

himself. "I'll win it. I'll show dad that I'm not a quitter."

Home he hurried with the news; every step of the way he hurried at top speed and did not pause until he stood breathless before his father. Then, panting and puffing like a small engine, he poured out the story in a torrent of excited words.

"I'm going to go for it, dad," he cried, "if you'll let me. It's a big chance—it's my chance—and I'll win. May I try?"

Mr. Hammond smiled at his son's impetuosity. "It's a big job to tackle, Bob," he said gravely. "There's more to building an aeroplane than there is to making a spool engine, or even a real engine. It takes study and planning; it takes courage and determination...."

"... But, if you think you can make good, you have my permission to go ahead."

"And can I use the machine shop and tools?" Robert eagerly asked.

"Of course; but before you get to using tools at all there will be a long period of study and of designing and planning. This is not a thing that can be done at hurriedly. The more care and skill you bring to your work the more likelihood there is to success.... Go into it with all your heart, Bob. Go in to win, for the prize is worth all the effort you can put to the winning of it."

Dinner had little interest for Robert that night. He had secured from the public library the latest book on aerodynamics and it was calling him with a voice that even the healthy appetite of youth could not resist. As soon as he could raise from the table he bolted for the library and there he sat with his nose buried in those fascinating pages until his father was obliged to order him off to bed. Even in his dreams he could not lay aside the subject, and all night long he sailed through the air in the most wonderful aeroplane ever conceived. He darted and swooped in and out among the clouds; he raced with huge birds, and, in the morning when he awakened, he was more than half sorry that his filmy adventures were not realities.

CHAPTER II.

The juvenile population of Hillsford knew but one topic of conversation on the following day. Every youth who ever handled a tool or who deemed himself possessed of the minutest mechanical skill was determined to become a contestant, and many were the lads who already could see themselves the proud pilots of ships of the air, and, in their minds, received the congratulations of their fellow-townsmen upon their success in winning the Aerial Scholarship. Wherever two boys forgot their aeroplanes were discussed. So early as this, the different types enlisted adherents who argued in favor of the monoplane or biplane with favor. The library was overrun with ambitious embryonic aeronauts demanding the literature of their chosen calling, and in the little park before this building arguments waxed hottest.

On the seats about the fountain half a dozen lads sat reviewing the situation, prophesying success for themselves or for some friend of known abilities, and chattering like a tree-fall of sparrows. One boy stood, hands in pockets, facing the others and listening to their words. He had arrived but a minute before and had not, as yet, contributed anything to the clamor. One of the excited debaters noticed the new arrival.

"Here's Emory Taine," he cried. "I'll bet he's made up his mind to go into it."

"Of course I have," replied Taine, somewhat coldly. "And I've made up my mind to win, too."

"Oh, you have, have you?" came in a chorus. "It was good of you to let us know so soon. Think of the trouble it will save us. We don't need to enter the contest at all now."

Emory Taine was a strong, healthy, good-looking boy, but there was naturally something of arrogance in his bearing that it was hard for his comrades to overlook. That he was gifted with a brain above the ordinary, his high standings in his class testified, and even if learning had come to him less laboriously than it did, he would, doubtless, have stood equally well at a greater ex-

pense of labor, for he could not bear to be surpassed in anything or to feel that another had snatched honors from him. Since the introduction of manual training into the schools young Taine had demonstrated an unusual aptitude for skillful work, and to encourage him his father had fitted out for him a complete workshop in which he could gratify his mechanical tastes to the utmost. As a matter of fact, when the boys came to consider it, it did seem that Emory possessed a very fair chance of making good his boast.

"Don't think you'll have any walk-away with this," called one of the lads. "Bob Hammond is pretty handy with tools himself. Maybe there are some of us here who can't beat you out, but I guess Bob can hold his own and a little better."

"Bob Hammond going into this?" demanded Taine.

"Don't know, I'm sure," observed the lad. "You might ask him, though. Here he comes."

The group waited for Robert to approach, and as he strolled up the walk Taine eyed him sullenly as though he already scented a dangerous rival.

"Hello, fellows," Robert called pleasantly.

There was no time for polite replies. In a hurry to get at the required fact nobody made a response, but a regular chorus demanded:

"Are you going into it, Bob?"

"Into what?" laughed Robert. "The fountain?"

"No. The contest—the aeroplane contest."

"I guess I'll have a try at it," Robert said smiling. "Is everybody else going in, too?"

"Looks that way," Taine rejoined. "But I guess quite a bunch will fall by the wayside."

Robert passed into the library, but presently reappeared with a volume under his arm. He passed the crowd of boys with a few words and set out briskly for home. He had gone but a few steps, however, before Emory Taine called after him:

"Oh, Hammond, wait a minute."

Robert slackened his pace, wondering what Taine could want with him. In boyhood one forms likes and dislikes quickly, and they are likely to be stronger and more unreasoning than when after years have come to attach their cheek to the hot spirits of youth. Robert disliked Emory Taine, and he knew that Taine returned the feeling. They usually avoided each other, and now Robert wondered greatly at the other lad's evident desire to speak to him.

"So you're going into this contest?" began Emory.

"Yes," responded Robert, briefly. "I'm going in, too, and I want to win," Taine said in a peculiar tone. It would please father a lot if I should win; in fact, he has promised to give me a year abroad before I start to college if I do."

"That will be very fine," Robert observed.

"Yes. But I've got to win. Now I haven't any fear of beating out that bunch back there, or any of the other fellows that go in—I know more about mechanics than any of them. You are the only fellow I'm afraid of—and I don't want to have to worry about you."

"Sorry," said Robert, "but I guess you'll have to."

"I want to make you an offer. I want you to keep out of the thing and help me make my machine. What will you take to do it?"

"Don't waste your time," snapped Robert. "You can't pay me to stay out. I'm going in, and if I beat you out, that will add a lot to my pleasure."

Taine flushed angrily.

"You won't stay out?"

"No."

"You'd better think it over. I'm going to win that scholarship, and if you know when you're well off you'll not try to beat me. You take my advice and stay out of it." With these words he turned and walked rapidly away.

"Hub," thought Robert, "I'll work just a little bit harder on your account, old fellow. When I get tired or discouraged I'll just think about beating you, and it'll be as good as a tonic."

For the next month Robert studied hard—studied as he never had before to master the intricacies of the science of aerodynamics. Book after book treating of balloons, dirigibles, gliders and aeroplanes he devoured with painstaking care. It seemed that he could not find enough written of his chosen subject, and by the time he was ready to consider the work of commencing his designs and putting his plans on paper, he was thoroughly saturated with the theory that now he was to endeavor to put into practice.

Early in his studies Robert saw that some practical experience would be necessary to him before he could hope to arrive at any satisfactory results.

"It's well enough to know all that the books say about flying," he told his father, "but that is only a beginning. A fellow actually has to try out the things the books tell him about. He has to prove for himself why various forms of planes produce certain results, and he must learn how these planes are to be handled. To try to make an aeroplane with only book knowledge would be like trying to build a house after you read a book on carpentry. And I'll bet a man would find it pretty difficult to do that until he had learned by the real work to use the saw and hammer and the other carpenter's tools."

"That's right, Bob," his father agreed with him. "Knowledge is a great thing, but if we don't supplement it with actual experience it isn't of very great benefit to us in the end. What are you going to do about it?"

"I'm going to have a sort of experimental station," said Robert with a laugh. "I want to rig up a place over by the machine shop where I can experiment with little designs and models until I hit upon something that seems to be worth while making full size. After I have tested out in practice the things that these books have told me, I will then be in a position to begin the real work."

"Go ahead, son," his father gave permission. "Only don't do any more damage to the property or to yourself than your experiments actually require." Both laughed at this little joke, and Robert returned to his studies.

On the following day he crossed the river to the shops and looked over the surrounding yards and grounds to find a place suitable for experiments in aviation. He knew that he must have a stretch of comparatively level ground, because an aeroplane requires a considerable run before it will rise into the air and fly.

"It's just like taking a run before you jump," he said, "only an aeroplane doesn't come down at the end of the jump—it keeps right on sailing. That's because it has an engine in it to force it ahead, while a fellow, when he jumps, goes just as far as the force that jumped him lasts, and then he falls to the ground. If a fellow could have great wings on either side and take the same jump he would go much farther, because the planes would hold him up, but even then he would fall to the ground after a while because the power would give out. In an aeroplane the engine keeps right on working, and the propellers keep right on going around, so he has the force of his jump continued until he wants it stopped."

At last he found a reach of level grass which ran from the edge of the machine shop to the brink of the river, a distance of nearly three hundred feet, and here he determined to carry on his work. The first thing to do was to build an incline down which he could coast his models to give them the force to carry them through the air. It was like sliding down hill on a sled, only that when the bottom was reached the sled ran along on the level while the planes rose and flew in the air. Robert knew that if he could arrange his planes so that they would fly a considerable distance through the air after a slide down the plane, it was almost certain they would make sustained flights when an engine was put in them to give them continuous power.

So he went to work, and from a pile of lumber and beams he made an inclined way which was about twenty-

five feet at its highest point and which slanted away somewhat abruptly to the ground. This took several days of hard work, but when it was finished he looked at it with a feeling of great satisfaction.

"There," he said to himself, "I feel as if I were actually at work at last."

Now he set about designing a model. The kites of which he had made so many when he was a little fellow, now stood him in good stead, for his first models were made from stiff paper and light sticks. His first efforts were nothing more or less than kites, for they consisted merely of two planes without either front or rear rudders, and with these he worked faithfully, endeavoring to find the form and shape that would skim through the air most satisfactorily. It may be thought that this was a boyish way of getting at the matter, but Robert did not think so. By his toylike models he solved many difficult problems in equilibrium, and, too, he decided upon the curve of plane that gave most lifting power while it presented least resistance to the wind. At last he felt that he might go about the construction of a glider of sufficient size to support his own weight.

This was much smaller than the aeroplane would be when complete, for the stretch of its planes was but fifteen feet; however, with so large a model he felt certain he could achieve results and make important deductions impossible in his smaller gliders.

From time to time he heard about the progress that various friends of his were making, but one by one the greater number of these gave up in disgust when they saw how many serious obstacles had to be overcome. Finally the only one to remain was Emory Taine. Emory appeared determined to succeed and was working with as much energy as Robert. Neither lad had much information as to the other's success, and Robert cared little what his rival was doing so long as his own work went along as he thought it should. This was not the case with Taine, however. His pride of leadership, his desire for superiority, drove him to the best efforts he was capable of; nevertheless he could not prevent himself from worrying about Robert. At last he determined to investigate and see for himself just what was going on in the machine-shop of the Hammond Steel Castings Company across the river, and in pursuance for his project set out for the works at a time when he was certain to find Robert at work.

Taking care to conceal himself, he approached the works just as Robert, aided by Old Tom Saunders, who had been retained as a sort of watchman, was hauling his big glider up the incline. Behind a small shed Emory crouched to witness the initial flight and listen.

"There," he heard Robert say, as the glider was set in position. "Now I'm off. Watch me fly all the way across the river."

Old Tom wore a troubled expression. "Can't you put a stone or something on there?" he asked. "There's no telling what that contraption will do. I'm afraid she'll balk or play off some kind of a trick and hurt you."

"No danger. She won't rise very high, and a little tumble won't do me any harm, even if I get one. Here goes."

Robert raised the planes above his head, ran at full speed down the incline for several yards and then launched himself into the air with all the force there was in the spring of his legs. The glider swooped downward sharply, and the flight seemed doomed to speedy disaster. Emory held his breath. Then the machine became vivified, as it were, and swept along gracefully for fifty feet—a hundred feet. Emory watched it sullenly, enviously. Suddenly it swerved sharply to the left, careened violently and plunged sidelong to the ground with a splintering of braces and rending of cloth.

Robert picked himself up and gazed ruefully at his wrecked apparatus—then he gave Old Tom a crestfallen look.

"Never mind, Bobby," comforted the old fellow. "She flew a little—and if