Fundamentals of Track and Field Athletics

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PREFACE

To the Athlete

The following chapters were written primarily for you in the hope that you will be able to acquire a better understanding of a great sport and thereby develop greater skill and success in competition.

If you are a member of a track team with a coach, remember that your coach's suggestions should be followed absolutely. He knows you personally and will ask you to do what he thinks is best for you. Ask your coach about any problems you may have.

Careful reading of this book should enable you to improve your present events or take up any new events in which you may be interested.

To the Coach

Every track coach, whether in junior high school, high school, or college, knows how hard it is to find enough reading material on track and field to keep his team members satisfied. There are several excellent books and plenty of magazine articles for the coach, but very little material that can be given to a beginning candidate with the words, "Here, study this in your spare time."

This book should serve as an assistant coach to give the athlete the mass of information that the track coach wants all his boys to learn but has no time to give them himself. Track and field events are so specialized that the coach's battle is against time. In the limited after-school hours it is impossible to give every individual the attention he needs: hence this book.

Boys who read about their events will flood the coach with questions, will practice more intelligently, and will be keener about learning new events which add to their point-winning capacities -- and the team's strength. Before long the coach is spending his time polishing off fine points rather than grinding out elementary details.

The practice techniques are simplified for the average track candidate. The work plans are nearer a minimum than an average.

The time problem in coaching is not limited to junior high school and high school track. The authors have experienced the problem also in connection with college freshmen and varsity men. Often the college boys come with an inadequate background; often they need to learn additional events to increase their value to the team.

In college track coaching methods courses this book should be especially useful because of the emphasis on fundamentals. There is nothing more important for a young track and field coach than a thorough knowledge of how the fundamentals of form and training operate in all events. Historical data and research studies are of interest and are useful for reference, but this book is trying to do a practical coaching job. When the young coach finishes his methods course and acquires a team of his own, a few copies of FUNDAMENTALS scattered among his squad members will help him a great deal. It is the ambition of the authors to keep this book up-to-date, so any comments and suggestions will be welcomed.

To all coaches and athletes, good luck, and may your trophy cases fill rapidly.

G. H. and G. E. G.

Columbus, Ohio
1951
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Acknowledgements are due to the boys on our high school and college teams who taught us the necessity of patience and thoroughness, and who helped work out teaching and practice techniques of a practical nature.

Also we must thank the excellent competitors among the opponents, from whom many ideas have been gleaned.

Particularly helpful with their wisdom and advice were Dr. Frank R. Castleman, who coached at Ohio State University before he broke the final tape, Larry Snyder, O.S.U. coach who has had so much experience with world-famous track men, and Charlie Beetham, O.S.U. assistant who knows middle distance running down to the last drop of perspiration.

George E. Gauthier
George E. Haney
CHAPTER I
THINGS EVERY TRACK MAN SHOULD KNOW

Hello! Glad to see that you are interested in track and field! It is a sport that offers its participants many advantages.

It is hoped that this book will help you enjoy track and field athletics and that it will help you to study the sport scientifically, with an eye to greater athletic success, health, and character. Track and field sports offer wonderful opportunities for developing your body through individual physical effort, and for character growth through regular and persistent training to reach a goal.

Every boy who wants to be a real man should try to take part in some athletic event, for health and good bodily development are fundamental in happy living. Scientific studies show that athletes live longer and with less sickness than others. Athletic teams offer unparalleled opportunities for making life-long friendships, and having an all-around good time; and, in particular, track athletics bring out character traits such as courage, concentration, self-confidence, persistence, self-sacrifice, courtesy. Probably you have thought of some of these points, but there may be others that haven't occurred to you. Have you thought of the trips the teams take? Have you thought of the advantage you will have in getting acquainted and getting a start in school or college if you are known as a good track athlete? Have you thought of the possibility of some day developing to the place where you might even represent your country at the Pan-American games or as a member of the Olympic team? Have you thought of the advantage it would be to have track experience if you ever want to be a teacher or coach? Regardless of why you are going into athletics, do it well. If you train conscientiously for several seasons you will find yourself no longer a boy, but a man. But for goodness sake, have some fun out of track, too, for all athletic events are fun, and shouldn't be made too much of a business. Now let's see what we mean by "track and field" athletics.

The track events are those which take place on a running track, or any road or other place marked off for foot races. The field events are the throwing and jumping contests. At present the high school track events are the 100 and 220-yard dashes (the sprints), the 120-yard and 220-yard hurdle races, (200 yards in some states), the 440-yard and 880-yard run (middle distance), the distance runs of 1 mile or more, and various relays.

The field events include shot putting, discus throwing, javelin throwing, the high jump, broad jump, and pole vault.

Ever since the first cave man was chased by a dinosaur or a saber-toothed tiger, or even by another cave man, there have been foot races! Some were sprints; others were middle and long distance runs with the idea of wearing out the pursuer. These first races were run with life and death seriousness! Woe to the man who didn't train.

When the cave man took to the woods and leaped logs and bushes he became the first hurdler; when he leaped over a high log or rock he became the first high-jumper; when he took to the air and sailed over a broad crevice or stream he was a broad-jumper; and when he used a pole to help himself over a stream he became a pole-vaulter. If the cave man were cornered he picked up a rock. The manner in which he used it determines whether he was the first shot-putter, discus thrower, or baseball pitcher. If he carried a spear he became a javelin thrower. Later when tribes became organized, messages were carried by relays of runners, and the first relay teams were established. So we find that all the things done by modern track and field athletes were done by primitive man as a matter of necessity. In modern times there are occasions on the field of battle where these skills are once more of life and death significance.

In primitive times every man's life depended upon his ability to perform skillfully all the acts mentioned above. The parents realized this and taught children to practice these things at home in their games and play. When the father gathered his children to-
gather to teach them to run and jump he became the first coach. When they competed to see who was the best, they had a track meet.

As civilization developed, history shows that competition in running, jumping, and throwing was used by the nations in training their boys. The early Egyptian, Greek, Persian, and Roman armies used such sports in training their fighters, and in time of peace the exercises were continued for the sport they furnished. Even modern armies use obstacle courses, which are modified track and field events, to train their men.

The Greeks developed track and field athletics to the highest level, believing that physical development was just as important to a boy as his mental development. The young Greek student spent approximately half his time at intellectual activities and half at physical activities. Some modern boys would prefer such a division of time! The Olympic Games were held by the Greeks long before the time of Christ. The Greeks even reckoned time according to the games, every four-year period being called an "Olympiad". The games were called the "Olympics" after Mount Olympus, the supposed home of the gods, in whose shadow they were held. The Greeks had practically the same events as now except for the pole vault and hurdle events, which came later.

In those days the boys did not compete for gold medals or other prizes, merely for the sport, the fame, and a wreath of laurel, the symbol of victory, which was placed on the head of a winner. Great crowds watched the games, people traveling from the villages for miles around to see the home-town boys compete. A winner was a great hero in his village for the rest of his life. Modern Olympic athletes may win even greater fame and recognition because of world-wide interest in the games. For instance, after the 1936 Olympics Jesse Owens, Ohio State's great Negro sprinter and broad-jumper, was loaded with gifts and business offers.

Other countries had their games, too. The ancient Tailtin Games in Ireland began about 1829 B.C. The Nothern games of the Vikings were earlier yet. In the English schools games were regularly organized about 1850.

The modern Olympic Games were revived and patterned after the ancient Olympics for the purpose of promoting peace. A Frenchman named de Coubertin was responsible. The first modern Olympic games were held at Athens, Greece, in 1896. Then they were at Paris, 1900; St. Louis, 1904; Athens, 1906; London, 1908; Stockholm, 1912; Antwerp, 1920; Paris, 1924; Amsterdam, 1928; Los Angeles, 1932; and Berlin, 1936. In 1940 they were to be held in Finland, but the European War prevented. The games were renewed in 1948 at London. Pan-American games, among all the American countries, are being planned for the two-year intervals between Olympic meets. There will be trips to thrill everyone who is skillful enough to compete.

In modern schools track and field events are a part of the program for several reasons. Recreation is first. Boys and men have always liked to run,
jump, throw, and vault just for the fun of it. There is a real thrill in training for some event until skill is attained. Another important reason for the existence of these athletics is that they build health. Any normal boy or man who trains carefully for some track or field event is bound to acquire a healthy, sound, and well-conditioned body. This is of tremendous value, for health is the most important single possession for a person to acquire. Without it nothing else means much. For this reason alone, hours spent on the track and field will pay far greater dividends for the future than hours spent in the poolroom or the corner drug store. The third important reason for track and field is the building of good character values.

Any boy who puts himself in the hands of his coach and sincerely tries to learn and improve is going to benefit from track and field athletics. Aim for perfection. Even though you never achieve it, you will improve more if you work as though you expect to become perfect. Even if you are not a member of a team, this book should still be of some use. You can use it to get started doing the track and field events. The nearest park or road will do for a track and the back yard or an empty lot will furnish space for jumping, throwing, and vaulting. So, whether with the team or as a lone wolf, good luck. Maybe you'll make the track team next year.
CHAPTER II
SPORTSMANSHIP

Before learning events, it is well to think a bit of the attitude with which we approach an athletic career. Membership on an athletic squad is one of the most enjoyable and valuable privileges any boy can have. Much has been said about the advantages of health and character to be derived from physical training, but there is much more than that to be gained from membership on a track team. When you make close contact with a group of teammates day after day for many months, dressing, training, joking, racing each other, racing together against opposing teams, making trips to meets together, friendships are made that have the strength of iron. Watch a pair of old grads who were teammates get together and talk over old times and you will see a glint in their eyes that comes from more than just the satisfaction of building a healthy body; it is the appreciation of the experiences, deep friendships, and pleasures of close contact with their pals through thick and thin.

If you are to get the most from these team associations, there are certain matters that you ought to consider. To gain the respect of your teammates, first of all you must live sportsmanship. You won’t be very popular, and you will cause your team untold harm, if you are the type of person who gossips, crabs about the weather, the coach, the bad start you got, or the thousand and one other things that a poor sport can crab about around a track team. You should do everything in your power to earn a position on the team, but do it in such a way that when you make your position you have nothing to regret. You wouldn’t feel right if you made a place but had no friends. There is no reason, anyway, why boys can’t compete for positions on the same team and remain the best of friends. In fact, it is rare that a case of poor sportsmanship appears. Most boys have a natural love of fair play; this is merely to call attention to the importance of good spirit on a track team. An out-cropping of poor sportsmanship can very easily ruin a track team by creating jealousy, lack of concentration on the job, bickering, and general loss of the fun of the whole sport.

In practice, each team member should remember that the more experienced fellows on the squad have picked up lots of pointers. Watch them; go through the practice work with them; and try to acquire all the little points that make them successful, and at the same time try to learn from other sources, too. Remember, all successful athletes take coaching in a good spirit. Do not be a know-it-all. Nobody knows all there is to know about any track or field event. Even the coach doesn’t. One of the reasons American athletes have been so successful in the Olympics is that they are constantly finding new and better ways of doing the different events. Seek more and more knowledge all the time. Drink up every bit of information you can get from coach, captain, and teammates, but don’t stop there. When you are at meets talk to your opponents and find out what they know. You’d be surprised at how much you can learn just from a friendly talk with the fellow who beat you. Of course
you wouldn't be so poor a sport as to try to talk to an opponent while he is actually competing, but while waiting for races, after races, and between turns there is plenty of opportunity for a friendly conversation. I have known boys to become successful overnight through a tip received from an opponent. Likewise, don’t hesitate to tell what you know if the occasion arises. There is no need for secrecy, for, after all, track meets are held for sport, and what sport is there if one treats his opponents like bitter enemies? You will find your opponent is usually just about like you, if you get to know him. This does not prevent rivalry; run your heart out to beat your opponent, but then don't regard him with hatred if he beats you, or with disgust if you beat him; always shake hands with the winner and be friends. Enjoy the competition.

Track has traditionally been a sport of gentlemen, and should be kept so. By "gentleman" no sissified implication is meant. No boy who runs a good 440 can ever be called a sissy. If you think so, try it. By "gentleman" we mean the person who always has a considerate, sportsmanlike attitude. You don't find such fellows wrangling and arguing with officials. If a point needs discussion or clarification, it is talked over calmly and intelligently, and the official's word is accepted as final. A good sportsman would rather concede a point to an opponent than be thought unsportsmanlike. Anyway, a boy who has good manners and a fair attitude is going to be much more popular with the officials, his teammates, and his coach.

You will find that practice is more fun if several boys go through warm-up and practice work together, in groups of three or four. Help each other; you will get farther.

Athletes should avoid "show-off" attitudes. Most boys who show off or grandstand don't realize how bad they look. Yet we all know how we despise such behavior in others. Grandstanding is rare in track, happily, but there are occasional incidents that bring expressions of disgust to spectators. The fellow who waves to the stands to get attention, the fellow who talks too much at the start and to the officials, the one who takes time unnecessarily in getting ready. The fellow who staggers in to the finish, usually gets a pitying smile and a disgusted comment instead of the sympathy he wants. If you want fame, you will find it easily enough by breaking records; if you can't get it that way, don't waste time trying to get attention in cheap ways, for that kind of attention is soon forgotten. Nine times out of ten the fellow who falls at the finish really has nothing wrong with him, and is perfectly all right when he calls on his girl that evening.
He would seem more of a hero to her if he had finished with a smile, standing on two feet. If he isn't in proper physical condition to stand up, a boy shouldn't run. Track meets can be made more of a pleasure if all competitors are careful about their attitudes.

At a track meet, while waiting for his event, the experienced, wise competitor "takes it easy". He knows that if he runs around the field trying to see everything that goes on, he not only gets in the way of officials and is a nuisance generally, but he is using up an amazing amount of energy, nervous as well as physical, that he will wish he had when his event comes around. Warm up in a businesslike manner and stay out of the way. Before and during a meet try to keep calm and unruffled. Sleep all you can, and talk things over with your teammates and coach, but try to avoid any loud, boisterous rough-house. Most champions are hard-working fellows, not playboys.
CHAPTER III
CHOOSING AN EVENT

It is very important to select an event at which you can best use your natural abilities. Sometimes boys waste many discouraging hours at events for which they are not at all fitted. Usually a boy has certain physical characteristics which make it possible for him to do better in one event than in others. Even if a boy feels certain of his event, he might well study this chapter carefully, for it may be that there is another event in which he could compete along with his specialty. However, don't attempt too many events; most of one's time should be spent on one event.

The first thing you should do is to take stock of your natural ability. Determine whether you have speed, strength, endurance, courage, persistence, gymnastic ability, height, weight, relaxed muscles, or a combination of these qualities and possibly others.

A young boy should try to learn as many events as possible, and as he matures he can specialize in the ones in which he seems to do best. But he should be sure not to become discouraged if he doesn't do as well as the other boys at the beginning. Look forward! You will improve. Perhaps you haven't grown enough. If you have no chance at all the coach will tell you, never fear.

Probably the rarest of natural gifts is speed. Natural speed is a curious thing. Some boys seem to be born with the ability that makes them fast runners later. Such boys are fortunate, for they will be able to compete in the sprints, or short distance events, in America the 100 and 220-yard dashes. These events aren't as wearing as others and permit a boy to compete in more events. To determine if you have speed, study the chapters on starting and sprinting and train for at least three weeks. Then have a reliable timer time you with a reliable watch. If you are a high school boy and can run 100 yards in less than 11 seconds with no coaching you are far better than average; if you can run the distance the first try in less than 11.5 seconds, you should by all means include the sprints in your list of events. If you can't run in less than 11.5 seconds, you probably should specialize in something else. Concentrate on other events, but keep working on speed in your spare time, for sometimes great improvement in speed appears after a few seasons. By all means, do not give up the idea of sprinting until you have had several trials over a period of several weeks, for quite often a bit of practice and a few pointers from the coach will make a remarkable difference. If you have tried sprinting and find that you have no natural speed but still would like to be a sprinter, do not be discouraged, for in some cases, as mentioned above, there is the possibility that with hard work and study of form you may increase your speed a great deal. How to do this is explained fully in the chapter on sprinting. College freshmen ought to run at least 10.3 in the first few months and usually are expected to run about 10.0 or better by the end of the freshman year if they are to do much good. Great sprinters have varied greatly in build, so don't let the build bother you. Clyde Jeffery (Stanford) was short and heavily muscled; Buddy Young is only 5'5" tall; Jesse Owens was almost six feet tall and beautifully built, while others have been taller yet, like Metcalf, 6'1½". About the only limitation seems to be extreme fatness or absolute lack of natural speed.

Another event that will fall to the boys of natural speed is the broad jump. If you can run 100 yards in 11 seconds or better, you should learn the form of broad jumping, because it is mostly speed that carries the broad jumper far. Jesse Owens, for instance, is the world-record holder in both the sprints and broad jump. Broad jumping doesn't take much out of a competitor, and can be easily combined with other events. Spring will help a jumper considerably, but isn't as important as the speed. If you have average speed and lots of spring, you may still be a good broad jumper. Here is an easy way to test your spring: Take chalk or crayon and make a mark on a wall as high as you can reach, standing with your heels flat. Now spring and make a mark as high as you can. Do this 6 or 8 times until you are sure you have your best jump. Now measure the distance between the lowest and highest chalk marks. If you have raised your mark 2'6" you should be a good broad jumper if your speed is at least average. Tall boys need a little less spring than short ones.
The third possibility for the fast boys is the pole vault. Do you have gymnastic ability? If you do, and can run the 100 yards in 11.5 seconds or better, you should give pole vaulting a try. But don't be discouraged if at first you don't succeed, for pole vaulting is the hardest event in track to learn. In a way, this is an advantage, though, for most of your competitors will become discouraged and quit; if you can stay with it you will have a good chance to win medals. By gymnastic ability I meant activities such as tumbling, rope climbing, work on the parallel bars, horse, trapeze, high bar, - events which require strong shoulder and body muscles and good coordination. Pole vaulting requires speed for the approach and strong shoulder and body coordination for the pull-up over the bar. At least average spring will help.

Now let us consider some events requiring qualities other than sheer speed. Suppose that you have fair natural speed (at least 11.5 seconds in the 100-yard dash) and are 5 feet 9 inches or more in height. Then you should take to the hurdles, because only tall boys can get the long stride and step that are essential for hurdling, unless they happen to be unusually springy or fast. If you can do 2'2" or better in the spring test it will help. Short boys are eliminated almost entirely, which cuts down the competition in the hurdle races. Then, too, many boys become discouraged when they first try the hurdles because they can't get the form immediately. Don't give up. It takes time to learn hurdling, but it is time well spent, for practice brings steady improvement in this event. If you can better 11.0 seconds in the 100 and are tall, you should be an outstanding hurdler; if you can break 10.5 seconds you are likely to be a champion. The ideal, of course, is the boy who is tall, springy, and fast as Jesse Owens. He hasn't been found yet!

If you have no great speed, height, or gymnastic ability, but still like to run, take heart, for there are still the middle distance and long distance runs. They require only(!) endurance, courage, hard training, and persistence. The rewards are great, because most boys become discouraged quickly with these events. In the middle distance events mediocre sprinters quite often become successful if they develop endurance. In the distance runs speed is a great help, of course, if combined with endurance, but is not essential, for many of the great distance runners are slow in the 100. Luckily, endurance is a quality one does not have to be born with; it can be increased tremendously by hard work over a long period of time. However, remember it cannot be done over night. It seems that fellows of any build can become milers, although overly fat boys are seriously handicapped. Some good ones are big and stocky, like Glenn Cunningham (170 lbs.) small and thin like Stanley Wooderson (120 lbs.) or tall and thin like Johnny Woodruff (6 ft. 4 in.). The most important physical qualifications seem to be a strong heart and a good pair of lungs. Most (but not all) good distance runners have a slow pulse beat. This seems to indicate that a heart strong enough and big enough to do its work more slowly will last longer in a race. Or it may mean that the distance runner develops a stronger heart through his course of training.

There are now left to consider the events that require no special speed ability at all. If we take the high jump, we won't know what size of boy to look for, except that he probably will be of fairly light build. But spring is found in boys of varying sizes. Occasionally at meets one sees a small fellow out-jumping the long-legged ones. Usually, though, the tall boys win because of the advantage of leg length. Then again, some boys can't get off the ground no matter how tall they are. Spring, like speed, seems to be one of those qualities that a person has to be born with, more or less. Good high jumpers are rare largely because so many boys have never discovered whether they possess spring or not. To determine your spring take the test described above for broad jumping. If you can spring 2 ft. 8 in. and are 5 ft. 10 in. tall, go to it. If you are shorter you will need more spring; if you are taller you won't need as much. Then get out in your back yard or on the athletic field and try jumping. If you don't know the best form, just jump as you would over a fence, with the old-fashioned "scissors kick" form. If you can clear five feet in several weeks you may consider yourself a good high jump prospect. If you will learn one of the roll styles of jumping and train well you should add six inches or a foot more to your jumping height. The ideal jumper, of course, is tall and springy. If you aren't tall, but have spring, go out and lick the big boys!
We now have the throwing events to consider. The discus can be thrown by three types of boys, short, strongly-built ones who use speed, tall lean boys who use the advantage of their long reach in swinging the discus, and a combination of these, the boys who are just plain big. A good throwing arm is essential. This event requires more time, practice, and study than most people realize, but is lots of fun because the improvement is steady if you work hard and intelligently.

Shot putting requires weight and strength. If they are combined with a good throwing arm it is fortunate, but the shot can be thrown pretty well by sheer strength if the form is mastered. You must be strong, but not necessarily a giant; boys of 160 lb. often do well, especially in high school. There isn't much of a chance in this event for boys of less than 150 pounds, but don't forget the possibility of growth. If you are young, and like to throw, go ahead and learn the form, for you may later put on enough weight to be a champion, and you will be far ahead if you have learned the form while still developing your body.

Many high schools and colleges have eliminated the javelin throw from competition because of the danger of careless boys spearing each other. However, if you wish to learn to throw the javelin, there is an explanation of the form in this book. For the javelin throw we can recommend any boy who has a good throwing arm, regardless of size or build. The form is complicated and is hard to learn to do perfectly. Don't waste time on this event unless you have a good throwing arm. You need not be big. Boys of 130 to 140 pounds have thrown the javelin well - 170 - 180 feet. Other good spearsmen have been 200 pounders.

If you master one event and wish to compete in others too, it is usually possible to work out combinations of events that assist each other or use the natural abilities with which you are blessed. For instance, the boy with natural speed can run all running events, the relays, the broad jump, and often the high or low hurdles.

A boy who has spring should try the high jump, broad jump, pole vault, and hurdles.

Tall boys should experiment with the hurdles, high jump, broad jump, discus, shot put.

If you have great strength or a good throwing arm, the shot put, discus throw or javelin throw can easily be worked in with other events, especially as they are not wearing.

Boys with endurance should try the two-mile, mile, half-mile, and quarter-mile events. The relays are made up of boys who show ability in running events which are included in any particular relay. For instance, the 440 and 880-yard relays require four boys each of 110-yard and 220-yard speed; the mile relay takes four quarter-milers; and the two-mile relay four half-milers. There are also various medleys sometimes used in relay meets.

It is a good idea any time that practice becomes boring, to take up a new event. It will add interest to your practice sessions. However, be sure that you don't carry this to extremes and spread your energies over so many events that you do no good in any. Be a specialist in one event, and carry on another or two as hobbies. And don't try to combine events that interfere with each other. For instance, a sprinter or hurdler should not do any long distance running, although a distance runner should do quite a bit of sprinting.
CHAPTER IV
FORM

Constantly in discussions of different athletic events you will hear references to the word "form". By the word is meant the manner in which an action is performed. For instance, in high jumping, experience has proved that jumping in certain ways will aid a jumper to get higher. Even if two jumpers have exactly the same strength and spring in their legs, if one has a better method of jumping, or "form", he will go higher. The problem of a good athlete, then, is to find the best possible form for an event at which he is working. When he is sure which is the best form, then he should try as hard as possible to master that form so that he can execute it perfectly. Then, even though he may not be as big or strong as other boys, he may be able to compete with them on an equal footing because he is more a master of his event. The athlete who disregards form and its importance is doomed to failure, regardless of his supply of natural ability.

Sometimes it is no easy matter to choose the best form, for physical differences may make a certain form impossible, or there may be other reasons why you should change from the usual form for an event. That is why you should have the advice and help of the coach in determining your particular form. At any rate, study the matter carefully and be sure that you have made a good selection of form in your event.

In this book the forms that have been proven by experience are described. There are many other methods, some about as good, and in individual cases maybe better. New methods are being discovered all the time, so that even as this is written some form described here may be old-fashioned because a better way has been discovered.

New forms are worked out by athletes as well as by coaches. Quite often they are discovered by accident. Don't be afraid of experimenting with new forms and variations. It is fun, and it may make you a champion, for you may discover something that will give you an advantage. But, here is a warning; don't change over too quickly. Know a standard form first, lest you be left without any form if you get on a wrong track and have in the meantime forgotten your regular form. Be sure you have a good reason for a change before you make much of a revolution in your form, for the forms in present use have been developed over a period of many years, and have a good, scientific foundation.

In studying form, watch your teammates, and outstanding or more advanced athletes. Observe movie news reels, your opponents, the newspaper photos of great athletes; read books, magazines, and just any source you can locate. Beware of cheap magazines and thriller sport stories. Sometimes they print things that aren't really true, just for the sake of a thrilling story. Occasionally you can pick up some pointers from them if you are careful what you believe. If you can get someone to take some movies of yourself in action, from different angles, it will help tremendously in analyzing your form and visualizing what you are doing and need to do.
CHAPTER V
TRAINING

So much nonsense and so many arguments have been written and talked about training for athletics that boys who really want to know something about the subject have a hard time knowing what to believe. For the purpose of this chapter, then, let us consider the bare essentials of training, and study the problem from the standpoint of taking care of the body as though it were a machine that we wish to use for some delicate and important work.

In the early days of athletics there were some successful athletes who paid little attention to training and still won their events. Their records, however, have not lasted. Modern times and distances are better than the old ones. Other athletes in the old days followed strict training rules that most of our modern trainers would say are ridiculously strict. All of you know some athletes who sneer at training rules and still seem to do pretty well. But the answer to this is that some boys are born with such ability that they can waste part of it and still win against boys with lesser endowments. Who knows what these fortunate fellows would be able to do if they cared for themselves properly? Perhaps they would have done twice as well. One never knows what might have been. Many boys are influenced by the advertised statements of athletes that they smoke certain brands of cigarettes, or use other articles of questionable value to athletes. These people, remember, have been paid for making such statements. Some people will do anything for money, even sell their names to support things that they know are wrong. You may have noticed that certain other athletes' names never occur in connection with such advertising; these men have been too honest to sell themselves. But the youngsters rarely hear their testimony; it is the high-powered advertising in newspapers, magazines, radio, and screen that catches the attention. In spite of all that noise, this book will try to stick to the truth as understood by the best coaches, and athletic trainers.

In the first place, we must realize that the body, although it is so powerful that it will stand a lot of punishment of certain kinds, yet is so delicately balanced in many respects that any tinkering will throw it out of adjustment seriously. In this sense it is like an automobile; your old jalopy will survive many wrecks and crashes, will take you across the continent and back, but you can't drive it without gears, clutch, steering wheel; you must have the carburetor in perfect adjustment, and you don't run the jalopy on water, or even alcohol; you buy gasoline. Even the gasoline differs. Your car runs better with good gas than other varieties. Yet some boys try to make their bodies run on smoke, grease, sugar and poison!

Sleep

Probably most of the crimes against good body care are in the matter of sleep. Sleep is important for this reason, that during sleep the body makes repairs and builds muscle, tendon, bone and nerve. During the day you have become tired because you are using up energy. During sleep the energy is restored, strained muscle fibers are repaired, and the brain becomes once more rested and vigorous, which is important not only in improving your thinking as you compete the next day, but in courage and determination - for a tired brain does not care whether its owner wins or not. You know well how much more you feel like doing things on a morning after you wake from a long, sound sleep, and how little you feel like action on those mornings when the lemon pie or the peanuts kept you awake, tossing and tumbling all night.

Sleep is important not only before the day of competition, but during the week, for it is during the practice periods that you are building your body to the point that it will do what you want in a meet. The best athletes should have eight hours of sleep at the least. If you do not feel rested with eight hours, try nine. If you have trouble finishing your studies in time to get the eight hours of sleep, you might try this plan, which is followed by many boys successfully: Go to bed early enough to obtain your sleep,
and rise early enough to do your studies in the morning before school, when your brain is fresh anyway, and doesn't require so much time. You will need an alarm clock, and quite a bit of will power to rise early if you haven't been used to early rising, but if you can do it a few times and get used to it, you will enjoy the increased pep you have and the shorter time required to master your studies. And you will feel like breaking records when you get on the track. For two nights before a meet go to bed early, and see if you don't do better than ever before. Take a book to bed and read until you drop off. Of course, habitual night owls will have to confine dates and other social affairs to week ends. This may be hard to do, but after all, are you man or mouse?

Food

Probably the next most common errors are in food. An old and very wise saying is "eat to live; don't live to eat". The wise athlete eats what his body needs to make him a champion. Few people know enough about hygiene to make up their diets intelligently, but there are a few rules that ought to be followed if you are going to use your body for vigorous sports. Of great importance is the time of eating. Any boy who has eaten a big meal and then tried to run a quarter mile race knows that it is bad to eat too near the time of competition. Although hygienists say that it takes only several hours for food to pass through the stomach, yet it seems to affect athletes for longer times than that. Digestion isn't completed in that time, and the processes of digestion take lots of blood that should be used for other purposes when you are competing, for the blood is used to carry oxygen and other energy-producing supplies to the muscles from the lungs and intestines. Many experienced athletes find that they get the best results by not eating at all the meal previous to competition, or by eating at least three to five hours before running. Even the shot putters will feel better if they omit a meal and then feel hungry enough to eat the shot when the event comes around. The reason for this rule is that the energy you use in a track meet comes from food previously stored in the muscles. Nothing you eat within 2 or 3 hours of competition will do much good.

Another point about eating is not to eat between meals. Even the best of food will cause trouble if eaten at the wrong times. If the stomach is overworked by eating between meals or by overeating, the food will not digest properly and will make you feel sluggish and sleepy - "dopey". You can choke the engine of your jalopy, you know, by giving it too much fuel.

Some boys eat carefully the day of a meet, but through the week they are careless. It is just as important to train for daily practice as for a meet, because if you don't make full progress in practice, you won't go as far in a meet.

Now about the question of what to eat. Any well-balanced diet of meat, vegetables, and fruit will do. Eat slowly at regular meal times, and don't overeat. Avoid all heavy pastries such as pie and cake, or other doughy foods or desserts, because of the fact that they digest slowly and lie heavily on the stomach. These foods have nothing inherently wrong about them, but they digest too slowly for successful use by athletes. Doughnuts and breakfast rolls, too, have caused many a stomach-ache. Fried foods, or any foods containing much grease are slow in digesting. Coffee and tea are bad if they make your sleep restless; even if they don't, they are of questionable value, because of the effects on nerves of any stimulant or drug. Study your diet carefully and select the foods that seem to work best for you. Do it intelligently, and consult the coach or a physician if in doubt, but try to eliminate the influence of hearsay and superstition. You will need will-power and common sense. Think of winning and it will be easier to train. Overeating is probably the worst food fault. But remember that even slight errors in training may be responsible for the tenths of seconds and the fractions of inches that make the difference between winning and losing.

Smoking

Smoking is a difficult subject to discuss with boys because so many boys, girls, and parents smoke. However, regardless of what other people do, you should try to find the
truth about the effects of smoking on the body. Chemists tell us that nicotine is a poison very small quantities of which will kill human beings if take pure. In tobacco the quantities are very small, but since they are there in large enough quantities for people to desire them, they must be having some effect on the body. Physiologists and advertisers tell us that nicotine has a soothing (this means depressing) effect on nerves and brain. This being the case, the athlete should reflect. Does he want his brain to be soothed? Or does he want it alive and keen as a whip when he competes? Another effect of tobacco is to constrict or tighten up the blood vessels. This reduces the flow of blood through the body and puts more of a load on the heart in attempting to keep up the flow. Of course, a free flow of blood through the entire circulatory system is essential in any athletic event.

In addition to the drug effects of tobacco, the smoke entering the smoker's lungs has evil effects. You can't fill your lungs with carbon from burning leaves without interfering with the lungs' function of taking oxygen from the air for the blood. The familiar puffing of the cigarette smoker as he runs for a street car or climbs a stair should tell the story well enough. This is a side of the story not told by the ads that talk up the "soothed nerves". Anyway, the money spent by some boys for cigarettes would come in mighty handy for other things in high school or college! So if you are a smoker, and want to be an athlete, for goodness sake, break off as soon as you can. If you are not a smoker, don't start a habit that is all drawback and is deucedly hard to break.

Incidentally, if you want to break off, there are some helps. Don't try to break off gradually; you have to think too much about it. It is easier to pull your will together, break off completely, and then try to do things to forget about smoking for a few days. After that you won't even think of smoking. One of the ways to forget is to keep a package of gum handy for a time and start chewing whenever you want to smoke. The chewing habit is easy to stop! Go for a walk, or start talking to someone every time that you want to smoke. Anything to put your brain to work - even studying - will help. All the trouble about stopping is mental, and can be overcome. If you still have trouble, see a doctor.

Alcohol

There isn't any doubt about the use of alcohol being harmful. People who use it, use it in spite of the fact that they know it is bad. If you are to be a successful athlete, however, you will never, under any circumstances, drink alcoholic beverages. They affect the stomach, brain, and nervous system too strongly to be disregarded. A person who drinks even slightly thinks more slowly, reacts more slowly, and is weaker, than a normal person. The after-effects are dizziness, drowsiness, lack of pep, less resistance to disease, and weaker morale. The drinker thinks he feels better, but a stop watch proves he is less efficient athletically. Alcohol is not to be played with. Much has been said in liquor ads and elsewhere about the high food value of alcohol. That is true. Alcohol does contain food value. But such statements fail to note the fact that in addition to being a food, alcohol has poisonous qualities.

The whole problem of training is just to take the same care of your body that you would of any fine instrument or other possession. You have only one body, and it will last a life-time that will be about as long as you wish it to be up to the limits of old age. It will win you athletic honors, if you care for it properly. But you can't be careless with your body and get away with it. Your body follows the laws of nature, and you can't kid yourself or your body into special treatment by Mother Nature. The laws of health supply their own punishment to the offender.

Muscle Building

In training for a race or other competition one ought to understand what happens to the body. Every boy knows that exercise makes him stronger, but few realize how this takes place. If you start out your training by running hard you find that the next day you have sore muscles. And right here is where many boys of weak will or lazy habits
Sometimes their mothers make them stop athletic training because they hear the boys complaining of sore muscles. But those sore muscles never hurt anybody. They might be prevented by starting out more slowly, but if you have them, don't worry. The soreness is there because the strenuous exercise was something you haven't been used to, or you brought into play muscles that hadn't been used, which is the same thing, and the tiny fibers that go to make up each bundle of muscle were stretched and pulled, feeling painful. But at the same time that the fibers were stretched, the exercise sent floods of fresh blood into the used muscles, and the body sent up its automatic call for more building materials. If you rested that night, the body started immediately to work repairing the strained fibers, building up new muscle, and strengthening what already existed. After a few weeks of this exercise, if regular, you found yourself becoming stronger and stronger. This is the theory that is behind the old Greek tale of the strong man who took a young calf and carried it around a field every day. He gained in strength as the calf grew, until he could carry the adult bull around the field. "Oh yeah?" I hear you say! The idea is good, anyway.

There is another fact that the athlete can use to advantage. It is this, that after your muscles are built up by regular exercise to a certain strength, then a day's rest will allow them to accumulate an unusual amount of energy. This is why experienced athletes never perform any hard exercise the day or two days before competition, and explains why good records are rarely made two days in succession. You may have seen how this phenomenon works when you came out for practice after a lay-off of a few days and felt like breaking all records. Some boys, noticing this, have decided not to practice at all! This is a mistake. The hard, regular practice gives you the muscle strength that makes the good performance possible, but also makes you tired. If you build up the strength by hard work at the beginning of the week, and then get your pep by a brief lay-off, you will constantly keep improving, week by week. Some ambitious boys have been dreadfully disappointed when they worked very hard and did not seem to improve. The answer probably was that they kept themselves constantly tired, not taking the rest before competition that allows the body to catch up. It is as bad to practice too hard as it is to practice too little—if you practice at the wrong time. Do the hard practice at the beginning of the week, and taper off before the meet.

Another fact about muscle building that the good athlete must realize is that muscle growth isn't stimulated as well by violent exercise as by frequent, moderate exercise. If you do very much hard starting or jumping, for instance, you tear down more body tissue than can be built up over night, and you may deteriorate instead of build up. So-called "staleness" is sometimes caused by this.

A fact about muscle action that every athlete ought to know, is that muscles do not work well until they are properly warmed up. Experiments with frog muscle artificially stimulated so that the pull can be measured, show that at first the reactions are weak. Then as the contractions continue, the reactions become stronger until they reach the peak. As fatigue sets in (Accumulation of wastes) the contractions weaken and eventually the muscle cramps. That is the experience of athletes. The best jump or throw is made at the time that the muscles are at peak performance. The object of the athlete is to know just how much he can warm up so that at the crucial moment of competition he is giving his best.

Another danger of not warming up thoroughly is that the many tiny fibers of the muscle do not pull together until the muscle is hot, and when the fibers are pulling separately they sometimes pull at the wrong time and tear apart from each other, causing the dreaded muscle tear that keeps runners and jumpers and throwers on the bench for several weeks, and sometimes actually ends a career. So it pays to take time to warm up.

Training for endurance is another matter. What has already been said about training of muscles applies, but in addition the endurance runner has to have the kind of muscles that keep on going when the runner is tired. He has to develop his heart and lungs beyond the average, so that they have a capacity to keep pumping blood and supplying oxygen in bigger quantities than usual. This kind of training cannot be accomplished overnight, but requires persistent practice over a longer period. It will get results, though. Anyone can train for endurance and tremendously increase his ability to hold out, merely by gradually demanding more and more of his body.
"Athletic Heart"

Since many wild ideas still float about concerning "athletic heart", it seems wise
to mention here that there is no such thing, except as there are hearts of athletes!
There used to be a belief that athletes developed oversized hearts, and in later life
this resulted in heart failure and all kinds of evils. This is absolutely false. Na-
turally, athletes develop bigger hearts, in the same way that they develop bigger arm or
leg muscles, or in the same way that an active, wild deer grows a bigger heart propor-
tionately, than a barnyard cow, because he needs it and uses it. But there is nothing
wrong with this. In fact, it is an advantage, for with a superior heart he is less sub-
ject to ailments. Of course, if a boy has a bad heart to begin with, and enters into
athletics, he may meet up with trouble, but that is his own fault; everyone should have
his heart examined to know whether it is normal, and should not enter into strenuous ac-
tivities unless it is normal. But, if your heart is normal, you have nothing to fear from
athletics. Nature has taken care of that. You will faint from lack of oxygen before your
heart will fail. But there is no necessity of this, either, for if you practice faithfully
and train well you will never have that kind of trouble. The boys who fall at the ends
of races are the grandstanders, the lazy ones who haven't learned how to run their races
or aren't in shape, and the poor trainers. Their coaches should not allow them to run in
the first place.

Winter Training

You can make a tremendous amount of progress if you wish to train in the winter, and
at the same time have some fun. Few fellows think of practicing track in the winter, but
it is no worse than playing football, hockey, hunting, or any of the other winter sports.
If you wish to do it, all you need is a good heavy sweat suit, a stocking cap or ear
muffs, a pair of gloves, and a pair or two of heavy socks. If you don't have a sweat
suit, a couple of sweaters and an old pair of trousers will do. It is true that the
clothes cramp your form a bit, but that handicap is nothing compared to the advantage of
keeping in good physical condition (it is surprising to some, but winter practice reduces
the colds and builds endurance), learning more about form, and keeping up progress. You
can be away ahead when spring comes if you will do regular winter practicing. Even a few
times a week will help. It is fun to run in the cold if you are properly dressed. If the
ground is frozen too hard for spikes, use rubber-soled shoes.

Staleness

Much nonsense has been said and written about so-called "staleness" in athletics.
There is nothing mysterious or strange about the condition. Near the end of the season
some boys are rather droopy and sleepy at practice and have no pep for either practice or
meets. The whole condition is usually mental; they are just plain tired of running. Some
boys are just as stale after two weeks of practice; they are the boys who dropped off the
squad right at first because they found they didn't like it so well. But even the champi-
ons get tired of the grind of practice if they go at it too hard and steadily; it takes
the fun out of running. If you get to this point, there is just one thing to do; take
Monday and Tuesday off and go fishing, play tennis, sleep under the trees, go to movies
- anything to relax and take your mind off track. On Wednesday take a good workout to keep
your form, and the rest of the week just take sun baths and play around at other events
until the meet. However, don't get involved in any foolish horseplay that ends in an in-
jury. I have never yet seen a case of staleness that couldn't be cured in this way - ex-
cept the case of a boy who is just plain downright lazy and refuses to train, or falls in
love so badly he sees stars at noon, or has some other fundamental difficulty that is be-
ing called "staleness". Occasionally the staleness is physical. An ambitious boy some-
times practices too hard and tears himself down. A few days of rest will do wonders.
Moderate work-outs will be needed the rest of the season.
Cleanliness

Always take a bath or shower after practice. Otherwise you feel sleepy and dopey - and are in danger of infection from the dirt and bacteria on your skin. Always soap well to get your skin thoroughly clean. Be especially careful to soap your feet and rub soap in between the toes, then dry your feet carefully. If you do this, you won't get athlete's foot.

A lukewarm shower is best. A hot shower opens the pores too much and brings a feeling of weakness and drowsiness. Don't take a very cold shower, as the shock on the heart is severe. It is unnecessary and does no earthly good in spite of the bragging of the toughies who turn the water from steaming hot to ice-cold. Take a lukewarm shower and gradually cool it off if you like the cold.

Injuries

The most common injury to runners, next to the pulled muscle, which has already been described, is the injury called shin splints. Why it received that name is a mystery, but it certainly exists, and can plague runners more than any other trouble. There seems to be no medicine or quick treatment for this injury, which is a painful soreness of the small muscles lying on the front of the shin bone, usually on the lower part of the leg, near the ankles. The most logical explanation seems to be that track running puts an unaccustomed strain on the tendons, ligaments, and muscle attachments of the lower leg in maintaining the high toe action of good running form. This seems to hold true, too, in the fact that shin splints are more common among beginning runners, or among those who return after a long absence from running.

The only successful treatment of shin splints that the writer has found is to stop hard work, but don't stop all work. Keep in condition by doing slow jogging. Do not run hard. The easy running seems to strengthen the weak parts and helps the athlete maintain good muscle condition. Use heat as much as possible. Wrap the shins in hot wet towels while you study in the evenings. Do not confuse shin splints with merely sore muscles which come from the normal process of getting into condition at the beginning of the season. It helps, too, to jog with a lower foot position. Don't try to stay extremely high on the toes.

Muscle soreness which comes from using muscles which haven't been used to hard work can be cured in only one way - continued exercise of the same kind that caused the soreness - but not so hard. Complete rest merely keeps the muscle sore for several days. However, a light workout and shower will often clear up the soreness overnight, by hurrying the normal body process of disposing of the fatigue poisons which cause the soreness.

Sprains

Sprained ankles should be soaked in cold water or ice water at first to prevent excessive swelling. After 24 hours, use hot water. They will recover more quickly, too, if given light exercise, unless the injury is too severe for any activity at all. Taping will help an ankle if you wish to use it in a race, but ordinarily taping merely interferes with proper circulation, slowing the healing. If there is any question whether the injury is a sprain or a break, see a doctor immediately.

Practically any other injuries a track man receives, unless mere scratches, should be treated by a doctor. Always have scratches and blisters taken care of, because an infection may remove you from competition permanently.

Relaxation

Another element of training that every track man needs to understand is how to conserve energy and use it at the proper time. Always, in practice and competition there
must be relaxation. Coaches yell themselves hoarse on this point. During practice sessions and warm-ups before competition keep plenty of clothes on, because you can lose much energy merely by being cold or just slightly chilly; the body uses fuel for heat as well as muscle action. If you can, stay in the dressing room as long as possible before a meet, except for warm-up work. Sometimes, if the weather is extremely cold, it is better to do warm-up exercises indoors. In cold weather always have a blanket to keep around your shoulders in addition to your warm-up suit. In cold weather, a slow, jogging warm-up over a long period of time is more effective than a lot of sprinting just before the event.

The matter of rub-downs should be mentioned. Some boys seem to think that hours spent on the training table will win races! Don't try to substitute massage for exercise. If you have a good trainer, a light rub-down before a race helps to relax the muscles and eliminate the waste products from the warm-up running. The only other use for rub-downs is in speeding the recovery of sore muscles. Don't be a "prima donna" and demand unnecessary rub-downs. Most good athletes don't need much rubbing and very few high school boys have a good trainer available anyway. The beating and pounding of a poor masseur will do more damage than good.
CHAPTER VI
THE START

This chapter is placed first because the starting form is used in races of all distances. But here is a warning: Don't try any fast starting until you are in good physical condition for it. The chapters on the various events discuss just when to work on starting. Read this chapter, and go through the starting movements in slow motion; then re-read this chapter after studying the running events.

In the shorter races a good start is absolutely essential if a boy is to have a chance with his competitors. In the middle-distance races a good start is necessary to secure a position at the pole (as the lane next to the curb is called) and to get free of the jostling that frequently takes place at the start of a race, especially in the bigger meets. Distance men need a start for the last reason only, but that is quite often important, for in city, district, state, league, and big relay meets there are sometimes as many as twenty to fifty starters in one distance race, and the slow starting boy who gets caught in the rear of such a crowd may not get free until it is too late to catch the leaders.

It is easy to learn the first principles of starting, but to become really good requires daily attention during the training period, especially early in the season, for the start requires the full use and development of the big muscles of the legs and back. This muscle development requires faithful practice over a long period of time for best results.

The purpose of a good sprint start is to gain full speed as soon as possible, which requires a leaning, driving position easily changed to the higher, but still forward-leaning position attained at full speed.

In general the best starting position is one which is similar to that of a wild rabbit, which sits bunched, often with its back to a tree or bank or tuft of weeds, or other "starting blocks", and is off like a bullet at the hunter's approach. All good sprinters now use the crouch start. The advantage of this start is that the weight is placed directly ahead of the source of power, the leg drive. When a runner starts from a standing position his legs tend to drive out from under him. However, some distance men still use this start, which was used by all runners in the early days of track and field athletics, as you have probably learned from old pictures. If you prefer to use the standing start, it will be described later.

In the crouch start the body is about parallel to the ground at the start. The legs drive directly against the body weight, and as speed is attained the body gradually comes to a more erect position. Even at top speed there is still good body lean to counteract the air resistance and to insure forward motion.

The foot position described here is for the average sprinter. Certain exceptions will be noted below. Arrange the pits or starting blocks as follows (the feet are placed in shallow pits dug with the spikes or trowel, or braced against various kinds of blocks so that the feet drive against a firm base): First decide which leg you prefer to have forward.
This description is for starters who place the right foot forward; left-footed starters reverse the procedure. As you stand in the middle of your lane, and facing down your lane, put your right toe at the starting line. Now make a mark behind your right heel. This marks your front pit or starting block. Now step back so that your right toe is behind the mark just made, and stand erect, feet side by side. Now make a mark behind your left heel. This marks your rear pit or block. Of course, if your shoe size is small, you will have to allow some extra space. Another variation often made is for tall or long-legged boys who cannot crouch comfortably with their feet so close together and so close to the line. They must move back somewhat, but will still get a fair start by getting a longer reach when they uncoil. Short boys sometimes are able to use an even closer foot arrangement. Here is a good general rule: If your front toe is 12" from the line, the rear foot should be 24" from the line. Or 9" and 18", for instance. It makes no difference which foot is forward, except that boys who are right-handed usually push off with the left foot.

Always be sure that your starting blocks are firmly placed or your pits dug with almost vertical back walls deep enough to hold firmly. Sometimes the back walls of a pit will push out and ruin a start. It is recommended that you buy or make some sort of starting blocks rather than use pits, because holes in a track cause injury to other runners, and holes are forbidden on many tracks.

To take the starting position, stand in front of the blocks. On the command "Take your marks" drop to your hands and back into position, pressing the spikes firmly into place, and resting on the knee of the rear leg.

Relax while arranging the hands on the starting line. Place your hand just behind the line with your thumbs turned toward the middle and your fingers pointing away from the body. Rest your weight on your finger tips so that when you drive off the marks you can move directly forward from your hands. The hands are now just under the shoulders. The arms are straight and are placed outside the legs. Now, relaxed and breathing deeply, wait for the command, "Get set".

At the command, "Get set", lift the rear knee off the ground about eight inches, or high enough to raise the hips a bit higher than the shoulders. Keep the back straight, the arms straight, and the eyes focused at the track just a few yards ahead. The body is now resting on the hands and feet only. The brain is keenly alert, but the muscles must not be tensed. Relaxed muscles work faster than tight ones. Test this by trying to strike an object with your fist when your arm is tense and when it is relaxed.

At the crack of the gun the runner drives out as suddenly and as powerfully as he can. The rear leg steps out in front, and the opposite arm drives forward to balance the leg drive. The first steps are short, because the body has not yet attained enough momentum to carry it between strides. However, don't try to shorten the strides. These first strides should be taken with full drive, the knees coming high and the leg driving all the way through until knee and toe are straight. The start is a flight to gain momentum, and the body gradually comes to an almost upright position. Common faults are wobbling, lack of arm drive, rising too soon, and falling forward. The drive for momentum takes at least twenty-five yards. Great runners are still increasing momentum as much as thirty-five yards from the start. Jesse Owens seemed to be getting faster and faster even to the fifty-yard mark.

After the starting position is mastered the most important thing to learn is the proper mental attitude while waiting for the gun. Don't be fussy-budgety and jumpy. Be determined, but calm. Jumping the gun is usually caused by worry about the start. After you are set think of nothing but the quickness of your first steps. When the gun cracks, your body will automatically drive forward even if you are not thinking about it. So it isn't necessary to think of the gun; just concentrate on the start to see how quickly you can move. The sound of the gun will start you - even someone's cough! Remember, this is very important.

Once the form is mastered, and you are in good shape physically, the way to improve your starting time is to have yourself timed for a distance of 15 or 20 yards and see how
much you can reduce the time and how consistent your time is. Improvement depends on quicker reaction to the sound, which comes with practice; and harder leg drive, which comes from hard patient practice to develop stronger leg muscles. Don’t neglect this part of your work. Do it every day, after you finish your warm-up. It will win races for you that can’t be won on sheer speed. In any race, the start may make as much as half a second’s difference.

A difficulty that many boys have in learning to start is in placing the feet wrongly in the first few steps. Some, especially football players, put the feet down too far apart, making a time-wasting side-wobble. Others cross the steps, causing a wobble; and some turn the feet out, losing power. The ideal foot position is pointing straight forward, and the foot should strike the ground just slightly to the side of a line on the track in the direction of your course. The best way to learn this action is to draw a straight line and do your starting along the line to see where your footprints fall.

Another error that frequently appears is in misuse of the arms. In the first few strides the arm drive is emphasized to the utmost, but the drive must be straight front and back. Don’t let the hands cross the middle line of the body or a side wobble will develop. Study the illustrations carefully.

The Standing Start

For the standing start, if you prefer to use it for distance runs, take a position with both feet behind the line, and with both feet pointing forward, but one foot a step back of the other. Now lean forward from the hips as far as you can without falling and draw back the arm on the side of the foot that is forward. This arm should be in the same position as though you were in the middle of a running stride. The opposite arm is forward, so that the runner appears as though posing in the middle of a stride. At the gun the arms swing as in a regular running action and the legs drive the body forward, the back foot coming forward.

Regardless of your preference of form, good starting requires a lot of hard work, but is something that all track men can master. In all races, the start is important enough to warrant the coach’s diligent attention. Getting free of the pack has saved many a distance runner unnecessary spills and jostling. Moreover, every bit of momentum gained at the start helps carry the runner for many yards after the start.

Suggestions to Coaches

Coaches have to watch their boys like hawks to see that no starting is done until two or three weeks of conditioning are past. Even then, the starting must be introduced gradually over the next week or there will be some strained muscles. Once the boys are ready for fast starting, never let them go at full effort two days in succession.

When the boys seem to be doing pretty well some day, get three or four together and without their knowing you are timing them, snap the watch on them at 15 yards or 25 yards. Then tell them what you are doing and watch the improvement. It is amazing how much they can speed up these 15 yards when they focus on the job.

Psychologists say that the quickest reaction to a signal is obtained by concentrating on the motor movement. For track men this would mean thinking of the leg and arm action rather than the gun. However, some very successful coaches take the opposite stand and teach their runners to concentrate on the gun. Both methods seem to be good if there is enough practice and concentration.
A good many coaches wait until the week of the first meet to begin work on starts. This is a mistake, because starting takes special muscle action and must be built up over a period of several weeks for safety and best results.

In coaching the start have someone else give the commands while you observe from the side, front, and rear. These different positions are necessary to get a complete picture of form relationships. Try to get a mental moving picture of the whole movement. Frequently a fault is so puzzling you cannot put your finger on it, and over the weekend, or at night, as you review your "mental movie," it suddenly flashes to your mind what is wrong.

It helps, too, to look for specific details. On one start watch the arms, on another the knee lift, the shoulders, hips, head, feet, etc. And never forget to check the footprints. They tell much.
CHAPTER VII
SPRINTING

From the average spectator's viewpoint the one-hundred and two-hundred-and-twenty-yard dashes are the most exciting of all track and field events, because of the closer competition. Through the ages, the fastest foot-racers have been admired and envied.

From the athlete's viewpoint, however, the dashes are very discouraging to those who lack natural speed, for determination and persistence in training will not be of much use in overcoming this lack. Don't misunderstand me; a sprinter must have determination and persistence! But these alone will not suffice in this event. You simply have to have the kind of nerve and muscle systems that make it possible for you to work your legs rapidly if you are going to be a good sprinter. Certain limitations of build are evident, too. If a boy is too tall and thin, he isn't likely to be a great sprinter because he won't have the strength and driving power to get a good start or conquer wind resistance at top speeds, although an occasional six footer, because of an unusually good build or muscle strength makes a good sprinter. If a boy's bones are big and heavy (raw-boned) or if he is too fat, his load will be too great in proportion to his muscles for him to attain great speed. Again there are rare exceptions. And if a boy is small, he must be unusually springy or muscular or he will not be able to equal the stride length of taller men, although there have been some very good sprinters who were small.

The ideal sprinter is a man of medium height, well-muscled and trim of build, with small bones and a tightly-knit, compact figure (stream-lined). Mentally he must be spirited, quick of nervous reaction, and full of fire - a fighter - for the sprints do not require endurance so much as the sudden, explosive type of nervous energy that reacts instantly and at high pressure to a competitive situation.

The history of sprinting shows great improvement over the years. The first American sprinter of note was George Seward, who in 1846 went to Europe and won many races. When the crouch start was invented in 1887 times started to improve, and as tracks were improved times were reduced until by 1924 four men had run the 100-yard dash in 9.6: A. E. Duffey, Dan Kelly, H. B. Drew, and Charley Paddock. The same men also held the 220 record at 21.2 seconds. Then George Simpson of Ohio State University set a new college record of 9.4, to be followed by Hubert Meier of Iowa State in 1930; Frank Wykoff of Southern California in 1930, Ralph Metcalf of Marquette in 1933; Jesse Owens of Ohio State in 1935 and Hal Davis of the Olympic Club, San Francisco in 1942. Jesse Owens of Ohio State pushed the 220 record down to 20.3 seconds in 1936. In 1948 Mel Patton of Southern California wiped off the 9.4 second record for the 100-yard distance with a new mark of 9.3, and in 1949 he lowered the 220-yard time to 20.2 seconds.

100 Yard Dash

Since we have already discussed the start, we will discuss the sprinting form as a continuation of the start. A few points are very obvious at first glance: boys who run fast must move their legs (1) faster or (2) farther, or (3) both if they are going to win. We will try to develop both points. The first is soon disposed of. After a few trials we soon learn to move the legs about as fast as they will go. As a matter of fact, a person can run in one place, moving his legs as fast as they will go without traveling an inch. The leg action, then, can't be speeded much. Exercises such as rope jumping and tap dancing or any other activity requiring quickness of foot will aid in developing all the speed you have, but it isn't likely to improve a great deal. A runner who reaches this point is exasperated and says, "I just can't move my legs any faster!"

Most of a sprinter's improvement, then, will come in learning to drive his legs farther and harder, so that each stride will carry him farther toward the tape. The net result of this development is that he has fewer steps to take in the total distance, and
he can take them at his maximum quickness. The longer the stride, the sooner he reaches the tape, if he doesn't slow up the leg action in straining for distance. There must be a combination of both efforts.

Continuing from the start, which has been already discussed, let us look at the sprint form. In order to get the best use from arms and legs the ideal position is one which allows easy, relaxed action and good balance. The body must not be leaning too far forward, an occasional fault of beginners, or a shortened, stumbling stride results. On the other hand, a too erect or leaning back position, a more common beginning fault, prevents the legs from reaching out to the next stride, and the runner seems to do all his running in one place - as the finish usually shows. The lean should be between these extremes, far enough forward to counteract wind resistance and to give the legs something to drive against, but not so far forward as to result in a stumble or shortening of the stride. The lean is of the entire body, the back and shoulders being in the same relative position as when standing straight at attention. In full stride there is a straight line from the head to the toe of the pushing foot. Do not hunch your back or shoulders in trying to run. This merely cramps the chest, interfering with breathing and arm action. To attain this position take a military "Attention" position with the head up, chin in, chest up, and stomach in. Now fall forward, raising the head enough to look directly down the track, and start jogging. Gradually speed up. Practice this until you can hold perfect position at top speed. This position allows the chest full expansion for the lungs, keeps the head up so the throat is not choked, and puts the shoulders in position for a full arm swing. Another advantage is that the chest is in position to break the wind (streamlined) in the same way that a swimmer's chest takes the water. Some usual errors that one sees in beginners are the hunched back, too much or too little lean, tense muscles, and distorted head positions, with the head on one side, down, back, or rolling around. These movements do no earthly good in a race, and are a decided detriment to good running in that they interfere with good breathing, ease of arm action, and smoothness of stride, all of which are essentials.

In order that the legs should attain maximum drive and spring, the runner should be on his toes, never flat-footed. This aids in utilizing the spring of ankle and toe in stretching the stride. The knees should come up pointed, as high in front as you can force them, thus giving the foreleg more time to swing out before it strikes the track, and also allowing the body to coast farther before the foot strikes. The legs are moved by an upward pull from the hips, the foreleg swinging loose and relaxed, the foot landing toe first. On landing, the ankle bends enough to absorb the shock, but usually not enough to show a heel print on the track. The thrust follows the touch on the track. The motion is much like that of riding a bicycle, only exaggerated. Although it sounds hard to do, the muscles must be kept relaxed. To obtain full driving power, the feet should point straight forward. If they are turned, the down thrust will be weakened. Also, loosely flopping feet make the runner wobble, breaking his form and shortening the stride. To test your foot action, jog down a straight line, watching how your feet land. They should strike to each side of the line, almost touching it but never coming on it. The toes should point straight forward. There should be no crossing over of the feet, because this causes wobble. Be sure you are not running stiff-legged; you will never develop full speed that way.

And now let's consider arm action. Few boys realize how important this is. In running, the arm swing helps balance the leg drive in this way: As the right leg pulls up, the left arm swings forward to balance. Otherwise the leg swing would pull the body
around to the side. The harder the leg swing the harder the arm action must be. The legs, then, can swing no faster than the arms can swing to keep the balance. This is why all good sprinters have strong shoulders and arms as well as strong legs.

Running is a series of forward drives, the arms keeping balance. In perfect running form the arms must be relaxed and swinging smoothly in time with the leg action. Nothing is more beautiful than the picture a good sprinter makes as he comes down the straighaway with arms pumping rhythmically and legs driving like pistons. The arms are bent at a 90-degree angle at the elbows. The hands are loosely closed, not clenched tightly, because clenching the hands usually tightens the whole arm and shoulder. The arm swing should be long, back far enough to bring the hands past the hips and forward far enough to bring the hand to the chin of an imaginary boxing opponent. Incidentally, a good way to practice the arm swing is to stand before a mirror and take imaginary uppercuts at the chin of your image as fast as you can work your arms. Be sure to get a good back swing, and don't break the mirror! In running, the emphasis in the arm swing is in a terrific forward jab. Good arm action means increased speed.

When you have mastered the form pretty well, you should have improved your 100 yard time considerably. But then will come a time when you can't seem to cut another tenth second off your record. Now concentrate on developing length of stride and leg strength. To do this keep emphasizing higher knee action. Do exercises such as high kicks to stretch the hip joints and muscles. Practice walking around the track pulling your knees up to your chest and snapping your foot out and down, keeping on tip-toe. Brush the track and run a 100. Then go back and count your strides. Then run another and see if you can reduce the number of steps without reducing the leg speed. Good sprinters vary from six to eight feet in stride length.

In competition the only problem is to run as fast as possible for 100 yards. To do this one must be perfectly relaxed, for even in so short a race as 100 yards one's muscles cramp somewhat at the end. But, if a man trains well and learns to relax he should be able to run at top speed the entire distance.

Before the race, warm up well by jogging one mile, with rest intervals between laps. Take each lap a bit faster than the previous one, and between laps take a thorough set of exercises to loosen all muscles and joints. Be sure to do some front bends with your hands flat on the ground and your knees straight. If you can't do this exercise at first, work at it daily until you can. This is absolutely necessary to prevent strained hamstring muscles. Now do several sprints on the straighaway, gradually building up to full speed. Then return to the dressing room and lie down. Rest; don't play around.

Just before your event get a light rub-down if you have a good trainer. Then go out, jog, take a couple of easy starts, a fast start, and a thirty-yard dash. Walk back and breathe deeply while you wait for the race, filling your lungs with oxygen. Keep relaxed! And win the race. After that keep improving until you set a new world's record! Somebody is going to do it some day; why not you?

During the race, keep your eyes on your lane and the finish yarn. Keep relaxed, breathe naturally, and try to keep perfect form all the way. When you reach the tape do not leap off the ground, as you have seen in pictures of old-time runners. This looks spectacular, but slows one's speed, and sometimes causes nasty falls and cinder burns. To "gather" for the finish, relax and drive your arms harder. Lean forward and keep driving - at least five yards beyond the tape, for many a boy has lost when he eased up too soon at the finish.

220 Yard Dash

The 220 yard dash requires more careful judgment of pace than the 100. A runner cannot drive at full speed for the whole 220 yards without tying up his leg muscles. Usually, then, good 220 runners sprint the first 75 yards as if running a 100. Then the stride is stretched as much as possible and every effort made to relax so that the speed can be maintained through the finish. The runner must now slow his speed - just stretch
and relax. Mastery of this form enables a runner to conserve his energy so that he has more drive left on the last fifty yards. It requires higher knee action if possible, freer arm action, and relaxed muscles. Drive 75 yards; "float" 75; drive 70. These proportions vary. Some strong runners use very little "float".

At the finish drive as hard as possible but do not change form. Keep your usual position and try not to wobble. The form that was fastest in getting you to the tape is also the best to take you through the tape!

Relaxation

There has been, you notice, a constant emphasis on relaxation. The reason is that relaxed muscles work faster, harder, and longer. This is because the muscles of the body are in pairs, opposite each other. You can see how this is by examining your arm. When the muscles are relaxed they work alternately (try your arm), just as if two people are on opposite sides of a gate and pulling it by turn. When the muscles are tensed (tense your arm), they pull against each other, as if the two people at the gate both pull at the same time. The gate will not move unless one of the people is stronger than the other. That is how muscles work. Then, too, if relaxed and not working against each other they do not have to work as hard and will last longer. If the muscles are relaxed the blood will circulate through the muscle better, bringing oxygen and other food materials, and carrying away the wastes from exercise, thus preventing exhaustion. Is it any wonder coaches yell themselves hoarse with the word "relax"?

Training

The training work for the 100 and 220, as contrasted with the other runs, is mostly for drive and quickness rather than endurance. Calisthenics and muscle-building exercises for the whole body are necessary, and should be carried on the year around. Avoid distance swimming or running, as these tend to slow the muscle reactions. Gymnastic work is fine for sprinters, also tap dancing, or any sport taking fast foot work and relaxed muscle coordination.

At the beginning of the season start working easily. Never begin a practice without a set of warm-up exercises. This gets the heart peppe up, starts the circulation speed- ing through the muscles, and warms and loosens all muscles so there is no danger of a tear from a sharp or sudden burst of speed. Many a sprinter has become sadder and wiser when he disregarded his coach's advice and started running without loosening up. A sudden painful tearing sensation in the leg or back muscles, and the runner is furloughed for a month with a pulled tendon or torn muscle.

These torn muscles are caused when different parts of a muscle fail to contract at the same time, causing one part to pull away from another. Hence the emphasis on warming up, which merely gets the muscle fiber in tune. The reason is the same as that for warm- ing up an airplane engine before a flight; it gets every part coordinated and ready for action. For your practice warm-up jog four laps, each a bit faster, with some walking between the laps. Then do at least fifteen minutes of stretching exercises. Be sure to include some vigorous bicycle exercise, lying on the back and making big circles with the feet.

For the first week of the season work only on form: arm action, body position, leg swing, foot placement, jogging easily back and forth on the straightaway.

The second week add some striding down the 220 straightaway at the end of each work- out.

The third week begin doing easy starts, and several times a day, at the end of prac- tice, do 30-yard dashes easily. Don't do any hard driving yet. Each day do on the straightaway a few minutes of exaggerated walking, coming up as high as you can on tip- toe at every step. This is to exercise the ankles and lower leg muscles and tendons to prevent "shin-splints", a painful injury caused by strain on tight muscles and tendons in
the lower leg that aren't used to the stretching they get in track work, where the athlete does all his running on his toes.

The fourth week do several easy 60-yard dashes along with the other work and end the week with a time trial over the full 100, if the coach thinks it advisable. Ten minutes later stride an easy 440.

Then start the heavy practice work, doing a dozen starts every second day and several 440-yard dashes each week to build up strength and drive. During the competitive season the program should consist of a thorough warm-up each day. On Monday, Tuesday, and Wednesday do six or eight starts (more if the starting is poor), run through easily for form twice, and finish with a couple of 300-yard runs. If time trials are necessary, on Tuesday or Wednesday do the 100, 220, and 440 for time. Whichever day you choose, ease up on the schedule for the previous day. The 440 run will help develop the drive needed in the last part of your sprint races. Three hundred yard dashes seem to work well for many sprinters, too.

On Thursday there should be some easy form work, if the competition is on Saturday. Friday do warm-up work only. If the competition is on Friday, do nothing on Thursday but warm up. The reason for the rest the day before the meet is to allow strained and tired muscle fibers to repair themselves and build up spring and elasticity.

Following is a simple practice schedule for mid-season. Your coach will add to it, or change it to help you, but here are fundamentals:

**Mid-Season Practice Schedule for Saturday Meets**

**Monday:**


**Tuesday:**

Warm up; stride 3 easy 220's. Do six easy starts. Run 100 yards for form. Jog 440. Today's work should be easy to prepare for time trials tomorrow. If there are no trials on Wednesday, then finish Tuesday's work with two 220's, sprinting 75 yards, then coasting in the middle and sprinting the last 50 yards.

**Wednesday:**

Warm up. Do six starts, each one harder. Run 100, 220, and 440 for time, resting between races. Jog a few laps easily. If no time trials are necessary, substitute 1/2 hour of form work over 50 yard distance and finish with a hard 300-yard dash.

**Thursday:**

Warm up. Do six easy starts to correct form errors discovered in yesterday's trials. Do 100 yards, coasting the middle 40. Rest. Stride a brisk 220.

**Friday:**

Warm up. Spend a half hour stretching in the sun if it is warm enough, or otherwise just taking life easy. Try to store up pep and rest for tomorrow's race.
To the Coach

(Sprinting)

Coaching sprinters is the hardest and easiest part of track coaching. If you have no fast boys it is heartbreaking. If you have some speedy individuals you wonder why anyone worries about coaching dash men. It is so simple! About all you can do for a sprinter is teach him to start, smooth out his form a bit, and be sure he is physically and psychologically fit. If you do these things your sprinters will improve a little.

Much has been said of the danger of over-working sprinters. This is especially true of the two days before the day of competition. However, in the early part of the week a sprinter must have sufficient hard work to assure power in his legs and stamina at the finish, because part of a man's speed depends on strength. If a sprinter isn't strong enough to run a pretty good 440 he will not do as well as he should in a 220 yard sprint. If a sprint candidate is trained this way and doesn't bloom into a point winner, he can be easily changed over to the 440 or mile relay to pick up some valuable points.

In teaching correct arm action here is a good technique: Standing behind the runner, reach around him, grasp his wrists, lift them to the proper height, and move his arms through the correct arc. Then have him make the movements himself; correcting him until he is in satisfactory position. Next have him practice at an easy jog and gradually speed up.

To check on running form study a man from the side, front, and back. Errors will show up at one angle which aren't noticeable at another angle.

Don't forget to analyze the footprints on the track for spacing, direction, balance, and push-off emphasis.

Be sure to know how much warm-up your men are using, both in practice and competition. Make sure their shoes are snug.
CHAPTER VIII

THE QUARTER-MILE RUN

"What a race! That's the last time for me!" is a frequent comment by beginners after running a 440 for the first time. And so the quarter mile has the reputation among high school boys of being the toughest event in track. Before we agree to this, let's study the event. It may not be as bad as it looks - or feels!

The quarter mile race was first established by the American Athletic Union in 1876. The approximate distance, however, was a standard event in the ancient Olympics. By 1916, J. E. Meredith had a time of 47.4. Ben Eastman, of Stanford University, dropped the time to 46.4 in 1932. Herbert McKinley of Illinois now has an official record of 46.0 seconds, set in 1948.

The 440-yard run combines the characteristics of a sprint and a distance run. It requires great endurance because it is impossible to run at top speed for 440 yards, and it does take plenty of speed, especially at start and finish. It is the fact that the race requires endurance that gives it a bad reputation. Many a boy who is a good sprinter has tried to run a 440 because it doesn't look hard. But don't be deceived; it takes a real man to sprint 300 yards, let alone 440. The same boy, if he trained well and controlled his pace, might do well and learn to love the race. So don't decide against the 440 until you have given yourself a month or two to prepare for it, and know how to control the pace for best results.

Any high school boy who can run 100 yards in 11 seconds or better should be able to do well in the 440 if he works hard, although it will be an easier event for boys who have enough speed to run the 100 in 10.5 seconds or better. Tall boys have the advantage in stride, but may be handicapped in lacking drive and speed on start and finish. Light, sprinter-type runners can turn in good time by getting fast starts and finishes, but have to develop endurance. Heavy, raw-boned men, though slower, often have the rugged power and endurance to run at almost their top speed. The ideal 440 runner is about 5 feet 10 inches tall, with springy legs and a rugged, well-muscled body. He must have courage and enough self-control and will power to follow a careful training schedule. He must live cleanly.

The 440 man will use the same start as the sprinter, and must follow the same training to develop a fast start, as many races are determined by obtaining the lead and forcing competitors to do extra work in passing. Don't be afraid of starting fast. To learn the start, turn to Chapter VI. Then, too, you should read the chapter on sprinting if you have not already done so.

Assuming now that you have studied the start and the sprinting form, let's consider what happens in a 440 race once you have left the blocks and are under way. The first job is to sprint about thirty yards to pick up speed. It might be advantageous to sprint even farther if necessary to get a good position, but don't carry the sprint too far. If a competitor insists on the lead, relax and plan how to pass him later. Then you slip into your 440 stride, which is your best effort at relaxation and smooth striding. A 440 runner must get every possible inch out of each stride, without straining, for he is in an endurance contest, and the fewer steps he has to take the more energy he will have at the finish. Conservation of energy is essential. The stride will be the same as the sprint stride for the first dash; then it must relax more and the emphasis changes to "swinging" along rather than "driving". The runner tries to maintain the speed he gathered on the sprint, but doesn't work as hard. This stride is sometimes called the "float". The arm action, like the leg action, is not quite as driving, but is as smooth and rhythmic as possible.

The first thing to do in order to obtain the long stride is to loosen the hip joints, for the knees must swing high. A good exercise is to grasp the knee with both hands and pull it to the chest, giving it a few hard tugs. Do this with alternate knees a few min-
utes each day; then try pulling the knee to the chest without the aid of the hands, snapping the leg out and down to the track as in a running stride. Learn to do this with alternate legs as you walk around the track, rising to tip-toes as in a regular running stride.

A fine way to develop the "float" or "striding" action and at the same time develop speed and endurance is by a practice technique known as "wind-sprints" or "gassers". This practice is best performed by three, four, or five men running together and taking turns in setting the pace. One method is to run the straightaways and walk the curves of the track; another is to run the 220-yard straightaway and catch the breath while walking back. At a signal from the leader, the group sprints for 20 yards to gain momentum and then coasts, "floating" along with a long, loose rhythmic stride at good speed, but not straining, concentrating on smoothness and form. Learn to use as much of the "float" as possible in your regular 440 stride. If you are relaxed, it is possible to travel almost as fast with the "float" as with regular sprint form. In doing gassers, repeat the sprints before fully recovered from the last one. It is the ability to dig into a good stride even while tired that brings out the endurance and will power needed for a good 440-yard race.

What has been said about relaxation in connection with sprinters is even more important for quarter milers, for the quarter miler must study his form to see if there are any muscles he has not been relaxing, which could be relaxed. Even the tiny muscles of wrist, arm, neck, and shoulders can waste enough energy, if not properly relaxed, to make a tremendous difference in the amount of energy left at the finish of the race. That is why the last 100 yards of a 440 race are torture for the beginner. Most of the boys who collapse at the end of a 440 race are boys who are not in condition or do not know how to run. The champions rarely fall. Do not run unless you are prepared for the race. Not only is it hard on you if you do not run properly, but the falls give track a bad name with uninformed parents and others who do not know that the boy who falls has not trained properly. They sometimes blame the sport. Train so that you can run a race, grin, and come back to shake hands with your competitors! It is fun to be able to "take it". A lot of the trouble that some boys have in the last of a 440 race lies in the fact that they change their form, starting to wobble, shorten the stride, or change positions. This is a mistake. At the finish, regardless of how tired you are, you will make more speed by maintaining good form than by breaking it. Other errors that are common at the finish are crossing the arms, pulling the head into unnatural positions, staggering, leaning back, galloping, and tensing the muscles. Some boys literally tie themselves into knots trying to win, when they would obtain more speed by relaxing and keeping their legs and arms swinging.

The most important secret of success in the 440 is to develop a fast "float". Carry this fast float until it begins to be a strain to maintain it; then go into your sprint. Many sprinters can loaf in the middle of a race and fool the slower opponents by a sudden burst of speed on the end of the race, but cannot get record times that way. It is impossible to make up in 100 yards the time lost in the other 340 yards. The boy who wants to be a champion will practice until he finds the fastest pace that he can hold consistently over the entire race. Following is the type of practice schedule to follow in training for this type of race.

First, set a goal that you want to reach. Suppose that you want to start by trying for a 52 second 440. That can be divided into two races of 220 yards each. Remember that it is better to practice full stride speed at shorter distances and increase the distance as you gain endurance, then to run slowly the whole distance and try to increase speed as
you get in condition, for stride and form change at different speeds. So, let us divide our 52 seconds between the two divisions. At first guess one would expect the race to be run at 26 seconds for each 220. However, when fatigue starts to set in, the stride shortens somewhat, causing the second 220 to be a bit slower, usually, than the first. Therefore, a division of 25.5 and 26.5 is about as even a division of time as a runner can expect.

Now try running 220's until you can clock very near to 25 seconds every time, and jog through to the 440 mark. As soon as you can do this consistently, stretch the distance to 330 yards and try the distance in 38 seconds, coasting on through the 440. When this goal is reached, just concentrate on cutting the time of the last 110 yards until you have your 52 second 440. Then set your goal at 50 flat and cut 1 second off each 220. However, don't try for time too often. Once or twice a week is plenty. Get improvement by practicing for strength, speed, and form. Too many time trials are a strain and may make you worse instead of better.

The early season training should consist entirely of jogging, easy starts, form work, and stride or "floating" practice. Do lots of pace work with the clock at the shorter distances of the schedule you have aimed at. Study the sprinters' instructions on early season work.

During the competitive season, if time trials are necessary, do one early each week, and an occasional 880 if you have mastered your 440 pace. If not, do another 440. Most of your practice time should be spent on sprints and pace work. If you can practice intelligently, you are better off without time trials. Two days before competition just do light form work, and the day before the meet do nothing but warm up.

It is absolutely essential in this race to be in good physical condition. Get plenty of sleep; eat carefully, and avoid rich foods; do not smoke, drink, etc. The chapter on training tells more about how to build good physical condition.

Just before the race take plenty of time to warm up, using exercises and jogging at least one mile, taking each lap a bit faster. Be sure to do enough fast spurting to get thoroughly heated; then allow 15 or 20 minutes of rest before the race. Usually high school boys are afraid to warm up. They think it tires them. It doesn't work that way if you've taken care of yourself. Have you ever had the experience of getting "second wind" after running awhile in a game? This merely means that you are warmed up, with heart, lungs, muscles, and circulation working together so smoothly that you feel as though you could run forever. You should have this feeling before starting a race -- you will run much better. Yet few beginners warm up well enough to reach this point. Find out just how much running you need for second wind, and then always do it about the same way. The procedure will vary with different boys, but not as much as they usually think. Often boys are surprised when their second 440 on the same day betters their first. The reason is that the first 440 gave them a full warm-up for the second. Many experienced 440 men run a good two miles during their warm-up, besides taking a full set of exercises.

Learn to fight for the pole at the start; do not let jostling bother you, but do not foul. If the competition is too keen for the pole, stay out of boxes and follow closely. Let the others set the pace; then fight for position on the back stretch and the final straightaway, picking up gradually. But be sure you do not get too far behind. Keep within five yards of the leaders if you expect to have a chance at the finish. Don't wait too long to pass. Step ahead while you still have some sprint, for if you are challenged, you may need a sudden burst of speed. Never look around while running, as this necessitates a slight break of stride that may cost a race. If anyone is going to pass you, you won't have to look around to find him. If you are doing your best, he may not catch you. If you are doing your best and he still pulls up, looking around won't help, and it may do serious harm. Read the chapter on strategy for more tips on racing situations.
Sample Mid-Season Practice Schedule for Saturday Meets

Monday:
Warm up. Stride an easy 880. Do two forty-yard dashes trying to develop as much speed as possible to practice securing the pole position. Run a 220' with the clock to test your 440 pace. Run another pace 220 with the clock and jog on around. Stride a good brisk 300. Shower.

Tuesday:
Warm up. Do several 220's at 440 pace to improve form. Do six starts. Jog two laps easily. Light work today preparing for tomorrow's time trials. If there are no time trials scheduled, then run a 660 yard run at 880 pace. Rest. Run a 100-yard dash. Shower.

Wednesday:
Warm up well. Jog four laps, starting slowly and making each one faster. Do six starts, each one faster. Rest fifteen minutes. Run 440 for time, if trials are required, substitute two 330-yard dashes and an easy striding 440. Shower.

Thursday:
Warm up. Work on straightaway to correct running form. Run 220 with watch to check pace. Do six easy starts. Do two laps easily. Shower.

Friday:
Warm up. Jog two laps. Stretch and take sunbaths. Try to store up pep and energy for tomorrow's race.
CHAPTER IX
THE HALF MILE

The 880-yard run has been a standard event ever since track athletics were introduced into the United States. C. H. Kilpatrick was one of the earliest to get good time, 1:53.4. In 1916, J. E. Meredith ran the distance in 1:52.2, and in 1934, Ben Eastman of Stanford, did 1:49.8. In 1938 Sidney Wooderson of England set the present record of 1:49.2, although in 1939 Rudolf Harbig of Germany ran 800 meters in 1:46.6, which is about 5 yds. shorter than ½ mile. In August of 1950, Malvin Whitfield of U. S. tied the 880 record with a time of 1:49.2.

The 880, like the 440, can be run by fellows of almost any build, or any size, but in general lean and rangy or well-built muscular boys of medium height have had the advantage because of the long stride and endurance that are essential. Heavy boys tire sooner, generally, although there are some exceptions. Pretty fair speed is essential.

The pace is not quite as fast as the 440 pace, but is surprisingly near it, considering that the race is twice as long. So the first thing to work on is conditioning. The pace, stride, start, and other form points can be learned on the track, but the only way to get in top condition is by year-round hard work. Boys who deliver papers after school should learn to cover their routes on the run to strengthen legs and wind. When you do errands, leave your bicycle or automobile at

home and run. Run the distance to and from school. Do this the year around and it will become a pleasure. And you -- will become a champion! One very good 880 man, Charley Beetham, of Ohio State University, trained for endurance and high knee lift by donning rubber-soled shoes and running up the steps of the Ohio Stadium. Other Ohio State University track men, too, have learned the value of this work.

The 880 man will use the same start as a sprinter, and must follow similar training to develop a fast start, for many races are determined by getting the lead at the start, thus forcing competitors to do extra work in passing. Don't be afraid of starting fast. Follow the starting instructions in Chapter VI.

Often you will have to sprint 50 yards to 75 yards to get the lead or a good position, but do not fight too long for the lead; it isn't worth that. If someone starts too fast let him go and know your pace well enough to let him kill himself off and then pass him. This demands sure knowledge of pace, which can be obtained only by persistent practice with a watch. Also, there is implied an ability to get the most from your stride, keeping well up in the race and at the same time conserving enough energy to make a good finish.
The 880 man, like the 440 man, is trying to stretch his stride for every inch, saving himself for the finish. To secure this long stride, follow the same practice work as a quarter miler. (Previous chapter.) Be sure to include the exercises of pulling up your knees and the "float". The 880 man goes into a floating stride just as the 440 man does after the first sprint. The only difference is that the stride won't be quite as fast or long, and the arm action isn't as pronounced. The last 75 or 100 yards will use every bit of speed that is left. As always, keep smooth form all the way.

The only way to get championship times in the 880 is to know the pace perfectly so that speed can be maintained for the whole distance at the highest rate possible without cramping. Some boys loaf along behind the leaders and plan to use their sprint at the finish, but this won't work if your competitor is a good sprinter or if he is too far ahead. If you know your pace well enough to run your best, you may have too much lead for the sprinters to overcome, and if you are beaten you may be sure that it was by a better man.

In order to run this type of race we must divide our distance as we did in the 440. Suppose we set a goal of 2:10 for the half mile. The best way to run a 2:10 half mile is in two 440 laps of almost even time. Now start by running one lap until you can do it consistently in 64 seconds. Then start doing the first lap in 64 and jogging through the other lap. Next, add a 220 in 33 seconds, making a total of 660 yds. in 1:37. Then add the fourth 220 in 33 seconds and you have reached your goal. After you have done your 2:10 in this way, set your goal at 2:04. That means doing the first lap in 61, the 660 in 1:32 and gradually bringing the 220 down to 32. If you can cut your time to 59 and 61 seconds per lap, you will have a two-minute half, the aim of every high school half-miler.

The early season training should consist of form work, jogging, striding, and later, lots of pace work with a clock at the shorter distances of the schedule aimed at. A cross country run once a week will help to build endurance, but don't do this too much. Faster pace work at shorter distances will do more good.

During the competitive season if time trials are wanted, run one 880 time trail early in the week, and a 440 the same day. Work on form and pace at shorter distances the rest of the time. Two days before the meet do light work only, and rest the day before the meet. Train religiously if you expect to do well in this race.

Just before the race take plenty of time to warm up thoroughly, using exercises to loosen all muscles. Jog at least a mile, each lap a bit faster, and do enough fast spurt ing to get thoroughly heated. Then rest about a half an hour while getting a rub, and go to the track just a few minutes before your event. Do a few starts and jog easily until ready for the race. Stretch those legs before taking your marks. In the preliminary warm-up don't be afraid of running too much. Most boys are afraid of tiring themselves by the warm-up. Usually, however, the opposite is the fault. Most boys don't warm up enough. Read carefully the warm-up suggestions in the 440 chapter if you have not already done so.

Learn to fight for the pole at the start. Do not let jostling bother you, but do not foul. If the competition is too keen for the pole on the start, drop in behind and do your passing on the straightaways and the final stretch, but get the lead while you still have enough energy to sprint. Do not let the leaders get more than ten yards ahead if you wish to win. The safest way is to do the pace-setting yourself unless someone wants to go too fast. Never look around, as it necessitates a slight break of stride that may cost the race.

Probably the most important item for any half-miler is a proper mental attitude. If you have practiced faithfully you should be confident that you can carry the pace you have set for yourself. If you lack confidence and allow others to get a stiff lead, you are setting yourself a hard task. It is harder to regain lost ground at the end of a race than it is to stay even all the way. Courage is the answer.
Some boys are troubled by the monotony of the middle part of a race and drop into a slow, plodding, heel-banging run that means they are licked. There are several tricks to correct this. Some boys relieve the monotony by an occasional short spurt. It is well, too, to drop the arms occasionally to a dangling, relaxed position, then go into a spurt. Sometimes concentrating on the boy ahead, or behind, or the first place medal seems to help.

Some boys divide the race psychologically and say to themselves, "The 1st quarter is easy; I've done better quarters lots of times. Here comes the 2nd quarter; now is the time to use the energy my training has provided; I've got to work! Now for the last 220; if I have any guts I'll need them now." A good half-miler must be a fighter. In the first three 220's he fights himself, and in the last one he fights the opponent.

Sample Mid-Season Practice Schedule for Saturday Meets

Monday:


Tuesday:

Warm up. Stride three 220's. Run 440 with watch at 880 pace. Six starts. Stride three 220's. Trials tomorrow if necessary. Otherwise stride a 56 second 440 today and 5 minutes later finish with a fast-striding 220.

Wednesday:


Thursday:


Friday:

Warm up. Jog three easy laps, separately. Go home and try to store up lots of pep and energy for tomorrow's race.
CHAPTER X
THE MILE RUN AND TWO MILE

The mile run was one of the events in the first A.A.U. championship in 1876. One of the best early runners was W. G. George of England, who ran the distance in 4:12-3/4 in 1886 as a pro. The first good American miler was Norman Taber, who had a time of 4:12.6 in 1915. Paavo Nurmi, the great Finish runner, ran a mile in 4:10.4 in 1923. In 1931 Jules Ladoumegue of France lowered the time to 4:09.2. Since then there have been more good milers than in all the history of track to that time, and the record of Gunder Haag of Sweden at 4:01.4 was established in 1945.

This event can be run, at least in high school, by any type of fellow who wants to compete, for the pace isn't too fast. However, tremendous endurance is necessary. Formerly mile runners merely jogged three quarters of a mile easily and then finished with a burst of speed that made the finish look like a 100-yard dash. The man with the most speed won.

Today the mile is run at a faster, more even pace through the entire distance. This has resulted in consistently better times, because sudden bursts of speed burn up extra energy - in the same way that an auto uses more gas in the stopping and starting of city traffic, - and also because the speed in the last 100 yards won't make up for all the time lost on slow pace throughout the long middle part of the race. The race has come to be a scientific problem of how to get the most speed with the least expenditure of energy over the entire course of the mile. Be sure to read the chapters on sprinting and 440 and 880, because the modern miler will benefit by whatever speed he can develop.

To begin with, the miler must have shorter spikes and slightly looser shoes than the other runners, because he must have freer circulation, and because long spikes are more tiring in the distance runs. Take very good care of your feet, because blisters develop easily, and the feet must be thoroughly toughened if they are to carry you around the track for long practice sessions and many miles of races. Painting the feet with tincture of benzoin helps toughen the skin.

If you expect to be a miler, the first thing to do is to start building your wind, strength, and endurance. Leave your car at home and run every place you go. Errands, paper routes, hikes, fishing trips - all should be done on the run, until running gets to be part of you. That is the only way to become really good, for you've got to remake your body more or less. Civilization doesn't give us the hardening that the Indians and pioneers of former times got through necessity. In order to be able to take the punishment of a fast mile you will have to develop a pair of legs like iron and lungs like bellows. It takes time, but it can be done. There is as much stuff to do it with in the boys of today as in the boys of olden times.

The miler should learn the same start as a sprinter, for a good start means much in many races. Don't be afraid of starting fast, but don't worry about developing a violent start, and don't let anyone pull you out too far. As in the 440 and 880, you must know pace well enough to run your own speed and catch the wild starters later.

After the sprint start, slip into your mile stride as soon as possible. This stride will not be as long as the others, but will be as relaxed and smooth as possible. You must aim for a smooth, swinging, effortless run. The arms are not driven as vigorously as in the other forms. They swing easily from the shoulders. The hands are held in the same half-closed position as in sprinting, but almost loosely, even flipping slightly from the wrist. This looseness of the hands is necessary to allow freer circulation of blood through the arms, hands, and back to the heart. The shoulders, too, are loose and relaxed. The leg action isn't as driving as in other runs.

Most American runners are coached to run on the ball of the foot. However, most European runners, who hold the records from one mile on up into the marathon distances,
touch the heel first, using a light, relaxed, rocking movement from heel to toe. In this form the straight push-off, with full leg extension is still essential. The only difference is in the landing position. Since the European style relieves the calf muscles from any work on landing, it may be advantageous in conserving energy. Let the knees come high enough to give the leg a full swing forward, but do not strain for high knee action in the mile. However, any runner must be able to come up on his toes and sprint at the start and finish or any other time a burst of speed is necessary.

After form and conditioning are acquired, the miler's greatest asset is a knowledge of pace. He must know just how fast to run each lap and know in a race whether he is on schedule or not. If the four-minute mile is ever run, and it probably will be, it will be by someone who can do approximately 60 seconds on each quarter mile. The boy who can run an even pace of this kind will find that he is far enough in the lead that sprinter type runners who loaf through the middle part of the race will not be able to catch him at the finish. If he is beaten it will be by someone who deserves to win.

In order to run an even type of race you will need much practice with a stop watch running laps at fast pace to know how fast you are going. With practice you can call the time within a few tenths of a second of the timer. Follow a schedule similar to that set up for the other races. Although we consider the following schedules fairly even, the first two laps are always just a bit faster than the third lap. Suppose we start with the goal of a five-minute mile. Most high school boys who beat five minutes will score lots of points, anyway. This schedule calls for about 75 seconds for each quarter mile. So run 440's until you can get about 72 for the first lap. This should not take long. Then try a half mile until you can run 72 and 75 for the first two laps, or 2:27 for the half. Then extend the distance to three quarters of a mile, trying to get as close as you can to 78 seconds for the third lap, or 3:45 for the three quarters. At each trial jog on through the rest of the mile. When the three-fourths mile is down to schedule (3:45), add the last quarter and keep after it until you can click off four laps in 5:00. The last lap is faster than the third because of the finish kick. The next step is to start reducing the first lap two seconds. Cut the second lap two seconds, the third, the fourth, until you have dropped your time to 4:52. Keep cutting this way until you get to 4:00! Below are listed some pace schedules:

- 5:00 minute mile: 72, 75, 78, 75.
- 4:50 minute mile: 70, 73, 75, 72.
- 4:40 minute mile: 67, 70, 73, 70.
- 4:30 minute mile: 66, 68, 70, 66.

As in the other events, the improvement comes not in repeated time trials, but from daily workouts that lead to improvement in the weekly trial or race.

The early season work should start with easy alternate jogging and walking, then form work and pace work over the shorter distances of the pace schedule aimed at, with lots of speed and endurance work. Once a week finish practice with a two-mile jog over the cross country course or around the track. Wind sprints and gassers are just as important as for the 440 and 880 men. And a good miler strides lots and lots of good brisk 440's. For every practice warm up well, with a full set of exercises and at least one mile of jogging before doing any pace or sprint running.

In a meet, warm up at least one-half hour before your event. Get a rub and keep warm until time to run.
During the competitive season, if it is necessary to run a time trial, do it early in the week, and run an 880 or 440 the same day. Spend the rest of the time improving form, strength, and knowledge of pace. Do light work two days before competition, and rest completely the day before a race. Study Chapter V on training, and make a religion of care in training.

Various workout plans: For the sake of variation, there are several kinds of workouts that can be used, at all stages of the season. One is repeating the pace laps. For example, if you are aiming for 65-second quarters in a mile, run a 65-second quarter, walk one, run one, walk one, etc., until you have run four. This will show you how a 65-second 440 feels when you are a bit tired. Then to remain speed-conscious, finish practice with a 300-yard dash.

Another good conditioner is for 6 or 8 runners to jog around the track at a moderate pace, about 2 yards apart. Then the rear one strides up briskly to take the lead and settles to a jog. Immediately the last man starts around. Continue until tired, then walk and repeat. This gives good practice in passing and sprinting, and the boys do an amazing amount of running this way without realizing it.

Another variation is to run a 440 at the pace of the first quarter you want in your race, then without stopping swing right onto the cross-country course for two miles of easy jogging. As you return to the track, break into a 440 with the clock to see how much kick is left. If your cross-country course is not adjacent to the track, jog the two miles around the outer, softer portions of the track.

A good way for distance runners to keep alert during a workout is to run a series of pace quarters at different rates, for example, each one faster: 75, 70, 65, 60, and the last all-out. Or reverse the procedure. Or call the times at random at the beginning of each lap.

The warm-up instructions for the 440 and 880 apply with equal importance to the mile. Be sure your engine is tuned up! Read the chapter on running strategy to obtain information as to different running situations and what to do about them.

**Mid-Season Practice Schedule for Saturday Meets**

Monday:

Warm up. Stride three 220's working on form. Run two or three miles of cross-country at easy pace. Rest. Stride a 60-second 440. Shower.

Tuesday:


Wednesday:


Thursday:

Warm up. Work on form, easy. Run two laps with clock to check pace. Jog two laps. Shower.

Friday:

Warm up. Jog one mile easily. Shower. Try to store up pep and energy for tomorrow's race.
The Two-Mile Run

W. G. George, away back in 1884, ran 2 miles in 9:17.4. Paavo Nurmi, of Finland, broke 9 minutes for the first time in 1931 with a record of 8:59.6. In 1939 Taisto Maki, another Finn, dropped the record to 8:53.2. The present record is 8:42.8, set in 1944 by Gunter Haag of Sweden.

For the two miler, the workouts are very similar to those of a good miler. The only difference is in the pace work. Anyone who is in physical shape for one mile can run two miles simply by running a somewhat slower pace. However, he must be mentally prepared. For example, an average high school miler who runs a five-minute mile in approximately 75-second quarters, will run about 11:20 for 2 miles, running 85-second quarters. Pace knowledge is just as important for the two-miler as for the one-miler—maybe more so. For the two-milers, it may be more convenient to divide the race into 880 divisions for pace study, running 2:30 halves for a 10-minute two-mile, for example. Thus, a 7:30 mile and a half makes a good practice race for the 10:00 minute two-miler.

In actual racing, the times usually work out about as follows, in 1/2-mile divisions:

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CHAPTER XI
HURDLING

There have been hurdle races in the United States since 1876. George Hitchcock held
the first world's record in the high hurdles with a time of 19 seconds. As more was
learned about the form, records dropped rapidly. Alvin Kraenzlein cleared the highs in
15.2 in 1899. In 1916 Robert Simpson ran the highs in 14.6. Percy Beard lowered the
time to 14.2 in 1931. The present record is 13.5 seconds, set in 1950 by Attlesey of
Southern California.

Hurdling places on the athlete stringent physical limitations. The good hurdler
must not only possess speed, but he must be tall enough or springy enough to get over the
hurdles easily and get the long strides that are necessary between the hurdles. Conse-
quently the best high hurdler is usually a boy at least five feet ten inches tall, and of
light, springy, or very muscular build, although shorter men sometimes are good in the
low hurdles. A heavily muscled boy of this height is good if he possesses the agility to
clear the hurdles, for he may have enough drive between the hurdles to compensate for his
weight. The best hurdlers have been about five feet ten inches to six feet four inches
in height, weighing about 160 to 180 pounds, with the spring of high-jumpers. Shorter
boys should not feel discouraged if they are still growing. Learn the form and wait for
strength and height.

All the instructions for sprinting apply to the hurdler. He must get as fast a start
as the sprinter, but he must also learn to regulate his strides so that he will approach
the first hurdle ready for the step-over. The running form and stride are the same as
for sprinting, so be sure to study the chapter on sprinting as thoroughly as though you
are planning to be a sprinter. The same applies to the chapter on starting.

When you have mastered the bare essentials of starting as given in chapters three and
four, you might as well begin to learn the actual hurdling, for you can continue to polish
your start and running form while you work on the hurdle form, but be sure your legs are
in pretty fair shape before you begin to run over hurdles, to prevent muscle injury.

In this description, the instructions are written for left-footed hurdling. There is
a good reason for this: Sometimes in your career you will have to run low hurdles around
a curve. When you are leaning to your left in rounding a curve, it is much faster to put
the left foot over the hurdle than it is to lead with the right. Right-footed hurdlers
are forced to jump higher in order to clear the left leg, and this cuts their speed.
Therefore, learn to put the left foot over the hurdle. Even if you have already been
hurdling right-footed, the change is worth the time it takes. If you follow instructions
and practice as though you were a beginner, you will, in just a few days, do as well with
either foot, and eventually you will be much faster, at least in a curved race. However,
the best time to try a change-over is in the summer and fall, when you have several months
with no competition.

Learning to hurdle requires patience in beginning with simple actions and staying with
them until they are mastered, but really there is nothing very hard about hurdling if one
will just study the form in this manner. If you have never hurdled, a simple way to learn
is with this kind of practice: set up a few low hurdles on the track about 5 yards apart.
Take a standing position (tip-toe) directly in front of and facing the first hurdle. Now
lift your left knee high and step over the hurdle, still facing forward. Be sure to put
the leading foot straight ahead, toes pointing forward. Don't drag your foot around the
side. Now you are standing with the left foot over the hurdle and the right foot behind.
Lean forward sharply, and, still facing straight forward, pull the right knee up, turning
the right foot out so that it points along the top of the hurdle away from the body. Keep
pulling the right knee up and forward until the foot is clear of the hurdle; then swing
the knee forward and snap the foot out and down in front as in a regular sprint stride.
Now walk through the rest of the hurdles doing the same thing. Turn around and come back
the same way, doing this until you are sure you have the leg and foot positions and action

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correct. Stay on your toes, as this is a necessary habit for hurdlers. Now set the hurdles at 10-yard intervals. The next step is to jog over the hurdles, stepping over in the same way that you did when you walked. You will need a springier push from the right toe as you take off. At jogging speed you should get five strides between hurdles. The next step is to work on proper balance, which depends on the correct positions of your arms and legs, and proper timing of emphasis in the movements.

The arms, for hurdling, should take the same relative positions as in a running stride, except that they are swung farther to make up for the extra time that the body is off the ground. For the high hurdle form, which should be learned with this practice over low hurdles first, thrust the right arms forward and down as you step over with the left foot. The right hand should reach beyond the left toe, but not across it. The left arm acts exactly as in a regular sprint stride, driving back sharply with the elbow pointed. Be sure not to fling your arms to the side like wings. The action should be backward and forward, close to the body. The arms cannot be brought into action as quickly for the next stride if they are in a spread-eagle position.

If you can master the form described above, you are a hurdler. Further progress will come in working out the stride, which is your next job, and no easy one. Meanwhile keep polishing the form until you can skim over the hurdles without losing speed, balance, or rhythm. The ideal hurdler tries to step over the hurdles as if they aren’t there.

For the high hurdles a springy forward push from the right toe and a very sharp lean forward mark the important deviations from low hurdlng form. It will be well to familiarize yourself with the high hurdles one at a time on grass before trying a flight. Be careful not to jump. If you are running highs on your toes, where you should be, you need not jump, but drive forward.

By this time you have probably discovered that it is hard to get your left foot high enough forward and your right leg high enough to the side to avoid kicking the hurdles. This is because your hip joints have not yet developed the looseness and flexibility that are necessary for smooth hurdling. You can acquire this looseness, however, by use of a few simple exercises which should be used as a warm-up for every practice. Another good time to do this is at night when
you are ready to retire. When you have your pajamas on, sit on the bed and do this exercise a few times before going to sleep: Sit on the bed with both legs straight in front. (The directions here are for hurdlers who put the left foot over the hurdle. Reverse the directions if you are right-footed.) Now swing the right leg around to the side until the thigh is pointing out at right angles to the other leg. Use the left hand to hold your-

self upright if necessary. Next, bend the right knee so that the part of the leg below the knee points directly to the rear. The legs are now in the position they attain over the hurdle. Now lean forward as far as possible from the hips and reach the right hand six inches to the right side of the left foot. Now give a slight lunge forward with the body and right shoulder. The left arm is bent and jabs back as in a regular sprint action. This position is exactly the position at the instant of crossing the hurdle. If you can put your body in this position a few minutes every night and do a few forward lunges trying to touch your toes with your hands, you will gradually stretch and loosen the hip muscles and joints that have most to do with hurdling.

However, there is one warning that beginners need. Don’t get the idea from doing this exercise that a hurdler leaps into the air, freezes into position, and sails until he hits the cinders. The sailing fault is common in hurdling, and prevents the continuous flowing action that is needed for smooth form. The position described is attained only in passing. The legs and arms should be in continuous fast action over the hurdle. The instant the front leg kicks over the hurdle it should snap down. Then the trailing leg snaps through for the next stride. Most beginners try to pull the trailing leg through too fast; doing so throws the body upright too soon and results in skinned ankles. As in our first instructions, be sure that your left leg does not cross over or does not go down to the side. It must point straight over the hurdle.

The Stride

When you have the position and leg action fairly well mastered by work over one hurdle, it is time to begin thinking about stride between hurdles, which is probably the next hardest problem for beginners. The easiest way to start learning the stride is to set up several hurdles at high hurdle distance, but turn them down to low hurdle height. They will be easy to clear, and you won’t have to worry about clearance while you are learning the stride length. The first hurdle is 15 yards from the start and the others are ten yards apart. Your first problem is to work out the stride to the first hurdle so that you take off at the correct spot every time. This will vary somewhat with different men. The directions here are for left-footed hurdlers. Your start will be with the right foot forward. If you have not been starting that way, don’t worry; you will soon be accustomed to the new positions. Starting with your right foot forward, you will step with your left foot from the blocks. The steps, then, are left, right, left, right, left, right, left,
right and over, a total of eight strides. Try this several times, counting the strides as you run. Be sure to do this at good speed, so that your strides will be the same as when you race. It is essential to get eight strides, as seven will be too strained unless you are unusually tall, and nine will be too chopped for good speed. If your take-off foot is too far from the hurdle, stretch all strides just a bit. Run to one side of the hurdle until your stride is correct, to avoid spills. Keep practicing, and you will soon be able to make your approach at top speed and place your take-off perfectly for the first hurdle. A hurdler must have this approach mastered so that he can reach the first hurdle in perfect position for the step-over. When you have worked out the approach, henceforth do all of your top speed practice from a crouch starting position, using a regular approach to the first hurdle. In this way your approach will become automatic. However, all warm-up work and form practice should be done at slow pace, with five strides between the hurdles.

Note: There are a few exceptionally tall, strong hurdlers, such as Robert Wright of Ohio State (6'5" and 190 lb.) who can use a 7-stride approach, but don't try 7 strides if you have to strain for them or you will be losing speed. Of course a 7-stride approach requires a left-footed start (left foot forward) for left-footed hurdlers.

As soon as you are fairly consistent in reaching the first hurdle properly you can go ahead with the other hurdles. the ten-yard distance demands the use of three full strides between hurdles. Five strides seem right to the beginner, and are all right for practice work, but you soon find that when you reach top speed the five steps are too short and you can't take them rapidly enough to maintain speed without banging into the hurdles.

To try the three strides, be sure the hurdles are turned down. Then take a start from crouch position, building up fair speed, for the more speed you have at the first hurdle, the easier it will be to make the second, since at sprinting speed each stride carries you farther. The speed on the approach is important too, because it is hard to accelerate speed in hurdle racing, and the boy with the lead at the start has a big advantage. Then too, the leader does not have to worry about the hurdler in the next lane hitting him with a flailing arm. When you clear the first hurdle, keep your lean as you snap down the lead leg. As you pull the trailing leg through, lift the knee high enough
The hurdler's eyes are on the first hurdle, and after that they concentrate on each hurdle he approaches. As he clears the last hurdle his eyes go to the finish tape and he concentrates on drive to get every bit of speed in that last dash, for many races are won or lost in that last fifteen yards. Concentration is essential during the whole race. The hurdler who takes his mind off the race for an instant may strike a hurdle and spend the rest of the afternoon picking cinders from his anatomy. Winning hurdlers must strike their fastest and smoothest rhythm from the very beginning of the race. They must have the agility and determination to keep driving even if they strike hurdles, for the opponents may strike them, too.

Low Hurdles

The first national low hurdle race was won by A. V. Copeland in 1887 at 27 seconds. In 1898 Alvin Kraenzlein of Penn ran the lows in 23.6 seconds. In 1936 Jesse Owens sprinted over the lows in 22.6; and now Harrison Dillard of Baldwin-Wallace College has the record at 22.3 seconds.

For low hurdlng there are some different factors to consider. We are considering the low hurdlng following the high because it is easy to master the low hurdle form once the highs are under way, and it requires endurance for a longer distance - which will take more time to acquire. In low hurdlng the step over the hurdle will be shorter, really only two feet more than a good running stride - the shorter the better. But this makes the other strides a bit longer. Since the low hurdles are twenty yards apart, we will double the number of steps we used on the highs. Not counting the landing as a step, there will be seven strides, the clearance coming on seven, which is emphasized. The approach to the first hurdle is twenty yards, and must be worked out in the same way as in the highs. Normally you should have ten strides on this approach.

The same points must be emphasized as in high hurdlng: high knee action, speed on the start, quick step down over the hurdle, toe and ankle spring, concentration, and relaxation. The lows require more endurance than the highs, for the race is 220 yards, and a boy who is not in top shape is too tired to make a good finish. Good relaxation is essential to distribute energy evenly. Two hundred and twenty yards is a long distance when
you are stepping over hurdles along the way. You might even have to hold in your speed somewhat in early season in order to finish a full flight. Some boys find that it helps to coast a bit at the fifth or sixth hurdle and "gather" themselves for the finish.

In clearing the hurdle, the time can be shortened somewhat by bending the knee more than in the high hurdle form. This permits a quicker chop down onto the track, as close as 3' to the hurdle. The take-off can be closer, too - about 6' for average boys. The stride between hurdles will be distributed about as listed in the accompanying chart, except that high schools using a shorter spacing will have to shorten the strides accordingly.

To get improvement in either the high or low hurdle events there are several form points that a hurdler should emphasize. These will be evident if we observe a good hurdler. Since the shortest distance between two points is a straight line, the runner should not lift his weight up and down any more than he has to, to clear the hurdle. Suppose the hurdler jumps one inch too high over the hurdle. Then, counting the distance up and down, he travels two inches too far over each hurdle, or twenty inches too far over ten hurdles. That is more than a foot and a half, which distance is more than enough to determine a close race. Also, remember that while the hurdler is sailing in the air he is losing speed. If by sailing he loses one hundredth of a second on each hurdle, that means one-tenth of a second lost over the whole flight. One-tenth of a second accounts for almost a yard of distance - in addition to that lost by unnecessary height. So the hurdler must step over the hurdle as if it weren't there, and shorten as much as possible the stride over the hurdle. A good practice stunt for high hurdling is to place a stick on the top bar of a hurdle and knock it off with the seat of the pants. This applies only to high hurdling, because the hurdler's legs are longer than the height of a low hurdle, and he need not bother about "skimming" it.

Now let us study carefully the form over a single hurdle. The runner approaches the hurdle straight. Do not twist a single muscle sideways. Lift the left leg straight over the hurdle and push straight forward off the right. As you drive over the hurdle, lean forward. This keeps your body weight lower so that you don't have to lift the total body
weight as high as if you remained in an upright position. As you pass over the hurdle, try to maintain the lean so that you are in a driving position for the next hurdle as you strike the track. (See diagram.) Try to keep your head on a level line. Have someone watch from the side as you hurdle. If your head rises as you clear a hurdle, you need more "buck" or bend. If your head ducks, you are bending more than necessary. Small fellows, of course, may have to do a regular jack-knife over the hurdle to develop a smooth rhythm with no sail. Nine times out of ten, a beginning hurdler isn't leaning as far as he thinks he is over a hurdle. Have someone else watch you. The lean begins before you leave the ground. Feel that you are diving head first at the hurdle.

**Training**

Hurdling requires careful training and practice work because it requires so much from the legs. The first job is to do daily exercises to develop flexibility of muscles and joints. This can be done all year. High kicks, side kicks, and the floor "spread" exercise described above are good. Do as much winter practice as you can to study form and build up wind and stamina.

The great improvement made in hurdling speeds in modern times is largely due to the use of five-stride practicing over hurdles. The old-timers used to do all their practicing with 3 strides, at high speed. Of course a hurdler couldn't do much of this without exhaustion. However, by working at slow speed a hurdler can work for hours to correct a single weakness. In this way perfection of form is more easily attained.

In using the five strides it is necessary to keep to a slow pace; otherwise you will over-run the hurdles. It helps to take very short, mincing strides, high on the toes. If the first three steps past the hurdle are chopped very short, then it is possible to stretch a bit on the last two strides before the next hurdle. To save time in this kind of practice, set up two lanes of hurdles facing opposite directions. Work down one lane; catch your breath and return via the other lane. A dozen hurdlers can work this way without wasting each others' time.

As soon as the weather permits outdoor work, begin working on running stride and jogging over hurdles easily. Do not use starts from pits or blocks because driving starts are hard on leg muscles and should not be used until the legs are in good condition. Each day begin with a thorough warm-up, because the strain and stretching of hurdling will tear muscles if they aren't warmed up. Do the stretching exercises described above. Start easily and finish vigorously. Do several fast striding 220's or gassers each day, emphasizing form and stride. Work up and down the straightaway for high knee action. It is good to finish each day's workout with a fast 220 or 300 yard dash or a good brisk 440, because hurdling takes endurance.

Here is a standard warm-up schedule for a hurdler. Of course, the fast parts won't be used the first two weeks. Jog three quarters, pausing between laps for some exercises. Run each faster than the last one. Do exercises for fifteen minutes. Then start working over hurdles, using five strides, easily. When you feel ready, take a few hurdles at increased speed with three strides. Finish the warm-up with three or four fast starts over two or three hurdles. If you are warming up for a meet, do this one-half hour before the event. Then go to the dressing room, get a rub, and rest until ten minutes before the event. Then do four standing starts, going over two or three hurdles, do a few fast crouch starts over two or three hurdles, and you are ready to go.

The second week of practice do some faster striding, but let the amount of work be governed by your condition. Do all your hurdling at slow speed, with 5 strides between hurdles. When any form point causes trouble, concentrate on that detail until the difficulty is eliminated. The third week, do some 3-stride form work over three, four, or five hurdles set on the straightaway, but most of the practice should be with 5 strides. Start doing a few 50-yard dashes each day to pick up sprint speed, and an occasional 220 to get used to the low hurdle distance. Do not try a full hurdle flight for time until the 4th week.
Until the meets start, run 6 or 8 hurdles frequently, but don't overdo. Occasionally run a full flight to get used to the distance and racing conditions. Be sure that some of your daily low hurdling practice is on a curve, if you are to do any racing around curves. After the meets begin, run for time only once a week in addition to the meet. Do lots of form work at 5 strides, and work with the dash men the rest of the time. Once a week run a 440 with the quarter-milers to keep building stamina. Follow carefully the advice of the chapter on training if you wish to have a good finish to your race.

In case you have to run a race on a slippery, muddy track, don't get panicky. You may have to adjust your stride. Stretch all you can, but be sure to find out in your warm-up how things go. It may even be necessary to take some of the hurdles in 5 strides rather than 3 (9 instead of 7 in the 220 lows), but try to decide before the race and be prepared. Sometimes, too, it is necessary to adjust your stride when running against a stiff wind. Likewise a quick "chop" is often required when running downwind to prevent slamming into hurdles, as the wind will tend to carry you too far.

**Mid-Season Practice Schedule for Saturday Meets**

**Monday:**

Warm up. Coast through a 220 for form. Work on form easily at 5-stride pace over a full flight of hurdles. Do six starts over three high hurdles and six starts over three low hurdles. Run an easy 440. Shower.

**Tuesday:**

Warm up. Spend one-half hour on form work at slow speed. Do six starts over three high hurdles and six starts over three low hurdles to check form. Stride three 220's. Shower.

**Wednesday:**

Warm up. Take six practice starts over several high hurdles. Run 2 full flights of highs for time 10 minutes apart. Take several starts over three low hurdles. When rested, run full flight of low hurdles for time. Rest. Run 300-yard dash. Shower.

**Thursday:**

Warm up. Work on form 15 minutes to correct any difficulties that showed up yesterday. Stride 2 fast 220's. Shower.

**Friday:**

Warm up. Shower. Go home and rest for tomorrow's race.
CHAPTER XII

RELAY RACING

More than any other track and field events the relay races offer opportunities for teamwork and cooperation. The four members of a successful relay team have to work together perfectly, which requires a lot of practice. Members of a relay team usually get to be very good chums, which is a good thing, for if a boy makes a mistake and costs his teammates gold medals, it is going to take a lot of friendship to save that boy's skin! Boys on relay teams and any who some day may be needed in a relay race should spend some time every day practicing baton passing, so that the exchanges become automatic. Most teams just practice baton exchanges a day or so before the first meet, but this is a mistake. The exchanges should be mastered so that they do not worry a runner; he then concerns himself only with winning. Of course every relay man should train, practice, warm-up, etc. exactly as if he were a specialist in the individual races of the distance he is running. Keep a baton handy and use it daily.

The present world records for the most commonly run relays are: 440 yards by Southern California, 1938, 40.5 sec.; 880 yards by Southern California, 1950, 1:24; mile relay by California, 1941, 3:09.4; and the two-mile relay by Michigan State College, 1950, 7:31.8.

In the sprint relays, the 440 and 880, the runners travel 110 yards apiece and 220 yards apiece. Here the baton exchange is of extra importance, for the distance each man runs is so short that the margin of victory is small. Every inch gained by baton passes may mean victory. Four mediocre sprinters can often win sprint relays if they make perfect exchanges. Good sprinters will lose with bad exchanges, for a poor exchange may mean a loss of as much as five yards, even though the baton isn't dropped. Three such exchanges mean fifteen yards, which is a long distance at the finish. Even the loss of one foot on an exchange means a yard at the finish if three men do it. One foot is bad enough. So, there can't be too much baton exchange practice.

The first thing needed by the sprint relay runner is speed, which is obtained by studying the same things as the other sprinters. Just follow the sprinter's program.

Handling the Baton

The number one man of a relay team has the problem of how to hold the baton at the start. Any grasp that permits a firm hold of the baton and doesn't interfere with starting will do. There are several methods, but probably the safest is to grasp it with the whole hand, then extend the thumb and forefinger to support the body for the sprint starting position. Another way is to hold the baton against the palm with the second or third finger. Be sure to have the baton in the left hand for the start so that it need not be changed over. Otherwise the start is the same as for any sprint race.

The exchanges are made in 20-yard areas marked by lines across the lanes. The runner receiving the baton stands between the two lines, just inside the first one. He must have possession of the baton before he crosses the second line, at the end of 20 yards. Be sure to read everything in the rule book regarding baton specifications and all relay rules.
The purpose in a good exchange is to keep the baton moving from runner to runner without slackening speed. If the incoming runner passes the receiver, then the baton has slowed down - or if they have to hesitate or fumble in the exchange. A perfect exchange is made in full stride, at arm's length, with a gap between the runners that never closes. The nearer the first line the exchange is made, the better, before the incoming man slows from exhaustion. The most important point for the incoming man to know is not to extend his arm before he is close enough to reach the outgoing runner. If he reaches too soon he may lose his balance and either fall or miss the exchange through bad form.

In order to know when to start, the receiver of the baton has, in practice, discovered how near the incoming man should be when the receiver starts. In practice he has marked off and measured this distance; so before the race he paces off or measures with a tape, the same distance back on the track from his first exchange line, and marks it with his spikes. Usually this mark is back about eight yards, but will vary with different men according to speed and starting ability and must be determined by long practice. Be sure to practice at the speed you run in competition, so there will be as little variation as possible. If you practice half-heartedly you will find your timing wrong when a man comes flying at you at top speed under the inspiration of a race. Good judgment is necessary, for unexpected developments frequently cause changes from the set plan.

When the receiver of the baton sees his teammate approaching he faces down his lane, half crouched and looking over his shoulder at the mark on the track. As the other runner reaches this mark, the receiver turns straight ahead and does four or five hard starting strides without looking back, but digging in as hard as he can to pick up speed. Then he reaches back his right hand, with the palm back, the thumb pointed in, and the fingers spread. He drops his head and looks back under his right arm to watch his teammate's feet to be sure he is coming and to judge his speed. As the teammate thrusts the baton upward against the receiver's hand, the receiver closes the hand, lifts his head, and drives forward as hard as he can go. As soon as he acquires top speed he changes the baton to his left hand so he won't have to fumble with it at the finish. The last runner doesn't have to change the baton, keeping it in his right hand. For sprint relays the handing methods illustrated are fast and fairly sure, requiring little break in running form.

The importance of speed in the sprint relays becomes more obvious if we divide the running time of a 440 relay into its parts. Each man runs 110 yards. Suppose we have four men who can run a 100 in 10.5 seconds. This means exactly .1 second per yard after the first 15 yards, for it takes two seconds to go 15 yards, on the average, or a loss of 1/2 second in gaining from 0 to top speed. Then it will take the first man 11.5 seconds to go the first 110 yards. If the others make perfect exchanges, each receives the baton at fifteen yards, or at top speed. With the running start they should do the 110 yards in 11.0 each. The total time of the race,
then, is 44.5. That is good time for any high school meet. Four men who can do the 100 yards in 10.0 each should do the 440 relay in 41.5. This, of course, requires perfect baton handling, the result of long practice.

The same situation applies in the 880 relay, except that the exchange has to be slowed slightly to allow for greater fatigue of incoming runners.

To place the men in best order for sprint relays, their temperaments, as well as their abilities, must be considered. If all are good fighters, then the slowest should be first to make him fight harder to get a lead, the next slowest second, etc., and the fastest last. A man who can't relax and do well unless he is even with the race should be in the first position so he can compete evenly with his opponents. If two or three of the men are evenly matched, put the fastest starter in first place, the slowest man in second, and the fastest last. First place is a good position for a green or inexperienced man if one has to be used, because he will not have to receive the baton, and the start is probably more like other situations he knows. If a man is weak on the finish, he should start near the end of his 20-yard space and make his exchange at the beginning of the next exchange, saving 10 - 30 yards.

Mile Relay

In the mile relay the baton exchanges are slower because of the fatigue of the incoming runners. This means that the receiving runner must wait longer to start, must not start too fast, and must turn and reach for the baton rather than wait for his teammate to hand it, because his teammate may be too weak to put it in his hand. The receiver's starting space will be about five yards or less, and the exchange should be made as soon as possible so that the tired runner doesn't run as far, losing time. All other points are about the same as in the sprint relays. If a team is not sure of itself, or not in top shape, the distance exchange is safer. When all members are capable of good strong finishes, use the sprint method.

In placing men for the mile relay it is nearly always best to have the fastest man last. In dual meets the slowest man should be first so that he will battle his man more evenly and perhaps get more out of himself. In bigger meets where the field is crowded and it is necessary to alternate lanes for the exchange, a lot of confusion and jostling can be avoided if the second fastest man leads off, trying to get a margin so that the baton exchanges will be easier.
When it is necessary to alternate lanes for the baton exchanges, the incoming runners should seek their lanes as soon as they round the last curve, so that they will not have to jostle or stop at the finish to cross over to the right lane. Many disqualifications and falls occur because of failure to observe this point.

Always finish! Even though you drop the baton and seem hopelessly outdistanced, recover and keep going, not only for the sake of the race, but because opponents may drop batons too, or even be disqualified, or may get into a tangle with someone else who has committed a foul.

Distance Relays

In distance relays such as the two-mile relay, the four-mile, or the distance medley, the speed of start and exchange are not so important; therefore, more emphasis is placed on sheer running ability. Usually slow men are placed first to draw out all the ability they have. The baton is handled as in the mile relay.

Distance men must guard against carelessness in carrying the baton because it is easy in the grind of a long race to forget and carry the baton loosely, which makes it easy to drop the baton or have it knocked from the hand by another runner who might touch it.
CHAPTER XIII
RACING STRATEGY

"Strategy" in running means the use of all knowledge of pace, position, cleverness in handling oneself, to aid in winning. Good use of strategy does not mean any illegal or unfair action.

There are many things that can be done by an experienced racer to aid him in getting the most from his ability. Speed, endurance, and temperament must be considered in planning strategy. If one has trained and practiced so well that he can take the lead and hold it regardless of his opponents, he needs no other strategy. On the other hand, if a runner is matched with an opponent or opponents of about equal ability, he may have need of every bit of wisdom he can call up if he is to win. Brains are always a valuable asset. Strategy merely means using brains as well as muscles.

Sprints

In the sprint races there is little need for strategy; full speed ahead is the main consideration. A short "float" and "gather" before the finish helps some sprinters, but pure fighting spirit and enough self-control to keep relaxed and hold good form are the main requirements. In case of bad weather, one may have to use his judgment if he has a choice of lanes. Always pick the lane that has the firmest footing, even if there is some water on it. Occasionally puddles cover parts of the track that are firmer than the rest, especially if races have already run over the other jart. Ordinarily, pick the driest lane. If the race is run around a curve, and most 200's are, your choice depends on your temperament. If you are a fighter who does better when behind, take the inside lane; for the others, because of the lane handicaps, will seem to be ahead of you. If you can run more easily and keep relaxed better when nobody is around, take the outside lane, for the off-set start now puts you temporarily in the lead. And too, the outside man doesn't have as sharp a turn.

The lead is important enough on a dry day, but on a wet one it is even more so, because it is so annoying to eat mud and cinders churned up by rivals. They blind one, too, so get that lead. Then hold it!

Hurdles

Hurdling strategy is about the same, except that the element of rhythm is important. Some runners have such a strong sense of rhythm that in an event like the hurdles, where all men are taking the same number of strides, they unconsciously keep step with the opponent and can't break the rhythm to go ahead. If you are like that you had better be ahead at the start. Learn to pay no attention to the opponents during a race.

In any race it is a strict rule, not only of sportsmanship but of strategy, never to stop; this applies with equal force to the hurdler. If you stumble or fall, even if it puts you into last place, keep going, for in close hurdle races every man in the race has been known to fall. Then, too, other teams or men sometimes disqualify, and you may place, or even win, if you keep going. Jesse Owens once won a low hurdle race after stumbling over a hurdle and giving the leaders a 20-yard advantage at the half-way mark! Jesse didn't stop. The author remembers a shuttle hurdle relay heat in which only one team finished, and it was disqualified. Of course, if you are a red-blooded boy you will never stop anyway, unless you are sick or injured in such a way that you might seriously hurt yourself. In that case neither you, your coach, nor your teammates should want you to continue.

If you strike bad weather and a soft track, you will have to drive extra hard to get your stride. If possible, choose a lane solid or free from puddles, as has been ex-
plained to the sprinters. In the hurdles, if you can't get your step because of a bad track, it may be necessary to take an extra number of steps occasionally, or between all hurdles. This should be determined in warm-up work before the race, because it is better to know what you are going to do than to be forced into a change when it is too late and you are thrown off balance and hit a hurdle or are put so far behind that you are lost. An extra fast start will help you get your stride by adding momentum!

When you have cleared the last hurdle in a race, instantly go into a sprint - all the sprint you have, for many a hurdle race is decided by the last 15- or 20-yard dash to the tape.

If the low hurdle race is run around a curve, it is well to remember that the outside lanes do not have as sharp a turn, but check to see if they are soft. Loose cinders shorten the stride.

440 and 880

Strategically the 440-yard dash takes a lot of quick thinking. In this race the runner has to maintain enough speed to keep within reach of the leaders and yet not overreach himself. If some numbskull tries to carry a full sprint, you must have enough confidence in your pace to know that you can catch him when he breaks, for no one can sprint a full 440. However, don't let such a runner have more than a fifteen-yard lead in the first 220. Then, if he is doing a 22-second 220, for instance, and you are still in pace for a 50-second 440, but he will probably break seriously in the last 100 yards, for he has been trying to set a world record pace.

At the start it is wise to sprint for 30-50 yards, for if you get caught in the crowd you may not get untangled until it is too late. If you have an inside lane, sprint with all you have to keep from getting boxed in by fast boys cutting across from the outside of the track. If you have an outside lane don't cut across too soon or the same thing will happen. Keep fairly wide until you reach the turn. This will prevent jostling as well as boxing. If you get the lead, stay as close to the curb as possible, and under all ordinary conditions run the inside lane to shorten the distance you have to run. However, if someone gets ahead and slows down, don't hesitate to swing out and pass, or someone else coming up on the outside may box you in back of the slow man. On the finish straightway it is wise to swing wide to prevent being boxed, if someone is leading you.

If you once get in a box there are three things to do: (1) relax and take it easy, conserving energy until there is an opening, and then sprint - if the opening comes; (2) check quickly and go to the outside, which is bad because it means a broken stride; (3) steadily swing out against the man at your side hoping he will give way, but don't touch him or you will be disqualified. The best solution is not to get boxed. When you do pass someone, take the lead quickly and with confidence. Many runners use a trick of dropping the arms and relaxing to "gather" themselves together before passing an opponent. This trick has a restful effect before a final sprint, too.

If you are having an off day and feel sluggish or are up against one or more decidedly superior runners, you may get your best place at the finish by falling into second place at the start, allowing the others to set the pace and do the hard work while you conserve all the energy you can for a finish fight. However, remember that if you drop too far back you are lost. Nearly every race soon breaks up into two groups of runners. Stay in the first group! Rarely does a man pull out of a rear group and pass the others.

If you are a runner of steady pace and stamina but no speed, and are competing against someone known to be a good sprinter, your best plan is to drive hard through the middle part of the race, thus either getting a lead that can't be eliminated by a sprint, or killing off the opponent's sprint if he tries to stay with you. This is the best way to run in any race, if you have developed staying power.

Green or inexperienced runners do better if they let someone else set the pace. But watch out for the fellow who gets the lead and then slows up. Don't wait for him if you think he is too slow; go on around.
On a bad track with soft cinders, or a wet track, you must use judgment. Pick the solid parts, even if you have to run a bit wide on the curves. Remember that shallow puddles aren't bad if there is solid ground beneath, but if the track is soft on the inside, don't hesitate to swing wide; it will pay. If the entire track is soft, you may as well stay at the curb. Don't expect your usual lap times when you are on a soft track. Allow for conditions.

On a soft track, tall light boys have the advantage, because of the fewer strides they take. Likewise, light wiry boys do not sink as deeply. Stretch your stride for all you can; the fewer steps you have to take the longer you will last. Bad tracks are tiring. When running in the rain you reap the rewards of persistent practice in all kinds of weather - if you have practiced in all kinds of weather!

**Mile and 2 Mile**

All the comments made about 440 strategy should be noted by distance runners. In addition, distance men have to understand a bit more about their pace and strength for passing, etc., in any particular part of a race.

In general, don't worry about men who sprint the first lap of a distance race. If you know your pace, you will soon catch them. If you haven't come within ten yards for the last lap, though, look for trouble. On the last lap you should begin to pick up speed immediately rather than wait for the final straightaway. If you can, stay just a few yards from your opponent; it makes him nervous to hear you striding along at his heels. Use the same arm drop and "gather" described in 440 strategy. Some runners relieve the monotony of the race by using a change of pace technique. This consists in an occasional pick-up or sprint for 15 or 20 yards, then settling again into a coasting stride. The knee lift and change of form seem to have a refreshing effect. Some do it when coming off a curve. Always do it in passing an opponent.

In general, passing should be done on the straightaways, but if you are hitting your stride nicely and someone is loafing ahead of you, don't hesitate to pass, even on a curve, for the extra yards you run won't hurt as much as slowing your stride to wait.

In all races, mental attitude is all-important. Don't think about being tired; that just makes you feel more tired. Think about your opponent's tiredness, or the weather, but don't worry about your ability to finish! You can always keep going - and that is the most important lesson that distance runners learn from their sport.

Here is a good mental attitude: Breeze through the first half of your race. You have done it so many times in practice, you take it with confidence. You work like a dog on the third quarter of the race, because that is the part that always is the slowest. You put out all you have, almost, knowing, with courage, that you can always get through the last quarter of your race when you call on the inner reserve of nerve, energy, guts, whatever it is, that everybody has.
CHAPTER XIV
CROSS COUNTRY RUNNING

In the fall, boys who like to run can participate in cross-country running. Besides being an interesting and worthwhile sport in itself, cross-country running is good fall work for prospective milers and two-milers. For men in other events the benefits of distance running aren't so certain. Although there is no definite proof, there is the feeling among coaches that long distance running may tend to slow up the reactions of sprinters or jumpers, or may tend to change their form, yet the general improvement in health and conditioning might be better than doing nothing during the fall season. So, decide for yourself; it is great sport to be running over park lanes and country roads when the leaves are falling and the tang of frost is beginning to sharpen the air - the time of year when the Indian braves felt like taking to the warpath. Everyone is full of energy and feels like running at this time of year.

Cross-country running doesn't attract huge crowds, but offers plenty of satisfaction for the boy who stays with the running long enough to get in good condition, and with the revival of interest in high school dual, district, and state competition, the sport seems destined to stay.

Cross country requires little equipment; a sweat suit or other warm clothes to cover the running trunks, a pair of tennis shoes or regular short-spiked or rubber-soled running shoes (with a low heel), and a persistent soul. People who haven't participated in distance running find it hard to understand the keen interest of those who have toughened themselves for the sport. The pleasure comes only with mastery of one's body. Practically anyone with a normal heart and lungs can run long distances with careful training. In some of the open meets in the East, and in some of the club affairs in Europe, it is not unusual for men of fifty to sixty years to jog along with the youngsters.

The running form is the same as for the mile. The only thing different is the pace, which varies according to the distance to be run. Most high school meets are for a distance of two miles. This distance is covered by the exceptional runners in about ten minutes. A good time is eleven minutes, but many boys strengthen their teams with times as low as eleven and one-half to twelve minutes.

In college meets the distances run are usually four or five miles. At these distances the only problems are to know the pace and to have confidence. Anyone who can run two miles in decent time can run four miles - by running a slower pace. The principles of running are the same.

The scoring for cross country is on a team basis, the score being the sum of the numbers of the finishing positions of the first five members of a team. The lowest score wins. This means that the team that has the best average group of runners will win. Consequently the practice must be planned so that the slowest runners are practicing with good men and are constantly being helped by teammates, for the meets will be won by the squad with the best team strength.

The training is about the same as for the mile or 2-mile runs on the track, except that the practice should be at distances which make even fractions of the distance you wish to run. If you aim for an eleven minute two miles, then the mile should ordinarily be run about five twenty. Of course this will have to be modified for such circumstances as rough ground over a part of the course, which would slow the time of that particular sector. But in general it is wise, as in the mile, to split the race into smaller divisions and run the shorter distances at faster pace until endurance is built to the point of running the complete race. Probably half-mile divisions will be convenient. The half-mile and mile distances should be marked on your practice course. As you develop, add half miles until you can hold your pace over the whole distance, and know when you are running the right pace.
At least twice a week, work on speed. Many distance runners neglect speed work. This is often disastrous in that they get in a "rut". They can run a slow pace but cannot call forth a burst of speed when it is needed. Run sprint races and 440's with your teammates!

The warm-up, both for practice or for competition, is the same as in track running. Be sure to run enough to get your second wind. Then rest while getting a rub, and you are ready to go.

The strategy of running is much the same as in the track events, except for differences made by the different running surfaces. The cross country champion must know how to lean forward and shorten his stride when running up grade, how to run upright and coast, without losing balance, on a down grade, how to use his toes on hard surface to eliminate jarring, how to keep his balance in loose stones, how to use walls and hedges for wind-breaks, how to change his arm position if his arm muscles start to cramp, swinging them overhead or dropping them low for a while. A quick spurt helps to relieve the monotony of a race. Often teammates who are of about the same ability rotate positions with each other. This keeps them alert.

Often in early season, cross-country men are bothered by side-ache. This usually occurs with beginners. There are two causes, gas pains and breathing difficulties. A gas bubble in the intestines will usually show up in your warm-up, and can be rubbed out by some easy massage and stretching while you jog. Another cause of side-ache is the heavy breathing you are doing, which calls for unaccustomed muscles to perform extra work. Temporary relief will come, often, by leaning over as you run, changing your pace, exaggerating the breathing, or rubbing. The ailment usually disappears gradually over a period of a week or two, if the victim keeps practicing regularly, but not too strenuously. Lots of twisting exercises in the warm-up help prevent side-ache.

On extra cold days a pair of knit gloves and a quarter-sleeve shirt will help tremendously. Wear all your sweat clothes until you are perspiring freely, and keep them on until the last minute. You are not likely to feel cold during the race, but get into your clothes as soon as possible after the race.

Always take care of your feet. Use the toughening powders and solutions that are on the market, and always dry your feet thoroughly after a bath. If athlete's foot starts, treat it immediately before it gets bad. If neglected it will ruin your season.

The practice work for mid-season should be divided approximately this way:

Monday:

Warm up. Do some short sprint work. Jog 6 miles in 2 mile divisions. Do some short sprints.

Tuesday:

Warm up. Use a clock for pace at the speed you want in the first mile of Saturday's race. Rest five minutes. Repeat at the pace of the second mile in Saturday's race. Run each mile of the coming race at the planned pace, with five minute intervals.

Wednesday:

Warm up. Run for time over at least 3/4 of Saturday's distance. Rest. Stride a good fast 440.

Thursday:

Warm up. Run half your race for pace. Do some sprinting against teammates.
Friday:

Warm up - That is all.

Saturday:

Use your brains, your heart, your feet.

Other Workouts for Variation

In order to keep alert and avoid monotony, it is good to run varying distances at definite pace, for instance 6 laps on the track, each one a second faster, starting at 80 seconds, or mixed up in any way at all to get practice in speed judgment. On another day do the timing at 880 intervals only, or again at the mile distances.

Going around the course in a group and rotating the lead is another good way to get a work-out without being too conscious of the "work". Games such as hare and hounds also help to liven up practice.
CHAPTER XV

POLE VAULTING

To be a good pole vaulter is undoubtedly the hardest accomplishment in track and field athletics, from the standpoint of skill. The form requires time and patience to master. The physical requirements are speed and coordination. Shoulder and abdominal strength must be developed, if not already possessed.

The history of the pole vault has shown more improvement in records, probably, than any other event, because of the improvement of methods and poles. In 1877, 9'7" won the national championship. By 1887 the height was raised to 11'5" by H. Baxter. In 1904 N. Dole jumped 12'1-3/10" for a record. In 1912 M. S. Wright cleared 13'2-1/4". Now the record is 15'7-3/4" made by Cornelius Warmerdam in 1942.

All pole vaulters should work with the sprinters to develop as much speed as possible, for a fast approach means that the body will swing higher in the pendulum-like swing at the beginning of the vault. A vaulter's speed must be smooth and flowing - under control for perfect timing.

If you have never pole vaulted, begin by learning how to hold the pole, carry it, place the end in the box, and swing. In learning, do not use check marks for the approach; just take a few steps and chop the stride for the take-off. After a while your eye will judge the distance and you will adjust your stride. Even with the full length run and use of check-marks, a good vaulter has to use a certain amount of eye judgment to make consistently smooth take-offs.

To begin, remove the cross bar. Now go back the runway about 20 feet and face the pit. Grasp the pole about eight feet from the bottom, with the right hand. The thumb is at the top and the whole hand circles the pole. Now, with the pole pointing down the runway, grasp with the left hand three feet below the right, with the thumb toward the right hand. Bring the right arm down to the side, thus bringing the butt end of the pole off the ground. The pole is now at your right side and pointing toward the pit - which you are facing. This is the carry position for the pole. For your first approaches, keep the end of the pole just off the ground. Most good vaulters carry the pole fairly low and slide the butt end into the box smoothly at the take-off.

Now walk along the runway. As you approach the vaulting box, bring the pole up overhead with the right hand, and slide the left hand up to a position under and against the right hand. Slide the butt end of the pole into the box, extend both arms overhead, and bent the right knee upward. Don't try to leave the ground. After you get used to these movements, jog down the runway easily, plant the pole, and push off with the left foot, swinging to the right of the pole. As the pole reaches vertical, use your arms to turn your body over into a face-down position. See illustration. Carry the pole with you into the pit, and try to land relaxed on both feet to prevent injury.

When you become familiar with the above exercise, then try swinging your feet and body upward as the pole rises, until your body is higher than your hand-grip. As the pole becomes vertical, pull with your arms and twist yourself over into a face-down position. Now push down on the pole and try to release so smoothly that the pole balances momentarily at vertical before falling back, to be caught in the runway. Release the left hand first, then the right. Flip your hands outward and up. You should land on
your feet, facing the standards. Never allow the pole to fall on the ground, for bamboo poles are easily cracked in that way and other type poles are weakened. Have someone catch the pole.

In making the twist at the top of the vault, good vaulters use a trick of crossing the left foot back of the right, with knee bent. Then a quick straightening of this left leg coupled with a wrist twist will snap the body over to face down at the exact instant the vaulter feels he is ready. The ability to control body movements and timing deliberately and coolly is essential to good consistent vaulting. Another trick of body control is to spread the legs as the turn over is completed. This prevents the vaulter from whirling on around after releasing. All of the above details will require lots of time to master; don't be discouraged if you aren't smooth even in a year. Cornelius Warmerdam was several years out of college before he vaulted 15'.

After acquiring rough ability to get through the above movements, you are ready to use the bar. Start with it set at about three feet, keeping the standards about 2 feet beyond the box. Gradually raise the bar until you can do eight feet with a nine-foot grip on your vaulting pole. Now you are ready to polish off your technique. First you will need a good approach.

To do this you must find a regular starting distance, and use it all the time, so you always run the same distance. Raise your grip on the pole to about ten feet, but leave the cross-bar at eight. Place the end of the pole in the box. Now grasp the pole with both hands (at 10 feet) and reach as high as you can straight overhead.

Now make a mark where your left heel stands. This is your take-off mark. It must be exactly in the center of the runway, the run must be in the center of the runway, and the swing must be straight forward, or your body will swing out of line, spoiling the vault. Scrape a line across the runway for your mark - or put down a piece of paper. Many vaulters lay their sweat pants beside the take-off mark to catch their eyes.

Go back the runway and draw a line for your start. If you are a quick-starting runner, this line will be about 60 feet from the take-off; if you are slow in starting, the line will be about 100 feet. Eventually 130' or 140' will be needed. Now have someone watch while you run through, carrying the pole. Stand with both feet on your starting mark. Step out with the left, and pick up speed smoothly and as quickly as you can, exactly as you will on the vault, for if you change your speed your stride will change, and your mark will be wrong. Now have the observer mark the position nearest the take-off which your left foot strikes. Now adjust your starting point. For instance, if your left foot was one foot short of the take-off, move your start one foot closer. If it was two feet beyond the take-off, move the start back two feet. Practice until you have a mark and run that bring you to the take-off consistently. Now measure the distance of this mark from the box, and the distance of the take-off point from the front of the box, and write them down. Henceforth always measure your marks, and use the same ones always, except when one of the reasons listed later forces a change.

Notice that this method of approach provides only one starting mark, and no check marks. The author believes that this method is best because the vaulter has nothing to think of but vaulting. With practice the take-off will come out right. However, if you have trouble hitting your take-off consistently, use check marks. Here is the system for an 18-stride approach. It can be varied for any number of strides. Take your pole to the sprinting straightaway and make a mark. Stand on this mark with both feet, and facing down the track. Now, carrying your pole, sprint down the track, stepping out with the right foot, and running exactly as you do in vaulting. If you don't run exactly the same way, your stride will be a different length. Have observers posted to mark where your left foot touches on the 6th, 12th, and 18th strides. Do this several times and get the most consistent marks. Now measure the distances and lay out the same marks on the vaulting runway, measuring back from the take-off point. The 18th stride is at your take-off mark, the 12th stride is your second check mark, the 6th stride your first check mark. Use colored pegs or some other distinctive method to mark these spots and use them religiously.
Now, with your ten-foot grip, keep vaulting at eight feet, easily, until your approach is adjusted so that your foot strikes the take-off correctly nine times out of ten. You cannot get a perfect vault unless your take-off point is right. Study carefully the following points which may make a difference in your stride and necessitate a change in your starting mark:

1. If you raise your grip, your take-off point will have to be moved back somewhat. Move your start the same distance back. (Also check marks if you use them.)

2. Practice an even stride and always run at the same speed (top speed but relaxed and smooth). If you change your speed, your stride length changes and your mark will have to change.

3. On a hard track your stride will be longer, and you will have to move your mark back. (And check marks.)

4. On a soft track your stride will be shorter and you will have to move your marks closer.

5. If you are feeling unusually good or peppy, you may have to move your mark back, for the extra springiness will give a longer stride.

6. If you do not warm up well, your stride will be short. Later, as you loosen up, it will lengthen, and you may go over your mark. Always warm up thoroughly. Removing sweat clothes lengthens your stride, too. Always try your run with sweat clothes off.

7. It is better to chop the last steps than to have to stretch, because a stretch puts the body out of position and jerks the pole too hard. It is better to have the starting mark a trifle too close than too far.

8. The mark will be closer in cold weather.

9. The mark will be closer if running against the wind.

Use your ten foot hold until you can vault over ten feet with it, because you should learn to clear the bar when it is a foot or two above your hand hold, if you are going to be more than an average vaulter.

To do this necessitates a high swing with feet well over the bar so that the body is literally in a hand stand with the hands on the pole and the feet pointing at the sky. It isn't sufficient to point the feet across the bar; they should continue upward toward vertical so that the vaulter's body will have time and space for clearance.

At the take-off the arms bend slightly to take the shock, then extend. As the body swings forward the shoulder and abdominal muscles are brought into play to whip the feet above the head. (See illustration.) Then the arms pull, shooting the body up along the pole. Then the wrists and legs act to twist the body into a handstand position. Most vaulters are in a hurry, and try to reach this position too soon. There is more time than they realize.

Now the body bends at the hips so that the bar is right under the hips. A sharp down push on the pole, head down, snaps the vaulter up and over the bar. The ideal fall is feet first, facing the bar. Turn the head sidewise so that the nose or chin will not hit the bar. It takes speed to get the momentum for this kind of vault.

In all practice work keep the standards at least 2' beyond the vaulting box so you are sure to have plenty of room to swing through and come to an upright position with pole vertical. Most vaulters fail to leave enough room between the box and the crossbar. If you don't reach the cross-bar it is because you are pulling up too soon. Delay the pull-up until the pole is almost vertical.
When you feel that you are vaulting as smoothly as possible with your 10' grip, it is time to experiment with a higher hold. This isn't as easy as it seems because the timing will change as you go higher; you will have to swing longer and hold to the pole longer until it reaches a vertical position.

Now move your hold to 10'3" and take off a few times just swinging up on your pole to get the timing without actually vaulting. Always do this when trying a new hold, because the timing changes at every height. Then try a few vaults, but don't be surprised if your vaults are worse than usual; keep at it. Eventually you should move your hold up to 11'6" if you are 5'10" tall or over. Shorter boys will be doing well if they can hold as high as 11'. Warning: don't try to hold so high that you can't get a smooth take-off, because a jerky take-off will ruin any vault. A six-foot boy with speed and a smooth take-off may eventually hold as high as 12'. Cornelius Warmerdam was able to hold a pole at 12'8" or 13', but that is exceptional. He was both tall (6'2") and fast (near 10 seconds in 100 yards) and exceptionally smooth. Don't be in a hurry to acquire a high handhold. There is very little to be gained in raising your grip until you have mastered vaulting form well enough to clear a bar 2 feet higher than the point where you hold. Warmerdam cleared 15'8½" when holding no higher than 13'. Incidentally, all references to the height of the hold mean with the pole in the box, as in vaulting. The depth of different vaulting boxes varies (it shouldn't), so always check your holding positions before competition by standing your pole in the box and against a crossbar. But for goodness' sake, don't be one of the silly time-wasters who do this with every vault. Mark your pole so you know where you grip.

When you are having trouble, check to see if your take-off is too close, if your swing is straight, if you are pulling close to the pole, if you are pulling clear through, if you are releasing too soon. In the pole vault the essential thing is to develop proper timing of each action. Remember that timing is different at greater heights. To secure good timing you must be relaxed.

Learn to land relaxed to prevent jar. Bend the knees and come down easily and roll over in the pit. Jarring falls will sap energy. If you are landing off balance you are not vaulting and releasing correctly. Check each detail.

Do all of your practicing for form and approach with only two holds, so that you perfect the timing. Remember that different holds require different timing and it will ruin your form to keep changing around. Good vaulters use no more than two holds: a moderate one, say 10'6", for warming up and form work, and a higher one, say 11'6", for regular practice and competition. Even use the high hold for low heights, once you are warmed up. Do not jump for height more than once a week in addition to your competition. Do not allow this trial for height to come later than Wednesday. Do not vault hard two days before a meet, not at all the day before the meet. Do jogging and easy calisthenic work - nothing else.

For everyday workouts and also for competition, use the following warm-up:

1. Jog one lap.

2. Do fifteen minutes of calisthenics such as knee bends, back bends, leg kicks overhead, bicycle exercise, push-ups, and walking on hands, rope climbing.

3. Do some striding on the straightaway, gradually working up to top speed.

4. Run through with pole at least three times to check step, and swing easily to loosen arms and shoulders when your stride is right. No cross-bar.

In competition, it is a good idea to warm up and check your form on low heights. Then, if you are sure of your form, pass all jumps to within a foot of your usual height. This will save you a lot of energy and spring that you will need badly. For instance, if you are a ten-foot vaulter, pass up to nine feet, and the energy saved may take you to 10'6". But if you are uncertain of your form, you had better take all the jumps to get the practice, or you might be eliminated if you passed to nine feet and then failed to get your step or had other form difficulties and missed three trials at nine feet.
Training

The pole vaulter needs gymnastic ability. To be successful he should spend his winter time doing as much gymnastic work as possible. Use the horses, bars, rope-climbing, and tumbling. A certain amount of this work should be used as warm-up for daily practice when possible.

Mid-Season Practice Schedule for Saturday Meets

Monday:

Warm up. Run through with pole several times to check stride. Work with your lower grip a while. When thoroughly warmed up, raise your grip on the pole to your highest point and work on form with the bar set where you can clear it easily. See how smoothly you can swing and how high you can get your feet. Keep the standards at least 2' beyond the vaulting box and delay extra long before pulling up.

Tuesday:

Warm up. Check stride. Work on form. If trials are necessary, jump for height today, no later in week. Finish practice with two 100-yard dashes.

Wednesday:

Warm up. Work on form at 6" below your best height. Try 3 vaults at your best record. No more. Work with the sprinters or hurdlers for 1/2 hour. Shower.

Thursday:

Warm up. Work at low heights to correct form errors discovered yesterday. Jog two laps. Shower.

Friday:

Warm up. Jog one mile. Shower. Rest up for meet tomorrow.

Analyzing Errors

1. A jerky take-off is usually caused by taking off too soon or too late. Be sure your take-off spot is under, or back of, your hand hold.

2. A late take-off is sometimes caused by shifting the pole too late for the plant. Start the shift about 3 strides from the take-off so there is time to bring the hands directly in front of the face as the pole is slid into the box. Don't reach overhead until your body pulls your arms straight at the take-off.

3. If you are swinging or landing to one side and not staying in the center, there may be several causes. You may be running a curve at the take-off, or running at a side of the run-way instead of the center. You may be taking off with the pole at the right or left of center (which will swing you to the side of the pit the pole starts on). Or you may be kicking your leg around the pole instead of straight through.

4. If you are whirling after releasing, try pushing harder with the top hand as you release.

5. If you are falling on your back, you are releasing too late.

6. If you can't clear higher than you are holding, you are probably, in addition to one of the previously listed errors, trying to reach your feet over the bar too soon, instead of aiming your feet up along the vaulting pole before the twist over and release.
CHAPTER XVI
THE HIGH JUMP

In 1876 the A.A.U. high jump was won with a jump of 5'5" by Ficken. In 1892 Michael Sweeney invented the Sweeney or Eastern style of jump and cleared 6'4 1/2". He cleared a height of 6'5-5/8" in 1895, which record lasted until 1912, when George Horine used his new "western" roll to jump 6'7". From that time the western roll was the established form for record-breakers, until the height was raised to 6'11" by Les Steers, U.S.A., 1941.

There are several ways of high jumping, but of late the methods (for champions) have narrowed down to two main forms, the California, or western roll, as it is called, and a modification of this form called the "straddle", "barrel" roll, and several other names. These rolling forms have won out because they allow a position of the body parallel to the bar. This means that even though the center of the body's weight (center of gravity in your physics books) is lifted no higher, there will be from 6" to 1' more clearance than in the old "scissors" form in which the body was in a sitting position as it passed the bar, the legs being kicked over the bar in a scissors-like motion.

The other advantage of the rolls is that they allow the outside leg to be kicked up, which brings into action more muscles in the hips in the swing up and over the bar. As the body passes over the bar it is almost motionless, so that sometimes the left side or stomach will actually press down the bar, gently, without knocking it off, the legs not touching the bar at all when the form is correctly executed.

Of the two rolls, the barrel roll is harder to perform perfectly, although easier to learn at the start. It has an advantage over the ordinary western roll, in that the body passes the bar in a face-down position, thus gaining several inches because the width of hips and shoulders is greater from side to side than from front to back.

Often, after watching the western roll or after trying it a few times, boys say, "I can't jump that way." Such an attitude is bad. I have never yet seen a boy who couldn't learn to do the roll if he really tried and was patient enough to stay at low heights until he mastered the form. Most boys, actually, will learn in a few days; some will pick it up in just a few tries; and some will get it right the first time. I saw one little tenth grader of 4'11" clear 5'1" with the western roll form the first day he ever high jumped.

Instructions are given here as they apply to boys who naturally lift the right leg in kicking a football, or jumping. Left-footed kickers should reverse the procedure. We will consider the form of the western roll first. It is easy to learn, and it isn't hard to change to the straddle form later. Learn both! Les Steers used the western for warm-up and practice work and for heights in competition up to about 6'4" or 6'6". Then he would switch to the straddle style for the top jumps.

The bar should be put at a height of two feet. Don't be ashamed; there will be plenty of time to raise it to six feet! Be satisfied to start with small things.

Now stand about a foot in front of the center of the bar, with the body turned sideways so that the left shoulder is toward the bar. See diagram. Now swing the right leg forward, up, and over the bar, at the same time straightening the left leg and snapping up off the left toe to clear the bar. As the feet are off the ground and over the bar, drop the left foot down and land lightly on the left foot, leaving the right extended to the rear. You have done the western roll! Probably you were awkward, and didn't get the smooth, easy swing of the expert, but you are on your way. Practice this easy swing and step over until you master it. Remember, swing up your right, push off the left, and land on the left. Land on the same foot you pushed from.
Now raise the bar to three feet (wish we could always raise it a foot at a time!) and try taking a few easy steps before the jump. Adjust the steps so that your left foot comes down for the jump about three feet in front of the bar and about \( \frac{1}{4} \) feet to the left of the center of the bar. This will put the body across the center of the bar where the sag is greatest. The approach is at an angle of \( 45^\circ \) degrees from the bar. Do not use a sharper angle than this, or there will not be enough momentum to carry the body across the bar. Some jumpers run almost parallel to the bar and have the embarrassing experience of actually clearing the bar but of coming down on it before they get beyond it. They have jumped the length of the bar instead of getting their greatest height over the bar.

If you will keep practicing the above instructions you should master the jumping form. Then you will want to go higher. So put the bar at four feet and begin to work on the "layout" and body turn. To get the layout along the bar, lean back at the instant you kick up the right leg, and kick so hard that your feet swing as high as your head. This puts the body in a position parallel to the bar. However, don't try to acquire a layout by leaning over to the left. Bring your feet up; don't bring your head down. Spring straight up. If your kick is good you will get a natural layout.

The turn of the body is made by a twist kick of the right leg after the body passes over the bar. Most beginners try to turn their bodies as they leave the ground. This is wrong, as it interferes with the free upward kick of the right leg. Kick and swing straight up until the body has cleared the bar, with the back to the bar. The right leg, which was kicked as high as possible, thus helping to carry the body upward, is now snapped quickly back to a position parallel to the bar. This second kick automatically snaps the body over to the left side as the jumper literally "rolls" over the bar. Nothing else needs to be done to get the body turn.

As the body passes the bar the left leg is pulled up, the left knee bent, and easily passed forward until the left foot is tucked under the right knee. The left shoulder and hip should be twisted as far away from the bar as possible. To learn this body position, lie down on your back with the right leg out straight and the left leg pulled up, the foot under the right knee, the arms forward, reaching to the left, the head turned to the left, and the left knee turned to the left. See illustration of position over the bar.
As you get higher you will need a better running approach, which will be explained after the straddle roll is described, since the approach and other form points are the same for both forms.

The Straddle Roll

As in the western roll, start with the bar at 1 foot. Stand with the left side of your body to the bar and swing the right leg up, at the same time springing off the left. Allow your right leg to swing up and over the bar so that your body rolls over to the left. When your left leg leaves the ground, bring it up even with the right leg and then slide it easily behind the right leg as the right leg reaches on over to the ground. The left leg remains outstretched as the right foot touches the ground. As the body passes over the bar it is thus in a face-down position. Remember that now, instead of landing on the left leg, as in the western roll, you land on the right, the leg that swung up at the take-off.

Now proceed in the same manner as described for the western roll, raising the bar to 3 feet and using a short approach, then 4 feet to begin developing a lay-out. And here is where trouble usually starts. In securing a lay-out with the face-down style, there is a tendency to start into the roll too soon. This is bad because an early lean kills the action of the swinging leg and also spoils the pushing action of the left leg by starting the body into a head-first dive instead of keeping the body erect over the pushing foot, which is the source of all power. When a straddle style jumper finds himself leaning or diving and not swinging the right leg well, he should return to the western roll until he regains the feel of a good straight lift and kick right straight up into the air—because these points are easier to execute with the back or side clearance of the western roll.

In the straddle style the take-off must be exactly the same as for the western. The only difference is in the action of the left leg, which passes behind the right leg, forcing the body into the prone position and requiring a right-footed landing.
The Running Approach

You will now need to work out a regular running approach, for as you develop the form and jump higher you will need more momentum to get across the bar, which is the only reason for the run. You will then run the same distance always, so you always reach the same take-off mark. If you didn't have a definite mark, you would place your take-off foot on a different spot each time, making your jumping very erratic.

Never jump without a thorough warm-up. As you put forth more effort, the danger of torn muscles increases. Jog one mile, and do vigorous calisthenics one-half hour before jumping. Do lots of leg kicks, and be sure to loosen your back muscles; it is surprising how many sprained backs come from high jumping without proper warm-up. Begin your exercises carefully and easily, but increase the vigor as you loosen up.

About seven steps seem to be enough run for most jumpers. Some use less, but this may lead to straining at the take-off, which is bad. As always, relaxation is a keynote. With too long a run there is the danger of getting too much speed and more chance of missing the take-off spot.

To find your starting mark if you are going to use seven steps, go to the front of the bar and face it at an angle of 45 degrees, exactly as you...
would for a jump. Now find the place where you can stand on your left foot, without kick-
ing the bar when you swing up your right foot. This will probably be about three feet
away from the bar, or approximately at arm's length. The position of the left foot is
marking "take-off" point, the spot where your left foot should strike when you jump.

Now turn, facing 45 degrees away from the bar, with both feet on the take-off point.
Step out with the left foot and run seven steps at exactly the speed you will use when you
approach to jump, and mark, or have someone else mark, the seventh step. This will be
your starting point for your jump. If you stand with both feet on this mark, step out
with your left, and run at the same speed you did before, you should strike the take-off
point with your left foot on the seventh step. (See diagram.) Of course, there will be
variations, and you may have to move your starting mark forward or back as you develop
and learn more about your jumping form, but be sure you work it out so you don't have to keep
changing and confusing yourself.

Ordinarily the last step should be shorter than the others, so that the left leg will
not be dropped too low, which cramps the muscles too much for a quick spring. Beware of
eccentric hops and skips as you run. They only interfere with your jump. Try not to run
too fast, as this flattens out the jump, giving a broad jump instead of a high jump, and
does not allow time for a good leg swing.

With either form, increased height depends on skill as well as strength and spring.
The first form point to emphasize is a good strong swing-up with the outside leg. The
harder you swing the higher that leg will carry your body.

You will naturally spring as hard as you can from the left foot, but work to bring
your ankles and toes into the push as much as you can. Don't crouch too low with the left
leg, as this cramps the muscles too much for a good spring. If you are not getting a good
lay-out (body parallel to the bar) see if a harder right leg kick won't help put your feet
higher. Find out which part of your body hits the bar first and work to get that part out
of the way. In the western roll if your form is good nothing should touch but your should-
er; in the barrel roll it should be the belt buckle. If you find your head going over the
bar lower than your feet, you have been leaning too soon at your take-off. Keep your head
and chest well up.

In any form it is bad to turn the body too soon. This puts the body in a sideways
position, that prevents a full swing on the kick-up. Depend on the leg action to roll
you over after you have reached the bar. Try to time the kick-up so that you swing your
right foot higher than your head just as you leave the ground. Work for smoothness and
grace. Good jumpers sail up and over the bar with cat-like ease and lightness. This
takes coordination and perfect form.

In the barrel roll do not allow the left leg to trail, or it will be knocking the
bar off. Bring it up behind the right leg quickly and easily before the body turns; then
as the body turns, the left leg is out of the way.

When these points are mastered, work for increased snap from the left foot and harder
kick-up with the right. The left foot action demands a quick push from hip, knee, ankle,
and toe. The right leg swing is just like the kick used in kicking a football. The knee
is bent at the beginning of the swing but snaps out straight and up as hard as possible.
The upper part of the body leans backward. Many good jumpers kick over their heads.

If you are off form, check to be sure if you are pushing as hard as you should with
the left foot. Sometimes when thinking of other form points, jumpers forget to push.
Also, be sure your foot is planted straight forward, not to the side.

The training for high jumping requires mostly self-control. Most boys want to jump
too much. The objection to continual jumping is that the shock of jumping tears muscle
fibers and weakens the muscles, rather than strengthens them. To get around this problem,
train as follows: Never jump for height more than once a week in addition to your day of
competition.

If your competition is on Friday, or Saturday, don't jump later than Tuesday for
height. Don't jump for height then if it isn't necessary. If you want to jump, put the
bar down low, a foot under your best mark, and do approaches and easy jumps to perfect
your form. Spend the rest of your time doing exercises to strengthen and quicken your
muscles, such as sprinting, hurdling, skipping the rope, and overhead kicking. The high
jumper improves by doing lots of easy jumps at easy heights. Build leg spring by miles of
easy, springy jogging on the toes, with lots of up and down bounce.

Once every Monday, try this. Put the bar 6" higher than you have ever jumped. Now
make your regular approach, and spring straight into the air as high as you can without
trying to clear the bar. Come down in front of the bar, erect. The idea is to see how
high you can lift your head, to get used to seeing the bar higher than usual, and to feel a
vertical lift. If you can raise your belt buckle even with the bar, when in this verti-
cal position, you should clear it when in a layout position.

To begin every day's practice, jog a lap easily. Then do exercises for at least 10
minutes to loosen the muscles: Kicks overhead, knee bends, back bends, push-ups, bicycle
exercise. Then do a 50-yard dash before you do any jumping. If you are not perspiring
run another dash. It is dangerous not to warm up sufficiently, because cold or stiff
muscles sometimes tear, either in the middle or at their attachments, and the careless
athlete spends two or three weeks, maybe longer, out of competition. Do some springing
on the grass before jumping hard at the pit.

On the day of the meet warm up just as was outlined above. Do not jump at the lower
heights if you are sure of yourself, for it wastes the precious snap of your legs, but be
sure you are warmed up. Very few jumpers can get the best results from their legs before
taking at least six or eight moderate jumps, not full blast by any means. Be sure to keep
warm between jumps by walking around and doing short spurts or dashes. Don't let your
legs get stiff. Loosen up well before every jump. Stand and concentrate before you jump,
but don't take too long or you just tie yourself up. Get yourself in a fighting attitude
when the crucial time arrives.

The high jumper's weeks of training are repaid or lost in the fraction of a second
it takes to push from the left foot, kick the right, and clear the bar. So, take care of
your body so that it will respond when you call on it. Quick response demands careful
choice of food, no drinking, no smoking - plenty of sleep.

Mid-Season Practice Schedule for Saturday Meets

Monday:
Warm up. Jog one mile, resting briefly between laps, and do exercises while catch-
ing breath. Do some form jumping, one foot below your best height.

Tuesday:
Warm up. Check steps. Starting at the greatest height you can safely clear, move
the bar up as in competition. Go as high as you can. Rest. Try some jumps at low
height to correct any errors you have discovered. Do some hurdling or sprinting be-
fore your shower.

Wednesday:
Warm up. Work at low height for ½ hour to correct any form points that are bad. Do
some hurdling or jogging. Shower.

Thursday:
Warm up. Jog some for spring. Shower. Stay off your feet as much as possible. No
jumping.

Friday:
Warm up. Shower. Stay off your feet to save up spring.
CHAPTER XVII
BROAD-JUMPING

In 1876 the first A.A.U. broad jump was won by I. Frazier of New York with a leap of 17'4". In 1901 Pat O'Connor of Great Britain jumped 24' 11". In 1936 Jesse Owens of Ohio State University established the present record of 26'8 3/4". In spite of this improvement, the number of jumpers who better 24' each year are very few.

Broad-jumping is an easy event to learn, but requires very careful training, good form, and lots of natural speed for best results. An encouraging feature is that many boys who cannot run with sustained speed for 100 yards can develop a short burst of speed and do well in broad jumping. The speed is essential in order to carry the jumper to any distance; and spring is necessary to attain sufficient height from the take-off so that the jumper will fly far enough to win points. Stocky boys, small wiry ones, tall thin boys, and tall strong boys have all been good jumpers; the speed and spring seem to be more important than build.

Careful training is essential in broad jumping because of the strain on leg muscles of making a supreme effort while traveling at top speed. Before doing any jumping, secure a piece of sponge rubber to wear in the heel of your jumping shoe during all practice and competition. A bruised heel is painful and is slow in healing. The training methods advocated below are planned with the idea of avoiding injury while preparing for championship performances, so that jumping will be no more risky than sprinting.

In this connection, a discussion of the broad jumper's warm-up is necessary. A good jumper does his warm-up religiously before doing any jumping. Since a jumper is primarily a sprinter, he must go through the regular sprinter's warm-up. In addition, the jumper must particularly emphasize the front bend exercises and knee bends to make sure the leg muscles are properly stretched and warmed for the jumping effort. In practice or competition, always do a front bend or two and a few knee bends before jumping. If you get very cool, stride and sprint some on the straightaway before jumping.

When the jumper finishes his sprint warm-up, the next stage is to do some easy hopping from the jumping foot, while jogging around on the grass or outer edge of the track. Then take a few easy jumps from the take-off board, practicing the hitch-kick, which will be described later. Now you are ready for some harder jumps, but remember that you should always work up gradually to a full-blast effort. Each warm-up jump should be just a "wee bit" harder until you are ready to explode your best jump.

The beginner's best procedure is to learn the hitch-kick method of jumping. The hitch-kick aids a jumper in maintaining good balance in the air so that he makes a perfect landing and gets a full reach with both feet. This often means an advantage of 6" or 1' in measuring the jump. Even if a jumper doesn't master the hitch-kick for a few seasons, it is a good practice exercise for developing spring and coordination. The technique of learning is simple. Jog easily to the edge of the pit, drop a little on the last step, and spring straight up into the air. The higher you spring the more time you have for the kick.

The kick is simply a continuation of the running movement. Each leg kicks downward once, in a paving, circular action similar to that of riding a bicycle. Sometimes the coordination is learned by holding to a rope or bar while going through the leg movements. At first the movements will be jerky and uncoordinated, but if the jumper keeps playing around with this exercise about 5 or 10 minutes every day, he will soon be getting the feel of the movements so that he can make two relaxed, smooth kicks and land with both feet even, coming down with knees relaxed to avoid jar. At first, very short, small kicks will suffice. The essential thing to remember in this exercise is to first concentrate on height. At jogging speed the jumper should not travel more than 3 or 4 feet from the take-off. Later when jumping from the board, the speed of the approach will provide the distance - if good height is attained.

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Actually, the most valuable part of the hitch-kick practice is that it aids in developing leg strength and spring as well as jumping form, and that it can be done at slow speed. Later, even a very good jumper should take 6 hitch-kicks daily as part of his warm-up.

The next stage is to practice some jumps from the take-off board. If possible, use a board set close to the pit. At first these jumps are taken with a short run of no more than 40 or 50 feet and at about half speed. At this distance the use of marks is unnecessary. Chop the step if necessary for a take-off and jump easily, aiming for a springy, relaxed lift. Form is the purpose of this practice, as well as muscle and tendon conditioning. Try to place the take-off foot squarely under the body. Do not cross over or side-step. Instill in yourself the habit of always jumping with the heel in the dirt and the spikes just on the board. It is very disappointing to have a good jump spoiled by a foul.

The foot and leg action in jumping are as follows: In the last two or three strides, the jumper relaxes and "gathers" himself for the jump, settling slightly lower in his running stride. Of course, this implies that full speed must be built up before reaching these last few strides. At the take-off, the pushing foot lands heel first. Then the leg straightens and as the body "rocks" up over the foot, the ankle snaps straight, and every effort is made to attain height. Think of nothing but getting up in the air. The lift involves a timing element that is important. If the leg straightens too soon the forward momentum is checked and there is height but no distance. If the leg straightens too late, the body shoots along the ground with insufficient height to gain distance.

As the take-off is completed, the jumper continues smoothly into his hitch-kick, then lifts his feet and reaches for a good landing. The feet should reach as far as possible, and at the instant of contact they pull so that the body comes on over the feet and will not fall back, for the jump is measured to the nearest mark in the pit.

Now you will want to use a longer run and try for more distance. To find your starting mark, make a mark on the runway about 80 feet from the board. Later your run will be about 120-130 feet long. Now stand on this mark in the runway, facing the pit, with both feet together. If you are a jumper who strikes the board with the left foot, step out with your left, run as fast as you can, and see how near your left foot comes to the board. If you miss the board, adjust your mark forward or back according to whether your step was
short of the board or over it, and practice until you can step on the board consistently. If you can master a stride that doesn’t change, and can learn to hit the board just right every time, you will have acquired one of the most important things for a jumper, for it is impossible to jump well if you never know whether your step is going to come out right. Some jumpers use several different marks on the runway. The author does not approve of this because the jumper has to pay so much attention to the check marks that he cannot concentrate on other points of the jumping form. However, if you need to use two check marks, here is the method:

Standing with both feet on the take-off board, facing your runway, step out with the right foot (for boys who jump from the left foot) and run just as you would if you were approaching the board for a jump. Count 18. Have someone mark the 18th stride. Now stand on this mark, step out with your right foot, and run exactly the same as you did before. Mark the 6th and 12th strides. These are your check marks. You now should have six strides to the first mark, which you strike with your left foot; six strides to the next mark; and six strides to the board. Now adjust the marks so that your last step before the take-off is shortened properly. If you wish to use a longer run, combinations of 8-6-6 strides or 8-8-6 can be used. Another good possibility is to use just one check mark and run 12-6 or 10-10 stride combinations.

**Things to remember:**

1. Develop an even stride, because changing the stride will make you miss your mark.

2. On a hard track you will have to move the marks back a bit because the stride will be longer.

3. On a soft track you will have to move the marks up, because the stride will be shorter.

4. If you are feeling unusually good or peppy, you may have to move your mark back to allow for the extra springiness in your stride.

5. If you do not warm up well, your stride will be short. Later, as you loosen up, your stride will lengthen and you will go over your mark. So be sure to warm up thoroughly before checking your mark.

6. It is better to chop the last step a bit than to stretch, because a long stretch allows the body to drop too low, and the leg will not be able to straighten quick enough as the body passes over. The mark is better too close than too far. Another reason is that most pulled muscles suffered in broad jumping occur a few strides before the take-off, when changing from a driving to a reaching position. Be sure you do not have to reach for the board.

7. The mark will be closer in cold weather because of the shortened stride.

8. The mark will be closer if you are running against the wind.
9. Do not drop too low at the take-off. There isn’t time to bend the knee. Just drop to the heel and then straighten the leg.

Do your practice work and form work easily, for jumping is hard on leg muscles. It is even harder on legs than high jumping, for it is done at top speed. Never jump at all before doing the warm-up exercises described above. Then try a few very easy jumps with a very short run before going all out.

Do not jump hard more than once a week besides your meet. If the meet is on Friday or Saturday, do not jump later than Tuesday for distance. Confine yourself to form work, running through for step, sprinting, and exercises. If you want to be a good broad jumper, learn your form and then jump hard only in competition! Develop the drive to increase your distance by sprinting, form jumping, and other exercises. Your muscle development is stimulated by the frequency of exercise, not by the violence of it.

The physical training for broad jumping is the same as for sprinters and high jumpers. Train for a quickly reacting nervous system, pep, drive, snap, and strength. Eat carefully, don’t smoke, drink, chew, or the like, and be sure to get plenty of sleep, as this makes for lively muscles.

**Mid-Season Practice Schedule for Saturday Meets**

**Monday:**

Warm up. Follow sprinter’s schedule. Run through six times for step. Practice hitch-kick 6 or 8 times easily.

**Tuesday:**

Warm up. Run through several times to check step. If necessary to have trials, take six jumps for distance. Follow sprinter schedule. Practice hitch-kick 8 to 10 times.

**Wednesday:**

Warm up. Run through several times to check step. Follow sprinter schedule. Take six easy hitch-kicks. Take full run 3 or 4 times but jump easily - no distance.

**Thursday:**

Same as Wednesday if meet is on Saturday. If meet is on Friday, just warm up and that is all.

**Friday:**

Follow sprinter schedule.

**Saturday:**

Competition. Warm up the same as for practice. For best results in competition be determined but relaxed. Think speed and height.
CHAPTER XVIII

THE SHOT PUT

Throwing a heavy weight has long been part of the sports of many peoples in many lands. Old Scottish literature mentions "putting the stone". In America the shot put first appeared officially in the A.A.U. in 1876. The records have improved from about 35 feet for the 16 pound shot to the present record of 58'5" set by Fuchs of Yale in 1950. High schools use the 12-pound weight so that the smaller boys can carry the weight across the circle easier. Any high school boy who can put forty feet can usually win points, although about 45 feet or more is the requirement for a champion, and some boys have even put the shot 60' in high school competition.

Shot putting is only for boys with strongly built, well-developed bodies. The putting is done with a tremendous push of the big muscles in legs, hips, abdomen, chest, and shoulders, the arm action following rapidly. The ideal form is one which brings into play as rapidly as possible, and in coordination, these muscles. Both tall and short men, but always strongly built ones, have been successful.

The first thing for the beginner to work on is the push, or the actual release of the shot at the end of the throw. To practice this, stand at the front of the circle (7 foot diameter), with the left shoulder to the direction of the put (left handers reverse the instructions). Place the left foot near the board and the right back in the circle so that the feet are well braced and widely spread. This position is shown in Figure 4 in the illustration of the complete putting motion.

Now grasp the shot so that it rests against the four fingers closely placed and is supported by the thumb in front. This position, with the wrist bent back, allows a powerful hold to begin the put and a full wrist snap at the end.

At the beginning of the push the shot is held so that the shot rests against the front of the shoulder. The bent elbow is held well up and back so that a line through the elbow and the shot will point the direction of the put.

To bring the big body muscles into the put, bend the right knee so that the body drops back. The left leg remains almost straight, but relaxed. Lines through the feet, hips, and shoulders should point the direction of the throw. The left arm is bent at the elbow so that the hand hangs loose and relaxed, the elbow pointing the direction of the throw, at an elevation of about 45 degrees, which is the angle at which you should
Fundamentals

get the most distance from the throw. Each boy, however, has to work out his hand, wrist, arm, and shoulder position to suit his particular bone build, because everyone is built a little differently, but try to come close to what is described here.

In the actual throwing motion the right leg acts first, straightening and twisting the hips around to the left, and whipping the lower body around to face straight forward. This pulls the side and abdominal muscles taut, which act next, swinging the shoulders around and bringing the big shoulder muscles into action. The left arm swings around in an arc to the left that resembles the motion of brushing a fly from the face. As the large muscles overcome inertia and start the movement of the shot, the smaller, faster muscles of the shoulder and arm whip into action, and the very end of the put is a quick snap of wrist and fingers that will add several feet to the distance. Meanwhile both legs are pushing the body into line directly behind the shot. A good putter drives so hard with his legs that his feet actually leave the ground, and his body follows through in a half-turn, so that at the end of the throw the putter is balancing on his right foot at the edge of the circle. At the end of the leg drive the ankles and toes snap straight, the left toe being the last to leave the ground. The follow through is very important, the putter stretching as far as he can, as though he were stuck to the shot and it is pulling him out of the circle.

Try to push so hard that you get a good follow through, but don't try to get the follow through by reversing the feet too soon. You lose power that way. The foot reverse should really follow. It is a by-product of pushing. Try to keep your feet on the ground as long as you can, because they furnish the drive and bracing that your body needs for the other pushing muscles. Every good shot putter practices this standing put until he feels all the body muscles coming into play, and always warms up in this way to check his form. Not until this form is mastered should the beginner try to do the drive across the circle.

The purpose of the drive is to overcome inertia and give the body and the shot momentum across the seven-foot circle. Obviously it does no good to move if one comes to a stop at the end of the movement; yet that is exactly what many beginners do. The drive must be practiced until one can whip across the circle in good position, and begin the push in one continuous motion - with no hesitation or pause along the route.

There are several ways of making the drive, but the purpose is the same in all. The easiest method, and it is as effective as any other, is here given, as for right-handed putters. Stand at the back of the circle on the right foot, which is pointed to the right of the direction of the throw. The shot is resting in position against the shoulder (near neck), and the body is at right angles to the direction of the put. When you feel balanced and ready to drive, lift the left leg high to the left, toward the toe board. Then drop it, and bend the right knee about half-way. Then kick the left leg hard across the circle to the toe board and move the right foot about two feet toward the center of the circle. This driving leg action should carry the body across the circle. As the right foot moves along the ground, place it down again quickly, and drive it hard as you complete the put. The left foot drops to the ground at the front of the circle, just a few inches to the left of a line through the center of the circle. The feet should start their drive for the reverse the instant they land in position, while the body still has its forward momentum. Practice this drive until you can move into perfect position for the put, with body and shoulders well back, cocked for the push and follow through. (See diagram.) The shoulder should be drawn back at the same time the left leg kicks.

Many shot putters lift too high from the ground in crossing the circle. A great many good putters actually slide the right foot into position, keeping constant contact with Mother Earth.

Another common fault is in driving too far across the circle. Many great putters have used only a quick, lightning-like flick of the right foot — just about 18". This allows for a quicker follow-up into the actual put. Cat-like "quickness" is characteristic of good shot-putting. The rhythm is a quick one-two, the count of one coming on the kick across the circle and the two, which gets a prolonged emphasis, coming with the leg drive and release.
FUNDAMENTALS OF TRACK AND FIELD ATHLETICS

And now it is time for a warning. Shot putting form looks easy and is easy to learn as far as we have gone, but few boys have ever really perfected the form. To go ahead from this point will require hours and hours of hard, intelligent practice. But boys who will stay with the practice will become champions. The difficulty comes in timing the different sets of muscles. Try to get the feel of power flowing up through the legs and body and straight out the shoulders and arm to the finger-tips. Continuous power. Don't try to throw with a quick jerk; the shot is too heavy to be snapped. Have someone check your position frequently; you will find that unknowingly you develop little errors without realizing it.

Another point, of course, is the development of sheer muscle strength. This can be done by exercises and weight-lifting, but actual putting is the best exercise for shot putters. In the off season, throw as many as fifty practice throws a day, to build up strength, but in the season of meets throw hard only in the early part of the week, for the throwing is hard on the small muscles of the arms. Do plenty of easy pushes, not using the arm hard. Do much running, always starting practice by jogging a few laps to several miles, and end your practice by working with the sprinters on starts and dashes.

Whenever you throw for distance, count every throw you take for warm-up, and remember the numbers of your best throws. Only by this kind of check-up can you learn exactly how much warm-up to take. Never throw for distance later than Tuesday if you have a meet on Friday, or later than Wednesday if you have a meet on Saturday. Two days before the meet do only easy form throws and lots of running. The day before the meet do some jogging.

On the day of the meet jog to warm up; then stretch well with a complete set of exercises. Now run a fifty-yard dash, for it is absolutely necessary to get every muscle loosened and invigorated so that it will react instantly. Take 6 or 8 easy throws to check your form. Take another short dash and report for the event. Just before throwing, do some twisting and stretching and keep warm between throws by easy jogging. Some boys have to put 12-15 fairly hard puts before they can obtain their best distance. In big meets with long-drawn-out competition, warm up for each put.

If you find yourself fouling, try two corrections: Shorten your first movement, and check to see if you are using your left leg vigorously enough as you lift.

If you aren't getting enough height, try raising your head and chest just before you push, but don't worry about height unless your angle of throw is less than 30 degrees. Most good putters have so much speed that the ideal angle of 45 degrees upward is never attained. If you are getting height but not distance, see if your elbow is high enough, and try using more speed.

When you reach a point where you don't seem to be getting any improvement, try (1) using more right leg drive, (2) shorter glide and longer follow through, (3) relaxing more, especially in forearm and wrist. Relax all over. (4) More speed all the way. (5) Slow down your start and speed up the finish. (6) Follow through farther. (7) Lay off two days and try again.

Many boys think that physical training is not essential in field events such as the shot put. This is a mistake. Field men do not have to train for endurance, but it is true that improper food, drinking, smoking, or any other misuse of the body will cause slowness of muscular and nervous reactions. This will cut down distances alarmingly, for success in throwing events depends on a quick and sudden response of muscles and nerves. Mental and nervous keenness will account for several feet.

Mid-Season Practice Schedule for Saturday Meets

Monday:

Warm up. Throw six or eight times easily to check form. Jog until tired. Shower.
Tuesday:

Warm up. Throw six or eight warm-up throws. Throw six times for distance if trials are necessary, and take 25-50 easy throws to correct form mistakes. Follow the schedule of some running or hurdling event. Shower.

Wednesday:

Warm up. Throw 25-50 times for form only. Follow the schedule of the sprinters.

Thursday:

Warm up. Do some easy throws. Follow the sprinters’ schedule.

Friday:

Warm up. Shower.
CHAPTER XIX
THE DISCUS THROW

The discus throw was an athletic event even before the time of the ancient Greek Olympics. In the ancient Olympics, the Greeks threw the disc from a raised pedestal. The event was revived in America in 1896 and at the modern Olympics in 1896. Since then the rules have been revised until the present custom is to throw from level ground from a circle with diameter of 8'2½". The first American champion threw 118'9". The present official record is 186'11", by Fortune Gordien of Minnesota in 1949.

The ancient Greeks, judging by their statues, threw the discus in pretty much the same manner that we do now. They were judged on form as well as distance.

Two types of fellows are successful with the discus - either the stocky, thick-bodied athlete with powerful muscles, or the tall, rangy, long-armed boy who can use his long reach to advantage in developing centrifugal force on the turn and swing.

In discus throwing the most important points are:

1. Attaining a position that will utilize the big body, hip, and chest muscles to swing the arm.

2. Using a swing instead of a throw.

3. Developing a "flat", spinning sail to cut down wind resistance.

4. Release at the proper angle to get the maximum distance.

The discus is thrown from a circle 8'2½" in diameter. All throws must be in a 90-degree sector to score. Each man is allowed four qualifying throws and four throws in the finals, the number of men qualifying usually being one more than the number to score.

The most successful form utilizes a full body turn, to give the body and discus momentum, followed by a body "reverse".

The beginner should learn the standing throw first, and later add the turn. Right-handed men will start by standing with the left side of the body towards the direction of throw. Spread the feet wide enough to get a firm stance. Now lay the discus on the palm of the right hand, just barely hooking the end joints of the fingers over the rim, and extending the thumb across the center. Most beginners want to hook the fingers too far over the rim. It is wise to swing the discus around and up to the left several times in order to loosen the body, shoulder and arm muscles; otherwise, the sudden pull of a throw may tear a small muscle or strain a ligament or tendon. As the arm swings to the right the palm is up, but as the disk swings to the left in these preliminary swings, the right arm turns over until the discus is parallel to the ground, and is held in position with the left hand as the swing stops. (See illustration.)

To make the throw, bend the knees slightly, shifting the weight to the right foot, and swing the discus around to the right. Twist the entire body from the hips through the shoulders as far to the right as possible, but being careful to keep the head and chest up. You are now in position for the throw, which is nothing more than a quick swing of the body around to the left, starting with a powerful straightening of the right leg. The arm should swing easily from the shoulder, and
parallel to the ground until the legs have pushed the body to an erect position, when the arm continues upward and around in the follow-through. Head and chest are lifted high as the arm pulls through. If the drive of leg and body muscles is vigorous enough, the thrower will be carried off his feet and into a half-turn, so that he ends the throw with his right foot where his left was at the start of the throw. This is called the "reverse". It follows the throw. Let the legs and body muscles do the hard work. The arm merely follows through.

The wrist action is very important in making the discus sail smoothly. When the reverse starts, the arm swings the discus, and the wrist turns forward so that as the arm swings to the front, the palm is toward the ground and very slightly tilted upward at the angle of release. The wrist must be kept slightly arched to conform with the surface of the disc. About a 25 - 30-degree angle is best, as will be explained later. At the instant of release the discus slides over the front edge of the index finger, which gives a clockwise spin. The other fingers "feather" the discus as it releases. (See illustration.) Develop a fast arm whip at the end of the throw.

The reason for the low angle of release is wind resistance. You have probably learned in physics that a thrown object travels farthest if released at a 45-degree angle. That is true of objects like a round shot. But the flat discus, sailing in a tilted position, is checked by the air if tilted as high as 45 degrees. Amateur aviators will compare the front edge and surfaces of a discus with an airplane wing and see why an almost horizontal plane gets good results.

The discus beginner should practice nothing but easy standing throws until he becomes familiar with the position, arm swing, release, and footwork, and can get a smooth sail with no wobble. The best warm-up drill for all discus throwers is an imitation throw, performed in full, without the discus.

When the athlete is ready for the full turn, he should try the following steps without the discus, for the attempt to hold the plate will just add confusion.

Take a position the same as for the reverse, but with the right foot sideways against the back of the circle, and the left towards the center. Some boys put their backs to the circle and take a half-step with the left to gain the above position before starting the turn, but there seems to be no advantage in it, and it offers an extra opportunity for error. To get the steps more easily, draw a line through the center of the circle in the direction of the throw. Place the right foot on the line at the rear of the circle, and put the left on the line, about 18" toward the direction of throw.

To start the action, take the warm-up swing as in the reverse, and twist the body as far to the right as possible, the same as before. I always tell beginners to twist until the last vertebra cracks, and then go into the turn. Now, keeping the body and arm in the twisted position, shift your weight from the right to the left foot and step across so that the right foot comes over in front of the left, and on the line drawn through the center of the circle. Note the diagrams.
The second step is the important one, as it requires quick timing. Look at Diagram 3. The left foot now, while the body is still turning slowly and lazily, must snap quickly around to the front of the circle and across the center line about two inches. This must be done so that the feet are in position before the body starts the throw, so that the feet are braced and pushing when the powerful body pull is made to swing the arm around. With the feet in this position the throw is made exactly as described above. As the pull is made, the left arm whips around sharply to the left, and the chest is lifted. Check pictures.

Have your practice area arranged so that you have arcs, well marked with lime, at 100', 110', 120', etc., so that you can tell approximately how far you are throwing. However, the boy who wants to be a good discus thrower will not try for distance more than once a week, but will spend hours perfecting his throwing form and learning to get all the muscles of the body (legs, hips, abdomen, chest, and shoulders, as well as the smaller arm muscles) into action at exactly the right time. Perfect balance is necessary, with the weight of the body over the balls of the feet. If you get back on your heels you will have trouble. Usually a thrower's best efforts come when he is perfectly relaxed, because then the timing is better.

The manner of holding the discus is important. Keep the hand on the back half of the discus with the thumb over the center. Now twist the wrist back, or "cock" it. Keep this position while you turn and pull. Experiment with different finger spreads to suit the shape and size of your hand. A slight arch of the wrist is essential in getting a smooth sail. Otherwise the discus will tilt to the left and sideslip quickly to the ground.

When learning to throw, turn at slow speed with a pivot, one foot in contact with the ground all the time. But when you acquire some polish and are able to increase the speed of your turn, you will attain better results by using a jump turn which is characterized by the fact that the feet whip around to throwing position so quickly that they are both off the ground at the same time. But take warning: don't get into an up-and-down motion in your jump. Keep your feet as near the ground as possible.

As you increase speed, if you have trouble fouling, bring the left foot around to the right farther when you start. See illustration for speed-turn with jump. If you still foul, shorten your first step more. Once you acquire the beginnings of form, do all your throwing from a circle so as to keep familiar with the space limitations of your event. If you throw without a circle and
get the habit of using too much room, then your form will be ruined when you get into a circle.

Through the season the training is merely a problem of keeping healthy and of developing muscles and form by exercises, running, and hours of intelligent practice. Carrying a tennis ball to squeeze is a wonderful way to build up tough wrists and fingers. Never eat things that upset your stomach. The discus man, however, will not have to worry about the dietary problems that the distance men have.

Never throw hard the second day before a meet; just do easy form work. Don't throw at all the day before a meet, but jog two or three laps so that you will be tired enough to rest well. This will allow arm and shoulder muscles to store up energy and be full of "zing" on the day of competition.

In a meet, warm up by jogging at least two laps. Then do some stretching exercises, including some reverses without the discus. Be sure your back, shoulders, legs, arms and abdomen are thoroughly loosened. Then do some easy reverses with the platter, followed by some reasonably hard throws, as many as your practice work has indicated are necessary to thoroughly warm you up for best distances. Usually 15-20 pretty fair throws are needed. While awaiting your turn, keep warm by sailing a discus back and forth with a teammate.

Mid-Season Practice Schedule for Saturday Meets

Monday:
Warm up. Throw 40-50 times easily for form. Follow the schedule of some running event. Shower.

Tuesday:
Warm up. Throw easily until your form is right. Throw 7-10 times for distance. Throw 25-50 times more just working on form. Follow the schedule of your running event. Shower.

Wednesday:
Warm up. Throw 25 times for form only. Do not strain your arm. Follow your running schedule. Shower.

Thursday:
Warm up. Take 20-25 easy throws for form. Shower.

Friday:
Warm up. Jog until tired. Shower.
CHAPTER XX

THE JAVELIN THROW

One doesn't throw spears for war or hunting purposes these days, so be careful to see that there are no people in the way when you throw the javelin, as it is a very dangerous tool, pointed as it is with steel and weighing not less than 1.765 pounds.

Because of its danger the javelin has been taken out of both high school and college competition in some conferences. However, since some schools still include the javelin throw in the program, and since you may want to learn to throw the javelin just for the fun of it, this chapter is included. Any boy who has a good throwing arm can learn to throw well. Size makes no difference. The event is lots of fun, but be careful where and how you throw.

The javelin throw was added to the modern Olympic program in 1908. It was first used in America in 1906. The Swedes were responsible for introducing the event in modern times, and they and the Finns have been consistently the best performers in the event. They have had many men throwing more than 200 feet, but Americans throwing more than 200 feet are rare. The present record is 258'2-3/8", by Nikkanen of Finland in 1938. Therefore, the European style of approach rather than the American is here given, although the American carry is described because it is easier to learn. The advantage of the Finnish style is that more than any other form it allows the thrower to approach the foul board at top speed and use all his throwing muscles without slowing to a stop at the moment of release, as is the tendency in the other methods.

To begin, try some throws standing still to get used to the spear. Grasp the javelin with your whole hand at first. Later you may experiment with different finger positions or grasps, but the simplest is just to put your whole hand around the cord grip, so that your thumb and forefinger are at the rear of the cord.

Now spread your feet so that you are braced, draw back your arm so that the point of the javelin is alongside your head and pointing in the direction of the throw. Your body is now turned so that the left side is turned to the direction of the throw, your eyes looking where you intend to throw, your left arm extended. Now throw straight overhead, pulling with the body and shoulder muscles first and finishing with a strong wrist snap. Do not bend your elbow more than you have to.

When you are familiar with the grip and throw and can make the javelin stick point first when it lands try some easy running throws. See illustration. The easiest carry position for beginners is the under arm carry, because this style helps keep the throwing arm straight behind until the throwing action starts. Try jogging very easily in the direction you wish to throw, facing straight forward and with the javelin pointing straight forward, tail low. When you wish to throw, turn the right foot sharply to the right as you set it down, and draw back the right shoulder. As the left foot comes through for the next stride, you are in throwing position. Drive into the throw easily with both legs and land with both feet set to keep from fouling. Jog around the field throwing easily in this manner until you feel that your position and timing are right. The method will feel awkward until you have mastered it. DO NOT TRY TO THROW FOR DISTANCE AT FIRST. Hard throwing is the worst thing you can do until you are in good condition, for the javelin is much heavier than a baseball and you can hurt your arm seriously if you throw before you are ready or without warming up well even if you are in good condition. There should probably be at least four weeks of easy work before any hard throwing. Try to throw smoothly so that the javelin does not vibrate in the air. Read the entire chapter, of course, so that you can use the correct form in your easy throwing before going into distance efforts.

When you are used to throwing as you jog, you are ready to try a regular approach. The javelin is thrown from behind a long board, and must be released without touching the board or running beyond it if the throw is to be counted. This means that the throw
must be made far enough back of the board so that the thrower can stop his run instantly. This requires a check mark. For experimental purposes let us set the mark about 25 feet from the board. Now go back about 50 feet and make a mark to run from. Standing on this mark with both feet, step out with the right and run easily. Observe how near your right foot comes to the check mark that you made 25 feet from the board. If you failed to hit the mark just right, move your starting point until you can run through and put your right foot on the check mark. When you can make this approach regularly, you are ready for a running throw.

Make an easy running approach. When your right foot strikes the check mark, make another stride with the left, then draw the right shoulder back, turn to the right, and as the right foot comes down you begin the throwing movement, so that as the left foot comes down, both feet are planted and the body is whipped into the throw, the arm following. The momentum of the run forces your body to whip on through over your feet, and if you can bring the shoulder and arm muscles into play at just the proper instant you will get a powerful whip into your arm. Your speed sends you on over after the javelin is released, and you jump to a stop, trying to get both sets of spikes into the turf to stop before you foul. The secret of getting distance is to whip the body muscles and arm muscles into action at just the proper instant as both feet come into place. Start out slowly and easily, and gradually speed up. At first you will get much more distance by going slowly, for you will not time the actions properly if you go too fast. As you improve, use a new starting mark back about 80 to 100 feet from the foul board, and learn to use more running speed. You will have to adjust your check mark, of course. If you find yourself fouling, move your check mark back a bit until you have the proper space for your foot work.

Early in the season do mostly standing throws easily, and easy throws as you jog. After four weeks start throwing hard once a week only, and never more than this. The rest of the time practice the running approach and easy throws. Never throw for two days before competition. Remember that your only hope of success in this event is to take care of your arm. It requires as much care as a baseball pitcher's. Don't allow your arm to get cold, for instance. Keep plenty of warm clothes on. Always warm up thoroughly with easy throws before competition. Be sure your legs and back are thoroughly loosened, too, for they must be ready for a quick, supreme effort, and they receive more of the strain of throwing than you think. Jog one mile and do exercises to loosen your whole body. Leg, back, and arm muscles receive most injuries. Try to develop a straight-arm throwing action. The American style of baseball throw will ruin your arm if you try to use it on a javelin.
In competition try to get your best throws first, for it is easy to slip or foul in javelin throwing, and spoiled throws may be costly. Then too, the form is so difficult that out of four throws you may not hit your form just right on more than one. So try to make each throw your best.

Mid-Season Practice Schedule for Saturday Meets

Monday:
Warm up. Jog around the field taking easy form throws. Do some sprinting. Shower.

Tuesday:
Warm up. Check your approach. Throw several times easily. When you are ready throw six times for distance, if trials are necessary. Then throw easily several times to correct errors discovered, if your arm is not too tired. If there are no trials, throw easily for form about 1 hour. Work on sprinting 15-20 minutes. Shower.

Wednesday:
Warm up. Throw easily for form no more than twenty times. Work with the sprinters. Shower.

Thursday:
Warm up. Shower.

Friday:
Warm up. Shower. Try to rest completely so that your arm is like a steel spring tomorrow.