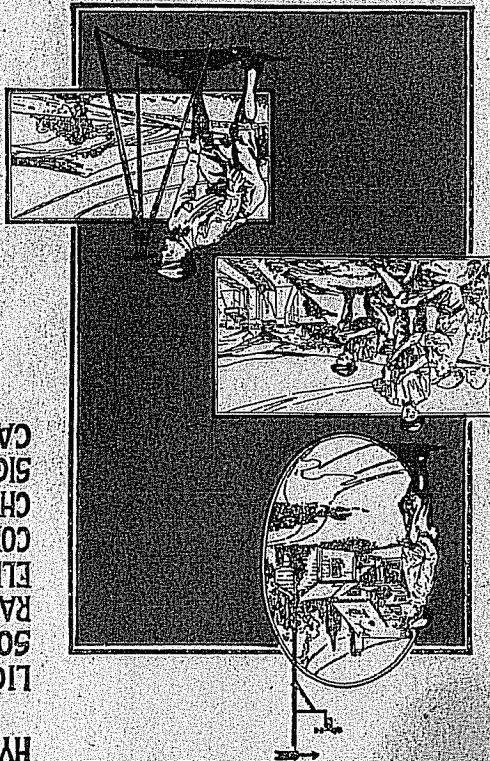


GILBERT

REG. U.S. PAT. OFF.

BOY ENGINEERING

CIVIL ENGINEERING
 WEATHER BUREAU
 HYDRAULIC & PNEUMATIC
 ENGINEERING
 LIGHT EXPERIMENTS
 SOUND EXPERIMENTS
 RADIO ENGINEERING
 ELECTRICAL ENGINEERING
 CONSTRUCTIONAL ENGINEERING
 CHEMICAL ENGINEERING
 SIGNAL ENGINEERING
 CARPENTRY



Price 25 Cents

The A.C. Gilbert
 NEW HAVEN, CONN., U.S.A.

GILBERT BOY ENGINEERING

Containing

PERSONAL LETTER TO GILBERT BOYS EVERYWHERE, by Alfred C. Gilbert,
President, The A. C. Gilbert Company.
THE HISTORY OF GILBERT TOYS, by A. C. Gilbert
HOW TO BECOME A FOOTBALL STAR, by Walter Camp, American Foot-
ball Association.
MY FIRST FLIGHT OVER THE GERMAN LINES, by Capt. Eddie
Rickenbacker, America's Ace of Aces.
HOW A BOY SHOULD TRAIN TO BECOME A CHAMPION ATHLETE, by
Johnny Mack, Athletic Trainer Yale University.
GENERAL THEORY OF WIRELESS TELEGRAPHY, by Clarence D. Tuska,
Associate I. R. E. Former Editor Q. S. T. Magazine.
HOW TO POLE VAULT, by A. C. Gilbert. World's Champion Pole
Vaulting at Olympic Games, London, 1908.
AN INTERVIEW WITH MR. THOMAS A. EDISON, by A. C. Gilbert.

GENERAL ARTICLES

ON

HYDRAULIC AND PNEUMATIC ENGINEERING
MAGNETISM
LIGHT AND HEAT IT MEANS TO US
SOUND
CIVIL ENGINEERING
WEATHER BUREAU

CHEMISTRY
ELECTRICITY
RADIO OPERATING
TIN CAN TOY MAKING
CARPENTRY
MAGIC, ETC., ETC.

Published by

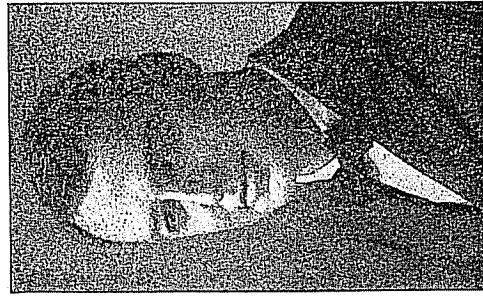
THE A. C. GILBERT COMPANY
NEW HAVEN, CONNECTICUT

In Canada:—The A. C. Gilbert-Menzies Co., Limited, Toronto
In England:—The A. C. Gilbert Co., 125 High Holborn, London, W. C. 2.

GILBERT TOYS are sold by the best toy dealers everywhere. If unable to find them in your city, write us and we will advise you where you can get them.

Prices and contents of all Gilbert Toys shown in this book are subject to change without notice.

Copyright, 1920, by
A. C. GILBERT



Hello Boys!
A. C. GILBERT

I suppose I have more boy friends in the world than any other single individual, and I am very proud of it. Every day the mail brings me letters from boys in all parts of the United States, from Maine to California, and also letters from boys in England, France, Japan, Australia, Cuba, South America, and once in a while from some boy who lives in a foreign land of which I have never heard before. Then I have to get out my old geography and study the map to find out where my boy friend lives. I have asked some men whom I know you are interested in to write articles for this book, and besides I have tried to tell you about Gilbert Toys, but before I do let me tell you something about myself, for I have had an interesting life, I can tell you.

I lived away up in the northern part of Idaho, and after I had finished my public school course, my father sent me to Pacific University at Forest Grove, Oregon, and it was there that I became interested in athletics. I did a great deal of wrestling, and one day the school entered me in the Northwest wrestling championship bouts. The first year, although I didn't win, I did very well. I went back home and trained all the harder, believing that if I persistently kept at it, I would some day win the championship. I didn't have to wait very long, for the next year the school entered me again and I succeeded in winning the Pacific Coast championship.

The same year I broke the Northwest record for pole vaulting, and was made Captain of the University Track Team. Although the school had only 150 men in it, I built up a very fine team and organized a training table just like they do at the big colleges. At this time I had no idea that some day I would go to a university like Yale. Although this was a small school, we competed with all the big colleges, and won the track championship of the Northwest. During my three years at Pacific University I took part in a great many contests and won lots of medals and prizes. I then became ambitious to go to Yale, and in 1904 I came to New Haven.

While at Yale I won the "Y" for three different branches of athletics and was presented with 160 different gold and silver medals. I also won the Wrestling Championship of the United States. In fact I was never thrown in wrestling. I was intercollegiate gymnast and won the "Y" for being the best all-round gymnast at Yale. I believe I had more success in Pole Vaulting than anything, for twice I had the world's record, having jumped over 13 feet. I was picked

out to represent America at the Olympic Games in London. During the last few days of the games I was awarded a medal by Queen Alexandria, in the presence of King Edward, as World's Champion in Pole Vaulting.

My main object in telling you this story about myself is to show you that it is the persistency with which you keep after things that counts most in making a success. I feel that every boy should be trained for leadership. It is only the bright-eyed, red-blooded boy who has learned things, done things, dared things beyond the reach of most boys who will find the way open to really big achievements. You see, boys, it is not so very long ago that I was a boy myself, and I know what boys want and the kind of toys they like. That is why, when I started to make Gilbert Toys, I made them genuine.

My toys are toys for the live-wire boy, who likes lots of fun and at the same time wants to do some of the big engineering things—things that are real—things that are genuine. Every toy I make is fully guaranteed to do just what I say it will, or I will give you your money back.

When you are in New Haven, don't forget to come and see me, and I will show you just how Gilbert Toys are made. Read through this book carefully, and don't miss the page on which I tell you about the Gilbert Engineering Institute for Boys.

Sincerely yours,

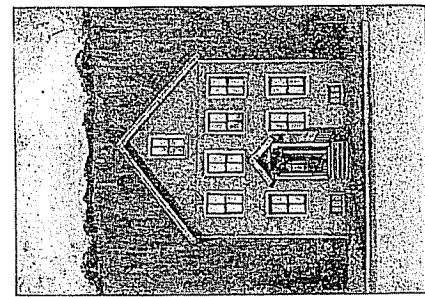
A.C. Gilbert

President

THE A. C. GILBERT COMPANY
NEW HAVEN, CONN.

New York Chicago San Francisco Toronto London

The History of Gilbert Toys

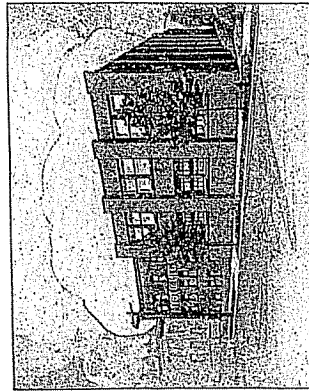


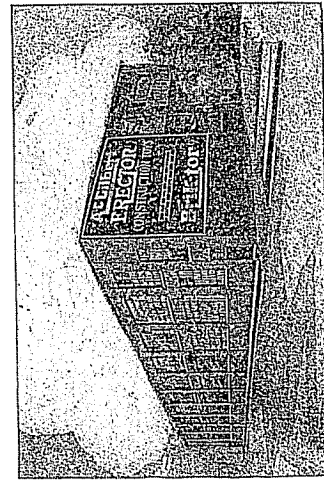
Today when I look over our plant covering many acres of floor space, and catch sight of a thousand or more employees, it seems a long time since I first started making Gilbert Toys, but, reckoned in years, it is hardly any time at all. But "much water passes over the dam in a few years." Little did I think those last few years I was in college that no sooner would I graduate when I would be striking out for myself.

Three things always interested me—Athletics, Sleight-of-Hand, and Scientific Experiments. Outside of my school work athletics claimed the major part of my time, but a good share was left to learn the secrets of magic and scientific things, the two hobbies I had ever since I was a boy. Both have been of great service to me: first, to help me earn my way through college and second, to bring science down to a boy's understanding through the scientific toys of our manufacture. The first money I ever made was by giving magic entertainments to private audiences, and while entertaining one of these audiences in this way, the thought occurred to me that if these same magic tricks I was doing could be put up so that boys would understand them easily, they would have a splendid sale. I determined to try it out. So even before I left college I had rented a small wooden building out in Westville, Connecticut, a suburb of New Haven, and started to manufacture magical apparatus on a small scale. I was my own manufacturer, shipper, and salesman, and during the holiday season I spent a great deal of time demonstrating in some of the larger cities. It was not long before Mysto Magic Sets, as they were called, were known pretty familiarly all over the country.

Manufacturing and selling just magic toys of this kind and type did not satisfy me. I had always felt that toys, besides giving a great amount of fun and enjoyment, also had a big influence on the character of a boy and that they should be considered of greater importance by parents. I realized that as a boy I always had a longing to know more about the secrets of nature and to experiment along scientific lines. So I conceived the idea of manufacturing toys of a character and kind that had been such a hobby with me as a boy—real engineering toys.

I then constructed the first models of what was to become one of the world's greatest toys—ERECTOR. These first models were crude, hand-made things that I spent many an hour working over myself. Finally the dies were completed and we started to produce the first Erector Sets. From that





day to this, Ector has been steadily growing in popularity, until it is now sold in almost every country in the world. From the very beginning boys liked it because it was something entirely different from any toy that had ever been given them—its girders were like actual, structural steel, and at that time it was the only toy operated by an electric motor.

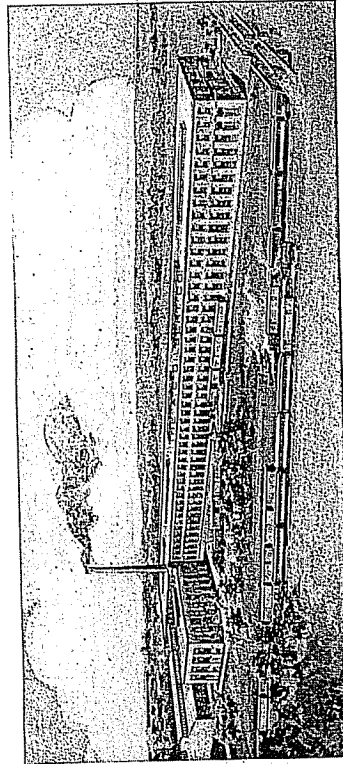
Parents were quick to see its educational value and how their boys would benefit by playing with such a toy. While educational, at the same time it was not "school booky," and the hit it made with boys proved its value as a scientific toy.

Its phenomenal success made necessary our moving into a larger plant on Foote Street, New Haven, in 1913, and its continued growth forced us to build our new plant on Fox Street, New Haven, in the early part of 1915.

My experience with Ector showed me I was on the right track. Toys could be made more than mere playthings—they could be made to mean something to the boy and his parents, and so I have continued to bring out many engineering toys of the kind and character that will hold the boy's interest because they are full of intensely interesting things and provide a great amount of fun and amusement.

As you go through this book of mine you will see illustrated the big family of Gilbert Toys that have grown up with this great, big business of ours, until it became necessary to build what they tell me is the largest toy factory in the world, covering many acres. It can be seen standing out conspicuously, with its big Wireless Tower on the main New York, New Haven and Hartford Railway going through New Haven. Its front door is always open to any of my boy friends who visit New Haven, to see the wonders of automatic machinery of every description—the kind that are turning out this great family of Gilbert Toys.

A.C. Gilbert
President.



POLE VAULTING

BY ALFRED C. GILBERT

WORLD'S CHAMPION POLE VAULTER AT OLYMPIC GAMES,
LONDON, 1908

RECORDS

World's Record—New York City, 1907 12 ft. 3 inches
World's Record—Philadelphia, 1908 12 ft. 7 ³/₄ inches
Championship of the World, London, 1908 12 ft. 2 inches
World's Record (Unofficial), Westville, 1909 13 ft. 2 inches

Pole vaulting is always an interesting and fascinating event in the program of track athletics, because it is very spectacular, and combines running, jumping, and gymnastics.

The first advice I would give a boy who is going to take up Pole Vaulting would be to make up his mind that he has got to keep everlastingly at the thing, for a great deal of patience and perseverance will be required of him before he really succeeds.

The next important thing, having made up your mind, is to learn to pole vault in the proper and scientific way, for all the practice in the world will be of no avail unless you decide that you are going to learn the only correct method of pole vaulting. If you practice in a haphazard, old-fashioned way, like most boys do who are learning, you will never become a champion.

I look back to the time when I was a boy and I remember that I became very discouraged because it seemed to me that I advanced very slowly and the chances of ever becoming a champion were very obscure, to say the least. However, I had one qualification that builds for success, whether in athletics or business, and that is keeping perpetually at the thing, regardless of the many discouragements, failures, and defeats that come to the beginner.

I do not think that there is any better advice that I could give to any boy than that if he makes up his mind to do a thing, he should do it right. You will never stand for leadership unless you make it a habit to learn all the fine points of the game. It is learning all the fine points of the game that puts you ahead of the other fellow. Learn the habit of being successful, for nothing succeeds like success.

THE POLE

When I began Pole Vaulting I learned with a wooden pole; but just after I came to Yale I read of a Japanese who had made quite a record for himself using a bamboo pole. So an old teammate of mine, who is also a World's Champion Pole Vaulter, and we myself, succeeded in getting hold of some bamboo poles, and we introduced the bamboo pole into American Pole Vaulting. It has been the standard ever since. My advice would be to secure from any sporting goods dealer a bamboo pole, about ten feet long. State that you want it for a boy who wishes to begin Pole Vaulting and he will, no doubt, give you a pole of the correct weight.

There is no definite or standard length to the pole. I vaulted 13 feet with a pole 12 feet, 6 inches long, although the average pole vaulter today uses a pole from 14 to 16 feet in length. However, this is not absolutely necessary, as has been proven from my own experience.

If you will study the photographs that I show you here, you will find that the body is lifted over a height far above the position of the hands on the pole. This is acquired by proper gymnastic training.

POSITION OF THE HANDS ON THE POLE

Observe the position of the hands—with both thumbs pointing upward. See Cut No. 1.

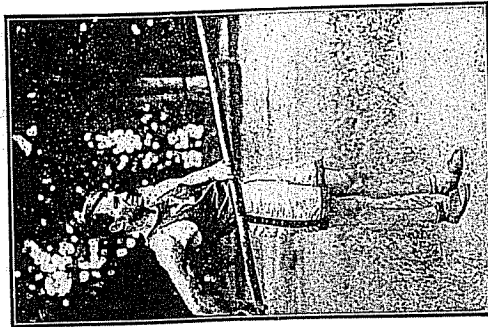


FIG. 1

POSITION OF THE POLE IN RUNNING

Note Cut No. 2. The pole is held parallel with the running path, so that the point of the pole is directly in line with the hole in the ground underneath the crossbar. You run in a straight line toward this hole with the point of the pole directly toward it; the pole parallel with the running path. This is what most pole vaulters, even some fairly successful ones, do not do; but it is very important that you

learn this method of holding the pole parallel with the path more than anything else. After a little while this becomes perfectly natural, and you would not think of doing it in any other way.

THE HOLE

The hole is dug below the crossbar, just in front—see Cut No. 3—about six inches deep at the back—the deepest part—and then gradually sloping off until it comes on a level with the running path about a foot and one-half or two feet in front of the deepest part of the hole. The object of this is so the end of the pole will slide into the hole naturally and smoothly and will keep it from slipping when the force of your body when you are run-

ning comes to position as you are ready to go off the ground.

THE SLIDE

The position of the upper hand, which is the right hand, if you are right-handed, never changes on the pole, but in the act of sliding the end of the pole into the hole, just as you are doing it, the lower or left hand of a right-handed pole vaulter, is slid up the pole just beneath the grasp of the right hand. (See Cut No. 3). Important Note: Be sure to slip the hand clear up just beneath the right hand, and do it just as you are sliding the pole into the hole. Practice will teach you the importance of doing this smoothly so that there is no jerk when your

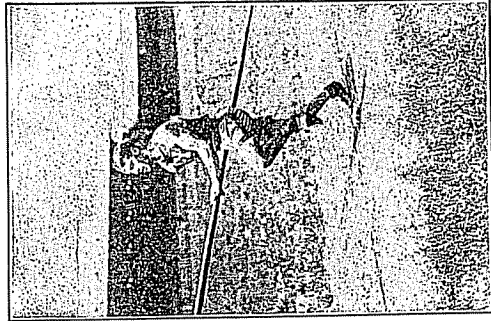


FIG. 2

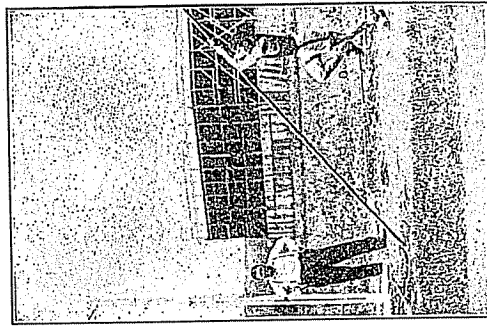


FIG. 3

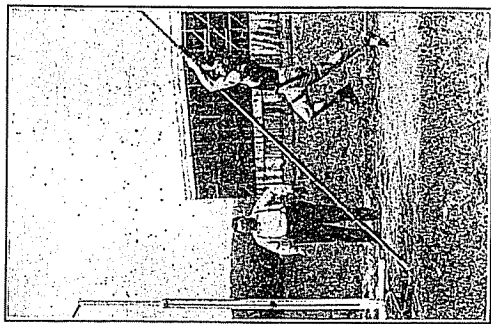


FIG. 4

body leaves the ground. This movement, of all the movements in pole vaulting, is the most difficult one to learn. To a beginner it seems awkward and impossible; and the only way to master it is to run down the runway, slip the pole into the hole and then "jump through," as we call it in practice, not trying to clear the bar until it becomes perfectly natural to slip the hand up and master this difficult movement. With a little practice it soon becomes natural, and you do it without thinking.

DISTANCE TO RUN

Different pole vaulters run different distances. The thing is to start far enough back so you can start slowly, and increase your speed gradually, so that just before placing your pole in the hole you are running at your maximum speed. It is always well to make a mark about fifty feet back of the take-off. (See Cut No. 2.) Note the scratch on the ground where my right foot is just striking in back of the mark. I have determined in practice where this mark shall be, so my take-off will always be in the same spot. This saves changing the length of your stride in order to take off at the right spot.

Now trot up to the mark and then run at your top speed, which brings you to the take-off with the right foot just at the right spot. This also requires practice; and it is necessary to run through a few times until you find the right mark to start from. After you once find the right mark, you should measure it so you will always have it when you go out again to jump. You will sometimes find it necessary to move the mark forward or backward, depending upon different conditions. If there is a strong wind your stride will not be as long, or sometimes you feel more brisk and your stride is more lively. You must make allowances for these differences. This will all be determined with practice, and you will soon know whether you are getting too close to the hole or too far away.

SHOVING THE HANDS UP IN THE AIR

Now note Cut No. 3, and especially notice how the arms are high up in the air—that is, straight from the shoulders. It is very important that you should have the pole up as high as you possibly can reach and keep the arms straight. **WARNING:** Do not bend them. Keep the pole high up and in this position even after you have left the ground, for if you study Cut No. 3 carefully you will find that my arms are straight and the pole is straight over my head, even after I have left the ground a fraction of a second.

Now it is not necessary to jump as you leave the ground. You simply run off the ground. This may be a surprise to you, as most pole vaulters think of jumping. Jumping will make your movements unnatural and jerky. A smooth pole vaulter simply runs off the ground and the pole itself carries him up and over with the momentum of his weight behind it.

THE PULL

After you have left the ground, start pulling on the pole with both arms. Note Cut No. 5. It is very important that you do not pull too quickly. You will find, if you followed the photographs carefully, that I always face the bar squarely. I do not start to turn or pull until I am well up in the air, and this is where the gymnastic part comes in. It is for this reason that I advise you to do a good deal of gymnastic work in the gymnasium, so you can execute the rest of the movements easily.

Now with the momentum of the run you are able to pull yourself up with ease. Note Cut No. 5, where I have just started to pull. I have not yet started to turn the body around.

THE TURN

Now examine Cut No. 6, where the body is just beginning to turn. As I said before, you do not turn the

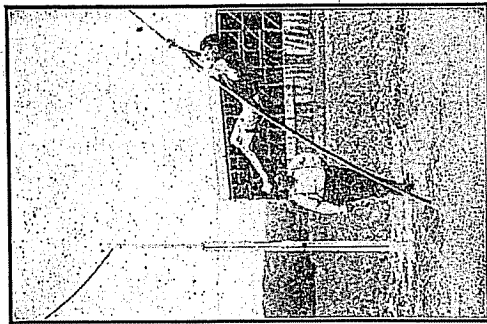


FIG. 5

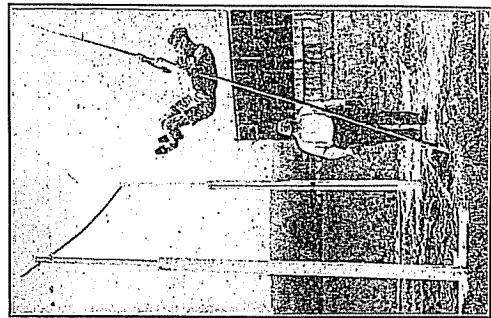


FIG. 6

body until you are well up in the air. The whole movement, until you have cleared the bar, is all executed in a few seconds; at the same time, these movements are difficult and separate. They are well illustrated by the different photographs. The turn consists in putting your body in the position of what is known as the "hand stand" in gymnastics. This is accomplished by pulling up with hands and turning the body around, and is well illustrated in Cuts Nos. 6 and 7; Cut No. 8 shows the body completely turned around in the position of a hand stand. You will find it impossible to accomplish this unless you have made a smooth, clean get-away from the ground without any jerk. With the proper momen-

turn—that is, a fast run—a smooth slide, arms well extended, and not pulling too quickly, you will find that you can throw your body into this position. This needs proper gymnastic training, so you will have sufficient strength in your arms to accomplish this movement.

Note carefully Cut. No. 8. My arms are not quite straight. That is because I have not reached the complete "hand stand" position as yet. My arms are slightly bent, for it is just at this moment that you give the final push which throws first your feet and then your body many inches over the cross bar high above the position of the hands on the pole. If you master this you have the real secret of success in pole vault-

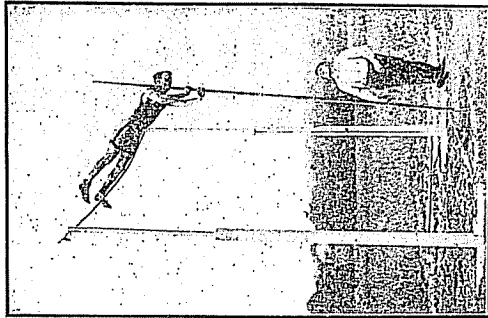


FIG. 7

ing great heights, that is, the ability to lift your body well above the position of the hands on the pole.

When I broke the World's Championship in Philadelphia in 1908 in a tryout to see who would represent America in the Olympic games at London, I cleared the bar at 12 feet, 7 $\frac{3}{4}$ inches, and my pole was only 12 feet, 6 inches in length, so that the pole actually dropped under the crossbar before I had cleared it. You can see how high above my hands my body was in going over the bar; and this depends, or is the result, of that little shove or push up just before letting go of the pole.

This is the last word in scientific pole vaulting, and will not be acquired until after many long weeks—

yes, months—of constant practice, with patience and perseverance. But with this knowledge of the secret of proper pole vaulting to begin with, you will probably master it much quicker than I did, because this method of pole vaulting was developed after I came to Yale.

The last move, illustrated in Cut No. 9, is, probably, the easiest of any because all that is required after the push up is to leave the pole behind you and throw the hands up into the air. This gives you an extra lift that will enable your body to clear the bar gracefully and successfully.

Now this is all there is to Pole Vaulting. It sounds and reads very smoothly, but when I tell you that

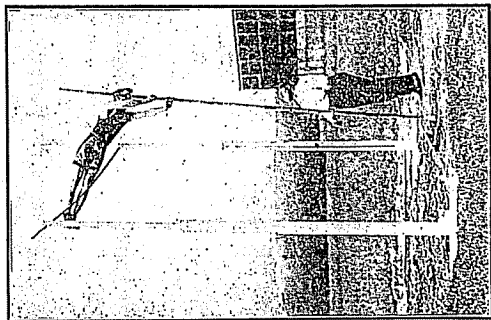


FIG. 8

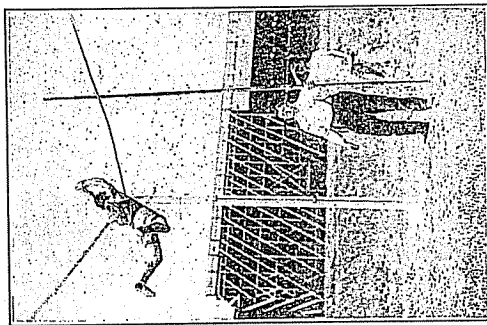


FIG. 9

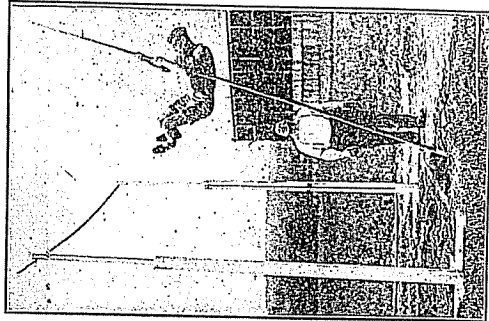


FIG. 6

body until you are well up in the air. The whole movement, until you have cleared the bar, is all executed in a few seconds; at the same time, these movements are difficult and separate. They are well illustrated by the different photographs. The turn consists in putting your body in the position of what is known as the "hand stand" in gymnastics. This is accomplished by pulling up with hands and turning the body around, and is well illustrated in Cuts Nos. 6 and 7; Cut No. 8 shows the body completely turned around in the position of a hand stand. You will find it impossible to accomplish this unless you have made a smooth, clean get-away from the ground without any jerk. With the proper momen-

turn—that is, a fast run—a smooth slide, arms well extended, and not pulling too quickly, you will find that you can throw your body into this position. This needs proper gymnastic training, so you will have sufficient strength in your arms to accomplish this movement.

Note carefully Cut. No. 8. My arms are not quite straight. That is because I have not reached the complete "hand stand" position as yet. My arms are slightly bent, for it is just at this moment that you give the final push which throws first your feet and then your body many inches over the cross bar high above the position of the hands on the pole. If you master this you have the real secret of success in pole vault-

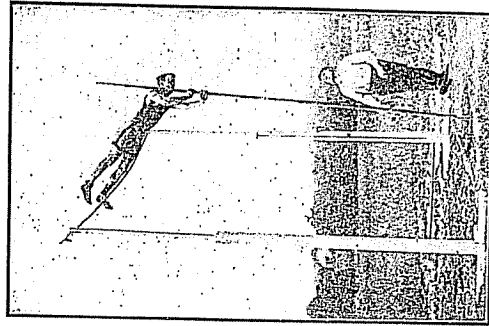


FIG. 7

ing great heights, that is, the ability to lift your body well above the position of the hands on the pole.

When I broke the World's Championship in Philadelphia in 1908 in a tryout to see who would represent America in the Olympic games at London, I cleared the bar at 12 feet, 7 $\frac{3}{4}$ inches, and my pole was only 12 feet, 6 inches in length, so that the pole actually dropped under the crossbar before I had cleared it. You can see how high above my hands my body was in going over the bar; and this depends, or is the result, of that little shove or push up just before letting go of the pole.

This is the last word in scientific pole vaulting, and will not be acquired until after many long weeks—

yes, months—of constant practice, with patience and perseverance. But with this knowledge of the secret of proper pole vaulting to begin with, you will probably master it much quicker than I did, because this method of pole vaulting was developed after I came to Yale.

The last move, illustrated in Cut No. 9, is, probably, the easiest of any because all that is required after the push up is to leave the pole behind you and throw the hands up into the air. This gives you an extra lift that will enable your body to clear the bar gracefully and successfully.

Now this is all there is to Pole Vaulting. It sounds and reads very smoothly, but when I tell you that

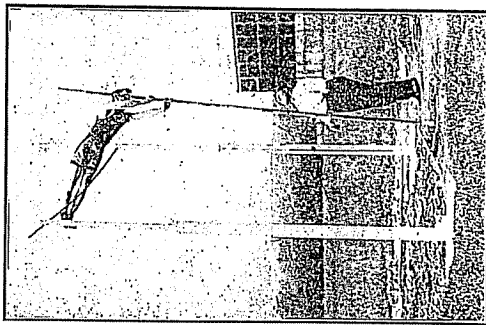


FIG. 8

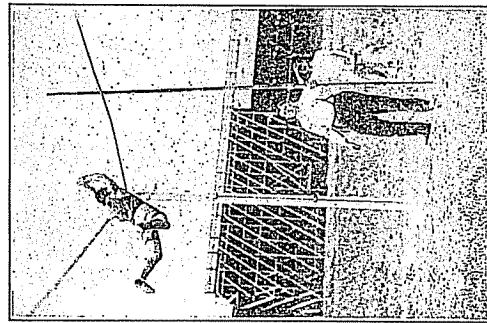


FIG. 9