7-1963

Coaching the Track Events

Thomas Ecker
Western Kentucky University

Ecker,

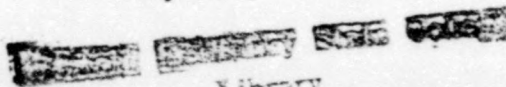Thomas R.

1963

COACHING THE TRACK EVENTS

BY

THOMAS R. ECKER

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

WESTERN KENTUCKY STATE COLLEGE

JULY, 1963

Approved:

Major Professor

Department of Education

Graduate Committee
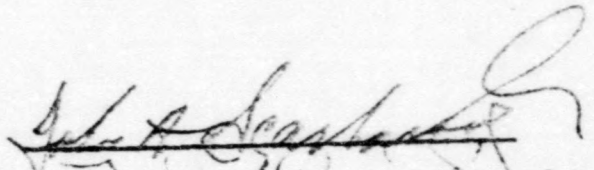
TABLE OF CONTENTS

Chapter I

TRAINING THE TRACK MAN

The beginning track coach might assume that the motivation
of track men is an almost insurmountable obstacle, particularly if
he has never competed in track and field himself. Seldom, if ever,
does track offer the attention, recognition, and possible "big money"
that are accepted realities in some of the team sports.

But in track and field the athlete's point of view seems to
be different from that of a team sport participant. Because of the
individuality of his sport, the track man is motivated, primarily,
through self-satisfaction--through knowing that he has accomplished
something on his own. Track men have little hope for material gain
through their sport, yet, paradoxically, they are the most dedicated,
self-sacrificing group of athletes in the world.

Attitude also plays a very important role in track and field.
Track practice sessions are not easy and are not often very much
fun, but an enthusiastic, respected coach can lead his runners
through a difficult workout program and make it seem like fun. A
coach's positive attitude encourages his runners to do what is best
to improve themselves, not necessarily what is easy or fun at the
time.

Winning is usually considered the only mark of achievement
in athletics, but this is not always true in track and field. A
track man can often take great pride in his accomplishments as an

individual, even in a losing effort. A last place finisher who betters his own personal best can be justly proud of his performance.

Warmup

Almost all coaches and athletes agree that warming up before a workout or race is essential, but many of these same coaches and athletes are not really sure why.

Warmup actually serves two purposes. It aids in the prevention of muscle and tendon injuries, and it prepares the athlete, both physically and psychologically, for the coming physical effort.

The warming and stretching of skeletal muscles increases the elasticity of the muscles and tendons and, in turn, decreases the possibility of muscle pulls. A warm muscle is not nearly as likely to tear as a cold muscle that cannot stretch sufficiently when it is forced to endure a sudden, heavy strain.

Physiologically, nothing could be better for an athlete prior to a workout or a race than warmup. First, the heart rate is increased, causing a greater flow of blood through the body. This increase in blood flow helps carry carbon dioxide, lactic acid, and other fatigue-producing waste products from the muscles more rapidly.

Also, a muscle that has contracted several times during warmup will contract with greater speed, power, and efficiency than one that has not been properly warmed. Muscles that do not undergo a thorough warmup prior to competition simply do not contract as fast or relax as completely as those that are warmed.

Warmup usually begins 30 to 45 minutes prior to the athlete's first event. A typical schedule calls for easy jogging, bending and stretching exercises, and acceleration runs, combining to create a gradual warming and stretching of the athlete's muscles. There is usually little deviation from this basic warmup pattern from one running event to another, except that hurdlers emphasize the bending and stretching phase of the warmup process and distance runners spend more time of the jogging phase.

The jog is usually a half mile to three miles in length. The bending and stretching phase must slowly and gradually stretch every muscle that will come into play in competition. The acceleration runs should be numerous and taxing enough to increase the respiration rate and heart rate and complete the warming of the muscles.

The warmup process must be paced so that there is a five- to ten-minute rest between the final stages of warmup and the race itself. During this period the athlete can stretch out and relax, but he must take care to keep his body as warm as possible. When it is time to go to the starting line, the runner usually does a few basic stretching exercises to alleviate any stiffness, and then at the last moment strips off his sweat clothes.

There are no set rules concerning warmup, except that the athlete's muscles must be warm and supple when it is time for the workout or competition to begin. A perfect warmup schedule for one athlete might be entirely wrong for another. The athlete should be guided by his coach in the beginning, but he must determine on his own, through trial and error, the warmup procedure that is best for him.

Warmdown

After a heavy workout or a competitive race, the athlete must warm down gradually while his body is returning to "normal." The warmdown period, which bridges between the strenuous activity and the customary functioning of the body, consists of easy jogging and walking, usually until normal breathing returns.

Interval Training

Interval training, accepted by modern-day coaches as the most effective system for conditioning athletes, was developed in Germany during the late 1930's. The system has undergone many changes since its inception, especially in the amount of work done by the athlete during his workouts, but the basic principle behind it remains the same: Repeated speed develops speed and endurance.

At first, coaches and athletes were reluctant to accept this new concept in training. Only through the successes of several world record-breaking foreign distance runners, particularly Emil Zatopek of Czechoslovakia, was the method finally brought to the fore.

Interval training, by definition, is a program of running a specific distance repeatedly at a pre-determined pace with a set interval of restful jogging after each run. The period between runs must be long enough to allow the athlete time for partial recovery from the previous run, but not long enough to afford him complete recovery. It is a unique system in that it is adaptable to any athlete, no matter what his capabilities or the stage of his development.

There are four variable factors in interval training:

1. Distance (a fraction of the race distance)

2. Speed (always accurately timed)

3. Interval of recovery

4. Number of repetitions

During a regular and gradual interval training program, the athlete may increase the intensity of his workouts by increasing his speed, decreasing the interval of recovery, or increasing the number of repetitions run, but the coach should never allow his runners to alter more than one of these variables during any one workout.

Distance. The distance run in interval training usually remains constant throughout each individual workout, but may vary greatly from one workout to the next. The important thing, of course, is that the distance be less than the athlete's race distance, usually in multiples of 110 yards.

The coach can best create variety in his workouts by alternating the distances run from practice to practice. A half-miler's workouts, for example, might consist largely of repeat 220's, 440's, and 660's, but for variety's sake they could just as well be 110's, 330's, 550's, or a combination of any of these, on other days.

Speed. To stress the development of endurance in his athletes, the coach should have them run a great number of repetitions at a pace that is a little slower than their normal race pace. To stress the development of speed in his athletes, the coach should have them run their repeats faster than their normal race pace.

Probably the best plan for most athletes to follow would be
to run their repeats on pace, rather than to attempt a pace that
is either slower or faster than the projected race pace. Running
on pace develops a combination of speed and endurance in the athlete,
and has the added advantage of teaching the runner pace-consciousness.
After leading the group through a series of repeat runs, the pace-
setter soon learns to distinguish between a 29- and a 31-second 220,
for example. The ability to judge pace is one of the most important
factors in distance running.

The coach should have no difficulty deciding what the speed
should be in interval training when the workouts are geared for the
race pace. He need merely decide the time the athlete should hit in
his next competitive race, being careful to take the athlete's ability
and present physical condition into consideration, and then multiply
that time by the fraction of the race distance that is going to be
run. In other words, the fraction of the time run will be the same
as the fraction of the distance run. The athlete who wants to run
a 4:52 mile in competition, for example, would run repeat 220's in
:36.5, 440's in 1:13, 660's in 1:49.5, etc. A 1:58 half-miler would
run 110's in :14.75, 220's in :29.5, 330's in :44.25, 440's in :59,
or 660's in 1:28.5.

Interval of recovery. The period of recovery following each
repeat run is usually taken up with easy jogging. The interval may
be of any length from a few seconds to 30 minutes or more, but it is
usually from one to five minutes long.

The important point in dealing with the interval is not its length, but its uniformity throughout the workout. There should be no more rest after the tenth repeat than there was after the first.

Number of repetitions. The purpose of any conditioning program is to develop the athlete's body so that it will be able to resist fatigue. In interval training, the determining factor in the development of this resistance is the number of repetitions that can be run.

On a given day, the coach may decide to have his 5:07 miler run interval 880's in 2:33.5 with six minutes of jogging after each run. In this case, three of the interval training factors--distance, speed, and interval--are constant. The only variable is the number of repetitions.

The number of repetitions that the athlete will be able to take under these conditions will determine his endurance at this point. If he is able to run only two 880's--his total race distance--at pace, he obviously is not ready for a 5:07 mile. When properly conditioned, he should be able to run from one-and-one-half to three times his total race distance in practice, without altering his pace or interval.

Adopting interval training does not in itself guarantee a successful conditioning program. Success comes with the proper attitude on the part of the runners and the amount of work they do while using this system. Repeat running is hard work and is often boring. Only with a positive attitude on the part of those involved can the program hope to be successful.

Fartlek

The fartlek system of training, which was developed in Sweden during the mid-1930's and reached its greatest acceptance in America during the past decade, is not nearly as popular as it once was. A few coaches are still using the fartlek training method in their workouts—primarily as a "monotony breaker"—but few runners have the courage and dependibility to punish themselves enough to derive any real benefit from exclusive use of this system. Fred Wilt, one of the great distance runners of the 1940's and 50's who has since done considerable research on training methods, reports that even the Swedes have not used the fartlek system to any great extent in recent years.[1]

Fartlek, which means "play of speed" in Swedish, is a program of jogging, walking, striding, and sprinting over a cross country course. Often the fartlek workout takes two or more hours to complete, allowing the athlete to run farther and at times faster than he would in a program of interval training. The athlete is supposed to feel somewhat invigorated, rather than completely fatigued, at the conclusion of a fartlek workout.

Fartlek's great advantage over interval training is the change of scenery it affords. The monotony of repeated workouts on the track often creates a sort of mental fatigue, which can be just as dangerous to the athlete as physical fatigue. Athletes who have been

---

[1]Letter from Fred Wilt, Editor, Track Technique, Lafayette, Ind., September 22, 1962.

training regularly on the track usually welcome an occasional run through the woods or over a golf course.

The following sample fartlek schedule is one that was used by Fred Wilt when he was in serious training. Like all schedules, it should be used only as a guide.

1. Fifteen minutes alternate walking and easy running as a warmup.

2. Fifteen to 30 minutes continuous running, sprinting 75 yards once every five minutes. Speed is about $5\frac{1}{2}$ to $6\frac{1}{2}$ minutes per mile. Five to ten quick "pick-ups" enroute.

3. Walk ten minutes.

4. Sprint 150 to 220 yards uphill.

5. Walk and run easily for ten minutes.

6. Run at extremely fast pace, but not wide open, for 440 to 550 yards. Speed is about 3/4 of maximum.

7. Rest two to three minutes and then repeat #6 one to three times, depending upon condition.

8. Run easy 100 yards, sprint 75 yards, run easy 100 yards, sprint 75 yards, run easy 100 yards.

9. Repeat #8, making a total of four to ten sprints, depending upon condition. No sprinting after Wednesday with a race on Saturday.

10. Fifteen minutes walking and running back home.[2]

The Workout Schedule

There is NO magic formula for getting an athlete in condition to run. In fact, there are probably as many good workout schedules in existence as there are runners to follow them. An imaginative

---

[2]Ibid.

coach with a sound knowledge of the different training methods can devise an infinite number of excellent workout schedules by following a simple outline. The schedule must include:

1. Warmup (described in detail on pages 2 and 3)

2. Skill work (for sprinters, hurdlers, and relay men)

3. Conditioning work

4. Warmdown (described in detail on page 4)

Skill work. Sprinters, hurdlers, and relay team members must spend time every day on their individual skills: sprinters practicing on their starts, hurdlers on starts and hurdling, and relay members on baton exchanges. Much of this skill work, when practiced repeatedly, will also serve as a part of the conditioning phase in the athlete's workout schedule.

Conditioning work. The best over-all conditioner for the track events is interval training. By following the interval training program described on pages 4-7, the coach can create any number of sound conditioning schedules. The most difficult job for the coach, however, is varying these schedules from day to day to keep the workouts from becoming a drudgery.

To create some variety in the schedule, the coach may include a day of slow-fast interval running occasionally. In slow-fast work, the first half of each repeat is run at racing pace and the second half is run slightly faster than pace or at top speed. For example, a 2:04 half-miler might run repeat slow-fast 220's with the first 110 of each 220 in 15.5 and the second 110 in 14.0.

The coach may alter the schedule, too, by varying the distances run during a particular practice session. Rather than pacing through repeat 220's in :35, a 4:40 miler might run a 440, a 660, an 880, a 660, and a 440, all at pace. This change in the basic workout schedule could help ward off the mental fatigue that often accompanies monotonous work.

And, of course, if there is a wooded area or a golf course nearby, the coach might want to send his runners out for an occasional day of fartlek. (See pages 8-9.)

Running Form

So-called "proper" running form actually means the most comfortable and most efficient running form, varying greatly from one individual to another. The form that is perfect for one runner may be all wrong for someone of a different skeletal and muscular make-up.

An athlete can achieve his most efficient running form by eliminating any body movements that will expend valuable energy unnecessarily. Such movements as overstriding or swinging the arms in a laboring, unrelaxed manner will deter from the efficiency of the athlete's running style.

Stride length. The athlete's length of stride is again a matter of efficiency. The stride should be long enough to give the runner the most speed and power for the amount of energy he expends, but no longer.

Understriding, which produces excessive fatigue because of the many extra steps that must be taken during the race, is not very common among runners. Taking a great number of extra steps simply does not feel economical to them.

Overstriding, on the other hand, is very common among runners and is also very useless. It seems logical to most young runners that increasing the stride length would result in a faster time because of the extra distance covered with each step. In reality, however, an increase in stride length can only be beneficial to the runner if there is a corresponding increase in the runner's speed. Therefore, it may be economical for a sprinter who is running at top speed to increase his length of stride, but the runner who is pacing himself will find that two shortened strides take less energy than one elongated stride and will carry him farther.

Foot plant. The runner's foot approaches the track with a downward, backward, "stroking" motion (not punching or pounding), and the ball of the foot makes first contact with the track. Immediately thereafter, the heel touches the track and momentarily bears the full weight of the body as the runners rides smoothly forward for the next stride. At this point, the foot has come to a complete stop for the slightest instant. As the body weight continues to ride forward, the heel is lifted, and finally the toe leaves the track. Any running, especially sprinting, which does not permit the heel to touch the track with each step, robs the runner of maximum leverage.[3]

_____

[3]Fred Wilt, How They Train (Los Altos, Calif.: Track and Field News, Inc., 1959) pp. 106-7.

Arm Action. The arms play an active, somewhat vigorous role in sprinting and hurdling, but a passive role in the middle distance and distance events. In either case, however, relaxation of the arms and upper body is necessary to keep the athlete from "tying up" during the latter stages of the race.

The arms should help give the runner balance and rhythm but must do nothing to tire him needlessly. They should swing easily in a rolling, forward and backward motion to a point directly in front of the runner's chest. The hands and fingers must remain completely relaxed.

Relaxation. If there is any secret to efficient running form, it is relaxation. A runner can conserve strength during a race by using only those muscles that are needed in the race, while relaxing those muscles that are not in use.

There are a number of methods practiced by runners to help them learn relaxation. Some smile as they run. Some carry objects in their hands. Some bounce their arms in a loose, relaxed manner. Some try to feel their jaw and cheeks bounce.

Relaxed running must be learned and practiced like any other skill. Only through the use of relaxation during workouts will an athlete develop a relaxed, efficient style for competition.

Weight Training

A very few years ago, the majority of coaches and physical educators believed that exercising with weights was harmful for athletes who participated in any activity other than wrestling or

weight lifting. It was thought that athletes would become musclebound and would thus be unable to perform well physically because of this excess muscle.

We now know, however, that strength, no matter how it is developed, is one of the most important aspects of physical conditioning. The athlete who is physically strong has a decided advantage over the athlete who is not strong. Of course, no matter how important strength is to the track man, weight training can never be a substitute for the endless hours of hard work on the track. Weight training should supplement the track program--not supplant it!

Weight training is not really as new a development as one might believe. Every boy uses his body weight and the weight of the objects around him to build his muscles as he grows up. He walks, runs, climbs trees, throws objects, lifts objects, pushes objects. He might even build strength in some more obvious way, like chinning himself on a bar or doing pushups--muscle-building exercises that have been known to athletes for years.

Modern weight training, a program of lifting barbells and dumbells and wearing foot and body weights, builds these very same muscles. The advantage in using weights is that the added resistance to the muscles increases their strength and the speed with which they will react.

A progressive resistance exercise program develops muscles in two ways. A periodic increase in weight, which of course is an increase in resistance against the muscles, develops strength and speed. Several repetitions of the exercise will develop endurance.

The beginner should start each exercise with a weight that he can lift five times in succession with little difficulty. Then, as his strength develops to the point where he can repeat the exercise ten times with ease, he is allowed to add weight, but he should never add so much weight at one time that he cannot repeat the exercise five times.

The beginner must be taught to lift so that his muscles are fully extended with every repetition. When muscles are not forced to stretch to their fullest length during as exercise, they will tend to shorten as they are developed. This shortening could hamper the boy's running, and, because of the strain that racing puts on a muscle that is shorter than it should be, might even result in a muscle pull.

As in any type of conditioning program, regularity is important for success. The weight program should be conducted the year around—even during the competitive season. Because weight training is so fatiguing, however, it is recommended that the lifting not be done on an every-day basis. Weight work on Mondays, Wednesdays, and Fridays during the off-season will build the athlete's strength adequately and will give him plenty of recovery time between sessions. During the season, just a Monday-Wednesday after-practice schedule would probably be sufficient.

A record of each runner's progress should be kept on the locker room wall, complete with the athlete's name, his exercises, the weight used for each exercise, the number of repetitions (complete cycles of

the exercise from beginning to end), and the number of sets (groups
of repetitions.

Five Basic Weight Exercises

Press. The athlete holds the barbell against his chest with
his palms forward and elbows down. The weight is raised upward until
the arms are fully extended above the head and then lowered to the
starting position to complete the exercise cycle.

Arm curl. With arms relaxed at his sides and palms forward,
the athlete holds the barbell against his thighs. By bending his
elbows, the athlete brings the weight up to his chest and then lowers
it to the starting position to complete the cycle. The athlete's
arms must not be braced against his body at any time during the
exercise.

Bench press. Lying supine on a bench, the athlete is handed
the barbell, which he presses to arms' length and lowers back to his
chest to complete the exercise cycle.

Lateral raise with dumbells. With arms down at his sides,
elbows locked, and palms facing inward, the athlete lifts the dumbells
upward to the sides as high as possible. He then returns them to the
starting position to complete the cycle.

Forward raise with dumbells. With arms down at his sides,
elbows locked, and palms facing inward, the athlete lifts the dumbells
forward and upward as far as possible. He then returns them to the
starting position to complete the exercise cycle.

Isometric Contraction

Isometric (or static) contraction, the newly popular strength-building system, develops strength through resistance against an immovable object. The "lifting" technique is similar to that of weight training, except that in isometric contraction the "weight" cannot be moved.

The equipment required for a program of isometric contraction can be simply and inexpensively constructed. Two upright 2x6 boards, spaced three or three-and-a-half feet apart, are anchored in the ground, or if inside, are anchored to the floor or braced between the floor and the ceiling. Holes drilled in the boards at three-inch intervals from the top to the bottom hold the one-inch bar or pipe that serves as the athlete's grip.

Most weight training exercises can be duplicated with isometric contraction. The athlete should simply place the bar in a position that the barbell would assume during the exercise cycle, and pull (or push) against the immovable bar at that point. The athlete's muscles are then developed isometrically without changing their length.

Each isometric exercise should be executed at two-thirds of maximum effort at a steady rate for no more than six seconds. Since each exercise is done only once each day, with isometric contraction the entire strength development segment of practice can be completed in a matter of minutes.

The full potential of isometric contraction has not been explored in depth as yet, but it is evident that the system develops

strength and speed in a relatively short time. The one drawback of developing strength isometrically is that the muscles will always lack in endurance--the ability to perform work repeatedly--unless repeated weight work is included in the strength-building schedule. Since endurance plays such an important role in the track events, isometric contraction can never replace, but may merely supplement, the weight training program. Therefore, a combination of the two systems would probably provide an athlete with the best over-all muscle development for the track events.

Diet

The human body can be compared with a very complex machine that operates on a variety of different fuels. Without a regular and adequate supply of these fuels, the machine obviously will not be able to run very efficiently.

The athlete's body requires that he maintain a well-balanced diet consisting of some of each of the three basic food groups--carbohydrates, proteins, and fats--and including an abundance of the many essential vitamins and minerals. Every day the athlete's diet should include foods from each of the "Fundamental Four" (milk and milk products, meat and meat substitutes, vegetables and fruits, and breads and cereals). Most athletes are able to get an adequate amount of the necessary foods from their normal daily meals. However, in a situation where well-balanced meals are not available to the athlete, he should be given a dietary supplement.

Milk has long been mistakenly condemned by coaches and trainers as the cause of a number of ill effects in athletes. Some of the more popular ills attributed to milk are: (1) It is slow and difficult to digest. (2) It creates mucus. (3) It causes "dry mouth." (4) It forms excess stomach gas.

Recent test have proved, however, that milk causes none of the above ailments or discomforts. In fact, milk, rich in vitamins A, B, C, D, G, K, and high in protein, is one of the best foods that can be included in an athlete's diet.[4]

Under no circumstances should the athlete be allowed to consume stimulants or depressants, even in moderation. Alcohol, tobacco, certain drugs, and even coffee and tea, make little or no worthwhile contribution to the athlete's diet and can harm athletic performance when taken excessively.

The pre-meet meal, consisting of small portions of non-greasy, easily digestible foods, should be eaten three to four hours prior to the athlete's first race. If a runner has a nervous stomach on the day of the meet, he should eat very little of the pre-meet meal. It is far better to eat too little before competition than to eat more than is needed.

Prevention and Treatment of Common Injuries

The most common track injuries are all confined to the athletes' feet and legs. Of these injuries, the five that occur most frequently

---

[4]Dr. Dale O. Nelson, "Milk and Athletics," Athletic Journal, (May, 1960), p. 37.

are muscle pulls, shin splints, foot cramps, heel bruises, and foot blisters.

Muscle pulls are the most common, most unpredictable, and most perplexing of all track injuries.

Prevention: Warm up thoroughly before every practice session and competition. If more than thirty minutes elapses between events, the athlete should repeat the warmup process in part before running again.

Treatment: Apply a cold pack to the injured area as soon as possible. The cold, which must be applied for at least thirty minutes, will help to retard hemorrhaging and to reduce pain.

After the internal bleeding has stopped, the injury should be treated with heat daily until the muscle has completely repaired itself. When the leg is almost healed, easy jogging is often permitted, usually with the injured muscle carefully taped.

Shin splints, another common ailment among runners, can be easily recognized by the sharp pain along both sides of the lower half of the runner's shin bone.

Prevention: Undertake a gradual conditioning program. Never make sudden stops when working out or run on a hard surface for any great length of time.

Treatment: Apply heat to the injured area every day. (Heat from a lamp may be satisfactory, but short wave or ultrasonic diathermy treatments are probably the most beneficial.) At night, cover the shin with analgesic balm and pull a sweat sock with the bottom cut out of it over the injury.

Certain methods of taping the runner's legs or of placing foot pads in the runner's shoes have been used by some trainers to give relief during the recovery period.

Foot cramps are generally caused and aggravated by tight-fitting shoes.

Prevention: Be careful in the selection of the runner's shoes. Of course track shoes should never be loose, but neither should they be so tight that they pinch the feet. The trouble is usually caused by narrow shoes, rather than by short shoes.

Treatment: If the athlete's arches are causing him a great deal of pain, rest and hot foot baths are recommended. Occasionally, arch supports or taping of the arches will give relief.

Heel bruises most often plague hurdlers, jumpers, pole vaulters, and distance runners, but they may at some time trouble anyone on the squad.

Prevention: Heel cups or sponge rubber cushions may be placed in the athlete's shoes to protect his heels. Of the two protectors, heel cups seem to be far superior. They not only offer excellent protection, but will often allow an athlete to continue competing without discomfort while a bruise is healing.

Treatment: If the athlete is unable to practice without aggravating the injury, complete rest is recommended. Hot foot baths and light massaging will help speed recovery.

Foot blisters are caused by friction created by the rubbing of an ill-fitting shoe against the skin of the foot.

Prevention: Toughen the feet daily with a benzoin or saline solution and see to it that shoes and socks fit properly. At the first sign of a "hot spot," cover the area with a band-aid, gauze pad, or piece of mole skin.

Treatment: Puncture the blister from one side with a sterilized knife and force all of the fluid out. Spray an antiseptic benzoin solution under the skin flap and replace the flap. Then cover the area with mole skin. If the blister is such that the epidermis flap does not cover the raw skin beneath it, the blister should be treated as any other open wound. At night, soak the feet in a pan of hot salt water to help toughen the raw areas.

Chapter II

THE DASHES

More than 50 years ago, a brilliant coach and trainer named Michael C. Murphy wrote that successful sprinting requires "a peculiar combination of strength, agility, and nervous energy, and if nature has not blessed the athlete with these attributes, no amount of hard work or coaching can make him a world champion."[5] Coach Murphy's words ring as true today as they did when he was developing champion sprinters at Yale and at the University of Pennsylvania during the early 1900's. Any runner can improve his speed eventually through hard work, no matter how slow he may be to begin with, but the leg speed that is required for championship sprinting is inborn and cannot be acquired through practice.

The Start

Improving a sprinter's start is often a determining factor in the improvement of his over-all dash performance. Obviously, the sprinter who is able to beat his opponent out of the blocks needs to run only as fast as the opponent in order to beat him.

When trying to determine proper block placement for a particular sprinter, remember that different body structures demand different block placements. The front block may be placed anywhere

---

[5] Michael C. Murphy, Athletic Training (New York: Charles Scribner's Sons, 1921) pp. 30-31.

from eight to twenty inches back from the starting line. The back block may be anywhere from twenty to forty-four inches back. The best plan for finding the individual sprinter's most effective block placement is to experiment with several different positions and find which one provides him with the fastest time for 25 yards.

At the command, "Take your marks!", the athlete places his hands on the ground in front of his starting position and backs into the blocks. One at a time, his feet are placed firmly against the blocks with his toes barely touching the ground. Resting on one knee, the sprinter can brush the cinders from his hands if he likes.

The sprinter's hands are then placed behind the line, directly below his shoulders, with thumbs pointed in and fingers pointed out. The elbows are straight, and he is as high on his fingers as possible. (See Figure 1.)

As soon as he is in the blocks, the sprinter rocks forward so that his shoulders are farther forward than his hands. At this point, the hands and arms are supporting much of the sprinter's body weight. With his neck and face relaxed, he is looking no more than six feet down the track.

On the "Set!" command, the sprinter takes a deep breath and raises his hips straight up so that his lead knee forms a right angle. The hips will be from three to six inches higher than his shoulders, depending upon the spacing of his blocks. The closer the blocks to the starting line, the higher his hips must be in the "set" position. (See Figure 2.) The neck is relaxed and the eyes are trained on or near the starting line.

Copies
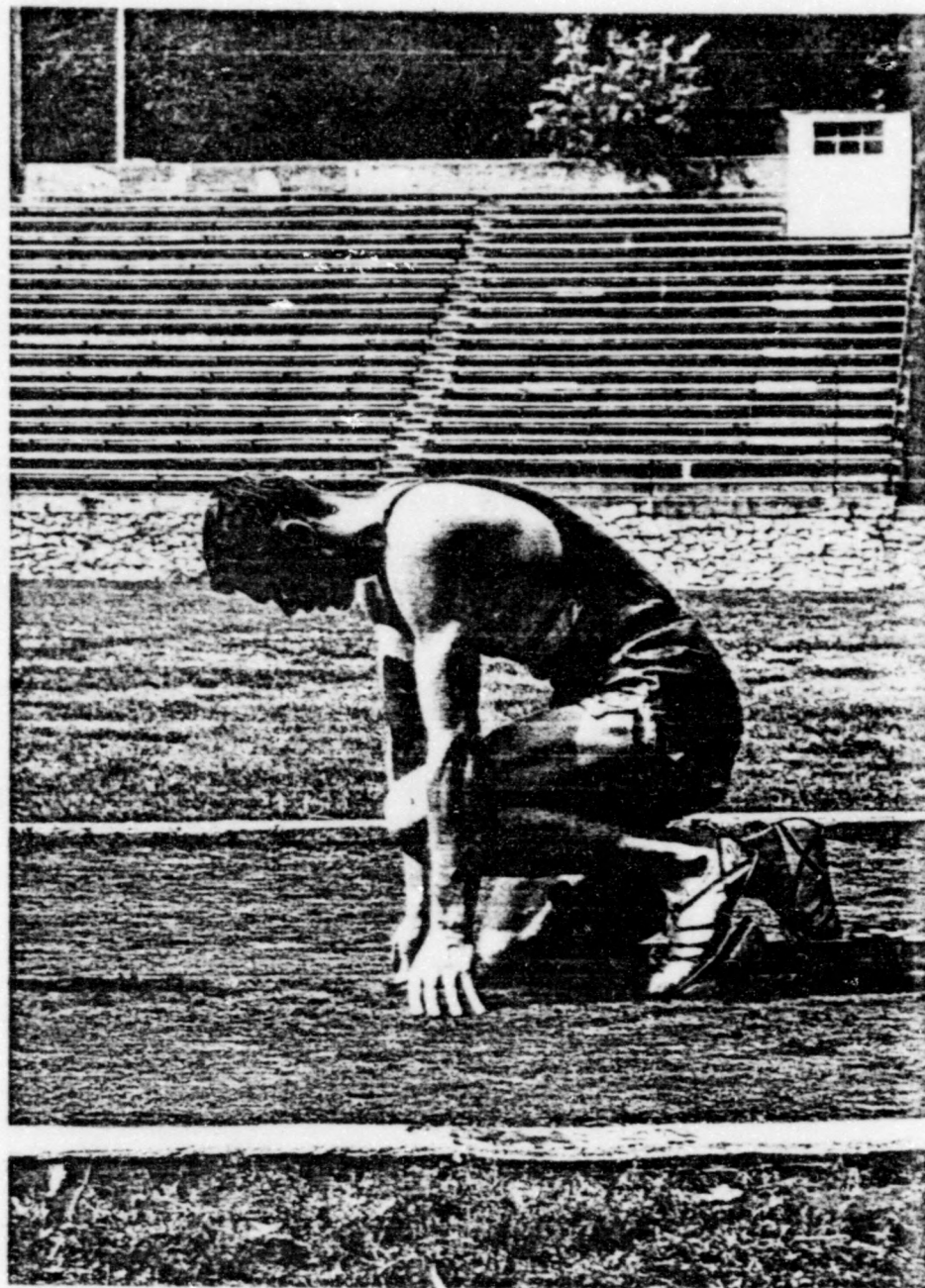# May Not
Film
Well !

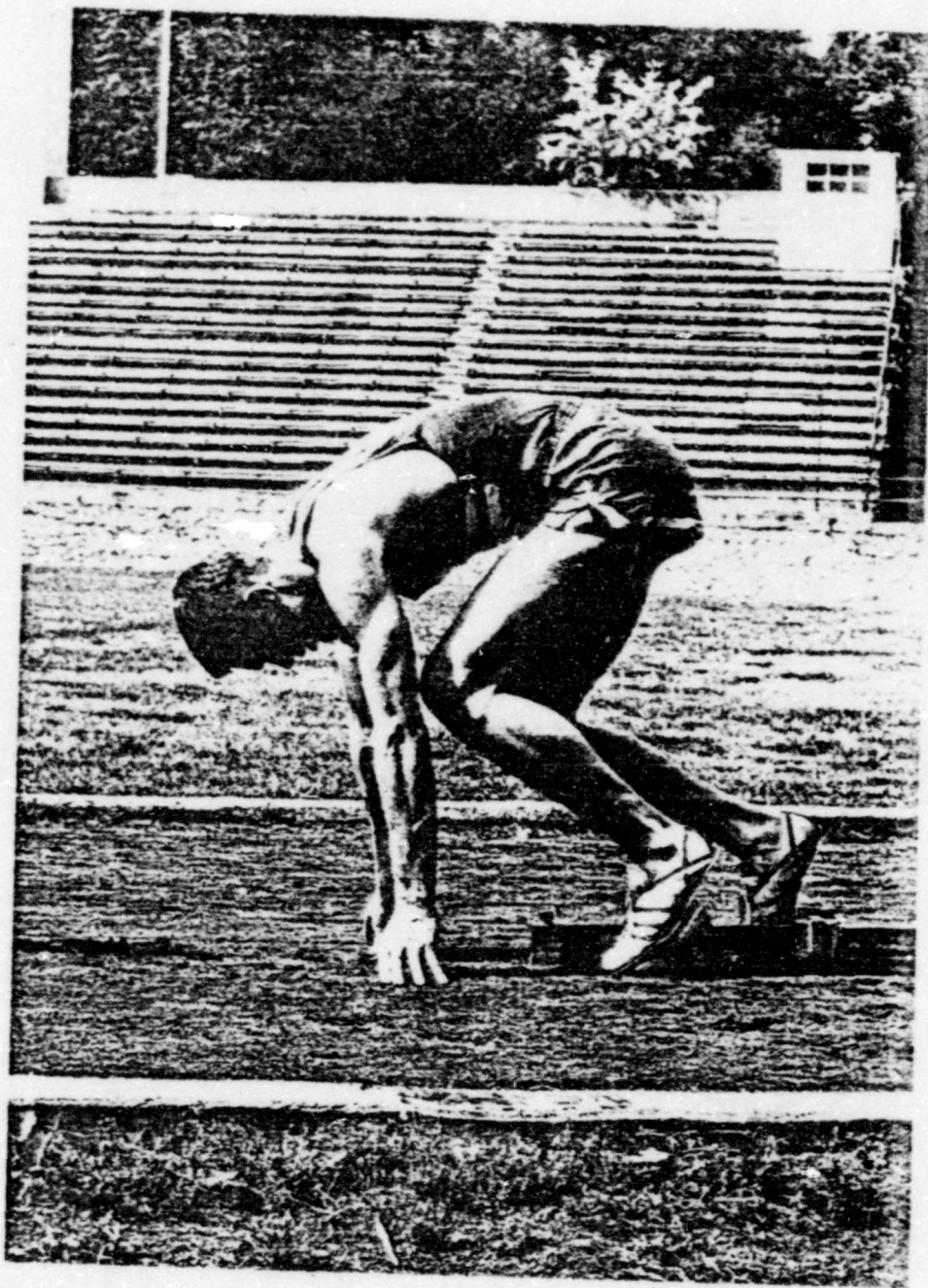Figure 1. The sprinter takes his marks.
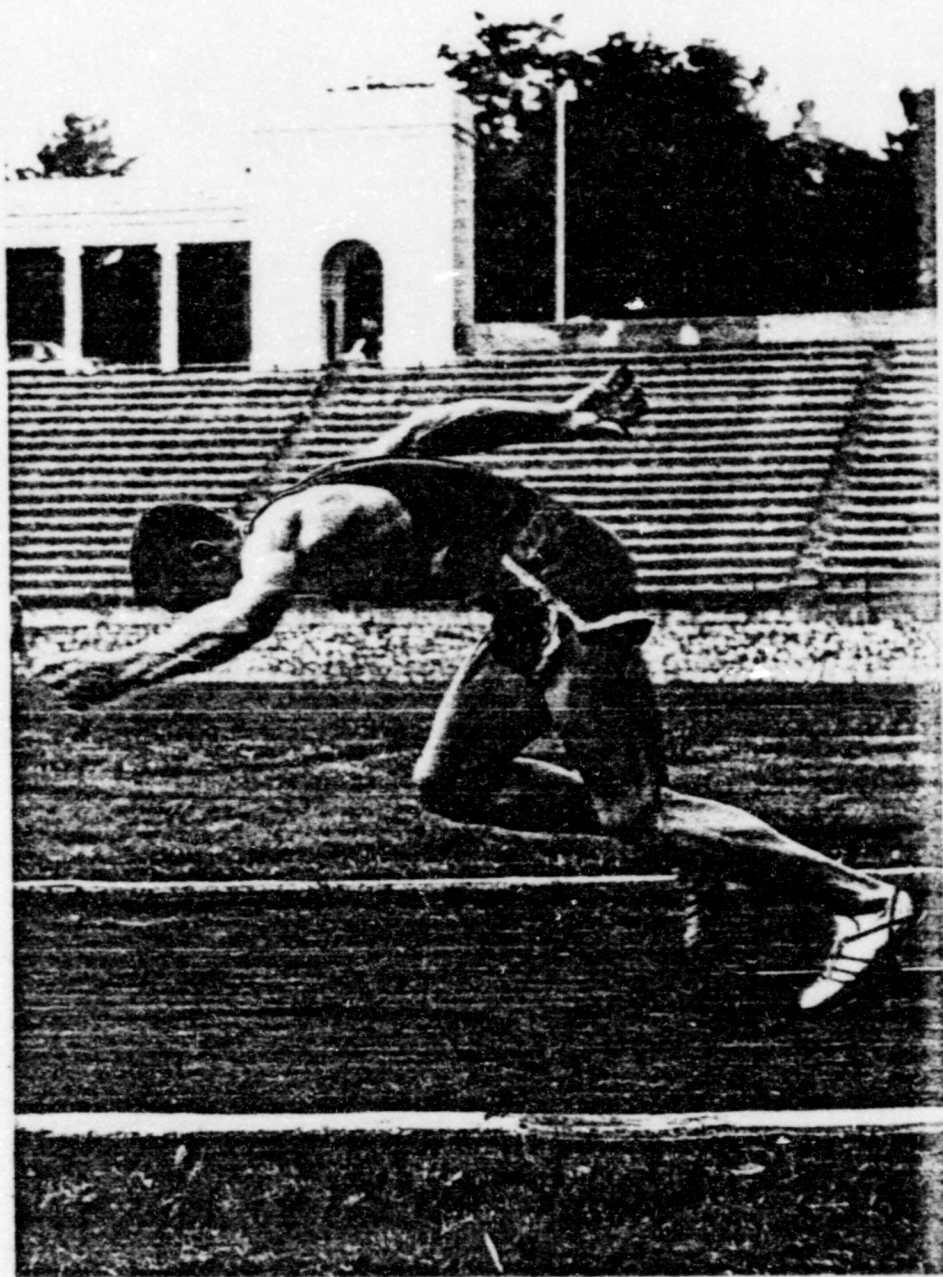
Figure 2. The "set" position.

Figure 3. Driving from the blocks.

At the sound of the gun, the sprinter exhales as he drives
his left arm forward (provided he is starting with his left leg
forward) and swings his right arm back vigorously to a point just
behind the right hip. (See Figure 3.) The right leg comes out low,
fast, and close to the ground.[6]

The Sprinting Action

There are only two ways in which a sprinter is able to
increase his racing speed--by increasing his leg speed or by
increasing the length of his stride. It is obvious, then, that the
sprinter should develop strength (and thus speed) in his legs through
his training program and should practice practice sprinting with as
long a stride as he can efficiently maintain.

High knee lift encourages the proper sprinting lean--approximately
70 degrees. The knee is lifted high, the lower leg swings forward and
is brought quickly down to the ground, the ball of the foot meets the
ground first, the heel touches the ground for an instant, and the
opposite knee is lifted high to complete the cycle. At the same time,
the arms are swung forward and backward in a relaxed, straight-ahead
manner.

The greatest single factor in successful sprinting is over-all
body relaxation. (See page 13.) After record performances, sprinters
often say, "It felt so easy. I seemed to flow along. I wasn't really

[6]Lloyd C. "Bud" Winter, So You Want To Be a Sprinter (San Francisco:
Fearon Publishers, 1956) p. 22.

trying. I can do better..."[7] The importance of relaxation can never be emphasized too much by the coach.

The Finish

There must never be any let up at the finish of a race. With 20 yards to go, the sprinter should take a deep breath and say to himself, "Relax and drive!"

Since many close sprint races are decided right at the finish line, the sprinter must develop an extreme forward lean at the finish to gain a few extra inches on his opponents. He must lean from the waist, throwing his arms back to retain his balance, as much as is possible, and turning his shoulder slightly into the tape. (See Figure 4.) Timing the lean is very important and requires a great deal of practice. If the sprinter's lean is too soon or too late, it will be ineffective and perhaps even detrimental to the finishing drive.

Training for the Dash Events

The sprinter's training program should begin with moderately long, slow repeats with the emphasis on relaxation during the earlier pre-season workouts and then gradually should become more intense. By the beginning of the competitive season, the entire conditioning schedule should consist of repeated speed over short distances. Some

---

[7] Ken Doherty, "Sprinting," Track and Field Movies on Paper, (1957), p. 6.
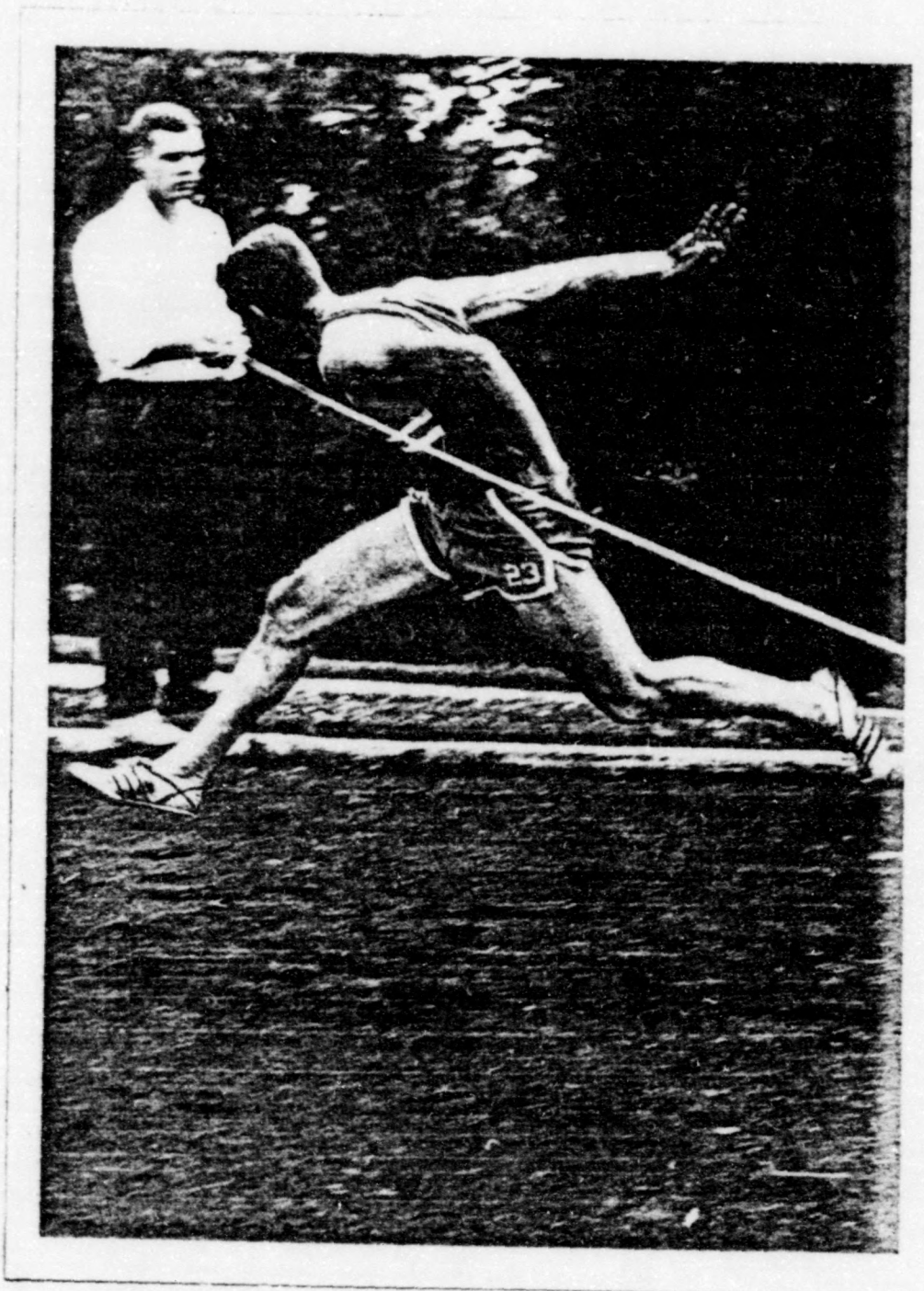
Figure 4. Leaning into the tape.

of the short-distance interval workouts which may be included in the conditioning phase of the sprinter's schedule follow:

1. Repeat 220's at 9/10 speed. Walk 220 and repeat. Continue until fatigued.

2. Step-down 220's. Run each 220 one second faster than the previous one. Slow jog between them.

3. Slow-fast 220's. Stride 150 yards and accelerate to top speed for the final 70 yards. Jog 220 and repeat. Continue until fatigued.

4. Repeat 220's at stride speed. Jog 220 and repeat. Continue until fatigued.

5. 110-yard accelerated runs. Accelerate for 30 yards, run at top speed for 50 yards, decelerate for 30 yards. Jog the turn and repeat. Continue until fatigued.

6. Slow-fast 110's. Stride 55 yards and accelerate to top speed for the final 55 yards. Jog the turn and repeat. Continue until fatigued.

Some of the skill work that may also be included in the sprinter's workout schedule follows:

1. Gun starts for form. (Only after warming up thoroughly.) Drive out for 15 yards. Walk back and repeat.

2. Repeat 220's, 330's, or 440's at stride speed, concentrating on a combination of speed and relaxation.

3. Repeat short runs through a finish tape, practicing the extreme forward lean from the waist.

4. Repeat baton passes.

Chapter III

THE MIDDLE DISTANCE RACES

A core of good middle distance runners can provide the nucleus for a powerful track team. Often, quarter- and half-milers are called upon by the coach to run (and score in) any event from the 100 to the mile, even including the hurdle races occasionally, and may also provide the team with many of its relay team members. The alert coach spends a great deal of time in the development and training of his middle distance men.

Running the Middle Distances

The quarter- and half-mile races are each a blend of speed and endurance--the 440 requiring greater emphasis on speed, and the 880, greater emphasis on endurance. To run either distance well, the runner must be able, through an easy, relaxed style, to carry a near-sprinting speed over a greater than sprinting distance. As Dave Rankin, track coach at Purdue University, so aptly stated, "It is not the distance that 'kills' runners, but, rather, the attempt to sustain a certain speed over a particular distance."[8]

In order to turn in the best possible time in competition, the runner must cover the first half of the middle distance race fast-- usually at least one second, and occasionally as much as three seconds,

---

[8]Dave Rankin, "Trends in Middle Distance and Distance Running," Journal of Health-Physical Education-Recreation, (May-June, 1959), p. 54.

faster than the last half of the race. The middle distance runner who loafs through the early stages of his race will find it impossible to accelerate enough in the latter stages to turn in his fastest possible time.

Since many 440 races are now run in lanes all the way, the quarter-miler will have to spend some additional time learning to run his race race rather mechanically, will little regard for his opponents until the final stretch drive. Since he may not be able to judge his opponents' pace during the race, the quarter-miler will have to learn to pace himself accurately for the first 330 yards so that he does not, because of either his excitement or cautiousness, run too fast or too slow.

Arm Action

One of the most important physical functions of a middle distance runner, and often the most neglected, is arm action. Many coaches tend to undervalue arm action in the 440 or 880, when a boy actually can become a much improved runner through the proper use of his arms.

Because so much energy is used in so short a time, the 440 has long been regarded the most grueling event in track and field. A quarter-miler who expends enough energy to be in good position at the 330 mark often is not able to add a finishing drive that is comparable to the first three-quarters of his race. The same is true of the fast-starting half-miler who finds himself too tired at the 660 mark to muster a hard-finishing drive.

Copies
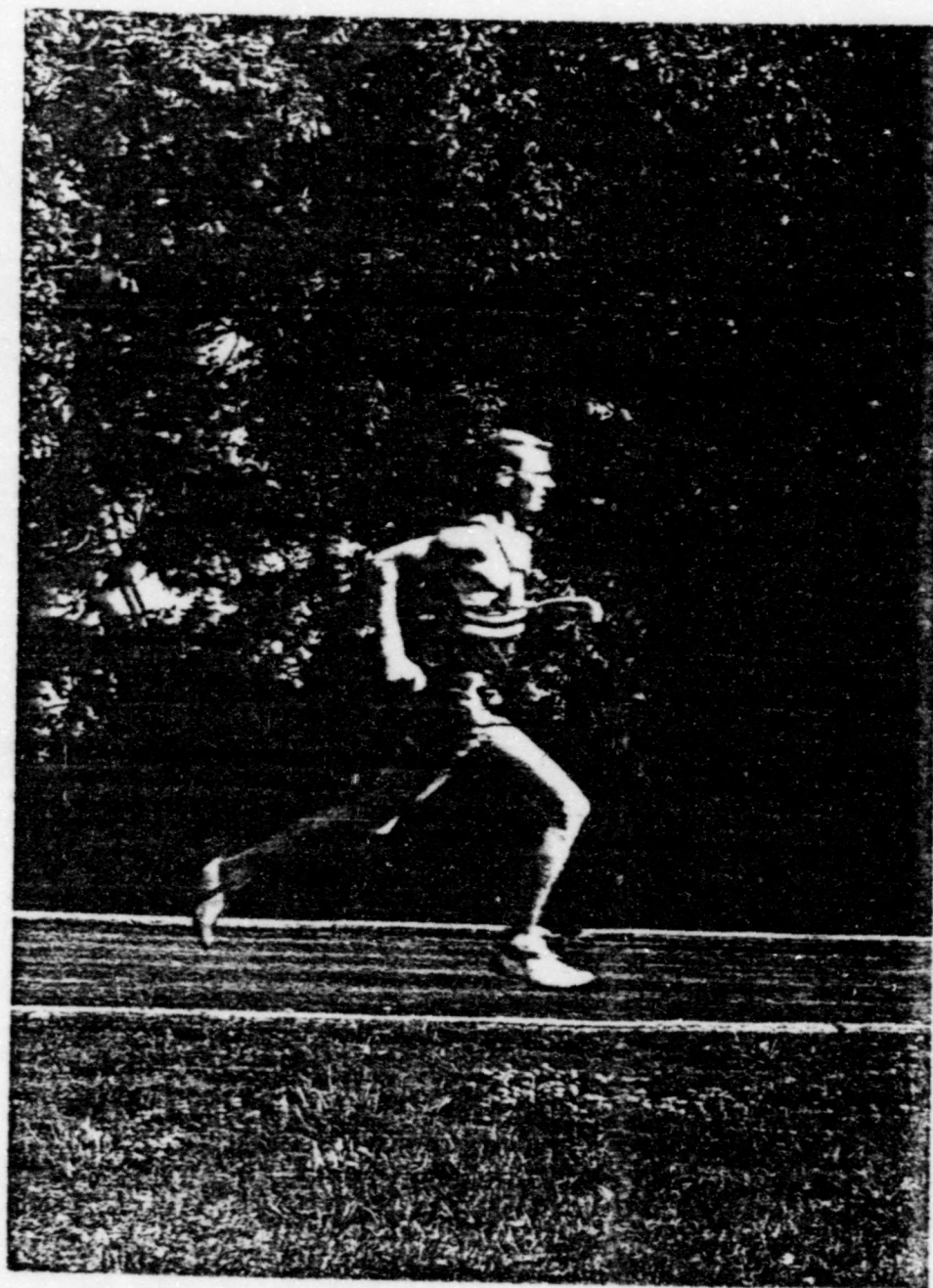## May Not
Film
Well !

Figure 5. The middle distance runner must be able, through an easy, relaxed style, to carry a near-sprinting speed over a greater than sprinting distance.

Quarter- and half-milers should be able to maintain good speed throughout their races by utilizing three distinct styles of arm action. From the time the race starts until they reach their racing pace, they use their arms like sprinters. Then they change to a relaxed, bouncing style which is maintained throughout the greater part of the distance. Finally, they finish the race by greatly exaggerating the swing of their arms in the final drive to the finish line.

At the sound of the gun, the runner drives from the blocks, accelerating rapidly until he reaches his racing speed. (Many coaches are rather reluctant to have their 440 and 880 men come out of the blocks at top speed since they feel that a boy will use some of the physical strength needed later in the race. Actually, however, nervous energy which is stored up for the start carries the runner through this opening drive with little, if any, loss of physical strength.)

After the initial burst, the runner settles into a relaxed style of running, sustaining the speed that he has built up coming out of the blocks, but without using nearly as much energy. The steps are short and rapid. The arms are not just swung, but are bounced with each stride so that the upper arms and shoulders are actually massaged and kept loose.

When the runner begins to tire in the latter stages of the race because of the fast pace he has set for himself, he should begin to exaggerate his arm action by swinging his hands up to a point in front of his eyes. This action prevents his arms and shoulders from

tying up in the final run for the tape. While exaggerating the arm swing, he also lifts his knees, picking them up and putting them down as rapidly as he is able. To make sure he never slows down at the tape, he must continue his drive to a point five yards past the finish line.[9]

Upper body strength is of the utmost importance in the middle distance races, particularly during the final stretch drive when the runner's passive arm action must suddenly become active. Therefore, a program of weight training or a combination program of weight training and isometric contraction geared for upper body development should be maintained on an every-other-day or twice-a-week basis throughout the year. (See pages 13-18.)

Training for the Middle Distance Races

The modern middle distance champion trains the year around. A typical schedule calls for a heavy program of strength and endurance building during cross country season, progressive interval work during the winter and spring, and a less-intense training program during the summer months.

In a sound program of interval training (described in detail on pages 4-7), the coach, taking the athlete's ability and physical condition into consideration, decides the time that the quarter- or half-miler should hit in his next competitive race, and then multiplies that time by the fraction of the race distance this is to be run. A

---

[9] Tom Ecker, "Arm Action in the 440," Athletic Journal, (March, 1960), pp. 50-51.

54-second quarter-miler would run 110's in :13.5, 220's in :27, and
330's in :40.5. A 2:04 half-miler would run 110's in :13.5, 220's
in :31, 330's in :46.5, 440's in 1:02, 550's in 1:17.5, and 660's in
1:33. (It should be noted here that the longer the athlete's
competitive race, the greater the variety of workouts available to
him.)

No matter what the athlete's potential or the stage of his
development, the interval workout can be adapted to him. For example,
a group of quarter-milers, ranging in potential from 48 to 58 seconds,
can all take the same workout at the same time. They all run the
same distance at their own pre-determined pace, take the same
approximate rest during the jogging interval (the slower runners
actually get a bit less rest), and run as many repeats as they can.

Every middle distance runner should conclude his workout (after
reaching the point of fatigue with his interval work) with repeat
110-yard dashes, emphasizing the swing of his arms and the lifting of
his knees. This added speed work will train the runner's body to
react with speed at the conclusion of the race when he might other-
wise be too fatigued to continue with a hard-finishing drive.

Some of the interval workouts which may be included in the
conditioning phase of the quarter-milers schedule follow:

1. Repeat 110's at pace. Jog the turn and repeat. Continue
   until fatigued.

2. Repeat 220's at pace. Jog 220 and repeat. Continue until
   fatigued.

3. Repeat 330's at pace. Jog 110 slowly and repeat. Continue
   until fatigued.

4. Step-down 220's. Run each 220 one second faster than the previous one. Slow jog between them.

5. Slow-fast 220's. Stride 150 yards and accelerate to top speed for the final 70 yards. Jog 220 and repeat. Continue until fatigued.

6. Up-and-down repeats. Run a 110, 220, 330, 220, 110, all at pace. Slow jog between them.

7. 110-yard straightaways. (Usually done at the conclusion of the regular conditioning workout.) Emphasize arm swing and knee lift. Jog the turn and repeat.

Some of the interval workouts which may be included in the conditioning phase of the half-miler's schedule follow:

1. Repeat 110's at pace. Jog the turn and repeat. Continue until fatigued.

2. Repeat 220's at pace. Jog 220 and repeat. Continue until fatigued.

3. Repeat 330's at pace. Jog 110 slowly and repeat. Continue until fatigued.

4. Repeat 440's at pace. Jog back slowly and repeat. Continue until fatigued.

5. Repeat 550's at pace. Jog back slowly and repeat. Continue until fatigued.

6. Repeat 660's at pace. Jog 220 slowly and repeat. Continue until fatigued.

7. Step-down 220's. Run each 220 one second faster than the previous one. Slow jog between them.

8. Step-down 440's. Run each 440 one second faster than the previous one. Slow jog between them.

9. Slow-fast 220's. Stride 150 yards and accelerate to top speed for the final 70 yards. Jog 220 and repeat. Continue until fatigued.

10. Slow-fast 440's. Stride 330 yards and accelerate to top speed for the final 110 yards. Jog 220 and repeat. Continue until fatigued.

11. Up-and-down repeats. Run a 220, 440, 660, 440, and 220, all at pace. Slow jog between them.

12. 110-yard straightaways. (Usually done at the conclusion of the regualar conditioning workout.) Emphasize arm swing and knee lift. Jog the turn and repeat.

Chapter IV

THE MILE RUN

In distance running, more than in any other area of track and field, year around training is essential for success. The only way to successfully condition the body for running long distances is to undertake a continuing, log range program of running.

Unfortunately, many high school track coaches are primarily football and basketball coaches who receive a little extra pay for coaching the school's track squad in the spring. Therefore, the track program usually begins when the basketball season ends and is concluded when school is out, giving the team's milers a maximum of two-and-one-half months a year to train. Any coach who has his milers train for only a fraction of a year can expect to turn out milers who develop to only a fraction on their potential. Obviously, a year-round conditioning program will produce a far better runner than a program that begins in March and ends in June.

Some coaches have insisted that continuous running makes athletes "stale" and unable to perform to capacity. This theory is completely unfounded. It may well be true that a monotonous schedule of day-in and day-out running will tire the athlete and make him wish for a vacation, but the staleness incurred is mental-- not physical.

Franz Stampfl, one of the truly great international coaches, feels that repeated training in track can be compared with training

in many other fields of endeavor. "The child learning to write, the pianist who practises _sic_ for six hours a day, the bricklayer laying bricks--the work of these people does not deteriorate as a result of constant repetition of the same movements. Instead, it becomes progressively better until it reaches the peak of which the individual is capable."[10]

This does not mean, however, that the runner should not be given a day off occasionally. As in any type of work, the worker needs a vacation once in a while. A well-deserved rest will often cause a hard-working athlete to bounce back with renewed enthusiasm and drive in his workouts.

Characteristics of the Miler

Of all of the physical characteristics that are commonly mentioned in the description of athletes--size, leg speed, strength, and agility--only strength is absolutely essential in distance running. Some successful milers are tall and some are short. Some have great innate speed and some are relatively slow. Some are loose and agile and some seem somewhat uncoordinated. But all of the great milers of today are strong of body. And the strength that is so important in distance running can be developed by the runner-- both strength in the voluntary muscles of his body and strength of heart--through his conditioning program. (See Interval Training, pages 4-7, and Weight Training, pages 13-16.)

---

[10]Franz Stampfl, _Franz Stampfl on Running_ (London: Herbert Jenkins Limited, 1955) p. 40.

The other big factor in determining how great a miler can become is not physical at all. It is the runner's attitude toward distance running. The boy with great determination--the one who has the courage to continue when it would be much easier for him to quit-- has the attitude that is desired of all distance runners. He must convince himself that only through a program of hard work can he become a great miler. According to Bill Bowerman, the highly successful coach at the University of Oregon, "In order to develop a miler, the coach must have a man who has some ability and a great deal of determination."[11]

Running the Mile

There are two general types of milers--those who set the pace and those who follow the pace. The pace-setter runs by the watch, hitting each 220 on or near the pre-determined time. The pace-follower leaves the pace-setting chore to others and relies on his strong finish to win races for him.

Tactically, following the pace and "waiting for the kill" at the conclusion of a race is sound, as long as the miler is sure that he can outsprint his opponents in the stretch drive. If he is not sure of his own finishing "kick," however, he might be wiser to pick up the pace and try to lose his opponents earlier in the race. In either case, he will learn after a few races which plan is better for him.

---

[11] Bill Bowerman, "Mile Mechanics and Training Techniques," Athletic Journal, (December, 1959), p. 8.

Copies
May Not
Film
Well !

Figure 6. The miler must develop a relaxed,
efficient style for competition.

The importance of pace-consciousness cannot be overemphasized. If the miler happens to set a pace that is too fast for him and he has to slow down later, or toos slow for him and he has to pick up the pace later, he will not run as fast as if he had allowed his energy to be expended evenly throughout the race.

To show the importance of proper pace as a means of conserving energy, there is the timeworn example of the three milers of equal ability who raced one day. Runner A set an even pace and held it throughout the race. Runner B set a pace that was too fast for him, but his plan was to discourage his opponents with his early lead, and then fight off challengers at the end of the race. Runner C set a slower pace than he was capable of maintaining, so he could conserve energy for $3\frac{1}{2}$ laps and then finish with a burst of speed.

At the end of the race, Runner A won handily, Runner B, completely exhausted, was several yards behind, struggling to finish, and Runner C was finishing strong, hoping to nip Runner B for second place. Proper pace, you see, can be very important. However, it must be remembered that it is sometimes good tactics to run the race with more regard for the opposition than for the proper pace.

Passing technique has been the subject of much controversy during the past few years. Many coaches tell their milers to pass with a burst of speed and take the "heart" out of their opponents. But since a sudden burst of speed expends more energy than constant running, easing by an opponent is definitely more economical.[12] However, if the

---

[12] Brutus Hamilton, Championship Track and Field By 12 Great Coaches, ed. Tom Ecker (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961) p. 57.

psychological advantage gained by passing suddenly and unexpectedly outweighs the accompanying loss of energy, then the technique of passing with speed is sound. The decision in each case will have to be made during the race by the individual runner.

Training for the Mile

When training a miler, the coach must stress endurance. Any miler has the speed and strength to run a 65-second quarter mile. But to be able to run a 4:20 mile, the miler must build his endurance to the point where he can put four 65-second quarters together. Therefore, his problem is one of endurance, not speed. According to Rankin, "In races with hard, consistent paces, the ability to run faster in the latter stages of the race is due to strength and endurance, and not to leg speed."[13]

The basis of the miler's workouts should be a strict program of interval training. (See pages 4-7.) Taking the athlete's ability and physical condition into consideration, the coach decides the time the miler should hit in his next competitive race, and then multiplies that time by the fraction of the race distance that is to be run. A 4:32 miler, for example, would run 110's in :17, 220's in :34, 330's in :51, 440's in 1:08, 660's in 1:42, 880's in 2:16, and 1320's in 3:24.

All of the miler's workouts should be concluded (after reaching the point of fatigue with his interval work) with repeat 110-yard dashes, emphasizing the swing of his arms and the lifting of his knees.

---

[13] Rankin, Journal of Health-Physical Education-Recreation, 54.

This added speed work will train the runner's body to react with speed

at the conlusion of a race when he might otherwise be too exhausted

to continue with a hard-finishing drive.

Some of the interval workouts which may be included in the miler's

schedule follow:

1. Repeat 110's at pace. Jog the turn and repeat. Continue until fatigued.

2. Repeat 220's at pace. Jog 220 and repeat. Continue until fatigued.

3. Repeat 330's at pace. Jog 110 slowly and repeat. Continue until fatigued.

4. Repeat 440's at pace. Jog back slowly and repeat. Continue until fatigued.

5. Repeat 660's at pace. Jog 220 slowly and repeat. Continue until fatigued.

6. Repeat 880's at pace. Jog 3-5 minutes and repeat. Continue until fatigued.

7. Repeat 1320's at pace. Jog 5 minutes and repeat once.

8. Step-down 220's. Run each 220 one second faster than the previous one. Slow jog between them.

9. Step-down 440's. Run each 440 one second faster than the previous one. Slow jog between them.

10. Slow-fast 220's. Stride 150 yards and accelerate to top speed for the final 70 yards. Jog 220 and repeat. Continue until fatigued.

11. Slow-fast 440's. Stride 330 yards and accelerate to top speed for the final 110 yards. Jog 440 and repeat. Continue until fatigued.

12. Up-and-down repeats. Run a 440, 660, 880, 660, and 440, all at pace. Slow jog between them.

13. 110-yard straightaways. (Usually done at the conclusion of the regular conditioning workout.) Emphasize arm swing and knee lift. Jog the turn and repeat.

Chapter V

THE HURDLE RACES

Size, strength, speed, agility, and competitive spirit are all important facets of hurdling. The ideal hurdler is as big and strong as a football end, as fast as a sprinter, as loose as a gymnast, and as quick and energetic as a flyweight boxer. There have been small hurdlers, certainly, just as there have been small basketball players. And there have been hurdlers who were not particularly speedy or strong or loose in the hips. But the hurdler who does not have these physical characteristics is like "Thursday's Child"—he has far to go because he is forfeiting something to those who have the more ideal physical make-up. On the other hand, the hurdler who has ALL of these characteristics obviously does not have as far to go.

Running the Highs

The high hurdler's start is usually the same as the sprinter's. The only adjustment that a hurdler might have to make when coming out of the blocks would be to compensate for a very short or a very long stride. Since the distance to the first hurdle is constant (15 yards) and all hurdlers do not have the same length of leg, it is obvious that a slight adjustment in stride length might have to be made by some hurdlers. Shorter hurdlers often have to stretch a little to make eight strides to the first hurdle. (An exaggerated arm

swing or an increase in speed from the blocks will help lengthen the
athlete's stride.) Some taller hurdlers have to cut down their
stride length slightly or may even have to start with the opposite foot
ahead and take only seven strides to the first hurdle.

A runner's length of stride during any given race is determined
by his speed during that race. The faster an athlete runs, the longer
his "natural stride." If the hurdler's speed is built up during the
race, his steps will come without stretching. If he begins to slow
down, however, he will be forced to stretch to make his steps.
Therefore, it is essential that the hurdler get a fast start, obtaining
top speed by hurdle number one, and maintain his speed, as much as
is physically possible, throughout the rest of the race.

Proper high hurdling form involves a few body contortions.
The hurdler must be able to blend an exaggerated lead step and a very
awkward-looking trailing step into one continuous movement, without
losing his balance or speed. (This hurdling action can be very
discouraging to a beginner, since it always feels more awkward than
it looks.)

As the hurdler reaches each barrier, the knee of his lead leg
is lifted and the lower part of the leg swings forward and up, into a
near-straight position. The heel and the entire underside of the
leading leg barely clear the hurdle. (See Figure 7.)

The trail leg swings around into a horizontal position for an
instant as it clears the hurdle, and then swings on up into an
elongated stride. There should never be any hesitation of the trailing
leg during the hurdling action. It should be treated merely as an

Copies May Not Film Well !

Figure 7. Clearing a high.

exaggerated step, with the underside of the thigh, knee, ankle, and foot barely clearing the top bar of the hurdle. The eventual feeling should be of running through, not over, the hurdles.

During the hurdling action, the upper body dips forward into a diving position. Proper arm action at this point not only facilitates the dipping motion, but aids greatly in keeping the hurdler in better balance throughout the race. The lead arm is thrust forward, parallel with the lead leg, and the opposite arm can either be swung back to further exaggerate the normal arm swing, which often keeps the hurdler in better balance, or it can be thrust forward along with the lead arm to bring about a more pronounced forward lean.

Hurdling is a sprinting action--not a series of jumps.[14] The hurdler should depart from his basic sprinting form only briefly as each barrier is cleared, and then return to the sprint action immediately. A hurdler's speed comes while he is on the ground, not while he is in the air, so he should spend as little of the total race time as possible in clearing the hurdles.[15]

Rhythm is one of the most important components of hurdling success. The beginner may jump and lope his way through a high hurdle race, but his eventual aim must be to develop the proper rhythm--"One, two, three and over; one, two, three and over...;" not, "a-one, two, three; a-one, two, three..." Developing the hurdler's balance over the hurdles and speed between them will cause the proper rhythm to emerge.

---

[14]Frank Sharpley, "Teaching Beginners to Hurdle," Track Technique, (June, 1961), p. 119.

[15]Larry Snyder, Championship Track and Field By 12 Great Coaches, ed. Tom Ecker (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961) p. 68.

The Beginning High Hurdler

Unlike many of the track and field events, the high hurdles can be won by boys who do not have a great amount of innate speed, are not exceptionally loose and agile, and whose legs seem to be far too short to get over the 39-inch barriers. Because relatively few young athletes take up the hurdle events, and since very few of those train very seriously, high hurdling is one of the few events of track and field in which a boy of just average ability can occasionally score points in dual meets, and may even win a race now and then.

The boys who have been chosen to try the hurdles should spend at least a week on bending and stretching exercises before attempting to go over a hurdle. Every muscle that will come into play during the hurdling action should be stretched daily during this "pre-hurdling" period.

When the beginning hurdlers are finally ready to try their hand at their new event, the coach should set up a low and let them jump over it, with complete disregard for speed or form. Usually, the leg that the beginner jumps from in this simple test is his natural jumping leg. Because so many boys play basketball and are used to jumping from the left foot when shooting lay-ups (provided they are right-handed), most right-handed boys favor hurdling off the left foot. However, if the beginner does not seem to have a preference, he should be encouraged to lead with his left, since using the left lead leg will give him a decided advantage over "right-handed" hurdlers in

the curve-run low hurdle races or in the intermediate hurdles later on.

The novice hurdler should begin by running repeatedly over a low hurdle--one that will tip or collapse easily. (His form over the hurdle in these early stages of development will probably leave much to be desired, but he must be encouraged to continue working toward perfection. Often, the hurdler is his own worst critic, since the hurdling action seldom feels as smooth as it looks.)

Some of the more serious form problems in the early stages of hurdling include the following:

1. Lead leg swinging around to clear the hurdle.

2. Arms not coordinated with the body.

3. Body weight too high.

4. Trail leg not swinging around correctly.

5. Body out of balance because the lead foot did not land properly.

As each runner clears the hurdle, the coach should find something good to say about his form and pick out just one of his faults, telling him how it may be corrected on the next try. Often, after the hurdler has gained some experience, a word of praise is all that will be necessary.

When the low hurdling technique has been mastered, the hurdlers will be anxious to try going over a high. It is during this early work over a high hurdle that most hurdlers begin to realize just how much pain they are going to have to be able to endure if they are going to stay with the hurdle events. During a typical run-through,

the hurdler may bang the hurdle with his trailing knee, causing it to ache and swell. On his next run-through he may lift his knee a little higher and slam the hurdle with his ankle, bruising it severely. Occasionally, he may even hook the heel of his lead foot or the toe of his trailing foot on the hurdle, causing a serious spill onto the grass or into the cinders.[16]

Many hurdlers tape protective pads to their knees and ankles to prevent aggravation of already-injured areas. The knee pad, usually a piece of foam rubber, is placed over the bruise on the inside of the knee and is strapped just below the knee with a single band of tape. The ankle pad, a smaller piece of foam rubber, is placed over the inside of the ankle and strapped to the leg just above the ankle. To further ease the pain of hurdle accidents, some coaches even pad the top bar of practice hurdles or have them built to they will collapse easily when they are hit.

One of the biggest obstacles facing the hurdler (besides the hurdle itself, of course) is getting his steps right to the first hurdle and between hurdles. The novice can begin by practicing starts over one low hurdle set 15 yards from the starting line. After several successful starts over one low, a second hurdle may be placed ten yards beyond the first so that the hurdler can attempt a few starts over two, practicing his eight strides to the first barrier and three steps between them. (The three steps will probably not come easy to the beginner at this point unless he is reasonably fresh and is running at top speed.)

---

[16]Larry Snyder, "From the Lows to the Highs," Athletic Journal, (April, 1958), p. 21.

The beginner should never be allowed to take four or five steps between the hurdles when he is racing. If he is unable to make the second hurdle with the conventional three strides, the coach should bring the second hurdle closer to the first until the hurdler is used to the three-step action. Then, as he increases his speed and the steps come easier for him, the distance between the hurdles can be increased to the full ten yards. The hurdler will then be ready to try the highs--one at first, then two spaced eight or nine yards apart, and finally two at top speed with the standard ten-yard spacing.

The beginning hurdler does not often have the strength or endurance to maintain his three-step hurdling rhythm throughout an entire flight of highs. As he begins to tire and slow down, the hurdler's stride will usually shorten slightly, making it more difficult for him to make each succeeding hurdle. Endurance work-- repeat runs of 110, 220, or 330 yards and repeated weight lifts to develop the arms and upper body--will condition the hurdler's body and will, in time, enable him to run as fast at the finish of the race as he does at the start.

Running the Lows

The low hurdle race is more a race of speed than of form. In fact, many of the all-time great low hurdlers were not high hurdlers at all, but were dashmen who ran the lows as an extra "sprint event."

Since speed is so important in the lows, the runner must clear each barrier in as little time as possible and use every stride between

the hurdles to gain speed. As the hurdler reaches each barrier, his lead leg swings forward and up, as in the high hurdles, but the step over the hurdle is not nearly as pronounced as it is when clearing a high. (See Figure 8.) The trail leg swings around, also as in the highs, but it swings outside and under the body. Again the trailing step is little more than an exaggerated stride, with no hesitation in its motion as it clears the hurdle.

Rhythm plays an important part in low hurdling, too, as it does in the highs. The hurdler should count to himself as he runs, "One, two, three, four, five, six, seven, over; one, two, three, four, five, six, seven, over..."

The Beginning Low Hurdler

The low hurdler should begin by practicing starts over one low hurdle set 20 yards from the starting line. After several successful starts over one hurdle, a second hurdle should be placed 20 yards beyond the first one so that the hurdler can practice his ten-stride approach to the first barrier and seven-stride pattern between them.

If the hurdler is unable to make the second hurdle in seven strides at this point, an increase in speed or an exaggeration of the arm action between hurdles may facilitate the lengthening of his stride. If he still has trouble, the distance between the hurdles may be shortened by a yard of two until the seven-step pattern begins to come more easily for him.

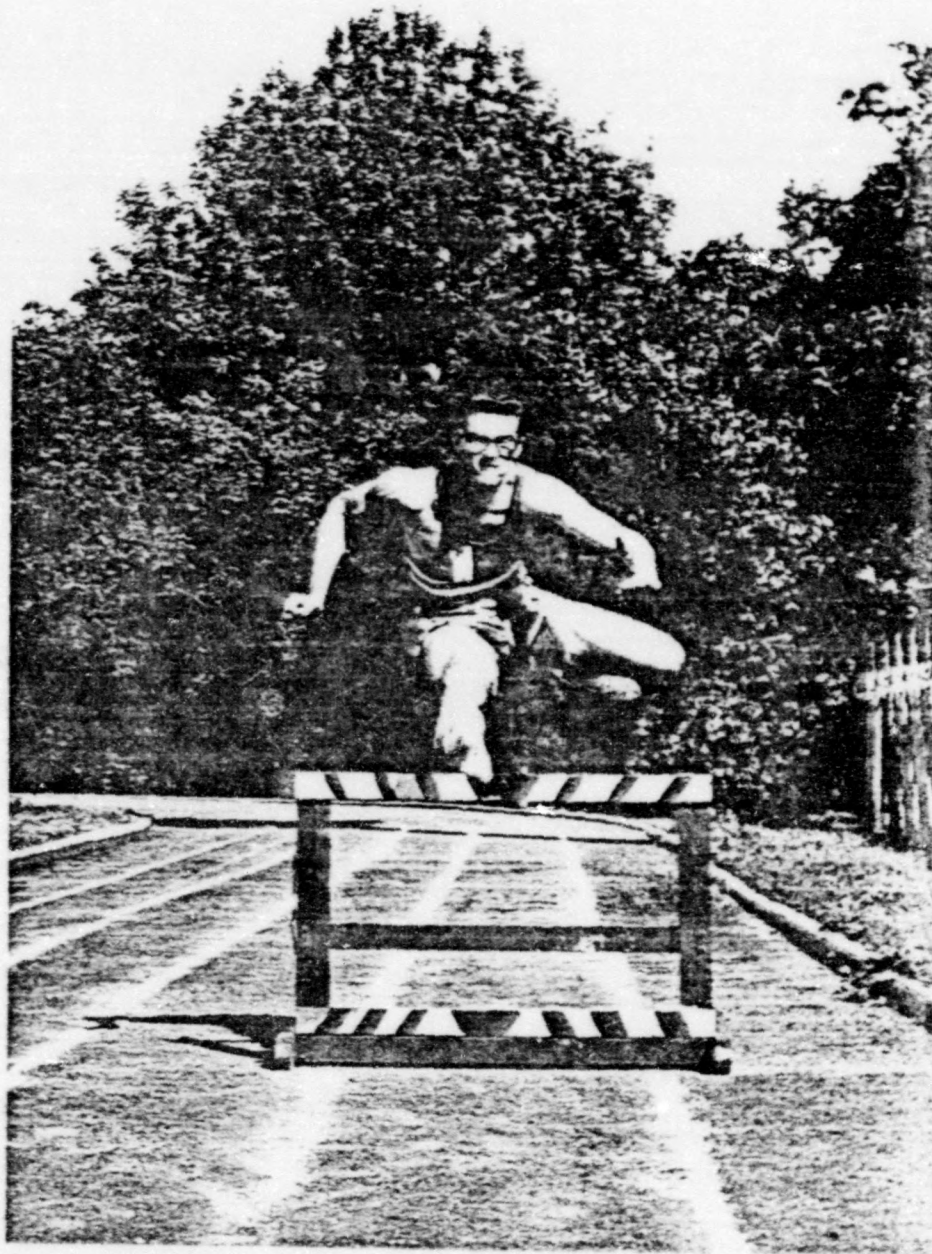# Copies
May Not
Film
Well !

Figure 8. Clearing a low.

The beginner must remember that form is not nearly as important in low hurdling as speed, coordination, and balance. The low hurdler's primary thoughts should be of clearing each hurdle in as little time as possible and of maintaining top speed throughout the race.

Training for the Hurdle Events

Because of the complexity of his events, the hurdler must work much harder than the ordinary short-distance runner. He must not only work on improving his physical condition, but he must also spend many additional hours perfecting his technique, a phase of running that is more important in hurdling than in any of the other track events.

Because of the unnatural strain that hurdling puts on certain skeletal muscles, each of these muscles must be loosened gradually before each workout session or race. Some of the better muscle-stretching exercises follow:

1. Kicking high with each leg; gradually at first--then more vigorously. (See Figure 9.)

2. Sitting on the ground in the hurdling position and bending forward. (See Figure 10.)

3. While in a standing position, pulling the trail knee up to the chest. (See Figure 11.)

4. While standing with the lower half of the trail leg resting along the top bar of the hurdle, bending forward and touching the ground with the lead hand. (See Figure 12.)

5. While facing a high hurdle, placing the lead foot on the top bar of the hurdle and bending forward, touching the lead foot with the lead hand. (See Figure 13.)

Copies

May Not
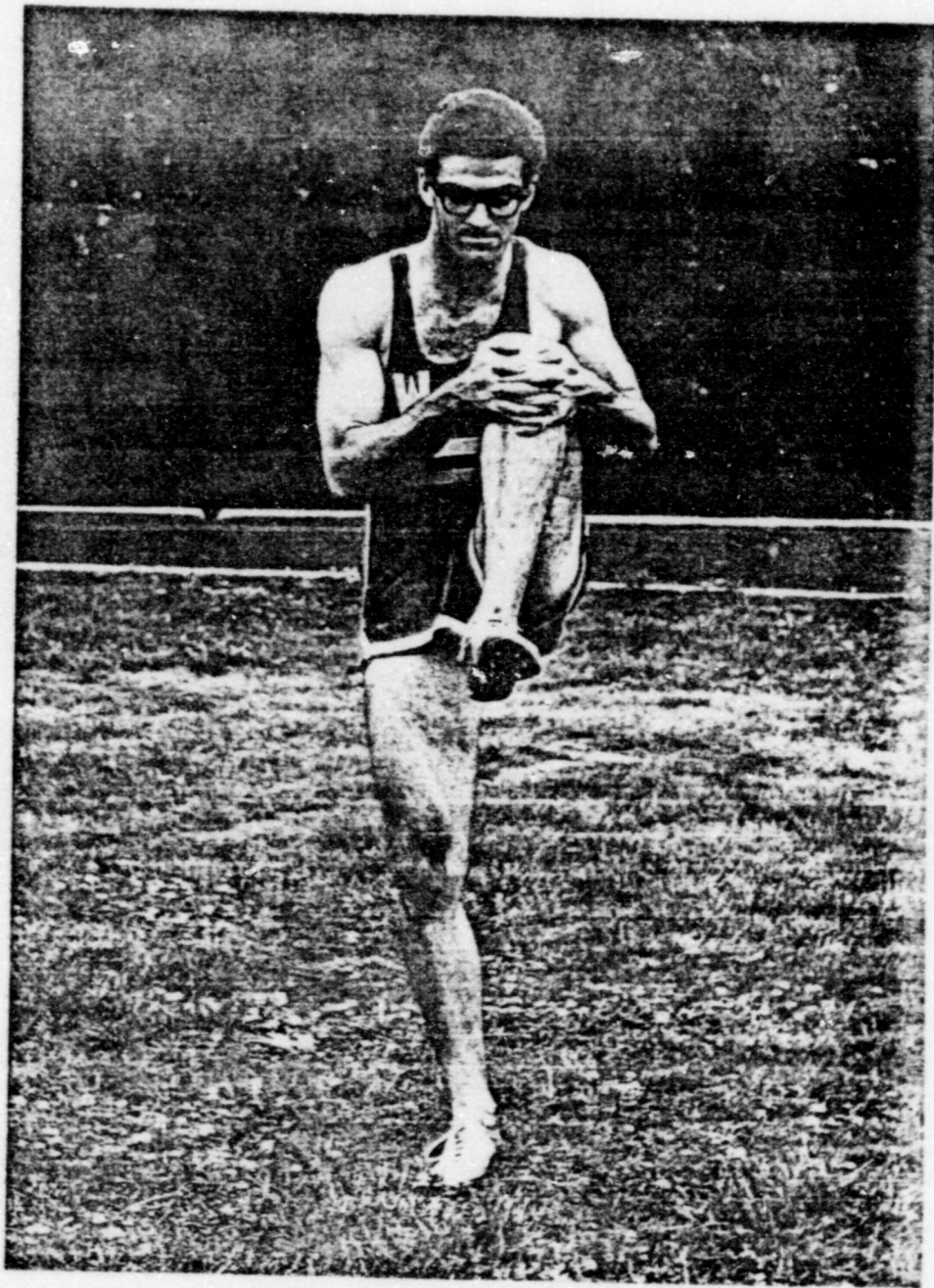
Film

Well !

Figure 9.
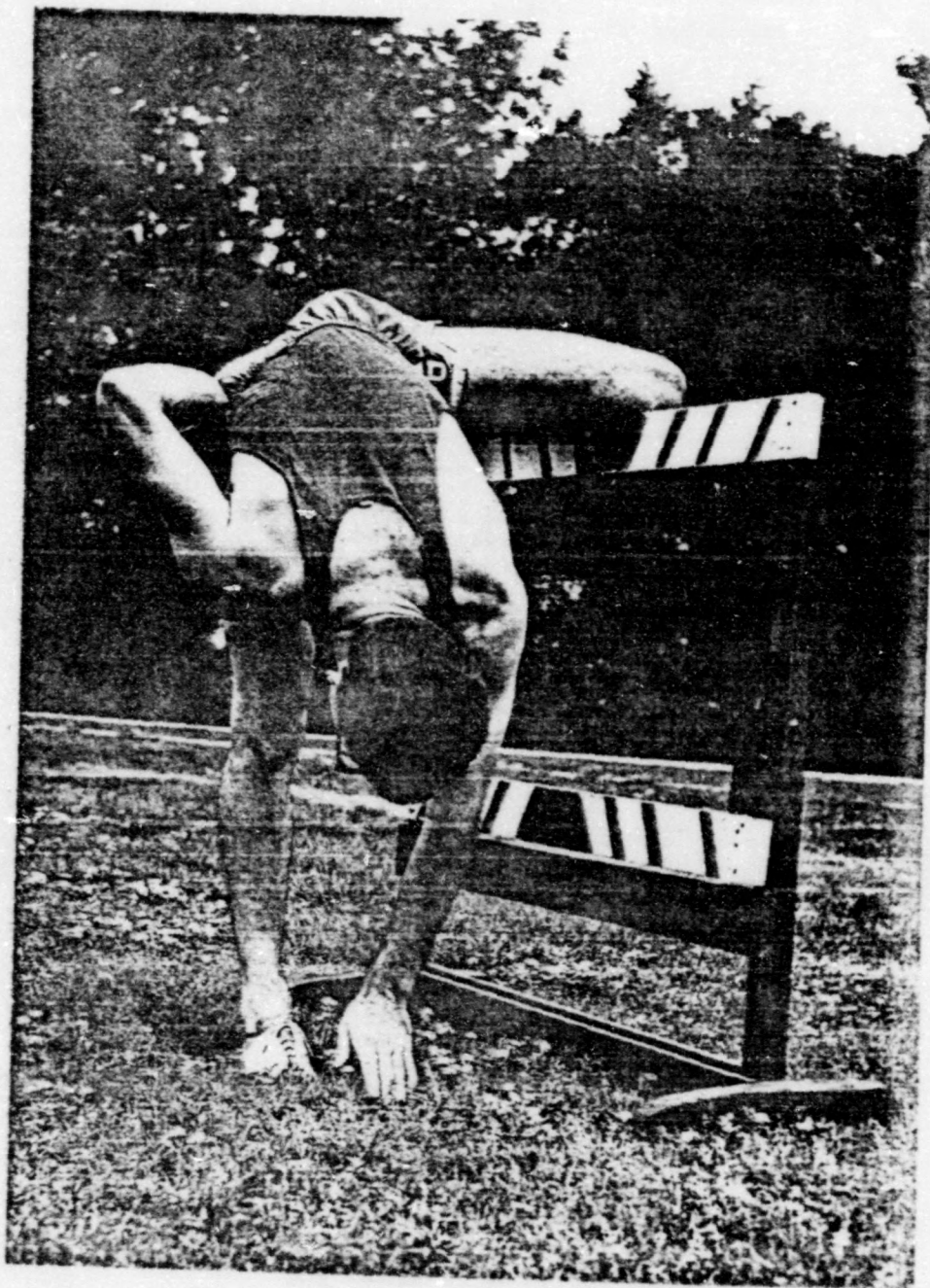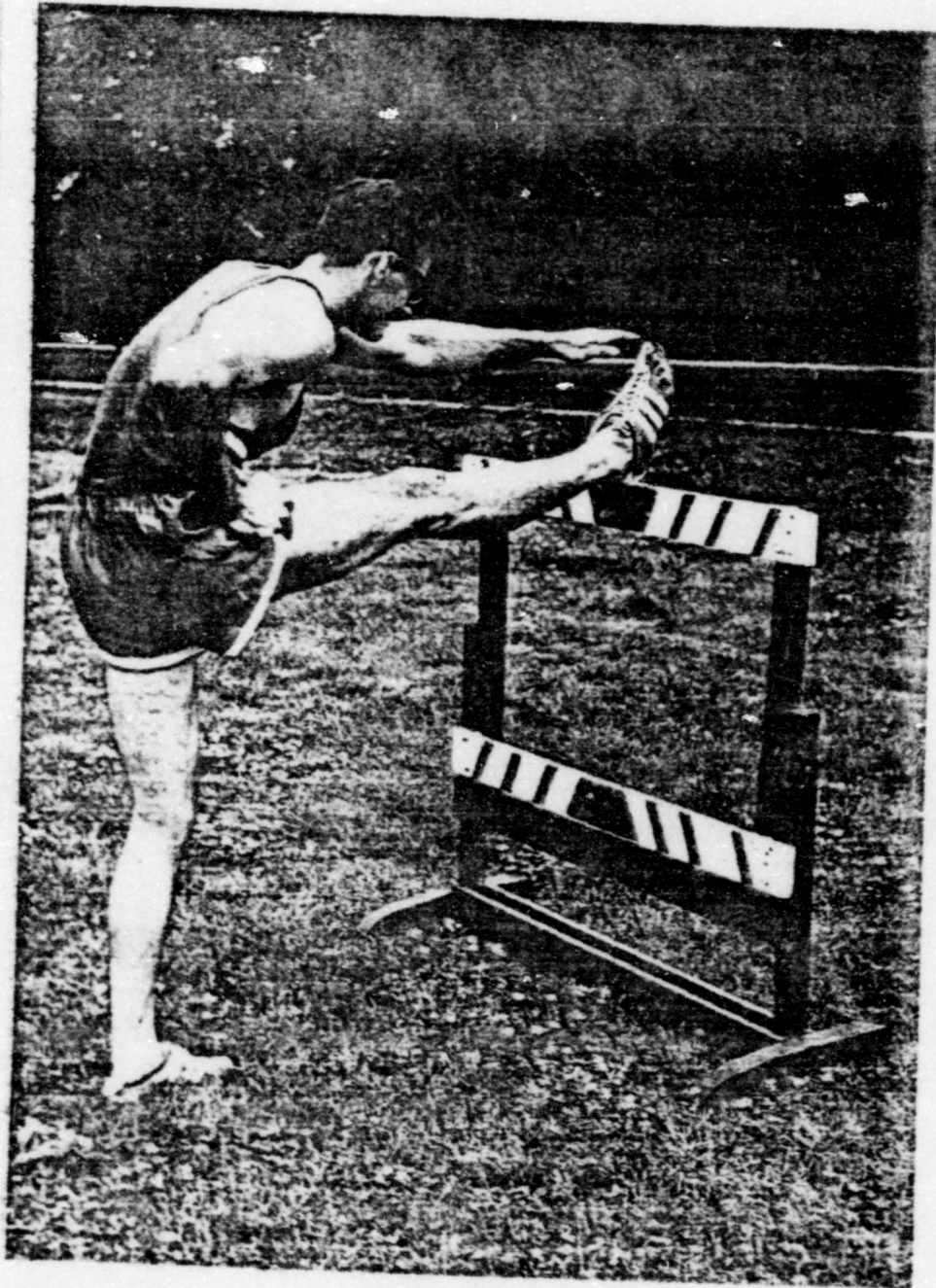
Figure 10.

Figure 11.

Figure 12.

Figure 13.

Figure 14.

6. While standing with both hands on the top bar of a high
   hurdle, swinging the trail leg on up through the trailing
   position and back to the ground several times in succession.
   (See Figure 14.)

A good culminating exercise is the five-step warmup between
hurdles. The athlete jogs between the highs, taking five steps
between them, and emphasizes his forward lean as he drives over each
hurdle.

While doing his stretching exercises, the hurdler must remember
that none of these should ever be done in a sudden or violent manner.
The athlete must develop his looseness gradually, never pushing an
exercise past the point of slight strain.

The hurdler should begin to refine his hurdling technique in
practice during repeat runs over one, two, or three hurdles. But
since high hurdling is such a complex maneuver, he will probably be
able to concentrate on correcting only one fault with each run-through.
He might work on putting his lead leg straight over the hurdle on the
first run-through, throwing his lead arm straight ahead on the second,
keeping his trunk straight on the third, etc.

As in the other track events, the hurdler's leg strength is
developed sufficiently during his daily workouts, but his arms and
upper body should be developed further through a program of weight
training or isometric contraction. (See pages 13-18.) This strength-
building program should be maintained on an every-other-day basis
during the pre-season period and continued on a more limited basis
during the season.

The final word to every young hurdler is PRACTICE! There must
be a combination of speed and form in high hurdling and speed and

balance in low hurdling that can only be developed through hours
of conscientious practice.

Chapter VI

THE RELAY RACES

A coach might feel that if he has the material for an outstanding relay team--whether it be four sprinters, four quarter-milers, four half-milers, or a good medley combination--that he will automatically have a good relay team. Consequently, he will probably work his runners in an effort to improve their individual times, but neglect the relay itself.

— A relay is much more than just the sum of all of its parts. There are other phases of relay racing in which a well-coached team can improve its over-all relay time.

In any relay race, many yards can be gained through smooth, efficient baton exchanges. A mediocre relay team with good baton passes can often defeat a team of better runners whose exchanges are poor.

Another way to cut valuable seconds off relay times is by reshuffling the team's running order so that each man is running the leg which will contribute most to the total effort. Close races that might have been lost can often be won by the boys who are running in an order based on their individual abilities.

And finally, when the team's members have the mechanics of the relay in mind, and when the best possible running order has been decided, the boys must get out and practice their baton passes. Only

through conscientious practice can a relay team gain the perfection that will pay off in the meets.[17]

The Sprint Relays

The fastest and most efficient sprint relay baton exchange is the blind pass. The receiver stands just within the exchange zone, poised to start fast as soon as the incoming runner passes a pre-determined "go" mark--usually from six to nine yards in front of the exchange zone.[18]

When the incoming runner passes the "go" mark, the receiver drives out without looking back. As soon as he nears his top speed-- usually after six or seven strides--he puts his receiving arm back, with elbow straight, and forms an inverted V with his thumb and fingers. By this time, the incoming runner should be within an arm's length of the receiver so that he can bring the baton up into the outgoing runner's receiving hand. (See Figure 15.) As soon as the baton is exchanged, the receiver switches it to his opposite hand.

The baton must be passed either from the left hand of the incoming runner to the receiver's right or from the right hand of the incoming runner to the receiver's left. In the 440-yard relay's curve exchanges, there is a slight advantage in passing from right to left (the inside pass), because this exchange technique permits

---

[17]Tom Ecker, "Mile Relay Strategy," Athletic Journal, (March, 1961), p. 31.

[18]Clyde Littlefield, Championship Track and Field By 12 Great Coaches, ed. Tom Ecker (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961) p. 86.
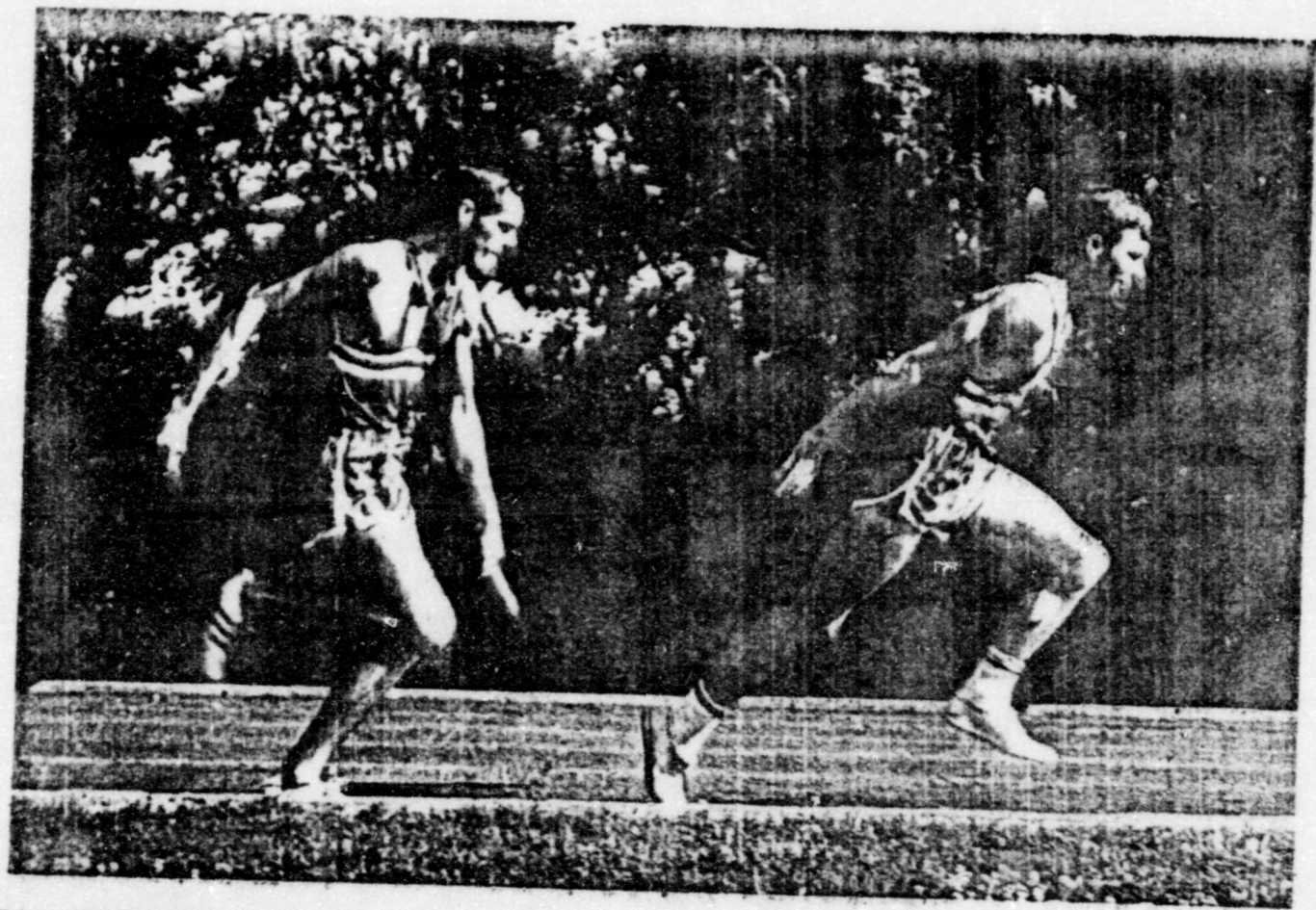
Copies
May Not
Film
Well !

the receiver to lean in as he runs the curve. Many 440-yard teams use both exchange techniques--passing from right to left at the first exchange, from left to right at the second, and from right to left on the third. In this way, the inside pass is utilized in the curve exchanges, and the runners need not be bothered with changing the baton from one of their hands to the other during the race.

When deciding the order in which the sprint relay men should run, the coach should consider many factors. The sprinter with the fastest start should probably lead off the relay. However, if he is also the fastest sprinter, he might be the best bet for the anchor position. The two who are most proficient at receiving the baton while running on a curve should be given the curve exchange positions. The poorest baton receiver of the four might be a good choice for the lead-off position.

The Mile Relay

Because it is the final event in most track meets, the mile relay often means the difference between winning or losing a close meet.

The most efficient and also the safest mile relay baton exchange is the visual pass. As in the sprint relay, the receiver stands just within the exchange zone, poised to start fast as soon as the incoming runner passes a pre-determined "go" mark--usually from four to seven yards in front of the exchange zone. When the incoming runner passes

the "go" mark, the receiver drives out at top speed for seven strides
and then reaches back with his receiving hand, looking back at the
same time. By this time, the incoming runner should be within two
arms' lengths of the receiver so that he can hand him the baton.
(See Figure 16.)

Headwork in the mile relay exchange is just as important as
passing technique. If the incoming runner begins to falter in his
final stretch run, it is the responsibility of the outgoing runner to
complete the exchange with a minimum of lost time and yardage.
Usually, this involves waiting an extra moment and receiving the
baton in the front half of the zone. On the other hand, if the
incoming runner has a strong finish, the outgoing runner can use most
of the zone and get a very fast exchange. Although the incoming
runner is responsible for letting his teammate know verbally if the
exchange is too fast, the burden of responsibility is on the outgoing
runner.

It is the responsibility of the incoming runner to get the
baton into the hand of the outgoing runner. The outgoing runner
should never grab for the baton, but should hold his receiving hand
as steady as possible until the baton is placed in it. It is very
difficult to pass the baton into a hand that is grasping for it.

Normally, the baton is handed off with the left hand, received
with the right hand, and is immediately switched to the left. However,
when the exchange must be made on a curve, as is often the case on
odd-length tracks, a smoother and faster exchange may be made through
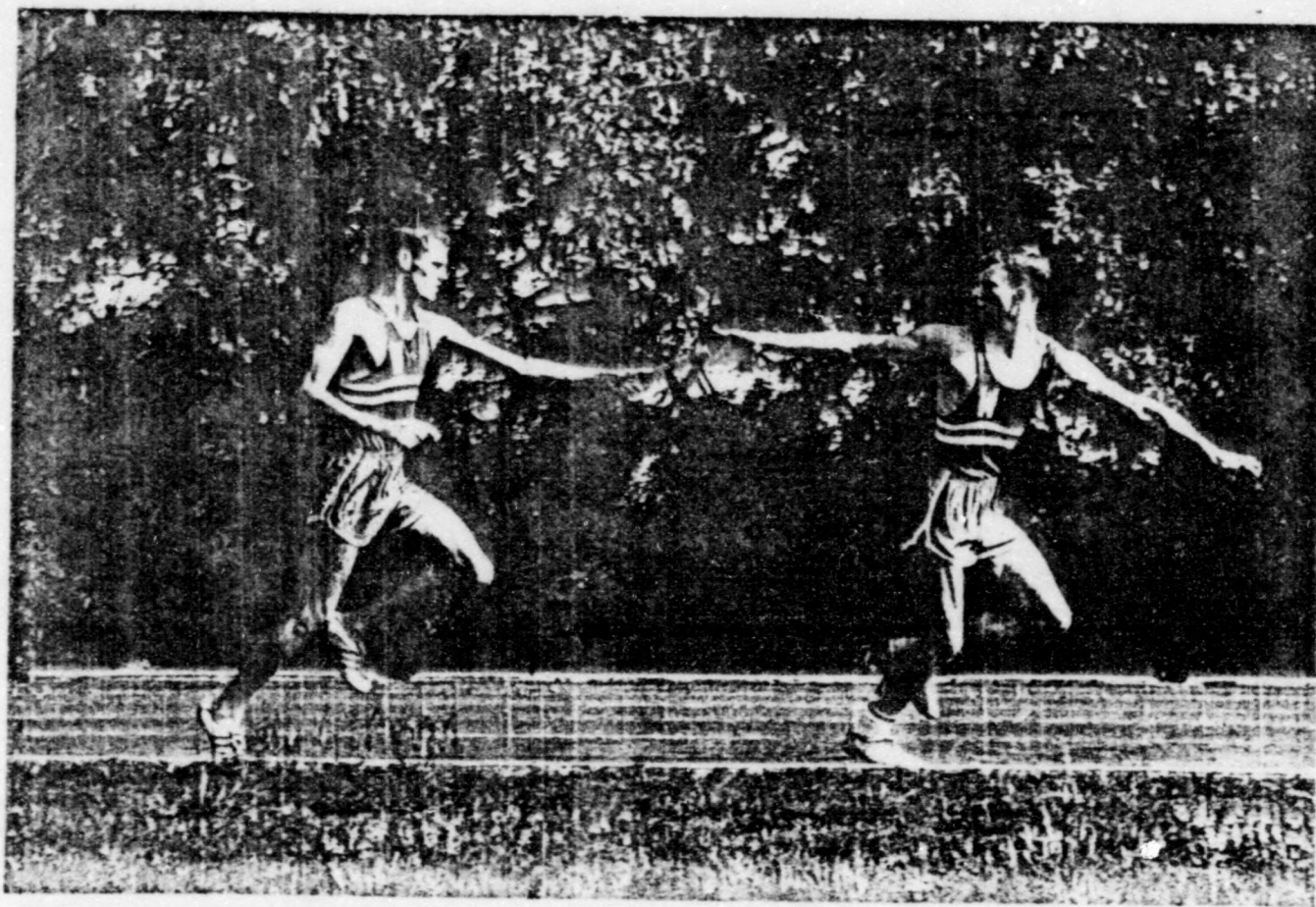
Copies
May Not
Film
Well!

Figure 16. The visual pass.

use of the inside pass--handing off with the right hand and receiving with the left.

Deciding the team's running order can be one of the coach's most perplexing duties. If the team is made up of a group of front runners, it would probably be best to start the fastest quarter-miler first to get the team out ahead, and let the second fastest run the anchor leg. However, a team of competitors would probably run a better relay be leading off with the slowest man and working up to the fastest man for the final leg.

The two most important positions when selecting the team's running order are the lead-off and the anchor legs. Many teams like their lead-off man to be a fast starter. But, if there is not a runner on the team whose start is fast enough to allow him to get out in front of the pack at the beginning of the race, the first man should be one who can take any first lap jostling that might occur in the pack. Or, out of necessity, a boy might be put in the lead-off spot because he is not as adept at receiving the baton as the others on the team.

When selecting an anchor man, a coach should look for the boy who can always run a little faster under pressure. It often takes a real competitor to pull a close relay race out of the fire.[19]

The Medley Relays

The most commonly-run medley relays are the sprint medley (440-220-220-880), (880-220-220-440), (440-220-110-880), or (220-110-

---

[19]Ecker, "Mile Relay . . . , Athletic Journal, 31.

110-440) and the distance medley (440-880-1320-mile), (880-440-1320-mile), or (880-440-220-mile).

The baton exchanges in the various medley relays can be divided into three general classifications--the step-up exchange, the step-down exchange, and the regular exchange.

In the step-up exchange, the baton is pass from the incoming runner to a runner who will be maintaining a faster pace. Included in this group are the following exchanges: 220 to 110, 440 to 220, 880 to 220, and 880 to 440.

In the step-down exchange, the baton is passed from the incoming runner to a runner who will be maintaining a slower pace. Included in this group are the following exchanges: 110 to 440, 110 to 880, 220 to 440, 220 to 880, 220 to mile, 440 to 880, 440 to 1320, 880 to 1320, and 1320 to mile.

In the regular exchange, the baton is pass from the incoming runner to a runner who will be maintaining the same pace. Included in this group are the following exchanges: 110 to 110 and 220 to 220.

To gain valuable yards in the medley relays, all step-up exchanges should be made in the front half of the exchange zone and all step-down exchanges should be made in the back half of the zone. In this way, precious yardage can be gained because more of the race can be run at a faster pace than if the exchanges were made in the center of the zones. For example, in the (440-220-220-880) sprint medley, the first exchange should be made near the beginning of the zone, and the third exchange should be made near the end of the zone.

In this way the actual distances run will be approximately (430-230-230-870), allowing the sprinters to cover almost 20 yards of the race that would have been run by the middle distance man.

Training for the Relay Events

To develop baton exchange timing, the relay team members should practice baton passing regularly. The baton passing practice can either be added at the end of the regular practice sessions or be included in the sessions as a part of the interval training program.

Besides working on baton exchanges, the team members should occasionally practice carrying a baton as they run through their workout schedules. And the lead-off men should spend some extra time driving out of the blocks with the baton in their hands, so that this will not be an unfamiliar experience for them.

The relay events should be more than just an afterthought. By using a little forethought, the coach can be confident that his well-prepared relay teams will be better able to turn in winning performances.[20]

----

[20]Ibid.

BIBLIOGRAPHY

Books

Cerutty, Percy. Running with Cerutty. Los Altos, Calif.: Track
and Field News, Inc., 1959.

Ecker, Tom (ed.). Championship Track and Field By 12 Great Coaches.
Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1961.

Jordan, Payton. Track and Field for Boys. Chicago: Follett
Publishing Co., 1960.

Luke, Brother G. Coaching High School Track and Field. Englewood
Cliffs, N. J.: Prentice-Hall, Inc., 1958.

Morehouse, Laurence E., and Rasch, Philip J. Sports Medicine for
Trainers. 2nd ed. Philadelphia: W. B. Saunders Co., 1963.

Murphy, Michael C. Athletic Training. New York: Charles Scribner's
Sons, 1921.

Rawlinson, Ken. Modern Athletic Training. Englewood Cliffs, N. J.:
Prentice-Hall, Inc., 1961.

Ryan, Allan J. Medical Care of the Athlete. New York: The McGraw-
Hill Book Co., Inc., 1962.

Stampfl, Franz. Franz Stampfl on Running. London: Herbert Jenkins
Limited, 1955.

Wilt, Fred. How They Train. Los Altos, Calif.: Track and Field
News, Inc., 1959.

Winter, Lloyd C. "Bud." So You Want To Be a Sprinter. San Francisco:
Fearon Publishers, 1956.

Woodard, Christopher. Sports Injuries. London: Max Parrish and Co.,
Ltd., 1954.

Articles and Periodicals

Bowerman, Bill. "Mile Mechanics and Training Techniques," Athletic Journal, (December, 1959), p. 8.

Burnham, Stan. "What to Expect from Weight Training," Athletic Journal, (June, 1962), p. 26.

Cooper, John M. "The Key to Becoming a Good Sprinter," Athletic Journal, (February, 1963), p. 16.

Dales, G. G. "Coaching the Sprint Start," Athletic Journal, (March, 1959), p. 12.

Doherty, Ken. "Interval Training," Track and Field News, (March, 1956), p. 11.

Doller, Dr. Joseph. "Shin Splints Treatment," Track Technique, (December, 1960), p. 53.

Ecker, Tom. "Arm Action in the 440," Athletic Journal, (March, 1960), p. 50.

————. "Interval Training," Athletic Journal, (March, 1963), p. 16.

————. "Mile Relay Strategy," Athletic Journal, (March, 1961), p. 31+.

Goldenburg, Joe. "The Real Cause of Pulled Muscles," Scholastic Coach, (November, 1962), p. 32.

————. "Training with Weights," Scholastic Coach, (November, 1961), p. 60.

Gordon, James A. "Some Observations on Starting," Athletic Journal, (April, 1962), p. 44.

Guild, Dr. Warren R. "Pre-event Nutrition," Track Technique, (December, 1960), p. 61.

Jordan, Payton. "Emotional Fitness for Track and Field Competition," Journal of Health-Physical Education-Recreation, (February, 1961), p. 29.

Kloepfer, Richard E. "Distance Running," Athletic Journal, (October, 1962), p. 24.

Luke, Brother G. "Stimulating Interest in Track and Field," Scholastic Coach, (March, 1959), p. 16.

Lydiard, Arthur. "Distance Training," Track Technique, (December, 1960), p. 35.

Marlow, Bill. "Sprinting Compexities," Scholastic Coach, (April, 1961), p. 20.

Mollet, Major Raoul. "Interval Training," Sport, (April 1, 1958), p. 97.

Moreau, Al. "Track for Youngsters," Coach and Athlete, (May, 1961), p. 19.

Nelson, Cordner. "Swedes Alter Distance Training Rules," Track and Field News, (March, 1949), p. 6.

_____. "Track Talk," Track and Field News, (August, 1961), p. 14.

Nelson, Dr. Dale O. "Idiosyncrasies in Training and Diet," Scholastic Coach, (May, 1961), p. 32.

_____. "Milk and Athletics," Athletic Journal, (May, 1960), p. 37.

O'Conner, Tom. "Year Round Track Program," Coach and Athlete, (February, 1962), p. 20.

Powell, John T. "Basic Mechanical Principles of Running," Track Technique, (September, 1960), p. 9.

_____. "Weight Training for Young Track and Field Athletes," Track Technique, (March, 1961), p. 68.

Rankin, Dave. "Trends in Middle Distance and Distance Running," Journal of Health-Physical Education-Recreation, (May-June, 1959), p. 53.

Sawdy, Dr. Allan, and Matthews, Dr. David O. "Prevention and Treatment of Track Injuries," Athletic Journal, (January, 1960), p. 26.

Sharpley, Frank. "Teaching Beginners to Hurdle," Track Technique, (June, 1961), p. 119.

Simpson, O. M. "Running the High and Low Hurdles," Texas Coach, (April, 1960), p. 32.

Snyder, Larry. "From the Lows to the Highs," Athletic Journal, (April, 1958), p. 20.

Stein, Julian U. "Fitting the Form to the Distance," Scholastic Coach, (March, 1961), p. 16.

Thompson, Hugh L. "Is Warm-up Necessary?," Scholastic Coach, (November, 1960), p. 40.

_____. "Values of Isometric Contraction," Scholastic Coach, (September, 1962), p. 38.

_____. "Weight Training vs. Isometric Contraction," Scholastic Coach, (October, 1962), p. 42.

Van Aaken, Dr. Ernst. "Speed or Endurance Training," Track Technique, (September, 1960), p. 3.

Wilt, Fred. "Athletics and Equilibrium," Track Technique, (December, 1960), p. 40.

_____. "Running Form," Scholastic Coach, (March, 1959), p. 10.

Wilton, W. M. "Athletic Injuries," Coach and Athlete, (March, 1962), p. 24.

Other Sources

Doherty, Ken. "Sprinting," Track and Field Movies on Paper, (1957), p. 6.

Jordan, Payton. "Your Weight Lifting Program," unpublished and undated. (Mimeographed.)

Stish, Dr. Eugene E. "Weight Training Program," unpublished, 1961. (Mimeographed.)

Wilt, Fred. Personal letter, September 22, 1962.