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Turgenev Wallace Fonatne Sydon Freud Schlegel
Twain Walther von der Vogelweide Fouqué Friedrich II. von Preußen
Weber Freiligrath Frey
Fechner Fichte Weiße Rose von Fallersleben Kant Ernst Richthofen Frommel
Engels Fielding Hölderlin Eichendorff Tacitus Dumas
Fehrs Faber Flaubert Eliasberg Eliot Zweig Ebner Eschenbach
Feuerbach Maximilian I. von Habsburg Fock Ewald Vergil
Goethe Elisabeth von Österreich London
Mendelssohn Balzac Shakespeare Rathenau Dostojewski Ganghofer
Trackl Stevenson Lichtenberg Doyle Gjellerup
Mommsen Thoma Tolstoi Lenz Hambruch Droste-Hülshoff
Dach Thoma von Arnim Hägele Hanrieder Hauptmann Humboldt
Karrillon Reuter Verne Rousseau Hagen Hauff Baudelaire Gautier
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Damaschke Descartes Schopenhauer George
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Bismarck Vigny Gengenbach Barlach Heine Grillparzer Georgy
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Brentano Claudius Schiller Bellamy Schilling Kralik Raabe Gibbon Tschchow
Katharina II. von Rußland Gerstäcker Raabe Gleim Vulpius
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**Tom Swift and His Photo
Telephone or the Picture That
Saved a Fortune**

Victor [pseud.] Appleton

Imprint

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Tom Swift and His Photo Telephone

OR

The Picture That Saved A Fortune

by Victor Appleton

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Chapter I A Man On The Roof

"Tom, I don't believe it can be done!"

"But, Dad, I'm sure it can!"

Tom Swift looked over at his father, who was seated in an easy chair in the library. The elderly gentleman--his hair was quite white now--slowly shook his head, as he murmured again:

"It can't be done, Tom! It can't be done! I admit that you've made a lot of wonderful things--things I never dreamed of--but this is too much. To transmit pictures over a telephone wire, so that persons cannot only see to whom they are talking, as well as hear them--well, to be frank with you, Tom, I should be sorry to see you waste your time trying to invent such a thing."

"I don't agree with you. Not only do I think it can be done, but I'm going to do it. In fact, I've already started on it. As for wasting my time, well, I haven't anything in particular to do, now that my giant cannon has been perfected, so I might as well be working on my new photo telephone instead of sitting around idle."

"Yes, Tom, I agree with you there," said Mr. Swift. "Sitting around idle isn't good for anyone--man or boy, young or old. So don't think I'm finding fault because you're busy."

"It's only that I don't want to see you throw away your efforts, only to be disappointed in the end. It can't be done, Tom, it can't be done," and the aged inventor shook his head in pitying doubt.

Tom only smiled confidently, and went on:

"Well, Dad, all you'll have to do will be to wait and see. It isn't going to be easy--I grant that. In fact, I've run up against more snags, the little way I've gone so far, than I like to admit. But I'm going to stick at it, and before this year is out I'll guarantee, Father, that you can be at one end of the telephone wire, talking to me, at the other, and I'll see you and you'll see me--if not as plainly as we see each other now, at least plainly enough to make sure of each other."

Mr. Swift chuckled silently, gradually breaking into a louder laugh. Instead of being angry, Tom only regarded his father with an indulgent smile, and continued:

"All right, Dad. Go ahead, laugh!"

"Well, Tom, I'm not exactly laughing at *you*--it's more at the idea than anything else. The idea of talking over a wire and, at the same

time, having light waves, as well as electrical waves passing on the same conductor!"

"All right, Dad, go ahead and laugh. I don't mind," said Tom, good-naturedly. "Folks laughed at Bell, when he said he could send a human voice over a copper spring; but Bell went ahead and to-day we can talk over a thousand miles by wire. That was the telephone." "Folks laughed at Morse when he said he could send a message over the wire. He let 'em laugh, but we have the telegraph. Folks laughed at Edison, when he said he could take the human voice--or any other sound--and fix it on a wax cylinder or a hard-rubber plate--but he did it, and we have the phonograph. And folks laughed at Santos Dumont, at the Wrights, and at all the other fellows, who said they could take a heavier-than-air machine, and skim above the clouds like a bird; but we do it--I've done it--you've done it."

"Hold on, Tom!" protested Mr. Swift. "I give up! Don't rub it in on your old dad. I admit that folks did laugh at those inventors, with their seemingly impossible schemes, but they made good. And you've made good lots of times where I thought you wouldn't. But just stop to consider for a moment. This thing of sending a picture over a telephone wire is totally out of the question, and entirely opposed to all the principles of science."

"What do I care for principles of science?" cried Tom, and he strode about the room so rapidly that Eradicate, the old colored servant, who came in with the mail, skipped out of the library with the remark:

"Deed, an' Massa Tom must be pow'fully preragitated dis mawnin'!"

"Some of the scientists said it was totally opposed to all natural laws when I planned my electric rifle," went on Tom. "But I made it, and it shot. They said my air glider would never stay up, but she did."

"But, Tom, this is different. You are talking of sending light waves--one of the most delicate forms of motion in the world--over a material wire. It can't be done!"

"Look here, Dad!" exclaimed Tom, coming to a halt in front of his parent. "What is light, anyhow? Merely another form of motion; isn't it?"

"Well, yes, Tom, I suppose it is."

"Of course it is," said Tom. "With vibrations of a certain length and rapidity we get sound--the faster the vibration per second the higher the sound note. Now, then, we have sound waves, or vibrations,

traveling at the rate of a mile in a little less than five seconds; that is, with the air at a temperature of sixty degrees. With each increase of a degree of temperature we get an increase of about a foot per second in the rapidity with which sound travels."

"Now, then, light shoots along at the rate of 186,000,000 miles a second. That is more than many times around the earth in a second of time. So we have sound, one kind of wave motion, or energy; we have light, a higher degree of vibration or wave motion, and then we come to electricity--and nobody has ever yet exactly measured the intensity or speed of the electric vibrations."

"But what I'm getting at is this--that electricity must travel pretty nearly as fast as light--if not faster. So I believe that electricity and light have about the same kind of vibrations, or wave motion."

"Now, then, if they do have--and I admit it's up to me to prove it," went on Tom, earnestly--"why can't I send light-waves over a wire, as well as electrical waves?"

Mr. Swift was silent for a moment. Then he said, slowly:

"Well, Tom, I never heard it argued just that way before. Maybe there's something in your photo telephone after all. But it never has been done. You can't deny that!"

He looked at his son triumphantly. It was not because he wanted to get the better of him in argument, that Mr. Swift held to his own views; but he wanted to bring out the best that was in his offspring. Tom accepted the challenge instantly.

"Yes, Dad, it has been done, in a way!" he said, earnestly. "No one has sent a picture over a telephone wire, as far as I know, but during the recent hydroplane tests at Monte Carlo, photographs taken of some of the events in the morning, and afternoon, were developed in the evening, and transmitted over five hundred miles of wire to Paris, and those same photographs were published in the Paris newspapers the next morning."

"Is that right, Tom?"

"It certainly is. The photographs weren't so very clear, but you could make out what they were. Of course that is a different system than the one I'm thinking of. In that case they took a photograph, and made a copper plate of it, as they would for a half-tone illustration. This gave them a picture with ridges and depressions in copper, little hills and valleys, so to speak, according to whether there were light or dark tints in the picture. The dark places meant that

the copper lines stood up higher there than where there were light colors."

"Now, by putting this copper plate on a wooden drum, and revolving this drum, with an electrical needle pressing lightly on the ridges of copper, they got a varying degree of electrical current. Where the needle touched a high place in the copper plate the contact was good, and there was a strong current. When the needle got to a light place in the copper--a depression, so to speak--the contact was not so good, and there was only a weak current."

"At the receiving end of the apparatus there was a sensitized film placed on a similar wooden drum. This was to receive the image that came over the five hundred miles of wire. Now then, as the electrical needle, moving across the copper plate, made electrical contacts of different degrees of strength, it worked a delicate galvanometer on the receiving end. The galvanometer caused a beam of light to vary--to grow brighter or dimmer, according as the electrical current was stronger or weaker. And this light, falling on the sensitive plate, made a picture, just like the one on the copper plate in Monte Carlo."

"In other words, where the copper plate was black, showing that considerable printing ink was needed, the negative on the other end was made light. Then when that negative was printed it would come out black, because more light comes through the light places on a photograph negative than through the dark places. And so, with the galvanometer making light flashes on the sensitive plate, the galvanometer being governed by the electrical contacts five hundred miles away, they transmitted a photograph by wire."

"But not a telephone wire, Tom."

"That doesn't make any difference, Dad. It was a wire just the same. But I'm not going into that just now, though later I may want to send photographs by wire. What I'm aiming at is to make an apparatus so that when you go into a telephone booth to talk to a friend, you can see him and he can see you, on a specially prepared plate that will be attached to the telephone."

"You mean see him as in a looking-glass, Tom?"

"Somewhat, yes. Though I shall probably use a metal plate instead of glass. It will be just as if you were talking over a telephone in an open field, where you could see the other party and he could see you."

"But how are you going to do it, Tom?"

"Well, I haven't quite decided. I shall probably have to use the metal called selenium, which is very sensitive to light, and which makes a good or a poor electrical conductor according as more or less light falls on it. After all, a photograph is only lights and shadows, fixed on sensitive paper or films."

"Well, Tom, maybe you can do it, and maybe you can't. I admit you've used some good arguments," said Mr. Swift. "But then, it all comes down to this: What good will it be if you can succeed in sending a picture over a telephone wire?"

"What good, Dad? Why, lots of good. Just think how important it will be in business, if you can make sure that you are talking to the party you think you are. As it is now, unless you know the person's voice, you can't tell that the man on the other end of the wire is the person he says he is. And even a voice can be imitated."

"But if you know the person yourself, he can't be imitated. If you see him, as well as hear his voice, you are sure of what you are doing. Why, think of the big business deals that could be made over the telephone if the two parties could not only hear but see each other. It would be a dead sure thing then. And Mr. Brown wouldn't have to take Mr. Smith's word that it was he who was talking. He could even get witnesses to look at the wire-image if he wanted to, and so clinch the thing. It will prevent a lot of frauds."

"Well, Tom, maybe you're right. Go ahead. I'll say no more against your plans. I wish you all success, and if I can help you, call on me."

"Thanks, Dad. I knew you'd feel that way when you understood. Now I'm going--"

But what Tom Swift was going to do he did not say just then, for above the heads of father and son sounded a rattling, crashing noise, and the whole house seemed to shake. Then the voice of Eradicat was heard yelling:

"Good land! Good land ob massy! Come out yeah, Massa Tom! Come right out yeah! Dere's a man on de roof an' he am all tangled up suthin' scandalous! Come right out yeah befo' he falls and translocates his neck! Come on!"

Chapter II Bad News

With startled glances at each other, Tom and his father rushed from the library to the side of the house, whence came the cries of Eradicate.

"What is it, Rad! what is it?" questioned Tom.

"Is someone hurt?" Mr. Swift wanted to know.

"He mighty soon will be!" exclaimed the colored man. "Look where he am holdin' on! Lucky fo' him he grabbed dat chimbley!"

Tom and his father looked to where Eradicate pointed, and saw a strange sight. A small biplane-airship had become entangled in some of the aerials of Tom's wireless apparatus, and the craft had turned turtle, being held from falling by some of the wire braces. The birdman had fallen out, but had managed to cling to the chimney, so that he had not reached the ground, and there he clung, while the motor of his airship was banging away, and revolving the propeller blades dangerously close to his head.

"Are you hurt?" cried Tom, to the unknown birdman.

"No, but I'm likely to be unless I get out of here!" was the gasped-out answer.

"Hold fast!" cried Tom. "We'll have you down in a jiffy. Here, Rad, you get the long ladder. Where's Koku? That giant is never around when he's wanted. Find Koku, Rad, and send him here."

"Yas, sah, Massa Tom; directly, sah!" and the colored man hastened off as fast as his aged legs would take him.

And while preparations are thus under way to rescue the birdman from the roof, I will take just a few minutes to tell you a little something more about Tom Swift and his numerous inventions, as set forth in the previous books of this series.

"Tom Swift and His Motor Cycle" was the first book, and in that I related how Tom made the acquaintance of a Mr. Wakefield Damon, of the neighboring town of Waterford, and how Tom bought that gentleman's motor cycle, after it had tried to climb a tree with its rider in the saddle. Mr. Wakefield Damon was an odd man, whose favorite expression was "Bless my shoelaces!" or something equally absurd. Waterford was not far from Shopton, where Tom and his father made their home.

Mr. Swift was also an inventor of note, and Tom soon followed in his father's footsteps. They lived in a large house, with many shops about it, for their work at times required much machinery.

Mrs. Baggert was the housekeeper who looked after Tom and his father, and got their meals, when they consented to take enough time from their inventive work to eat. Another member of the household was Eradicate Sampson, a genial old colored man, who said he was named Eradicate because he used to eradicate the dirt about the place.

Koku, just referred to by Tom, was an immense man, a veritable giant, whom Tom had brought back with him from one of his trips, after escaping from captivity. The young inventor really brought two giants, brothers they were, but one had gone to a museum, and the other took service with our hero, making himself very useful when it came to lifting heavy machinery.

Tom had a close friend in Ned Newton, who was employed in the Shopton bank. Another friend was Miss Mary Nestor, a young lady whose life Tom had once saved. He had many other friends, and some enemies, whom you will meet from time to time in this story. After Tom had had many adventures on his motor cycle he acquired a motor boat, and in that he and Ned went through some strenuous times on Lake Carlopa, near Tom's home. Then followed an airship, for Tom got that craze, and in the book concerning that machine I related some of the things that happened to him. He had even more wonderful adventures in his submarine, and with his electric runabout our hero was instrumental in saving a bank from ruin by making a trip in the speediest car on the road.

After Tom Swift had sent his wireless message, and saved the castaways of Earthquake Island, he thought he would give up his inventive work for a time, and settle down to a life of ease and quiet. But the call of the spirit of adventure was still too strong for him to resist. That was why he sought out the diamond makers, and learned the secret of Phantom Mountain. And when he went to the Caves of Ice, and there saw his airship wrecked, Tom was well-nigh discouraged, But he managed to get back to civilization, and later undertook a journey to elephant land, with his powerful electric rifle.

Marvelous adventures underground did Tom Swift have when he went to the City of Gold, and I have set down some of them in the

book bearing the latter title. Later on he sought the platinum treasure in his air glider. And when Tom was taken captive, in giant land, only his speedy airship saved him from a hard fate.

By this time moving pictures were beginning to occupy a large place in the scientific, as well as the amusement world, and Tom invented a Wizard Camera which did excellent work. Then came the need of a powerful light, to enable Uncle Sam's custom officers on the border to detect the smugglers, and Tom was successful in making his apparatus.

He thought he would take a rest after that, but with the opening of the Panama Canal came the need of powerful guns to protect that important waterway, and Tom made a Giant Cannon, which enabled the longest shots on record to be fired.

Now, some months had passed, after the successful trial of the big weapon, and Tom longed for new activities. He found them in the idea of a photo telephone, and he and his father were just talking of this when interrupted by the accident to the birdman on the roof of the Swift home.

"Have you got that ladder, Rad?" cried the young inventor, anxiously, as he saw the dangerous position of the man from the airship.

"Yas, sah, Massa Tom! I'se a-camin' wif it!"

"And where's Koku? We'll need him!"

"He's a-camin', too!"

"Here Koku!" exclaimed a deep voice, and a big man came running around the corner of the house. "What is it, Master?"

"We must get him down, Koku!" said Tom, simply. "I will go up on the roof. You had better come, too. Rad, go in the house and get a mattress from the bed. Put it down on the ground where he's likely to fall. Lively now!"

"Yas, sah, Massa Tom!"

"Me git my own ladder--dat one not strong 'nuff!" grunted Koku, who did not speak very good English. He had a very strong ladder, of his own make, built to hold his enormous bulk, and this he soon brought and placed against the side of the house.

Meanwhile Tom and his father had raised the one Eradicate had brought, though Tom did most of the lifting, for his father was elderly, and had once suffered from heart trouble.

"We're coming for you!" cried the young inventor as he began to ascend the ladder, at the same time observing that the giant was coming with his. "Can you hold on a little longer?"

"Yes, I guess so. But I dare not move for fear the propellers will strike me."

"I see. I'll soon shut off the motor," said Tom. "What happened, anyhow?"

"Well, I was flying over your house. I was on my way to pay you a visit, but I didn't intend to do it in just this way," and the birdman smiled grimly. "I didn't see your wireless aerials until I was plumb into them, and then it was too late. I hope I haven't damaged them any."

"Oh, they are easily fixed," said Tom. "I hope you and your biplane are not damaged. This way, Koku!" he called to the giant.

"Say, is--is he real, or am I seeing things?" asked the aviator, as he looked at the big man.

"Oh, he's real, all right," laughed Tom. "Now, then, I'm going to shut off your motor, and then you can quit hugging that chimney, and come down."

"I'll be real glad to," said the birdman.

Making his way cautiously along the gutters of the roof, Tom managed to reach the motor controls. He pulled out the electrical switch, and with a sort of cough and groan the motor stopped. The big propellers ceased revolving, and the aviator could leave his perch in safety.

This he did, edging along until he could climb down and meet Tom, who stood near the ladder.

"Much obliged," said the birdman, as he shook hands with Tom.

"My name is Grant Halling. I'm a newcomer in Mansburg," he added, naming a town not far from Shopton. "I know you by reputation, so you don't need to introduce yourself."

"Glad to meet you," said the young inventor, cordially. "Rather a queer place to meet a friend," he went on with a laugh and a glance down to the ground. "Can you climb?"

"Oh, yes, I'm used to that. The next thing will be to get my machine down."

"Oh, we can manage that with Koku's help," spoke Tom. "Koku, get some ropes, and see what you and Rad can do toward getting the

aeroplane down," he added to the giant. "Let me know if you need any help."

"Me can do!" exclaimed the big man. "Me fix him!"

Tom and Mr. Halling made their way down the ladder, while the giant proceeded to study out a plan for getting the airship off the roof.

"You say you were coming over to see me, when you ran into my wireless aerials?" asked Tom, curiously, when he had introduced his father to the birdman.

"Yes," went on Mr. Halling. "I have been having some trouble with my motor, and I thought perhaps you could tell me what was wrong. My friend, Mr. Wakefield Damon, sent me to you."

"What! Do you know Mr. Damon?" cried Tom.

"I've known' him for some years. I met him in the West, but I hadn't seen him lately, until I came East. He sent me to see you, and said you would help me."

"Well, any friend of Mr. Damon's is a friend of mine!" exclaimed Tom, genially. "I'll have a look at your machine as soon as Koku gets it down. How is Mr. Damon, anyhow? I haven't seen him in over two weeks."

"I'm sorry to say he isn't very well, Mr. Swift."

"Is he ill? What is the trouble?"

"He isn't exactly ill," went on Mr. Halling, "but he is fretting himself into a sickness, worrying over his lost fortune."

"His lost fortune!" cried Tom, in surprise at the bad news concerning his friend. "I didn't know he had lost his money!"

"He hasn't yet, but he's in a fair way to, he says. It's something about bad investments, and he did speak of the trickery of one man, I didn't get the particulars. But he certainly feels very badly over it."

"I should think he would," put in Mr. Swift. "Tom, we must look into this. If we can help Mr. Damon--"

"We certainly will," interrupted Tom. "Now come in the house, Mr. Halling. I'm sure you must be quite shaken up by your upset."

"I am, to tell you the truth, though it isn't the first accident I've had in my airship."

They were proceeding toward the house, when there came a cry from Koku, who had fastened a rope about the airship to lower it.

"Master! Master!" cried the giant. "The rope am slippin'. Grab the end of it!"

