

I started as a small boy and kept at it perseveringly for some eight or nine years, you can imagine that it is not so easy to learn as it sounds or looks. That is why I keep talking about the importance of making up your mind that if you are going to get anywhere, or do anything successfully, you especially must realize that it takes patience and perseverance to master any form or method of athletics that will put you in the top row of leaders and champions.

Therefore, you must be a red-blooded boy, and unless you make up your mind to do this thing thoroughly, there is no use starting. I hope that this little description will start some boy on his way toward becoming a champion pole vaulter; and it would, truly, be a source of pride to me if I could sometime read that one of my boy friends had broken the world's record.



President.

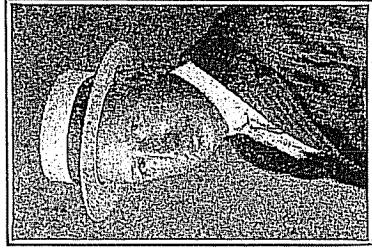
## HOW TO BECOME A FOOTBALL STAR

By WALTER CAMP

In these days of keen competition for positions on football teams, preparation is the thing that counts enormously. By preparation I do not mean just a little preliminary training, but weeks, months, and even years of getting ready to do the work well. That is what makes the great league player in professional baseball, and it is coming to be more and more a necessity for any boy who is to make a first-class football team. It is not all drudgery by any means. All the time that he is improving his strength, physique, agility, and knowledge of the game, he is playing through the fall on his scrub or school football team and getting a lot of fun out of it.

The point I wish, however, to emphasize, is this: that he can, at the same time that he is having his fun in the practice and in the contests, be making himself better and better until by the time he is twenty he may be a real star. The way to do this is for every boy to study first how to put himself into first-class physical condition, and then how to keep in trim and at the same time steadily improve his physical strength, suppleness, and endurance. Good health is the basis of it all. You cannot build without that foundation. One of the most promising half-backs on one of the best 'varsity teams, a few years ago, was forced to abandon the game in mid-season because a medical examination showed that for a long time he had not been in good health. Here was a man who had all the qualifications except that one foundation, and yet on the very eve of the time when he should have blossomed out as a star, he was obliged to give up the game. All the rest is supplemental to and should help in the continuance of this good health.

A man's endurance comes quite largely from the condition of his heart and lungs; just as when you see a player with a good deep chest you feel a confidence in his power because he has room for his heart and lungs. No man should be all knotted up with



**Hello Boys!** You've heard of Capt. Eddie Rickenbacker, America's Ace of Aces. The man who went to France to drive General Pershing's automobile and came back the greatest flyer America produced. You heard a lot about him during the war and since then, but how many of you knew he was the idol of the automobile racing world at the moment America entered the war. As soon as he heard that he came to America, for he was in England building a new racing car, and endeavored to enlist all his friends in the automobile racing world in a squadron of Air Fighters. However, this was impossible, as he soon found out so he determined to strike out by himself.

He suddenly accepted General Pershing's invitation to sail with him the next day and became the driver of the general's automobile at the front, where he wisely foresaw he would find a quicker opportunity for entering the flying service.

In eighteen months he returned, the American Ace of Aces.

Boys, Capt. Eddie Rickenbacker was a regular fellow. I'll bet when he was a boy he was one of the liveliest in his crowd. He was a real boy. The kind I want every Gilbert boy to be. I've asked him to write for you his first experience over the German lines for I know you'll enjoy it, and what he has written, boys, carries one of the biggest kinds of messages to you. It shows what a man can do if he has confidence in himself and the courage to stick to a task, no matter how hard. We can't all become Aces, boys, but a good many of you can become big men in other ways by following Capt. Eddie Rickenbacker's example.

Sincerely yours,

*A.C. Gilbert*  
President.



## My First Flying Over the German Lines

By

CAPT. EDDIE RICKENBACKER

After days of schooling and nights of anticipation, I woke up one morning to find my dreams come true. Major Raoul Lufbery, the most famous of our American flyers, and the commanding officer of our group, announced that a flight would take off after breakfast for a look at the war across the German lines. He himself was to lead the patrol.

The patrol was to be over enemy territory in the Champagne sector. "Who is to go?" was the thought in every pilot's mind, as we all stood by in more or less unconcealed eagerness. None of us had as yet caught a glimpse of our future arenas. We all had vague ideas of the several kinds of surprises in store for us over Hun lines, and every one of us was keen to get into it.

Major Lufbery looked us over without saying much. Luf was very quiet in manner and very droll when he wanted to be. He had seen almost four years of service with the French Air Service and in the Lafayette Escadrille, and had shot down seventeen Hun aeroplanes before the American Air Service began active work at the front. Every one of us idolized Lufbery.

"Rick," said the Major casually, "you and Campbell be ready to leave at 8:15."

I tried to appear nonchalant as I replied, "Yes, sir." Douglas Campbell put up a much better face than I did. The other boys crowded around us and presented us with good advice, such as "Look out for Archy, mind," and one thoughtful fellow kindly cautioned me to crash in our lines if the Huns got me, so that he could personally put a cross over my grave.

That memorable morning was the 6th day of March, 1918. I had joined the Hat-in-the-Ring Squadron just two days before at

19

Villeneuve. We were then some twenty miles behind the lines and were well installed on an old aerodrome that had been used previously by several French Aero Squadrons. This expedition was to be the first essay over the lines by a "Made-in-America" Squadron. Sharp upon eight o'clock, when Major Lufbery entered the hangar, he found us ready for him. It takes about ten seconds to step into your Teddy-bear suit, slip a flying helmet over your head, and snap on the glasses. Campbell and I climbed into our Nieuports. The Major gave a few instructions to Lieutenant Campbell, then came over to me. I felt like a man in the chair when the dentist approaches. Of course I listened politely to his parting words, but the only thing that appealed to me in his discourse was the order to stick close to him and keep formation. He did not have to repeat that order. Never before did I realize how seductively cold death beckons a pilot toward his first trip over enemy lines.

Lufbery ran his motor for a moment, then took off. Campbell followed upon his heels, and then I opened my throttle. I cast a last, longing glance at the familiar flying field as I felt my tail go up, the wheels began to skim the ground, and with the wind in my teeth I pulled her up and headed after Campbell.

Just when I had gained enough equilibrium of mind to keep my place in formation and at the same time take an interest in the battlefields below me, I began to feel a terrible realization that seasickness had overcome me. I didn't want to confess even to myself that I could get sick in the air. This was what world be expected from a brand new aviator on his first trip over the lines. It would be wonderfully amusing to Lufbery and the rest of the boys in the Squadron when I got back to the field—if I ever did—to advise me to take along a bottle of medicine next time I tried to fly. I grew cold with the thought of it. Then I set my teeth and prayed that I might fight it off. I determined to look straight ahead and to concentrate my whole mind on the task of sticking it out, no matter how I felt.

I had hardly got control of myself when I was horribly startled by an explosion which seemed only a few feet in my rear. The same instant the concussion caught my plane and I began to roll and toss much worse than I had ever realized was possible. The very terror of my situation drove away all thoughts of sickness. In the midst of it several more shocks tipped my machine and

repeated sounds of nearby explosions smote my ears. All that I could see were four or five black puffs of smoke some distance behind and below my tail.

I knew what they were right enough. They were "Archy!" They were eighteen-pound shells of shrapnel which were being fired at me by the Germans. And probably they had quite a few more of those shells on hand which they contemplated popping up at me.

I shall never forget how scared I was and how enraged I felt at the old pilots at home, who pretended to like the Archies. Little by little my alarm passed away. I began to watch the course of the black puffs behind me. I grew accustomed to the momentary disturbance of the air after each explosion, and almost mechanically I met the lift of the machine with the gentle pressure of my joystick, which righted my Nieuport and smoothed its course. And a rush of happiness came over me with the assurance that I was neither going to be sick nor was I any longer in any terror of the bursting shells. By Jove, I had passed through the ordeal! A feeling of elation possessed me as I realized that my long-dreamed and long-dreaded novitiate was over. At last I knew clear down deep in my own heart that I was all right. I could fly! I could go over enemy lines like the other boys who had seemed so wonderful to me! I forgot entirely my recent fear and terror. Only a deep feeling of satisfaction and gratitude remained that warred me and delighted me, for not until that moment had I dared to hope that I possessed all the requisite characteristics for a successful war pilot. Though I had feared no enemy, yet I had feared that I myself might be lacking. With the sudden banishment of that first mortal fear that had so possessed me came the belief in my own powers that knew no bounds. I loved flying. I had been familiar with motors all my life. Sports of every sort had always appealed to me. The excitement of automobile racing did not compare with what I knew must come with aeroplane fighting in France. The pleasure of shooting down another man was no more attractive to me than the chance of being shot down myself. The whole business of war was ugly to me. But the thought of pitting my experience and confidence against that of German aviators and beating them at their own boasted prowess in air combats had fascinated me.

So it was that each experience that came to me in those first days

of war flying made a great impression on my mind. I grew more confident each day. Many doubts were removed, more disdain for the enemy came to me, and a growing certainty gradually possessed me that I had fathomed all the possibilities that could threaten me and my aeroplane when over the lines of the enemy. And I always tried to remember every incident that happened, so that in the future I might take advantage of familiar circumstances.

So I say to you, boys, profit by your experiences: Gain from them the things that build your mind and body.



## HOW A BOY SHOULD TRAIN TO BECOME A CHAMPION ATHLETE

By JOHNNY MACK

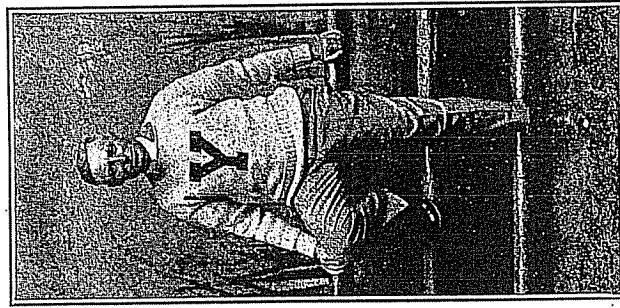
Athletic Trainer, Yale University

It has been my responsibility to instruct, train, and develop many athletes, and I want to say right in the beginning that the greatest disadvantage, by far the greatest obstacle I have had to contend with in trying to develop champion athletes, is to correct old styles, wrong methods and, poor form acquired before coming to college —acquired by young boys who have been taught wrong in the beginning, or who have never had any athletic instruction at all, and have tried to learn by their own methods.

The best advice I can give any boy, if he is at all interested in any branch of athletics, is to learn the correct way in the beginning, and then he will not have to unlearn things afterward. You, no doubt, are familiar with the expression commonly used among good athletes—"good form."

**Good Form.** Ninety-nine out of a hundred times it is safe to say that it makes no difference how wonderful your physical development may be—or how naturally athletics may come to you—if, in your respective athletic event, you have not acquired good form or correct methods, the chances are pretty limited for your ever becoming a champion athlete. Therefore, the first essential is to get someone who knows how to teach you, or read and study from authoritative books to assure yourself of a right start in the right direction, so that you will not begin by acquiring bad form which takes months, yes years, to correct.

23



and breaking all preceding records. However, there is no doubt that the big man is apt to be more qualified as a hammer thrower, or shot putter, or football player, than a small man.

The main thing I want to impress upon you is that it does not make any difference whether you think you are too small, or light, or weak, or that some of your good friends will laugh at you when you go in for athletics. Just forget all this and have the right kind of stuff in you. The physical requirements that appear to you to be lacking, will gradually develop, and with the right kind of determination you will find that these hindrances amount to nothing. You will soon overcome them and make yourself worth while.

### PHYSICAL EXAMINATION

In most big institutions you are not permitted to go into athletics unless you have had an examination by a physician. It is just as important as any other factor that young men who enter into athletics should know what their physical condition is. For this reason a physical examination is imperative. It is too often neglected by young men. The importance of it cannot be overestimated, because there may be some little physical defect that can be easily overcome with proper instructions in the beginning. You sometimes hear people talk about athletics hurting a young man. The only time that athletics hurt a young man is when he takes them up while he has some physical defect of which he was not aware. As a general rule this physical defect could have been easily remedied with the proper care or instruction. Therefore, take my advice and find out about these things in the beginning.

of the boy who hopes some day to be a great athlete. He should conserve his strength in youth so that when he comes to the peak of his training, during those days when he goes to college, he will have a big reserve of energy in order to do those big things that make world champions out of men.

My sole object in writing this paragraph is to impress upon you that you should not try to go into too many things or do too many things when you are in preparatory school. The thing to remember, then, is that the future is still in front of you, and the great big things in life and the things that are going to mean most to you, are the things that you will do in the college or university. I know that it is a hard thing for a boy to hold himself in check when he is anxious to help his school in every way; but not to do so will be a great misfortune, one that he will regret later when he is called upon to do the most that is in him for his university. He will find then that he has outdone himself too early in life.

### AT WHAT AGE SHOULD A BOY BEGIN

There is no set age when a boy should take up athletics. I would say the best time is when he has made up his mind that he wants to go into training; but, as I said in the beginning, when he does make up his mind that he wants to go into them, he must learn how to go about it right. However, at whatever age he enters, the main thing is not to overtax himself too much in the beginning. He should work up gradually. Never let anybody put you to a task which is beyond your power to accomplish, or that taxes you too much in the early years of your life. Start early if you want to, but go about it systematically.

### COMPETITIVE ATHLETICS

A man without nerve, determination, or courage can exercise in a gymnasium and enjoy the benefits of training, but the joy of competition will never belong to him.

I think it, however, a great misfortune that young boys in preparatory schools are thrown into competitive athletics when too young. By this I do not mean that a reasonable amount of competition is not good for the young man. It is oftentimes the case that boys will go into a great number of events to help out their school in championship meets. This is too much of a tax upon the strength

### PROPER TRAINING

A very silly idea prevails in the minds of most people about the proper method of training. It is an old-fashioned idea that an athlete should make great sacrifices regarding his diet. Special dieting does not hold the important position it once held in athletics. Modern trainers have assumed the common sense idea that the essential thing is to eat good food, properly masticate it, live a natural, healthy life, and you will be following the proper course that an athlete should follow. This does not mean that you have to deprive yourself of a reasonable amount of good things, like pies

and cake, that most boys are fond of. Smoking is one thing that every boy must make up his mind not to do. Live a good, vigorous, healthy outdoor life, with regular hours of sleep, and see that your room is well ventilated with fresh air. The very best sort of thing that a young man can do is to develop the habit when rising to go through some simple calisthenics that will invigorate him, and follow them with a good rub.

All that I have said may be summed up in a very few words, but they mean success or failure in athletics.

1. Determination to keep everlastingly at it and never become discouraged.
2. Avoid forming bad habits in the beginning, by getting competent instructions.
3. Don't think your natural physical make-up is a handicap to your becoming a successful athlete.
4. Common sense, plain, healthy living.
5. Remember you must keep up in your studies.
6. Be sure to get a physical examination before you go into athletics.
7. Don't forget your exercises in the morning, with a cold shower and a good rub. It only requires a few minutes, but it will mean much to you in later life.

## AN INTERVIEW WITH THOMAS A. EDISON



In answer to a question as to what he thought was the World's greatest need, Mr. Edison said:

*"We are living in the age of the world's greatest discoveries and inventions, but it should be of great interest to know that many great problems and many great inventions and discoveries are yet in store for us. This means there are great possibilities ahead for the inventors of the future. In all the recent great discoveries and inventions, there is plenty of room for perfection and improvement. The great question of food production, soil fertilization, automatic machinery of every description and kind are problems in their mere infancy, and they hold in store great possibilities for the inventors and scientific men who will perfect and work out the things that are of such great importance to the whole civilized world."*

*"These facts may start many boys on the way to thought and experiment through which many new discoveries and inventions may enrich future generations.*

*"The boys of today will be the inventors of tomorrow, and the achievements of some of them will probably startle the world. When I see the opportunities for studying and experimenting that are open to boys of today I think of my earlier days and wish that I might have had the advantages now existing. But, I realize that the boys of every age have advantages over the boys of the previous one and that the world progresses through experiences and discoveries of preceding generations.*

*"If I have any advice to give to young boys, I should say, first of all train your mind. Take an interest in everything. Do not neglect your school work; play hard when you play and work hard when you work. Reason things out for yourself. Things come easier for boys now than they did when I was a boy,*

and many are apt to drift along and not train themselves for the big things in life. They do not take things seriously enough for the success of their own future. Nothing breeds success like success—cultivate it. Start in succeeding; be serious; learn things that other boys do not know.

"If a boy is at all interested in electricity by all means let him begin to study and experiment now. There is no science that is more interesting—none that offers such opportunities for progress and profit. The skilled electrical worker will always be in demand and the boy or man who combines creative ability with electrical knowledge can go very far on the road to success. "Let the American boy of today train himself so he will stand for leadership and the big achievements of the future."

I have asked Mr. Edison to say a few words for my book on Boy Engineering, believing it will be an inspiration to boys who are interested in learning about scientific things. His leadership and achievements are an inspiration to all red-blooded boys and I have asked him to give his opinion as to what the future holds in store for the boy who trains himself to become a Scientist. Thomas Alva Edison, as we all know, is truly a great Inventor. His achievements are an inspiration to everyone. His inventions did not merely happen. The result was the thing that held his interest as much as the reason for it.

In introducing "The Boy's Life of Edison," an interesting and authoritative book published by Harper & Bros., Mr. Meadowcroft, Edison's assistant, says: "It is probably as an Interpreter of the Secrets of Nature, that Edison fascinates the imagination of almost every boy. His greatness has not been reached by chance, but honestly earned by the hardest kind of hard work and the most intense and earnest application."

It can certainly be said of Mr. Edison that he belongs to the electrical age, and is the Master Experimenter. I earnestly believe that Mr. Edison's words will lead many boys toward some of the great achievements of the future.



A.C. Gilbert  
President

## GENERAL THEORY OF WIRELESS TELEGRAPHY

BY CLARENCE D. TUSKA

Associate I. R. E. Former Editor O. S. T. Magazine

In 1901, when Marconi first succeeded in transmitting signals across the Atlantic from Poldhu, Cornwall, to St. John's, Newfoundland, a great wave of enthusiasm spread over this country for the new-found science of wireless telegraphy. Wireless was no longer a dream, but an actual, practical method of telegraphing without wires. Not long after the results of the first work were heard of, amateur wireless sprang up in the United States. From that time to this, the amateur operators have grown in number and knowledge. The amateurs of the United States lead every other country. The amount of their knowledge is surprising, and it is hoped they will always lead.

### WIRELESS WAVES

The theory of wireless telegraphy may be best understood by referring to an electrical condenser. From your work with the Gilbert Electrical Set you are probably already acquainted with condensers. Still, it is possible that you have forgotten about them, and in this case Figure No. 1 illustrates a simple condenser. The condenser consists of two parts: the metal plates or conductors, and the insulating material which separates them. The separating material is always an insulator, called the dielectric. If we connect the condenser plates to a battery or any source of electricity, energy can be stored in the dielectric.



Fig. 1

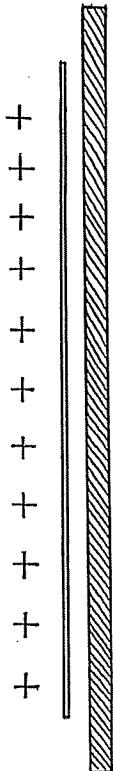


Fig. 2

Now let us see how the electrical energy is stored up. Fig. 2 shows two plates which have been charged with electricity. On one plate a certain number of positive charges have been placed, and on the other an equal amount of negative charges. The positive and negative attract each other. The attraction between the plates is so strong that the material between them is compressed slightly. If we could put enough electricity into the condenser, we could crush the plates.

We can consider what would happen if the condenser were charged up and then let discharge. A gap is placed across the terminals of the condenser, as shown in Fig. 3. When the condenser

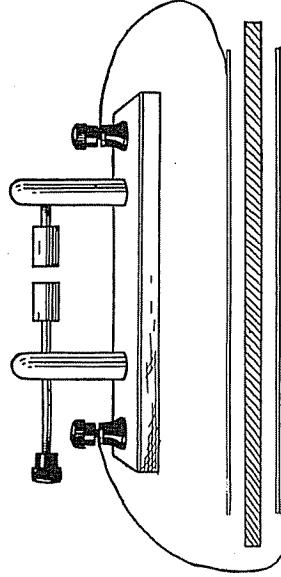


Fig. 3

has stored up enough electricity its voltage becomes so great that it jumps across the gap, and the electricity follows with a snap and spark. As we watch it there appears to be but one flash. However, there is a rapid succession of sparks from one side of the gap to the other and back again. Each spark becomes a little

weaker than the one before it, until finally the sparks die out altogether. To make this clear in our minds, we can consider a pendulum swinging as shown in Fig. 4. The pendulum starts in with a big bold swing, which gradually dies out just as our condenser charge dies out with its sparking. This process of swinging back and forth is called oscillation. We speak of a condenser as giving an oscillating spark or an oscillatory discharge.

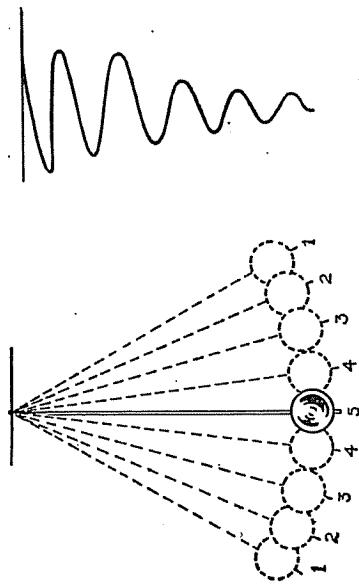


Fig. 4

A condenser oscillates at the almost unbelievable rate of 1,000,000 to 1,500,000 sparks per second. The rate at which it sparks depends upon its size; some condensers giving as low as 25,000 sparks per second.

Electrical waves are sent out by the rapidly discharging condenser. This discharge of electricity forces out electro-magnetic waves, which extend in ever-increasing circles, as do water waves when a stone is thrown into a pond. These waves could be picked up at a receiving station, and by means of a code, messages are transmitted.

### THE ANTENNA

However, with practical wireless telegraphy, such as is used to communicate over several miles, we have more than a condenser. You have probably seen the aerials which other amateur operators have erected on the roofs of buildings, between trees, and on poles.