it for the last several years with myself and the high school runners I coach. The main idea is to increase the number of reps to 10 and then cut the time (3-5 seconds) with a corresponding decrease in reps (usually to six). Then my progress is repeated.

"There are many other factors in my training, and these have evolved from 25 years of competitive running and 12 years of coaching. It would take at least a full-length book to adequately describe my philosophy."



RUNNING SHORTS

• Kiou Jalayer wonders how much cooperation he's going to get in July when he organizes the first Sahara Tahoe marathon at Stateline, Nev.

Jayaler is from Ireland and works as a bellhop at the Sahara Tahoe Hotel. He arranged with the gambling spa to put up money for the race next summer. Kiou agreed to do the legwork.

He started in December by running the planned course. It was fine until he entered South Lake Tahoe at dusk on a cold, snowy afternoon. A short distance from the hotel, Kiou ran a red light. All runners run red lights.

The police pulled him over and asked for his identification. Of course Jalayer didn't have any.

"Just let me run my last mile down to the Sahara Tahoe," the runner pleaded. "I'll have someone identify me there." The officer then proceeded to spread-eagle Kiou on the police car and frisk him, before handcuffing him and hauling him to the station.

Jalayer asked for the customary one phone call. "This ain't a public phone, buddy," he was told. Finally, after holding him for two hours, the police released the suspect. It was night now. "Can one of you give me a ride home?" Jalayer asked. "We aren't running a taxi service," an officer said. "Get on your way." And he sent Kiou on a five-mile run through the night.

Rather than pay the small fine for running the red light, Jalayer pleaded not guilty and asked for a jury trial. The trial was set for late January.

Meanwhile, Kiou's troubles didn't end. He traveled to Houston for a marathon in late December. En route, he smashed up his new car. Early in the race, he slipped on a wet spot in the road and fell heavily on his leg. He finished, an hour slower than normal, and was hospitalized afterwards.

• Emiel Puttemans, the Belgian who holds world records at 3000 and 5000 meters as well as three miles, candidly admits he's a better time runner than racer.

Jerome McFadden reports Puttemans as saying, "I'm more at ease in a record attempt than I am in a championship final, like the European championships or the Olympics. I'm enormously uptight in a race where I have to aim for a place."

Always a light trainer, Puttemans has cut down even more since September. "Actually, I'm running about 15 kilometers per day," he says, "after having stopped completely this fall after my record attempts. Fifteen kilometers (9.3 miles) may look insufficient these days, especially when someone like Dave Bedford is broadcasting that he runs 30 or 40 per day, but I don't think you can do that for very long. A little before the Games, I ran for three weeks at an average of 30 kilometers per day. But I couldn't have done it for a long time."

Puttemans is a bit suspicious of high-mileage claims: "I'm convinced that the people like David Bedford are trying to influence their opponents, to lead them into an error. My secret, they are saying, is mileage. But are they really running as long as they say?"

• Low mileage has worked well for one American marathoner. Pete Span averaged only about 50 miles a week in the six months between the Olympic Trial race and the Fiesta Bowl marathon in December. Until November, he hadn't taken any run over 10 miles. "I was worried that I might not last the distance," he says, "so I put in four 14 milers." He ran from Cave Creek to Scottsdale, Ariz., in 2:20:27—his best by three minutes.

• Marty Liquori, now living in Florida, is almost recovered from the injury that kept him out of Olympic year racing. He says, "The heel is definitely still a question mark, but I'm optimistic. I've been running outdoors for a couple of months, and it's time for a test in competition. It still hurts after a hard run for a day or so. When I started training in Florida, I could run only a quarter-mile. Now I'm doing 100 miles a week, which was my routine before the injury." He planned to run the two-mile in his first indoor meet. "I think I'll be pretty close to 100%," he says.

• Tom Childers, a Marine captain, never ran in high school or college, only beginning after returning from Vietnam with shrapnel in his legs. In December, Childers ran 10 miles on the track in 49:47.8—becoming one of the few Americans ever to break 50 minutes for the distance.

• Jim O'Neil of Sacramento, Calif., recently claimed a "world record." He played 18 holes of golf in 47:17, shooting a 99. No sooner was the word out than Bob Fries, 42-year-old track coach at Fresno City College, broke it. He ran the course in 38:12, stopping long enough to shoot an 81. If you must play golf, that's the way to do it.

• Eight runners relayed from Los Angeles to Las Vegas—300 miles—in 41 hours 40 minutes not long ago. The unusual feature here is that all the men are over 60 years of age. One, Noel Johnson, is 73. This was the third such run put together by Bill Selvin, who ran. Despite icy winds that reduced them to 10-minute legs over the El Cajon Pass, the team broke the record by 24 minutes. Runners, ages and total running times were: John Montoya (60) 5:35; Norman Bright (62) 5:25; Walt Frederick (66) 5:25; Walt Stack (65) 5:25; Monty Montgomery (66) 5:25; Al Clark (60) 5:05; Selvin (62) 4:40; Johnson (73) 4:40. Next year Selvin wants to challenge similar teams from "Red China or Russia." Seriously.

• Women will be running the 400-meter hurdles in 1973. The AAU voted to include the race as a championship distance, using 10 30-inch hurdles spaced as they are in the men's intermediates. Standard cross-country distances were revised as follows: 9-under age group—one mile (same as before); 10-11—1½ miles (was 1¼); 12-13—2 miles (was 1½); 14-15—2½ miles (was 2); open—3 miles (was 2½). Provisions were made to add "masters" competition for women, starting at age 30.

• Runners can earn Presidential Sports Awards—certificates, emblems, pins—from the President's Council on Physical Fitness and Sports. The Council's award standard is 125 miles, but "no more than 2½ miles in any one day may be credited to total." The daily mileage limit is to encourage a moderate, long-range program. Score sheets and information is available by writing: Presidential Sports Award, P.O. Box 129, Radio City Station, New York, N.Y. 10019.

TRAIL'S END MARATHON

RUSSELL PATE (Ore.)
Winner 1972

Fourth Annual

SEASIDE, OREGON

"Where the RUNNER is King"

FEBRUARY 24, 1973 (11:30 a.m.)

ELAINE PEDERSEN (Cal.)
Women's Winner 1972

The one-loop course of 26 miles 385 yards was revised and AAU-certified this year. The course is well marked and monitored. All of the running surface is on either black top or concrete. The route encompasses the coastal communities of Seaside, Gearhart, Surf Pines and Sunset Beach. The topography is mostly flat with an occasional undulating hill. The cool sea air and the scenic beauty of this area have proved to be ideal for marathons.

SPONSORED BY SEASIDE CHAMBER OF COMMERCE

AWARDS: Trophies, medallions, color-coded official Trail's End Club Cards by time, T-shirts, post-run meal, merchandise.

DIVISIONS:
1. General Over-all-Winner, top three, top twenty, all finishers T-shirts and official time Club cards.
2. Age: Youngest, high school, college, 30-39, 40-49, 50-59, 60 & Over, Oldest.
3. Special: Man & Wife competition, Father & Son, Top 10 Women, Man & Woman living the longest distance from Seaside.
4. Other competition: Women's; World Marathon Assoc.; Oregon AAU; Dist. 2 NAIA Champ., scoring carries over into the Spring Track Championships.

SPECIAL FEATURE: Club Competition - Minimum of three ot a team (Teams should be composed of 4 men to a team). The first three runners to count. 9 medallions.

Sound videotape replay of highlights.

REGULATIONS

1. AAU membership; 2. ALL contestants must have trained in advance for the run; 3. Open to men and women of amateur standing only; 4. Comply with entry deadline; 5. Advance $3.00 entry fee to Seaside Chamber of Commerce, P.O. Box 7, Seaside, Oregon 97138. Entry forms, Maps, housing guides and any other information regarding Trail's End are available at the above address, or phone (503) 738-6391.

ENTRIES WILL NOT BE ACCEPTED AFTER MIDNIGHT, SATURDAY, FEBRUARY 17, 1973

MARCH COMING EVENTS

These are the major races for the month of March. Starting points, entry restrictions and contacts are noted when known. Write ahead for information before traveling to races, because details often change without notice.

Contacts for smaller local races were listed in the January issue, page 46. Please send schedules well in advance to RW, Box 366, Mountain View, Calif. 94040.

NORTHEAST

3-4 IC4A indoor, Princeton, N.J. (Jadwin Gym; college)

4 Connecticut AAU marathon, Middletown, Conn. (noon; open; Bernie O'Rourke, Director of Recreation, Municipal Building, Middletown, Conn. 06457)

10 Eastern Masters indoor, Hightstown, N. J. (Peddie School; 40-up; Masters Sports Assn., 11 Park Place, New York, N.Y. 10007)

18 Earth Day marathon, Westbury, N.Y. (Roosevelt Raceway, noon; open; Paul Fetscher, 183 Maxine Ct., West Hempstead, N.Y. 11552)

18 Boston Qualifier marathon, Ithaca, N.Y. (Barton Hall, 1 p.m.; open; James Hartshorne, 108 Kay St., Ithaca, N.Y. 14850)

25 Eastern Regional AAU 25-kilometer, New Jersey (city indefinite; open)

31 JFK 50-mile hike-run, Boonsboro, Md. (open; Buzz Sawyer, 149 N. Potomac, Hagerstown, Md. 21740)

SOUTHEAST

3 Florida marathon, Ft. Myers, Fla. (open; Lou Cappi, P.O. Box 6488, Ft. Myers, Fla. 33902)

16 US-USSR indoor, Richmond, Va. (international dual, men & women)

24 Louisiana State Invitational track, Baton Rouge, La. (invitational and college)

31 Florida Relays (invitational and college) and Florida Relays marathon (open; University of Florida, Gainesville; Jimmy Carnes, Track Coach, University of Florida, Gainesville, Fla. 32601)

MIDWEST

3 Missouri Valley AAU 30-kilometer, Columbia, Mo. (Cosmo Park, 2 p.m.; open; Joe Duncan, 4004 DeFoe Dr., Columbia, Mo. 65201)

4 Athens marathon, Athens, Ohio (noon; open; Ellsworth Holden, 26 Northwood Dr., Athens, Ohio 45701)

4 Olympiad Memorial marathon, St. Louis, Mo. (open; Bob Salisbury, 1528 Locust, St. Louis, Mo. 63103)

9-10 NCAA indoor championships, Detroit, Mich.; Cobo Arena; college-invitational)

10 Windy marathon, Indianapolis, Ind. (Eagle Creek Park, noon; open; Carl Carey, 406 Murphy Lane, Brownsburg, Ind. 46112)

10 USTFF Midwestern marathon, Detroit, Mich. (Belle Isle; open; Dixon Farmer, Track Coach, University of Michigan, Ann Arbor, Mich. 48104)

17 Missouri Valley AAU 20-kilometer, Manhattan, Kans. (open; Arne Richards, 1430 Fairchild, Manhattan, Kans. 66502)

SOUTHWEST

3 Border Olympics track, Laredo, Tex. (college-invitational)

3 White Rock marathon, Dallas, Tex. (White Rock Lake, noon; open; Talmage Morrison, P.O. Box 34464, Dallas, Tex. 75234)

23 Professional indoor, Albuquerque, N.M. (invitational)

24 Oil Capital marathon, Tulsa, Okla. (Mohawk Park, 9 a.m.; open; Larry Aduddell, 1849 N. Louisville, Tulsa, Okla. 74115)

ROCKIES

3 USTFF Intermountain indoor, Pocatello, Idaho (Idaho State U.; invitational; Bob Beeten, Track Coach, Idaho State U., Pocatello, Idaho 83201)

WEST

3 City of Los Angeles marathon, Los Angeles, Calif. (Elysian Park, 8 a.m.; open; L.A. City Parks and Recreation Dept., 3401 Riverside Dr., Los Angeles, Calif. 90027)

24 Professional indoor, Los Angeles, Calif. (invitational)

24 Mountain marathon, Tacoma, Wash. (11 a.m.; open; Carl Glatze, P.O. Box 804, Steilacoom, Wash. 98388)

24 Santa Barbara Relays, Santa Barbara, Calif. (college-invitational)

24 San Martin marathon, San Martin, Calif. (8 a.m.; open; William Flodberg, 12925 Foothill Ave., San Martin, Calif.)

31 Claremont Relays, Claremont, Calif. (college-invitational)

INTERNATIONAL

10-11 European indoor championships, Rotterdam, Holland

17 International cross-country championships, Waregem, Belgium

RACE WALKING

3 AAU Junior one-hour, Reno, Nev. (University of Nevada)

31 AAU 10-kilometer championship, Reno, Nev.

1973 MARATHONS

A deluge of 1973 marathon information arrived just days after the new Marathon Handbook went to press. These are additions and corrections to the schedule published there.

Alberta (Calgary, Alberta, Canada)—15 April.

Cupertino (Calif.)—14 April; contact Daniel O'Keefe, 20203 Camarda Ct., Cupertino, Calif. 95014.

Earth Day (Westbury, N.Y., not Central Park in New York City) —18 March; contact Paul Fetscher, 183 Maxine Ct., West Hempstead, N.Y. 11552.

Florida (Ft. Myers, Fla.)—3 March; contact Lou Cappi, Box 6488, Ft. Myers, Fla. 33902.

Golden Gate (San Francisco, Calif.)—26 May; contact Richard Perry, 3909 Peppertree Ct., Redwood City, Calif. 94061.

Grand Valley (Grand Rapids, Mich.)—10 Nov. (tentative date).

Guanella Pass (Colo.)—4 Aug.; contact Bill Shafer, Box 112, Idaho Springs, Colo. 80452.

Mardi Gras (New Orleans, La.)—24 Feb. (not 27 Jan.); contact Dreaux Summers, 549 Brookmeade Dr., Gretna, La. 70053.

Mel Vos Memorial (Topeka, Kans.)—1 Dec.; contact Karlton Naylor, 120 N.W. 35th St., Topeka, Kans. 66617.

Mile-High (Denver, Colo.)—27 May; contact Alan Cunniff, 424 S. Clarkson, Denver, Colo. 80209.

Northwest Seniors (Gresham, Ore.)—22 July (tentative date).

Nova Scotia (Shelburne, Nova Scotia, Canada)—12 Sept.; contact Ron Jefferson, Box 400, Shelburne, N.S., Canada.

Ocean-Bay (Belmont, Calif.)—4 Aug.; contact Richard Perry, 3909 Peppertree Ct., Redwood City, Calif. 94061.

Pacific AAU (Petaluma, Calif.)—9 Dec.; contact Richard Perry, 3909 Peppertree Ct., Redwood City, Calif. 94061.

Pioneer (Salt Lake City, Utah)—24 July.

Puerto Rican-Hispanic (New York, N.Y.) —12 or 19 Aug.

Redwood Empire (Arcata, Calif.)—7 July (not 4 Aug.).

Sahara Tahoe (Stateline, Nev.)—switched from 11 July to 15 July.

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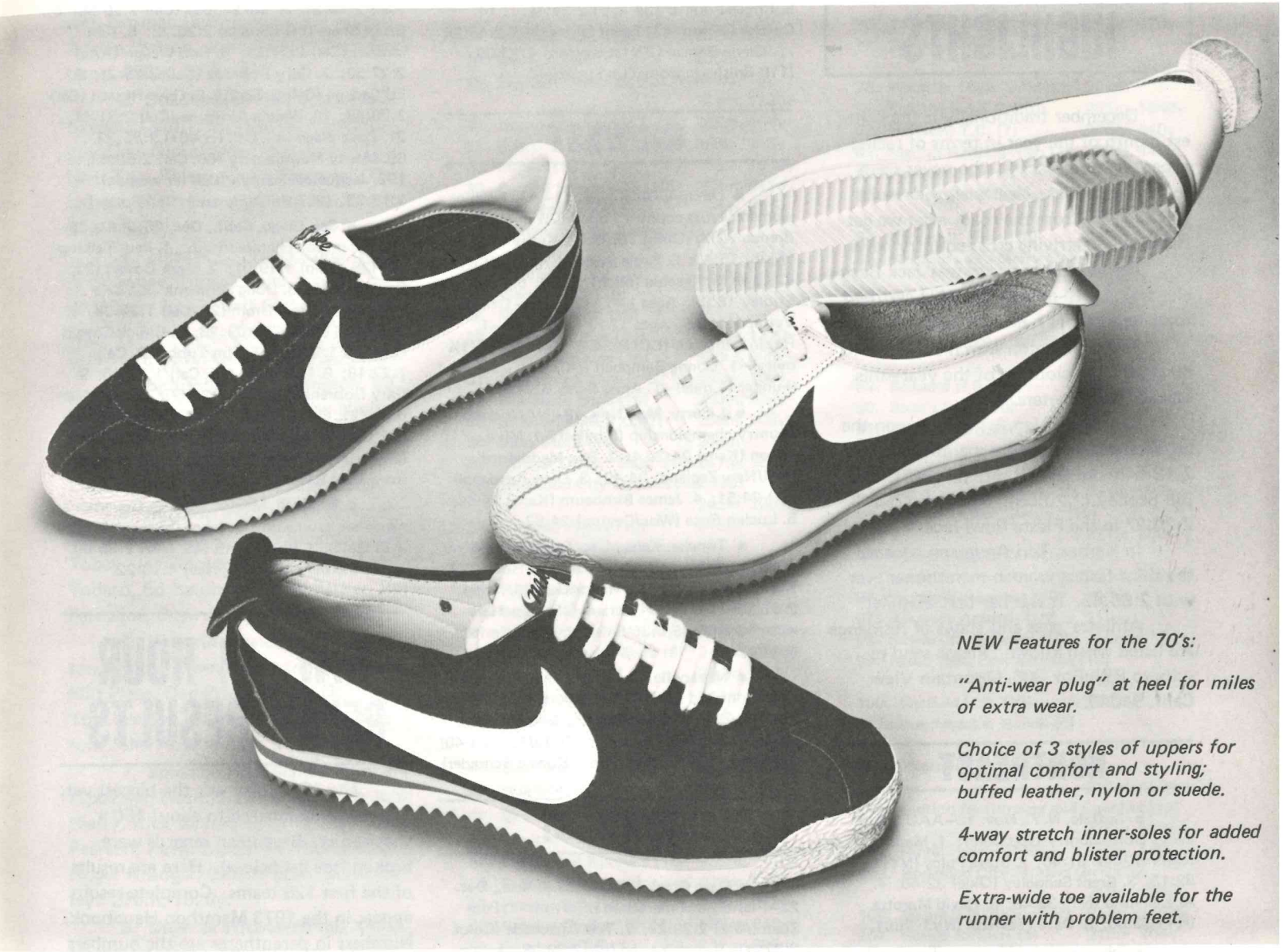

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RACING HIGHLIGHTS

December traditionally is the lightest month of the year in terms of racing—except for road racers, who never seem to take vacations. Nearly all the results this issue are from the roads after we get past the late-arriving cross-country news.

Perhaps the top race was Jack Bacheler's 47:16 10-mile on an AAU certified road course.

Paul Talkington won his third AAU distance championship of the year—this one at 25 kilometers.

Canadian Brian Armstrong won the big Western Hemisphere marathon in 2:18:54 from Dave White (2:19:31) and Bill Scobey (2:20:55). Pete Span ran 2:20:27 in the Fiesta Bowl race.

In Kansas, Teri Anderson became the third fastest woman marathoner ever with 2:55:45. It was her first 26-miler.

Athletes' ages and states of residence are listed when known. Please send results to RW, Box 366, Mountain View, Calif. 94040.

NORTHEAST

• **Buffalo, N.Y., Nov. 12**—AAU Junior men's cross-country (10,000m): 1. Mark Kushner (Cal) 31:40; 2. Steve Pulos (NY) 32:13; 3. Brent Schooley (Okla) 32:46; 4. Al Kalameja (NY) 32:48; 5. David Marotta (NY) 33:00; 6. Dave Pederson (NY) 33:01.

• **Silver Spring, Md., Dec. 10**—10-mile track run: 1. Tom Childers 49:47.8; 2. Jack Fultz 49:52. (69 finished; from Bob Thurston).

• **New York, N.Y., Dec. 17**—12-mile road run: 1. Tom Fleming (21, NJ) 1:00:54.4; 2. Glenn Appell (23) 1:04:42. (71 finished; from Joe Kleinerman).

SOUTHEAST

• **Ahoskie, N.C., Dec. 2**—10-mile road run (distance AAU certified): 1. Jack Bacheler 47:16; 2. Jeff Galloway 48:49; 3. Dennis Delmott 50:15; 4. Ed Hereford 50:27. (43 finished; from Jim Lee).

• **Melbourne, Fla., Dec. 29**—Melbourne marathon road run: 1. Clayton Craig (17) 2:28:22; 2. Ken Misner 2:31:26. . . 14. Mark Waterbury (13) 3:04:01. (64 finished; 50 degrees).

• **Atlanta, Ga., Dec. 30**—Peach Bowl marathon road run: 1. Don Kennedy (25, Ga) 2:32:29; 2. Norm Patenaude (27, Ont/Canada) 2:33:01; 3. Lee Fidler (23, SC) 2:35:45; 4. Dennis Spencer (20, Ga) 2:36:54; 5. Roger Rouiller (34, WV) 2:37:16. . . 14. Charles Gibson (49, Tenn/1st over-40) 2:48:29 . . . Gayle Barron (27/1st woman) 4:13:00. (110 finished; from Tim Singleton).

MIDWEST

• **Dayton, Ohio, Nov. 11**—AAU Junior women's cross-country: open (2½ miles)—1. Brenda Webb (Ohio) 15:25; 2. Kathy Kuyk (Wash) 15:43; 3. Paula Strack (Ohio) 15:55; 4. Karen McKeachie (Mich) 16:03; 5. Carol Fridley 16:09. Ages 14-17 (2 miles)—Debbie Vetter 12:06.6. Ages 12-13 (1½ miles)—1. Robin Campbell (DC) 8:34.2. Ages 10-11 (1¼ miles)—1. Donna Campbell (DC) 7:31. Ages 9-under (1 mile)—1. Anne Berry 6:14.8.

• **Liberty, Mo., Nov. 18**—NAIA cross-country championship (5 miles): 1. Mike Nixon (Kans) 24:29.4; 2. Rex Maddaford (NM/New Zealand) 24:42; 3. Dave Antognoli (Pa) 24:51; 4. James Birnbaum (Kans) 24:56; 5. Lucian Rosa (Wisc/Ceylon) 24:57.

• **Topeka, Kans., Dec. 2**—Mel Vos Memorial marathon road run: 1. Jerome Howe (22, Kans) 2:34:18; 2. Tim Hendricks (26, Nebr) 2:37:25. . . 8. Teri Anderson (19, Kans/1st woman) 2:55:45. (35 finished; from Karlton Naylor).

• **Naperville, Ill., Dec. 2**—North Central marathon road run: 1. Ken Young (31, Ill) 2:32:04.2; 2. Lucian Rosa (28, Wisc/Ceylon) 2:33:24; 3. Steve Goldberg (40, Ill/1st over-40) 2:34:21. (120 finished; from Robert Schrader).

SOUTHWEST

• **Cave Creek to Scottsdale, Ariz., Dec. 22**—Fiesta Bowl marathon road run: 1. Pete Span (Ariz) 2:20:27; 2. Ted Castenada (Colo) 2:27:30; 3. Ken Young (Ill) 2:29:28; 4. Leonard Suarez (Ariz) 2:33:07; 5. Ed Horn (Colo) 2:35:05. (81 finished; Steve Stephenson).

• **Houston, Tex., Dec. 30**—Houston marathon road run: 1. Danny Green (24, Tex) 2:32:33; 2. Clyde Villemez (26, Tex) 2:33:53; 3. Wayne Comer (31) 2:38:23; 4. John Lodwick (18, Tex) 2:38:44; 5. Jeff Wells (18, Tex) 2:38:44. . . 8. Joe Burns (43, NJ/1st over-40) 2:46:47. (73 finished; from Neal Picken).

WEST

• **Portland, Ore., Nov. 25**—Island marathon road run: 1. Jim Pearson (28, Wash) 2:25:41; 2. George Oja (29, Ore) 2:27:07; 3. Gary Bryan (36, Wash) 2:28:57; 4. Jack Taunton (25, BC) 2:30:03; 5. Wayne Ristau (24, Ore) 2:32:39. . . 8. Gordon Braun (17, Wash/1st junior) 2:34:58. . . 23. Field Ryan (40, Wash—1st over-40) 2:48:07. . . 99. Susan Rossiter (26)/1st woman) 3:27:53. (173 finished; from Ken Weidkamp).

• **Culver City, Calif., Dec. 3**—Western Hemisphere marathon road run: 1. Brian Armstrong (Ont/Canada) 2:18:54; 2. Dave White (Cal) 2:19:31; 3. Bill Scobey (Cal) 2:20:55; 4. Bruce Shaw (BC/Canada) 2:25:28; 5. Ken Moffitt (Cal) 2:27:31; 6. Rob Waugh (Ariz) 2:27:50; 7. Gary Dobrenz (Cal) 2:28:21; 8. Ed Cadena (Cal) 2:29:20; 9. Dave Russell (Cal) 2:29:48; 10. Wayne Akiyama (Cal) 2:31:44. . . 21. Dave Waco (40, Cal/1st 40+) 2:35:32. . . 89. Monty Montgomery (66, Cal) 2:56:48. . . 192. Jacqueline Hansen (Cal/1st woman) 3:15:53. (287 finished; from Carl Porter).

• **San Diego, Calif., Dec. 16**—AAU 25-kilometer road championship: 1. Paul Talkington (26, Ohio) 1:19:01; 2. Mark Covert (22, Cal) 1:19:53; 3. Doug Schmenk (22, Cal) 1:20:19; 4. Don Timm (23, Cal) 1:21:08; 5. Bob Price (26, Cal) 1:21:23; 6. Chuck Smead (21, Cal) 1:21:30; 7. Tim Tubb (22, Cal) 1:22:18; 8. Phil Ryan (28, Cal) 1:22:46; 9. Gary Dobrenz (26, Cal) 1:22:50; 10. Ben Martinez (21, Cal) 1:23:40. . . 37. Owen Gorman (43, Cal/1st 40+) 1:31:30. . . 68. Betty Wake (35, Cal/1st woman) 1:43:41. (129 finished; from Tom Bache).

• **Mexicali, Mexico, Jan. 1**—Governor's marathon road run: 1. Nabor Gomez (Mexico) 2:31:25. . . 3. Ross Smith (45, Nev) 2:35:00. . . . Catherine Smith (39, Nev) 4:16:22.

R.W. 24-HOUR RELAY RESULTS

The 1972 relay was the biggest yet: 255 teams, compared to about 180 a year earlier. Seventeen records were broken (see list below). Here are results of the first 128 teams. Complete results appear in the 1973 Marathon Handbook. Numbers in parentheses are the numbers of runners on the team. Teams are limited to 10 runners, each of whom runs a mile on the track before handing off to the next man.

1972 RELAY RECORDS

Club (Sale Harriers, Eng.)	**293m, 378y**
Am. Club (Tulsa R.C.)	**275m, 959y**
Indoor (Williams RR)	**201m, 880y**
High School (Dos Pueblos HS)	**276m, 769y**
Girls' H.S. (So. Eugene)	**155m**
Jr. High (Bedford JH)	**232m, 330y**
Women (Kettering Striders)	**223m, 80y**
9-man (Kettering Striders)	**272m, 1060y**
8-woman (Baker Girls)	**110m, 440y**
7-man (Springbank RR)	**245m, 1460y**
6-man (76ers)	**236m, 1220y**
5-man (Troy State AC)	**227m, 720y**
4-man (Goleta Striders)	**213m, 904y**
3-man (Fresno Pac. Frosh)	**190m**
3-woman (Pacetrotters)	**115m**
2-man (Bowling Green)	**181m, 632y**
Police teams (LAPD)	**236m, 1630y**

1. Sale Harriers (Crossford Bridge, England); Dave Farmer, Kelvin Breeze, Steve Edmunds, Mike Delaney, Dai Davies, Norman Carrington, Dave Fossati, Adrian Watson, John Davies, Doug Cockburn. **293m, 378y.**

2. Dos Pueblos H.S. Track Club (Goleta, Calif.); Gil Rocha, Tom Phillips, Dale Nickel, Joe Szepwo, Joe Lambert, Tom Kelsey, Craig Bjorkman, Carl Udesen, Mark Pruner, Doug Hopwood. **276m, 769y.**

3. Tulsa R.C. (Tulsa, Okla.); Henry Shawnee, Terry Ziegler, Larry Aduddell, Terry Lewis, Jeff Fetterman, Phil Maltby, Bill Ward, Bill Welch, Doug Crawford, David Sanders. **275m, 959y.**

4. Bethesda T.C. (Arlington, Va.); Dan Decks, Gordon Oliver, Stu Nibley, Jim McClurkin, Brett Dunkelman, Tom Giroux, Kent Staver, Peter Slevin, Mike Lieder, Jim Fitzgerald. **275m, 330y.**

5. Missouri Madmen (Florissant, Mo.); Ken Thoele, Steve Szachta, Dave Tobey, Joe Werner, Mike Busch, Don Todard, Ed Heidbrier, Steve Parker, Bill Parmalee, Dave James. **274m, 1452y.**

6. Kettering Striders "A" (Trenton, Ohio); Dennis Bayham, Bob Reef, Milt Place, Dan Price, Wayne Doehlman, Tom Preston, Bill Schnier, Duane Gaston, John Hoff. **272m, 1060y.**

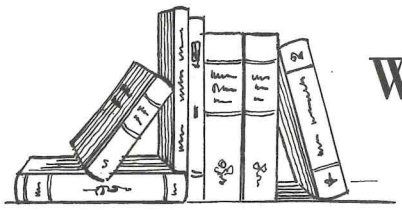
7. Spokane High School Runners (Spokane, Wash.); Larry Thibault, John Bierly, Rick Whitaker, Ken Henry, Dave Pearson, Kevin Blackwell, Rick Barbero, Roger Risinger, Cliff English, Steve Daley. **270m, 1628y.**

8. Univ. of Witwatersrand X-C & Marathon Club (Johannesburg, South Africa); Weston Dickson, Andrew Hauptfleisch, Trevor Darry, Robert Gardiner, Lesley Adler, Jeremy Boulle, Charles Coville, Peter Gordon, David Hodgkiss, Paul Lewin. **270m, 488y.**

9. Maine AAU All-Stars (Portland, Maine); Brian Gillespie, Ken Flanders, Jerry Crommett, Dav McDonald, Al Mc Cann, Joe Dahl, Danny Paul, Steve Jaymes, Mark Beede, Ralph Thomas. **269m, 1579y.**

10 **10. Redwood City Striders Open (San Jose, Calif.)**; Jose Cortez, Bryan Geiser, Mitch Kingery, Stacy Geiken, John Barbour, Arnie Nelson, Doug Peck, Tim Wright, Matthew Logan, Frank Cortez. **268m, 630y.**

11. Ontario Place AC (9) 267m, 1644y
12. NATO (10) 265m, 861y
13. "Never again!" (10) 263m, 1630y
14. Ten Harding Runners (10) 261m, 1662y
15. Bali Hai Striders (10) 260m, 930y
16. Cedar Valley Foot Pounders (9) 259m, 1170y
17. Alameda T.C. (10) 259m, 790y
18. Minn. All-Stars (10) 259m
19. Sheldon-Churchill H.S. Runners (10) 258m, 1130y
20. Koons Kardiac (10) 258m, 464y
21. P.H.U.N. H.S. (9) 258m, 155y
22. Sunset (10) 255m, 1019y
23. Patrick Henry H.S. (10) 254m, 611y
24. Loy Norrix X-C (10) 254m, 501y
25. Roseburg, Ore. Runners (8) 252m, 1214y
26. Malone College (10) 251m, 1233y
27. Warren R.C. (10) 251m, 516y
28. Mohegan T.C. (10) 251m
29. East L.A. Club (10) 250m, 1320y
30. Kennedy Studs (10) 250m, 500y
31. Kettering Striders "B" (9) 250m, 402y
32. Northside High (10) 250m, 330y
33. Silverhillsville T.C. (?) 250m, 109y
34. Mort Studs (10) 248m
35. CCC of Dallas "Red" (10) 247m, 398y
36. Redwood City Striders H.S. (10) 246m, 295y
37. Virginia Flyers (10) 246m
38. Springbank Road Runners (7) 245m, 1460y
39. Royal H.S. (9) 245m
40. South Eugene "A" (10) 244m, 1650y
41. Proviso Cinder "A" (8) 244m, 1130y
42. Bertha Butt All-Stars (9) 243m, 1443y
43. Used Tigers (10) 243m, 962y
44. Delaware All-Stars (10) 243m, 880y
45. Kettering Striders Masters (10) 241m, 1593y
46. Brentwood T.C. (10) 241m, 1280y
47. Oak Hill High (10) 241m, 76y
48. Skyline Loafers (9) 240m, 830y
49. Lincoln H.S. (10) 240m, 387y
50. Oil Capital Runners (10) 239m, 1116y
51. Sylvania 9-man (9) 238m, 1602y
52. Pamakids A (10) 238m, 690y
53. Proviso Cinder "B" (8) 238m, 640y
54. Southside T.C. "A" (10) 237m, 205y
55. Whitehall H.S. (10) 236m, 1368y
56. 76ers (6) 236m, 1220y
57. Run Bums (10) 236m, 640y
58. Fairmont East H.S. X-C (7) 235m, 1558y
59. Mont Pleasant Scavengers (10) 234m, 1070y
60. Lifers (10) 233m, 1608y
61. The Collection (10) 233m, 1392y
62. Camden H.S. "Zoo" (6) 233m, 1320y
63. Waterloo Family "Y" (10) 232m, 1018y
64. Wakehurst Joggers (10) 232m, 660y
65. Folson Damrats (8) 232m, 440y
66. Bedford Jr. High (10) 232m, 330y
67. Salesianum H.S. Sentinels (9) 232m
68. Hannibal H.S. Harriers (10) 231m, 630y
69. Hoisies Boys (10) 231m, 363y
70. El Dorado H.S. (10) 230m, 1502y
71. Charleston H.S. (10) 230m
72. Bay Area Roadrunners (9) 230m
73. Galion Putuchees (10) 229m
74. Fox Chapel T.C. (9) 229m
75. Ashland Area Striders "A" (10) 228m
76. Troy State A.C. (5) 227m, 720y
77. Baldwinsville Harriers (10) 227m, 590y
78. Webb Jr. High "A" (10) 227m
79. San Marino T.C. (10) 226m, 1640y
80. Hartford T.C. (7) 226m, 440y
81. Marion Harding High (10) 226m, 440y
82. Fort Erie Spartans (10) 225m, 1712y
83. New England College X-C (?) 225m, 1610y
84. Center Jr. High (10) 225m, 1037y
85. Robin Hood's Merry Men (9) 225m, 450y
86. Irvington H.S. (7) 224m, 902y
87. Alhambra H.S. No. 1 (10) 224m, 774y
88. Schalmont Dist. All-Stars (10) 224m, 700y
89. Scituate H.S. (10) 224m, 371y
90. Buzz's Boys (10) 223m, 675y
91. Kettering Striders Women (10) 223m, 80y
92. Allegheny T.C. (10) 222m, 984y
93. Mater Dei H.S. No. 1 (10) 221m, 957y
94. CCC of Dallas "Green" (10) 221m, 850y
95. Forest Heights Collegiate (10) 221m, 597y
96. Placerville Harriers (10) 220m
97. Alameda Animals (10) 219m
98. Senile City Striders (10) 219m
99. Idaho Falls Easy Striders (10) 218m, 1320y
100. Garfield H.S. (10) 218
101. Buschwacker Bunch (5) 217m, 1480y
102. Westside Roadrunners (7) 217m, 1191y
103. Section III Runners and Coaches (10) 216m, 1200y
104. Royal Hustlers (10) 216m, 440y
105. Redwood City Striders Girls (10) 215m, 1250y
106. Maine-N.H. Striders (?) 214m, 1360y
107. Goleta Striders (4) 213m, 904y
108. Schalmont H.S. Runners (10) 211m, 146y
109. Brandywine H.S. (10) 210m, 1741y
110. Clarke Central H.S. (7) 210m
111. Purple Pack T.C. (10) 210m
112. Trotwood Madison H.S. (10) 210m
113. Bull Athletic Club (10) 209m
114. Burris H.S. (10) 209m
115. Newark H.S. (10) 208m, 880y
116. Sunnyvale H.S. (7) 208m, 841y
117. Penn Trailers Club (9) 208m
118. Dallas CCC Masters (10) 207m, 1077y
119. Spoons (9) 207m, 133y
120. Webb Jr. High "B" (10) 207m
121. Metro Toronto Fitness Club (9) 206m, 1563y
122. Medicare Branch (10) 206m, 1068y
123. Tentative Ten T.C. (8) 205m, 1650y
124. G.E. Road Runners (10) 205m
125. Hell No's (10) 204m, 1318y
126. UCTC "A" (4) 204m, 998y
127. "Freshmen" (6) 204m
128. Roadrunners (9) 203m, 1126y



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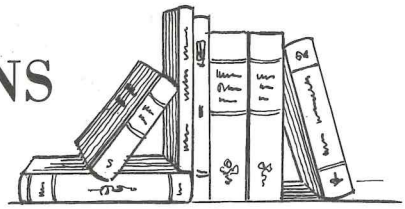

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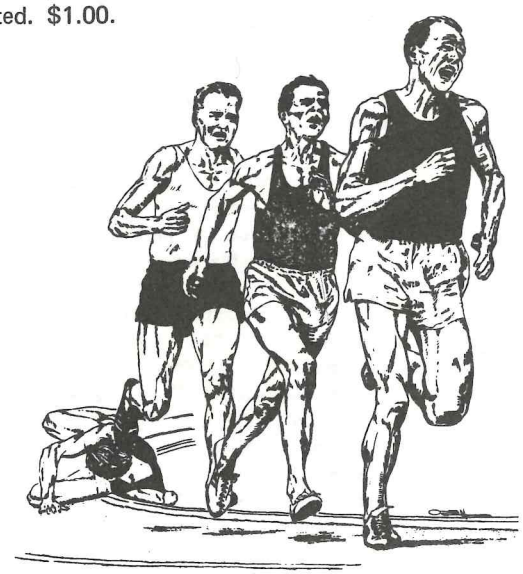
BIOGRAPHIES

DAVE BEDFORD STORY, James Coote. This is Dave's own story as told to James Coote. He talks about his 200-mile weeks, what happened at the European Championships, etc. It covers his life through the European Championships. A major highlight of the book is the pictures—68 in all and eight are full-page color ones. 1971. Paperback, (8½ x 11) 68 pp., ill. $3.50.

THE FRANK SHORTER STORY, John Parker. (Booklet of the month no. 18) Articulate and philosophical, the winner of the Olympic Games marathon tells his story to a close friend and teammate. 1972. Paperback, 52 pp., $1.00.

FOUR MILLION FOOTSTEPS, Bruce Tulloh. Tulloh's lively and literate book describes his epic "record" run across the United States during the summer of 1969. He tells of the mammoth obstacles imposed by injuries, fatigue, traffic and sheer mileage during his 65-day journey. Fascinating! 1970. Paperback, 175 pp., illustrated. $1.95.

GERRY LINDGREN STORY (Booklet of the month no. 6) This is Gerry's own story. He describes in lively style how he went from "a runt who couldn't do anything" as a sophomore in high school to a national hero as a senior. A superb personality study. 1971. Paperback, 36 pp., illustrated. $1.00.



HIGH ABOVE THE OLYMPIANS, Bud Spencer. Combines a biography of controversial coaching great Dink Templeton with material on the fundamentals of each event—as Templeton taught during a long, colorful career. 1967. Hardback, 320pp., illustrated. $5.75.

JIM RYUN STORY, Cordner Nelson. A detailed description of the life and times of America's number one track hero. Brilliantly illustrated with nearly 200 photos by Rich Clarkson. 1967. Hardback, 272 pp. $5.95.

THE LONELY BREED, Ron Clarke. Clarke looks deeply into the personalities and methods of 21 distance greats that he admires most. 1967. Hardback, 187 pp., illustrated. $5.95.

MILEAGE UNLIMITED, Marv Rothenstein. 9000-mile-a-year runner Rothenstein tells more stories about his running and what he's learned from it. The usual Rothenstein dry humor. Paperback, 66 pp. $2.00.

MY RUN ACROSS THE UNITED STATES, Don Shepherd. Using sharp observation and an equally sharp sense of humor this South African miner describes his 1964 trans-U.S. run alone. 1970. Paperback, 188 pp., illustrated. $3.50.

RANDY MATSON STORY, Carlton Stowers. Randy Matson is the greatest shot putter in history and this is his story. Well illustrated with about 40 photos. Statistical appendix. 1971. Hardback, 200 pp., illustrated. $5.95.

RON CLARKE TALKS TRACK, edited by Jon Hendershott. The "runner's runner" sees the inside values of the sport with consistent intelligence and accuracy—and tells it all in an interesting way. 1972. Paperback, 114 pp., illustrated. $2.50.

THERE'S A HUMAN BEING IN THAT SWEAT SUIT, Marvin Rothenstein. Personal memoir of a 5000-mile-a-year non-competitive runner. Loaded with advice for joggers—particularly older ones. 1969. Paperback, 64 pp. $2.00.

THE UNFORGIVING MINUTE, Ron Clarke. The autobiography of history's most successful record-breaker gets into the factors and philosophies behind his times. 1966. Hardback, 190pp., illustrated. $5.95.

TECHNIQUE/TRAINING

COMPETITIVE RACE WALKING, Ron Laird. A modern guide to technique, training, judging, etc. by one of America's top walkers. Well illustrated. 8½ x 11, illustrated. $3.00.

COACHING DISTANCE RUNNERS (Booklet of the month no. 3) A look at distance coaches and their role—from both sides. Coaches discuss coaching and athletes discuss their coaches. The meat of the booklet is a 13-article section on coaches at the international, college, prep, club and women's level. Must reading for all coaches and runners too. 1971. Paperback, 52 pp. $1.25.

COMPUTERIZED RUNNING TRAINING PROGRAMS, Jim Gardner and Gerry Purdy. A new concept in training. Using a computer, the authors have taken the guesswork out of interval training—devising sets of workouts geared to the specific ability of each runner, all distances. Paperback. 1970. 100pp of text, 122pp of tables. Illustrated. $4.50.

THE CONDITIONING OF DISTANCE RUNNERS, Tom Osler. Good little book for those interested in events over the 6-mile. 1967. 29 pp. $1.25.

ENCYCLOPEDIA OF ATHLETIC MEDICINE (Booklet of the month no. 12) Dr. George Sheehan describes the ailments peculiar to distance people and suggests treatment for them. Very useful for coaches and runners. 1972. Paperback, 84 pp., ill. $1.95.

INTERVAL TRAINING (Booklet of the month no. 16)—Nick Costes, an Olympic distance runner and college track coach, takes a fresh look at the subject. The result is a booklet loaded with helpful hints on using the method effectively. 1972. Paperback, 82pp. $1.95.

LONG SLOW DISTANCE, THE HUMANE WAY TO TRAIN, Joe Henderson. Training needn't be a pain—or so the experiences of a number of mildly to highly successful distance runners indicate. Bob Deines and Amby Burfoot are among the converts to comfortably-paced LSD running. 1969. Paperback, 64 pp., illustrated. $2.00.

MIDDLE DISTANCE RUNNING, Percy Cerutty. Percy Cerutty has strong, often unique ideas on almost everything. And he doesn't hesitate to express them forcefully. When the topic is middle-distance running, he speaks from solid experience. Cerutty coached Herb Elliott, and the unorthodox methods catapulted Elliott to world fame as a miler in the late '50s. Cerutty gives particular emphasis to the roles of strength training, breathing and running techniques. 1964. Hardback, 197pp. $4.95.

NEW VIEWS OF SPEED TRAINING (Booklet of the month no. 4) Speedwork—fast training—has gotten an undeserved bad name. When used properly, it builds the sharpness demanded in fast racing. This booklet covers the topic well. Arthur Lydiard contributed an excellent article. 1971. Paperback, 52 pp., illustrated. $1.25.

PRACTICAL RUNNING PSYCHOLOGY (Booklet of the month no. 11) Dr. Bruce Ogilvie at San Jose State College has studied several thousand athletes and he is a major contributor to this valuable booklet. It is a guide to understanding the distance athlete's mental makeup, and making the most of all-important emotional factors. 1972. Paperback, 52 pp., ill. $1.50.

RACING TECHNIQUES (Booklet of the month no. 13) At last, a booklet that centers on HOW races are run—not just the training before and the statistical aftermath. Includes a wealth of practical advice on pacing and tactics, optimum racing frequency, comparing performances in different events. 1972. Paperback, 52 pp. $1.50.

ROAD RACERS AND THEIR TRAINING, Joe Henderson. The first comprehensive survey on this subject. Includes general material on this aspect of the sport, plus detailed data on the training, philosophies, etc. of 60 top road runners. 1970. Paperback, 96 pp., illustrated. $2.50.

THE RUNNER'S DIET (Booklet of the month no. 14) The long-awaited guide to the feeding and watering of runners. Suggests ways to improve performance through dietary control, weight watching, proper drinking habits. Based on the latest scientific data, and tested by runners themselves. 1972. Paperback, 84pp., illus. $1.95.

RUN RUN RUN, Fred Wilt. The most complete book available on running technique. All training methods, theory, tactics, warmup, pace—from sprinting through marathon. 1964. 281 pp. Paperback, $3.50. Hardback, $5.00.

RUNNING AFTER FORTY (Booklet of the month no. 5) Veterans running is booming, and now there's a booklet specifically about and for the runners over 40. Larry Lewis the 105-year-old marvel and Bill Emerton are the subjects of full-length features. Plus 21 personality/training profiles. Emphasis on distance running. 1971. Paperback, 40pp., illustrated. $1.00.

STAMPFL ON RUNNING, Franz Stampfl. A thorough account of the acclaimed coach's interval training methods, which have influenced athletes of the class of Roger Bannister and Ralph Doubell. 1956. Hardback, 159pp., ill. $3.50.

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READERS' COMMENTS

WAFFLE SHOES

I read Janet Newman's article ("Hot Off Bowerman's Waffle Iron," Jan. 73) with great interest for two reasons. I am an admirer of Bill Bowerman, and I work for a competitor of Nike, the Onitsuka-Tiger Company.

Certain items in the article need immediate clarification:

1. Janet Newman is an employee of a Nike distributor.

2. Otis Davis did not wear Bowerman-made shoes in the 1960 Olympics. He wore Adidas. The same was true of Bill Dellinger in his Olympic races. This was verified by Dick Bank, who was then a representative of Adidas.

3. Geoff Hollister did not originate the idea of the four-way stretch insole sewn into running shoes. I started doing that in 1968.

4. The idea of running fast track races in flats is not new to the Nike waffle. Frank Shorter told me in Munich that he has run 10,000 meters under 29 minutes in a specially-made Tiger flat.

5. It was not noted that a number of runners were given Nike waffles to wear at the Olympic marathon trial. The shoes proved to be as hot on the foot as they were off the waffle iron, and several runners who wore them suffered from blisters. Interestingly, the blistering on several runners examined was identical to the waffle pattern of the shoe soles.

I feel the article was a biased advertisement for the shoe and should have been labeled as such. Otherwise, it was a disservice to Bill Bowerman's reputation as a shoe designer and to the readers of *Runner's World.*

John Bork
Onitsuka-Tiger Representative
Pacific Palisades, Calif.

DISTANCES ONLY

If you're worried about your name since it didn't cover sprints or hurdles, why didn't you just change the name instead of including them. Sprints and hurdles don't need the coverage. They get more than their share. Also, American dominance of these two areas shows that technique is far advanced.

Stick to the distances! You had a good thing going. Don't ruin it, please.

John Dickey
Charleston, Ill.

"RACISM"

To a chap named Brian Chapman ("Advice from a Weary Traveler," Nov. 72). How shall I put it gently? Guess I'll just put out a straight sound. His article reeked with racism. The subhead at the top of page 26 blew my mind. It was so direct about it. Australia's racial policies are nothing too beautiful, and Chapman certainly is honest in his reflection of them. The surprise was not in seeing the attitude in print, It was seeing it in *Runner's World.*

Benjamin Sawyer
Santa Cruz, Calif.

ADDICTION

I cannot thank *RW* or Bob Bard enough for the article "New Hope for the Addicted" (Nov. 72). For the past 19 years, I've been a movie and TV stuntman in Hollywood. At present, I am the stunt coordinator on NBC's series "Search." Unfortunately, everyone at the studio accuses me of being a "running addict." But I'm sure *RW* readers will understand my problem. First, I must stay in shape because of my occupation. But most important I have a 120-pound German Shepherd who must run at least six miles a day for *his* health. Now, I can't just send him out alone in the mountains, can I?

Loren James
Burbank, Calif.

WHAT READERS WANT

The time is ripe for a full-scale investigation into such questions as the minimum mile speed one must possess in order to run a 2:15 marathon, the requisite 440 speed needed for a sub-four-minute mile, or something along these lines. In other words, delve into the entire question of the relationship between a runner's time at so-called "speed distances" (100-yards-mile) and his limits or potentials for achieving given performance at the "long distances" (two miles-marathon).

Bob Bergman
Bronx, N.Y.

I would like to see *RW* become an advocate of defined positions. Your editorial stance is too blase. Your circulation would rise, I feel, if you began taking positions, particularly vis-a-vis the governance of sport.

Walt Boehm
APO San Francisco, Calif.

WHY ASK WHY?

How often have you been asked, "What do you do or think about while you run?" After a long time of giving pat answers about looking at the scenery, composing poems, planning vacations, etc., I really thought about it. I realized what I really did was run, and what I thought about was running. They erected a phone booth on one of my regular routes that necessitated my altering my path. I did not notice it for a month. Could I really be viewing the sights? I think about my feet, how they hurt, my legs, how they move (I spend a lot of time watching my feet and legs), and so forth.

I bring this up because I think it bears on a question that all of us have to answer: "Why do you run?" Now I know. I run because I enjoy running. I don't enjoy pain, rain, dogs, scenery, sunrises and sunsets, being tired, being fit, winning, losing, living longer, being able to catch buses, or any of that. I enjoy running, the plain physical act of placing one foot rapidly in front of the other one. I train because it is more fun to run fast than slow.

Richard Raymond
Portland, Ore.

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Contact: Paul Fetscher, Long Island Athletic Club, 183 Maxine Court, West Hempstead, N.Y. 11552.

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