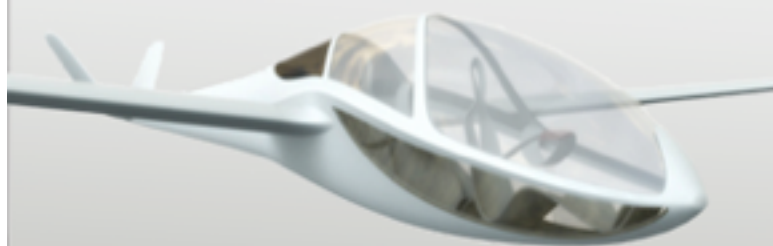


TOM SWIFT

and His
Polymorphic Glider



By T. Edward Fox

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Tom Swift and His Polymorphic Glider

A Tom Swift Invention Story

By T. Edward Fox

Printed in the U.S.A by
THACKERY FOX & ASSOC.

Tom Swift and His Polymorphic Glider

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A chance discovery of the sparse remains of a spaceship on the dark side of the Moon leads Tom to bringing back part of the outer covering, and a conundrum.

The “skin” is incredibly metal-like, totally self-sealing if cut then exposed to an electrical current, light as a feather, and completely beyond the capabilities of anyone on Earth.

He sets out to first find out what it is made from, and then tries to produce it for himself. And just in time.

A millionaire makes a request for a high-flying, configurable glider. It might only be achievable if he can figure out how to use this mysterious polymer “skin.”

But, can his “Of this Earth” science reconstruct this “Out of this world” substance?

This story is dedicated to Leo. Working with you on his Tommy stories keyed an interest in the skin on your ship, the *Exedra*. So much so that when Jon’s Summary Generator came up with a variation on this title, I had to put the two together. Hope I did justice.

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Tom Swift and His Polymorphic Glider

FOREWORD

In another book's Foreword, I mentioned that I had been a fighter pilot during World War II. What I did not tell you was that my first love was gliders. The feeling of silent flight, the search for rising air, the skill involved in riding air waves around just can't be beat.

For some reason I always felt that I was flying about twice as fast as the air speed indicator ever told me I was going. Please understand that I wasn't an expert, but I was a very good weekend pilot.

Through the almost thirty years of flying gliders, I never had an accident or even a very close call. I never flew one of those versions with the small engine and propeller; I preferred buying a tow, usually behind a clapped out Cessna or old Piper.

When I read the advanced copy of this story I was enthralled! Tom was creating everything I had ever wished for. The perfect glider for every circumstance.

The glider that could easily conquer a Denver to Salt Lake City flight as easily as you please. One that might fly from Munich to Rome as easily as it might soar over the east hills in the San Francisco Bay area.

Of course, the real kicker is the source of the amazing ability for Tom's glider to do what it does. I guess the old saying that I just made up is true: What man can not create himself, he can surely find elsewhere in the universe—and then copy like the dickens!

Victor Appleton II

CHAPTER 1 /

THE FIND

TOM SWIFT and his steady girlfriend, Bashalli Prandit, lay back on the large towel she had spread on the sandy beach on a small island in the middle of Lake Carlopa. In the summer, the island was usually covered with shoulder-to-shoulder teens having picnics, dancing to the latest music, and often sneaking kisses. And beer.

Today was the first day of the new school year. The weather was very much as sunny as any summer day and yet was just about eighty degrees. Only one other couple—Tom's best friend, Bud Barclay, and his sister, Sandy Swift—were to be seen anywhere on the ninety foot by three hundred foot sand, scrub grass and rocky piece of land that sat almost three quarters of the way across the lake from the marina at Shopton, New York.

"Is it not marvelous, Tom?" the dark-skinned girl whispered in his ear. "Perfect weather, nobody else around, and just those two glider airplanes flying over near the airport." She pointed toward a pair of silent, long-winged planes that were skimming through the rising heat waves provided by the expanse of black tarmac covering Shopton Regional Airport at the north end of the lake half a mile away.

He smiled and leaned over to kiss her cheek. "It sure is," he replied. They sat up and watched the two pilots as they spiraled up the thermals almost as easily as they might climb a spiral staircase. One evidently had enough at about the two thousand foot point and did a wing-over, soaring out and away from the invisible air elevator it had just been in.

The other pilot rode the rising air another five or six hundred feet, and then he—or she—too, steered out. Both were heading for the east hills that surrounded the valley in which both the lake and the town sat. Minutes later they were too far away to see, so Tom and Bashalli decided to go for a swim.

“Hey, you two,” Tom called over to his sister and best friend. “Enough with the kissy face and lovey eyes. Time to get wet!” Having said this, Tom joined Bashalli in the shallow water, taking her hand in his. “In case I haven’t complimented you enough already, Bash, that red bikini of yours is really incredible!”

He could see her blushing at the compliment. Raised until the age of ten in her native Pakistan, her parents had been horrified the first time she—with a little help and a *lot* of prodding from Sandy—had purchased her first two-piece swimsuit, a powder blue one that showcased her amazing figure.

Now, a full summer later, Bashalli easily put her parents’ reservations about her Americanization out of her mind, although she was still amazed and slightly embarrassed about the attention her body and bikini got from the male population of Shopton.

By the time they reached the drop-off and lowered themselves into the water, Bud and Sandy were splashing out to meet them. Sandy’s blonde ponytail was swinging back and forth so vigorously that it whipped Bud across the face.

“Youch! Watch that cat-o-one-million-tails of yours, Sandy!” he exclaimed.

“Watch it yourself, Budworth Barclay,” she admonished him. “You’ve been watching every other part of me for the past hour!” Now, she giggled and dove forward into the deepening water, surfacing next to her best friend, Bashalli.

Twenty minutes later they waded back toward the island only to be passed overhead by both of the gliders, momentarily putting them in fast-moving shadows.

“Hey, skipper,” Bud said, pointing. “Aren’t they a little too low?”

Bud was nineteen, like Tom, and was not only his best friend, he was one of the top pilots at Swift Enterprises, the four-mile-square experiment and development facility owned by the Swifts. He was more than qualified to make a

call on anything having to do with flight.

Even Sandy, a great pilot in her own right, looked worried.

Tom shaded his eyes and looked at the retreating gliders. They did, indeed, seem to be flying dangerously low over the remaining lake water behind the island. Seconds later they disappeared over the treetops. Then, as if by magic, one of them soared up at a thirty-degree angle and turned back toward the lake. It passed overhead, higher this time, and soon made a turn over the town toward the airport.

The other glider did not reappear. The foursome waited a full three minutes but there was nothing coming back out of the tree area or climbing up the nearby hills.

“Grab the stuff!” Tom yelled out as he headed for their boat. “Let’s get over to the far shore and see if we can find him!” while Bud and the girls hastily tossed their picnic gear into the speedboat they had driven over, Tom pulled his cell phone from a utility bag and called 9-1-1.

After explaining the circumstances, he told the woman, “The first pilot seemed to be able to get back to the airport. We’re heading over there to see if we can spot the other glider.”

Bud revved the engine up as Tom leapt into the boat, and they quickly backed out of the small cove and spun around the near end of the island. Less than thirty seconds later he beached the boat on the shore opposite town and they all jumped out.

“Bash? You stay here to show the Sheriffs which way we went. Sandy, you come with us a couple hundred yards and then stand by to call out to them. Bud and I will split up at that point and go another quarter mile or so. Hopefully, we find the pilot managed to land in one of the small clearings over here.” Although he said it with a hopeful tone, Tom didn’t believe they would find a happy ending to this story.

He was wrong, or at least partly so.

After he and Bud left Sandy sitting on a rock in an area where two trees had fallen over each other—leaving a visible X to be seen from the air which she called into the

9-1-1- operator in case the Sheriffs called in a helicopter—Tom headed about fifteen degrees to the left with Bud doing the same to the right.

“Nuts!” Tom thought as he pushed through the brush. “If I’d only thought to bring TeleVocs for us, Bud and I could be in constant contact.” The button-sized pins attached to the collars of all Enterprises employees and allowed silent communication to occur between people. Once constrained by proximity to the main Enterprises tower, the newest model could be used in situation like this for up to one-half mile.

Fifteen minutes later he heard the horn on their boat. Bashalli was signaling the arrival of the Sheriff’s boat with three Deputies. While neither he nor Bud—nor Sandy for that matter—knew exactly what she meant, Bashalli honked it three additional times.

Bud had not made it as far from Sandy’s position so he heard her shout out, “Here! I’m here!” She repeated it at about thirty-second intervals for another two minutes. Evidently, the Deputies had found her. So, Bud cupped his hands and turned to face her approximate position, yelling out, “Now, come this way!”

He was answered by at least two make voices yelling, “Coming!” Like Sandy, he called out about every half minute. At the three-minute mark he finally heard Tom yelling something. It wasn’t distinct enough to make out, but Bud was determined to get at least one of the Sheriff’s men heading that direction, so he yelled back toward the approaching posse, “Stand still. I’ll come to you!”

Three minutes later he stood with a trio of middle-aged and scratched up Deputies. While two of them sought to catch their breath, Bud told them all that he believe his companion may have found something. He told them what to say, and they all faced where Tom should be and yelled out, “Tom. Do you want us?”

All four of them practically jumped out of their skins as Tom calmly replied from just twenty feet away, “Sure. You can help me get the pilot down from the trees. He seems to be okay, just badly shaken up and upside down.”

Five minutes later they all were looking up at the mostly crumpled glider with its pilot hanging down against his canopy, only his harness keeping him from probably smashing through it and falling thirty feet to the ground.

It took the combined efforts of the five men plus a rescue helicopter from the Coast Guard base located over in Oswego, New York, to get the man to the ground. Shaken, bruised and with a cracked left kneecap and bloody chin, the man was thankful for the rescue.

“That stupid son of a b—” he paused, realizing that Sandy and Bashalli were staring openly at him. “I mean, my fellow flier cut me off and practically forced me over the lake, far too low as you see,” he said pointing at the wreck, “to do anything but crash!”

One of the Deputies, whose name plate identified him as “DPTY Dawson,” asked the man a few questions about the incident before turning to Tom. “Guess we owe you another one, Mr. Swift. First, you and your pa came to the Sheriff’s rescue when you made that mighty generous donation last year, and now you possibly saved this man’s life.”

Tom demurred, but pointed to the dangling glider. “Do you see that mark on the right wing? The smear?” The man looked up and nodded. “My guess is that came from the other glider’s wing. That is very suspicious”

The deputy’s radios crackled. “This is deputy Withers. We just got to the airport. The other pilot appears to have trailered his glider in a real hurry and high-tailed it out of here.”

Tom turned to the injured pilot who was about to be airlifted by the Coast Guard helicopter. “Who is that other pilot?”

“I have no idea. He just sort of swooped in and kept following me. Maybe for the last half hour or so. I’ve never seen him or his plane. In fact, I never saw his face. He kept it covered. And, yes, his right wingtip did hit my left wing.”

“If that’s the case,” Tom stated, “this might very well have been a deliberate attack!”

“What’s up, skipper?” Bud asked as he walked into the large office Tom and his father, Damon Swift, shared in the Administration building. Noticing several other Enterprises employees—Hank Sterling, Red Jones, Zimby Cox and Brian Hutton—he added, “I’m hoping this isn’t an intervention. I swear that I can give up flying at any time.” He grinned at them and they returned it.

“No, flyboy,” Tom replied. “What this is, is the team I want to take up to the Moon day after tomorrow. You see,” he said quickly to forestall any questions, “during a sweep of the surface at the cusp of the dark side only the outpost can view, one of the scientists renting space and time up there was using the space prober and saw something.”

“That something,” Damon said, picking up the story, “does not appear to be a natural phenomenon. Rather, the opposite may be true. Take a look at this photograph.” He slid a sheet of paper over his desk that Bud picked up.

Giving a low whistle, he stated, “That is certainly no rock formation. Is it?” Everyone else in the room shook their heads. “Uh, do we have any scale for it?”

Tom told him, “Based on the prober, that should be roughly one hundred thirty feet long and about thirty feet wide. If you look closely, you can see what seem to be landing gear or skids, and a great gash torn in what I believe is the underside of that thing. It’s upside down is my guess.”

“Hmmm. Not from around these parts, then?”

Tom shook his head. “It neither matches nor even approximates anything we have ever heard of originating from the Earth. But there’s more. You know that Norway recently joined the space community. They launched three satellites last year and a Moon lander three weeks ago.”

Bud nodded. “Yes. So?”

“Well,” Mr. Swift spoke up, “the ‘so’ of it all is their mission put a rover right at the edge of the light and dark sides. It is set up to power up for a couple days of constant sun and then travel for about twenty hours into the dark

regions to take photos, videos and pick up samples. But, three days ago it ran into something, literally, and stopped. It hasn't come back out but the point it supposedly reached is right were that thing is," he said pointing at the mystery object.

"Jetz! Double mystery. Does anybody know anything else?"

"No, and we won't really know anything until we go up there. You up for the trip?" Tom inquired giving his friend a sly grin.

Bud ticked his head to one side. "With this bunch of jokers?"

Tom nodded.

"You bet!

Preparations were made to outfit Tom's giant repelatron spaceship, the *Challenger*, for a three to ten day expedition. Nobody knew what they might find, but one thing was certain. If it was a spacecraft of some sort, and there was anyone—or anything—still alive, they could very possibly be placing themselves in deep peril. Since no Enterprises' employee ever carried an offensive weapon, the only thing they could take would be eGuns, a modernization of Tom's great grandfather's original electric rifle.

It was capable of shocking a man or small to medium-sized animal, but might prove to be useless in the forthcoming situation.

Clearing his throat, Damon Swift spoke up. "Because of an outstanding agreement with our Government, I have to report this to the President. I will be flying down to D.C. in about two hours for a private meeting. Not that I would ever promote such a thing, but I want us all to be prepared to receive an order to take along some sort of, uh... guard detail."

There was a mumbling of dissent about that possibility from everyone in the room. They hated the idea, but Tom knew that an order had been made after a previous lunar excursion had located the still-operating reactor from a

Chinese unmanned probe that had crash landed. A race to get to the craft between *Challenger* and a rocket manned by Brungarian militants bent on retrieving the nuclear materials, had ended with the foreign craft also crashing, killing all aboard. Since then the edict had come down that anything other than fully peaceful exploration would require a military presence.

That, they knew, would mean weapons, the one thing Damon insisted Enterprises never be involved in. Tom knew it rankled his father, but that he would agree if ordered by the President of the United States. And, nobody else!

The meeting broke up, Tom went back to his desk to make notes about what to take along, and Mr. Swift got ready to depart.

“You know, Son, that I’ll do everything I can to keep the military out of this, don’t you?” He was looking very concerned. “I’m not certain what else to do.”

Tom smiled encouragingly at him. “If it helps, tell them that as ship’s captain I won’t take anyone not qualified and trained for space. And, even with our new simulators and training, that will take ten days per man, and we can only train two at a time!”

Now it was Damon’s turn to smile. “I like it. Of course, you need to take off in no more than three days. Right? It may not fly, but I do like that concept. Wish me luck.” As he left the office, Mr. Swift spoke for a few minutes with the secretary he and Tom shared. Munford Trent was an amazing man who kept everything running smoothly. Tom saw him nodding periodically before reaching out to shake Mr. Swift’s hand.

* * * * *

Along with the previously assembled crew, *Challenger* took off from Fearing Island with a single additional crewman. His name was Terry Pratt and he was an incredible combination. A retired Marine Colonel, three-time space shuttle astronaut/Commander, and currently with the CIA, he was one of the most affable people Tom had ever met. He did come aboard with two long and fairly

heavy cases that he explained were his “necessities,” but promised to act as observer only, at least until they reached the Moon.

He let Tom and his crew get the craft on its way, but near the halfway point he approached Tom with information about his mission. “We need to talk about your landing.”

“Go on.”

“At that time, and I fully have been briefed on your company’s dislike of weaponry so I apologize in advance, I will open that case and take out a special RPG and launcher. That rocket-propelled grenade should have a lunar range of five miles and an accuracy down to three feet. She is laser-guided and designed to operate in a vacuum.” He grinned. “Bet you thought I brought something that required air and fins, huh?”

Tom grinned. “Something like that. Let me guess. Micro-nitrogen bursts to change course?”

“Go on...”

“Possibly not solid rocket technology, either. More compressed gas?” He received a curt nod and saw the Colonel narrow his eyes. “So, much slower than a rocket. Fast enough to not be too severely affected by the lunar gravity, but slow enough to make whatever minute changes are necessary. Can it also stand off?”

Pratt gave an almost unseen shake of his head. “Is that something you could do for us?”

Now, Tom gave him a head shake. “We don’t do weapons, sir.”

“Hmmm. Well, either you are the amazing man we all have heard about, or we have a huge leak in our security. You hit every nail on their heads about the RPG. The only thing we haven’t discussed is my positioning. You see, I will need to be set down at least two miles from whatever that is up there. You will give me five minutes to set up, and then you can set down closer. Off to the side, or course so I have a direct line of fire. At the first sign of any attack from within or outside of that alien craft—”

“Or, whatever it actually might be,” Tom reminded him. “We don’t know what it is right now.”

“Right. Anyway, at the first sign I call out, ‘scram!’ You have fifteen seconds to get as far away as possible before I launch. Travel time will be eighteen seconds. I only hope that isn’t too long a time.”

Tom knew better than to ask, but Bud—who had just walked in on the last part of the conversation did not—asked, “So, what’s the explosive? C4? Mini-nuke?”

Both Tom and the Colonel glared at him.

“Oh. Sorry I asked, I’m sure!” He spun around and walked back out of the little room.

As landing time neared, the crew went back into action. *Challenger* slowed down and made its approach from a point well over the lunar horizon from whatever lay on the surface. It skimmed just a few dozen yards about the surface, winding its way through rocky outcroppings, down into and up and over crater walls. With every mile it got closer, Tom had Red Jones, one of their best pilots at low altitude flying, slow the mighty craft. By the time it reached a point five miles from the object, he was flying at only ten feet above the surface and at just three miles per hour.

Tom contemplated having his crew subdue the Colonel and not setting the man down with his infernal weapon, but knew what that would mean to Enterprises and its relationship with the Federal Government.

So, as planned, they dropped to the surface at a point just about two miles from their destination. Rocks, piled nearly fifty feet high and possibly pushed up by some millennia-old volcanic action, stood nearby. The Colonel announced that he would be setting up there as it would give him a high enough vantage point to actually see over the nearby horizon, and to view any target that might require his attention.

For all the angst that his presence created he might have just as well remained on Earth.

When Tom set the *Challenger* down just one hundred

feet to the left of the object, it was plain for everyone inside to see that it was some sort of crashed spacecraft. There were a few things about it that made sense in an Earthly way, but the design was far from anything built on the planet. It was also easy to see that it had been there for quite some time.

A search by Tom, Bud and Brian in the rear of the craft, and Hank and Zimby in the front, showed that the lone occupant, a vaguely humanoid robot, had been smashed into pieces by the crash. No form of life was apparent.

Bud took photo after photo of everything they came across, while Tom ran his Multicorder—a hand-held instrument package with interchangeable capabilities—using the radiation detector and the energy sensor.

Neither instrument registered anything.

Tom and his team found many smashed machines of incredible complexity in what must have been the engine or drive section. Practically nothing they saw was recognizable.

Zimby and Hank located several intact instruments that did seem to be similar to Earthly counterparts. At Tom's suggestion, they pulled several from their mounts and took them back to the *Challenger*.

Nothing Tom found could be removed from inside the ship. However, he made an interesting discovery. In several locations, the outer skin of the ship appeared to have been either patched, or, as he instinctively believed, it had been trying to repair itself!

Where the surrounding skin was darker, scratched and dirty, some of the skin next to it was shinier, brighter and its edges seemed to be smooth, not torn.

To match that incredible possibility, the entire skin of the hull was incredibly flexible and could easily be moved, twisted and even pulled and stretched slightly.

Bud was peering over Tom's shoulder watching as his friend moved the skin all around.

"That's freaky, skipper. Shouldn't the metal of this hull

be solid?”

“Bud,” Tom said turning his face away from the piece he was examining and with a look of wonder on his face, “I think what we’re seeing here isn’t metal at all. I think it is an organic substance that is analogous to human skin.”

Brian, standing about five feet away, shivered on hearing that. “You mean that it’s alive?” he asked, the nervousness in his voice making it vibrate.

“Not now, but I think when this ship crashed, it very might well have been!”

CHAPTER 2 /

AN IMPORTANT MAN MAKES A REQUEST

TOM AND HIS team remained on the lunar surface for two days. An hour after they landed in front of the crash site, Tom had Red and Zimby return to pick up their passenger.

“Looks like the famous tempest in a teapot,” Colonel Pratt told Tom after scouting for several hundred feet all around the wreck. In the permanent twilight of the narrow band between the actual light side and the dark side, he had asked to borrow a bright, wide-beam portable light.

“Most of what we have ever found up here falls into that category, Colonel,” Tom told him.

“Hey. I’m off the clock as of now, so how about you all calling me Terry?”

It was agreed on and soon Terry was lending a hand collecting as much of the smaller and relatively undamaged pieces as possible.

It was Bud, taking a walk around the perimeter of the craft who spotted the Norwegian rover. It had run right under part of the overturned ship and was wedged tightly in the deep shadow.

“Come on, little fellow,” he said as he got behind it and gave a good tug. His strong arms did what the small motors in the ten wheels could not do. The rover slid back and was soon out of its jammed position. There was only a single, very dim LED showing on the status board on top of the small vehicle, and the camera mast had been bent hopelessly backwards so the antenna and camera were both now completely out of position to do anything.

“Skipper?” he called over the radio. “Can you open up the Swift Lunar Rover Repair Shop for me? I found our little lost friend.”

Later in the day when everyone was taking a break, Tom went down to the hangar on the lowest deck of the ship where Bud had placed the rover.

The mast turned out not to be bent much, but the spring and gear mechanism that had raised it in the first place was stripped. He pulled the gear, placed it into a laser scanning device that fed the data into the 3D printer that Tom had outfitted the ship with. It was something he also did in his *Sky Queen* and the Outpost in space.

Five hours later a new piece, made not from the aluminum alloy of the original but a stronger polymer plastic that was only slightly heavier, was installed and tested. During that time Tom had found the charge port bypass used back on Earth and gave the battery pack a good, full charge.

He also carefully wiped the dust from the solar panel and erased that part of the memory with any pictures of the alien ship replacing it with an equal amount of static.

After making a radio call to the Norwegian Space Ministry to tell them of the rescue, he passed along a design fault with the machine leading to the dust issue.

“If I can have permission in the next hour I can fabricate a thin shield that will minimize that,” he told the head of the Ministry, who promised to pass along the information to the scientists who were trying to regain contact, “...in he next day or two.”

Tom shook his head at the inanity of the man. It was like bureaucrats the world over. What they did not wish to try to understand they would hope might just go away if they stalled long enough.

Tom made the decision to go ahead with the little fix. With low gravity and no wind, it was a simple task of raiding the small kitchen and taking about five feet of aluminum foil that he shaped and the glued into place. Now, what the wheels tossed up would just fall harmlessly back down to the lunar surface.

The following noon—Shopton time which was observed at all time in space—Bud and Red lifted the *Challenger* off the surface and flew the half mile to the light side where Tom and Zimby Cox carefully lowered the Norwegian rover to the surface, climbed down and extended the mast and then waited until the status board showed that radio

contact had been established.

The large ship lifted off once the rover had moved away to a safe distance. Tom noted with some amusement that the camera had rotated so that it was looking at his ship as they headed for home.

“I hope they got a good shot of us,” Bud said once Zimby took his place at the controls. “It’ll make a great publicity shot. I’ll call George Dilling and tell him to get it from them. ‘Swift Rescue of Norse Rover,’ or something like that!”

Within minutes of landing back on Fearing Island—a stretch of former scrub grass island off the coast of Georgia and site of many of the Swift’s rocket and spaceship launches—everything they collected at the lunar crash was transferred to the waiting hangar of the *Sky Queen*.

Tom made a high-speed run north along the coast before dropping below supersonic speeds for their westerly flight into upstate New York. And, since he wanted to examine everything in his underground lab, and that was at the floor level of the below ground hangar for the jet, he simply let the passengers off on the tarmac and then lowered the great ship down.

As he was carrying the first of the smaller object down the ramp and into his lab the phone on his desk rang.

“Hello?” he answered.

“Tom. It’s Trent over at the big office. Can you come over? Your father is entertaining a gentleman who actually came here to speak to you.”

“Well,” Tom began before asking, “who is it?”

“Gerald Sterling.”

Tom was surprised. He knew the philanthropist by name and reputation although they had never met. “I’ll be there in five minutes. I need to wash my face,” he explained. Two days in a spaceship and spacesuit had left him feeling a bit unwashed, but he realized he didn’t have time for a shower.

When he arrived at the office he had not only washed

his face but had performed a one-minute over-the-sink job of washing his entire head.

“Mr. Sterling,” he said as he opened the door.

“Tom Swift,” the man stated as he and Damon Swift rose from the leather chairs they had been sitting on. “My goodness. I’ve seen so many pictures but to finally meet you in person... I don’t believe I can express my joy!” He stepped forward and warmly took Tom’s offered hand in both of his.

“I’m honored, sir. Over the years I’ve followed your exploits first in hot air balloons and then in the long distance helium jobs. First to fly the Pacific from Taiwan to California in a hot air balloon and first man to fly around the globe twice without landing. Wow!”

Damon cleared his throat. “If you two are about finished with the mutual admiration society, I believe Mr. Sterling has a request of you.”

They all sat down and Gerald Sterling handed Tom a manila folder.

“I must begin by telling you that the man you rescued the other week is... well, let’s call him a dear acquaintance of mine and a fellow glider enthusiast. I mention this only because it was he who gave me the idea to call on you. In that folder is a request for something I do not believe is possible, but I so desperately wish to have it that I came here. If anybody is to make that possible, it is you, Tom. Go ahead and give the first page a look. If you hand the folder back to me I’ll know that I’ve asked for too much and will accept that it is not possible. At least, not today.” There was a twinkle in his eye as he smiled at Tom.

The young inventor looked curiously at his father. Mr. Swift shrugged and nodded toward the folder in his son’s hands.

The first page was a neatly typed letter:

Dear Tom Swift;

On September 5th of this year you rescued someone very dear to me when his glider was forced to crash near your town. That

man is my son, David. For that I can never thank you enough. Had you not been there his injuries could certainly have gone from minor to major or even been fatal.

Both David and I share a fantasy and I hope that you might make it come true. If not for me, then at least for him.

It is our wish to be able to soar, unaided by mechanical means, into the sky in a glider and from then to fly using only what nature provides for a great distance. In point of fact, we wish to take off from an airfield in Rostock in northeast Germany and then fly south over the Alps and land in Taranto in the “arch” of the boot of Italy. This is a flight of approximately 750 miles by air.

To accomplish this we not only wish to take off without assistance, but believe a successful glider must be able to reconfigure itself in flight to take advantage of varying conditions.

While a two-man glider is preferred, we can accept a single-seat plane. We are realists even if this request makes it sound otherwise.

The price is up to you. We have more money than sense and so will accept the figure you name.

Please consider this as a very serious request and not a silly pipe dream of a rich man who may have flown too high and for too long in the past.

Sincerely and With Hope;

Gerald Arthur Sterling

Tom placed the letter back inside the folder and set that on the table. He looked at their guest who looked back into Tom’s steely-blue eyes with his own famously vivid green ones. Neither man blinked for many seconds.

When Tom spoke it was in a quiet and assured voice.

“Mr. Sterling. In my nearly twenty years I have been handed a great number of projects. Most have been surprises to me. Ask my father here and he will probably tell you that I do not work from a list of to-do items. Regardless, things keep falling into my lap in a never-

ending stream. To date I have simply nodded and moved forward with what needs to be done.”

Sterling now was looking apprehensive. He seemed about to ask a question when Tom continued.

“What you are asking for is possible to a small degree, possibly as far as powered yet unassisted takeoff and some small degree of reconfiguring is concerned, but that isn’t what you actually want, is it?”

Sterling shook his head. “No. You are correct in that it is not. I do not wish to use a small engine or even electric motor to turn a propeller to either get me underway or worse yet, to keep the aircraft flying. I consider that a supreme cheat. I am relieved to see that you understand that. What I have in mind will not use propulsion that cannot be accomplished with anything other than the wings of the craft. I’ve envisioned flying like a bird and not just soaring on the updrafts. Even DaVinci pictured aircraft that used a manmade equivalent to a bird’s wing. Is it too much to ask that today’s technology might give me that?”

Tom pursed his lips and rubbed his chin. His mind was temporarily taken off the subject by the feel of the stubble he had not take time to shave off before the meeting.

“To tell you the truth, Mr. Sterling, while I can’t say I hold a lot of hope for this I would actually like to give it a try. That is,” he turned to look at his father, “unless dad has something else in mind for me.”

Mr. Swift shook his head. “Just so you know, Mr. Sterling, whenever my son asks me that question it is a sure sign he does not want me to say, ‘why, but I have a thousand other things you must attend to.’ In fact, he generally wishes me to give my blessing and then butt out. So, I give my blessing, reservedly as I hope you understand we must bill you for Tom’s time even if he is ultimately unsuccessful.” He looked right at Sterling.

The man nodded, ran his tongue around the inside of his mouth, and then stated, “Good! Toward that I will give you this check in the sum of one million dollars. Please deposit it into an account from which you draw all funds for this. When the money gets to a quarter of that amount,

call me and I will provide you more. There is just one other small detail to attend to.” He stood up, followed by Tom and Damon, and held out his hand to the younger Swift.

“Hello, my name is Gerry. I am always Gerry to friends and to those I trust my life to. I hope that I might call you Tom and you, Damon. Would that be okay?”

Tom shook the man’s hand, as did Mr. Swift. “That would be wonderful, Gerry,” Tom said. “Give me two weeks to really research this and I’ll let you know if we have a possibility, or if it is a no-go.”

Once the industrialist and adventurer left, Damon asked his son, “Do you actually believe there is some possibility it this?”

Tom smiled. “All I have to do is figure out how to do the takeoff thing, come up with some sort of outer covering that will support a repositionable skeleton in the fuselage and wings, and then put it into a package that is light enough to fly. As Chow would say, ‘It’s a right piece o’ cake!’”

“And, speaking of Chow, I missed lunch by being over at the Construction Company and I’ll guess you didn’t get anything in your hurry to get back from the Moon trip. Which, I want to hear all about. Let’s call for a couple sandwiches.”

A plate filled with roast beef and chicken salad sandwiches arrived ten minutes later on the roll-around cart their private cook pushed into the room.

“Howdy, gents!” the westerner greeted them. He was dressed, as usual, in denim jeans and a gaudy, bright western-style shirt. Around his recently slenderized stomach was a white apron and below that were his cowboy boots. On his head, rather than wearing a chef’s hat, perched a weather-beaten but still stylish ten-gallon hat.

“Howdy back at you, Chow,” Tom replied. “Good thing Bud’s not here to give you a hard time about that shirt. It’s a real doozy!”

Chow stood up tall and patted his chest. “Right purty number if’n I do say so myself,” he stated. “My lady friend,

Wanda—” and now he looked a little sad, “—wahl my ex-lady friend who’s now livin’ out in Oh-ree-gun, found this in a second-hand shop in Portland. Can you imagine anybody gettin’ rid o’ somethin’ as nice as this?” He sounded astounded.

Tom and Damon were able to keep straight faces until the cook had left. They both had a good chuckle. Chow was famous for his bright shirts, many featuring things like flaming cactus, howling coyotes and even prairie dogs in fluorescent colors. He loved them and loved being the center or attention when people saw his latest.

While they ate Tom told his father about everything they had found on the Moon.

“We need to keep this spaceship under our hats, Son,” cautioned Damon. “Do you think the military man will blow this open with he debriefing?”

Tom shook his head. “No, and I’ll tell you why. We sat down yesterday evening and had a very good talk. Before I forget it, I think he would be very open to being hired away from the Government and taking a position up at the outpost. He has a doctorate in astrophysics and a Masters in planetary geology. Anyway, he is acutely aware of what a stampede this might cause if word gets out.”

Damon Swift nodded. “Right. What government wouldn’t want to get their hands on something that might prove to be a game changer in global politics. So, what will he tell them?”

“That we found a tangle of metal that had a plate inscribed in Kranjovian characters. It turns out that the wreck is the remains of one of their rockets that once tried to attack me. Where we all thought it hightailed it away from the Earth to possible try a second attack, it must have malfunctioned and ended up back in the lunar gravity field, eventually crashing. We found no signs of bodies so the Kranjovs may have mounted a secret rescue.” He looked innocently at his father.

“Just don’t bat your eyelids if you have to tell that fairly tale to anybody,” Damon cautioned.

After inviting his father to come look at what they'd brought back when the older inventor got the chance, Tom went back to his lab.

Bud was waiting for him just outside the door.

"I hope you won't get angry at me, but I sort of unloaded everything from the *Queen*. It's all on carts and all sitting at the back of the lab."

Tom shook his head and smiled. "No. Thank you. Saves me a lot of time. Just as long as you didn't drop anything, that is."

"Really? Do I look like the sort of guy who'd go breaking something?" Bud asked as he reached out to open the door. The handle came off in his hand and the two boys practically fell to the ground they began laughing so hard.

It took a few minutes to regain their composure but they had the knob back in place—tightened by one of the small screwdrivers Tom kept in his pocket most times—and were looking over the various instruments.

Bud picked up something that appeared to be made from some sort of plastic and had a thin clear length of something coming from what must be the back.

"Fiber optics?" he asked, showing it to Tom.

The blond inventor took it from his friend and turned it over and over. He took a deep breath in through his nose and answered, "It does look like that, doesn't it?"

He handed it back and the flyer returned it to the cart. While he was looking over more of the devices Tom walked over to an object he had torn from the craft and put in his spacesuit's pocket.

It was a light gray in the middle and had obviously been torn most away from the fuselage of the crashed ship before Tom ever discovered it. The odd thing—well, as Tom told himself—one of the odd things was that from the edges outward the color was a little different. A few shades lighter. Even the shape was a little different. Where the darker part stopped and the lighter began, the edge, anywhere from an inch to nearly three inches, followed the

basic shape of the inner area but was smoother and more rounded.

Tom couldn't help but feel that this was something very significant and decided to make it among the first things he tried to figure out.

Another odd aspect of the piece was that it seemed to have a mesh of extremely fine wires barely embedded in what would have been the inner surface.

"What's with the grid?" Bud asked looking over his shoulder.

"I don't know, but it appears to not be much of a way to strengthen the rest of the material. It looks like metal but I haven't tested that. If it is a mesh or grid of tiny wires, did it once have electricity running through it?"

"Yeah," Bud agreed. "Even if it did, what happens if you put Earth electricity through it. Or, does it only work if you have all of those wires hooked up?"

"And," Tom said, "what side is positive and what negative? Or does this require alternating current and at what strength." He believed that electricity must be the same across the universe and so the only things to determine would be where, what strength and how much?

Bud left about twenty minutes later explaining that he had a date with Sandy that evening. "Why don't you and Bash join us? It's just going to be pizza at Mama's Pie Hole."

The inventor agreed and placed a call. Bashalli worked afternoons and some evenings at her brother's coffee shop, The Glass Cat, in downtown Shopton. The pizza place was just four blocks away so she agreed to meet them all there at six.

Once Bud left Tom went to his workbench and set up a few pieces of equipment. He didn't have enough leads to connect one to each and every wire; there must have been eighty running across it and twice that many from bottom to top. He opted to connect four on each side and another four that intersected those along the left edge.

He sat thinking about what to try for at least ten minutes. Before he could come to a conclusion there was a small knock on the door behind him. Turning, he saw his father standing there.

“Come on in, Dad. I may need your brain to figure this one out. See this, well, it isn’t fabric and it isn’t metal but it was apparently the outer skin of that ship up there. Take a close look.”

After the older inventor had pulled over a large magnifying glass and let out a deep whistle of astonishment, he said, “Extremely interesting, Son. That grid work does appear to be made from wires and I agree that it must be to put electricity through.”

They discussed what settings Tom ought to use.

“Let’s start with direct current and at about the strength of a double A battery and work up from there,” Mr. Swift suggested.

Five minutes later and at about fifteen volts and only a few hundred milliamps both men let out a gasp and stepped back.

The closest edges to the overlapping wires had begun to grow. It was slow, but noticeable.

When exposed to electricity, the material seemed to be trying to heal itself!

CHAPTER 3 /

CONSTRUCTING THE IMPOSSIBLE

OVER THE course of dinner Tom found it very difficult to keep his mind from wandering back to the unbelievable sight of the strange materials growing. It had to be some sort of cellular division, but that would mean the material was alive. Wouldn't it?

That, he knew with his deepest set beliefs, was impossible.

Bud could see that his friend was preoccupied and so he kept up an almost nonstop conversation with the two girls. They laughed and had a good time, but as he was taking her to the door, Bashalli asked Tom, "Where were you tonight, Tom? I could see you next to me and I felt your hand when I reached for it, but I think that your head and your heart were not with us. Am I right?"

Tom leaned in and kissed her. Pulling back a little, he said, "There is something going on at work that has me knocked back on my heels a little. It's nothing I can tell you about, but I do apologize for letting it get in between you enjoying the evening."

She placed her right hand against his left cheek. "Do not be silly, Tom Swift. Of course I enjoyed the evening. Any evening I can spend with you is a joy. I only wish that you could have been part of the happiness as well." She sighed and gave him another kiss. It might have lasted longer but the front door opened and her father was standing there.

"That is something I understand I can have no control over, my daughter, but I must insist that you not make a public performance of it. Now, say good night to your young man and come inside. Your mother is worried." He stepped back and closed the door.

Bashalli whispered, "My *mother* is worried? I would laugh but I know he is standing just behind the door. I will see you tomorrow?"

Tom nodded, picked her right hand up and kissed the

back of it.

“Night, Bash.”

He drove slowly home, his mind quickly returning to the mystery of the alien material.

During the following ten days Tom concentrated on the incredible aspects and capabilities of the “skin” of the alien spaceship. One entire day was spent studying the wires of a five inch piece of mesh he had been working on. After conceding that he needed a small sample of the wires in order to find out what they were, he discovered they were a simple alloy of silver, copper and titanium.

Another day went by as he built a wiring harness that allowed him to attach to the now six hundred and eighty four tiny wires he had exposed.

His father had admonished him to not share the discovery with anyone, not even Bud, so Tom kept a piece of light cloth nearby to toss over his experiment. It came in handy late on the second day when he heard the elevator bell sound across the underground hangar. He covered things and then turned to examining one of the instruments.

“Still not sure what those do?” Bud asked as he came in the office and sat down on the small sofa against the left wall.

Tom spun around on his stool and replied, “Not yet. Dad has taken a good look and figures I need to try to energize one of these, but can’t offer any ideas. It seems that the one fiber pigtail coming out may be the combination power in and data in all combined. I’m darned if I can see a way to divide them.”

Bud, who frequently complained to Tom that his “little football player brain” couldn’t understand much more than how to fly a plane, often said things that jostled Tom’s mind and led to some very good discoveries.

“Maybe if it is fiber optics, all you need to do is send the data in as light and the thingie there turns the light into the data and also electricity.”

This gave the inventor something to ponder. He would need to try an experiment on one of the incredible pieces of equipment, but which one to use? Obviously he would not want to risk anything that seemed to be in functioning order. He did, however, have a small collection of the gauges—or what he believed might be gauges—that were partially smashed.

“I think I have one small thing we can try that on, Bud. If it works, I’ll personally renew your Junior Genius card for another year!”

“Great. Just make certain you spell that second word with a G and not a J.”

“Sure. Want to hang around while I get set to try your idea?”

Bud frowned. “Well, I’m of two minds here, skipper. If it looks like it will succeed I’m all for staying to rake in the accolades. If you are pretty sure it’s going to be an exercise in futility, I may just slip out now. Do you give it much hope?”

Tom shrugged. “About as much as anything I’ve already tried. I set up a magnetic induction coil next to one of the instruments yesterday. Not even a glimmer. And, with no obvious input or output ports, I’d give your idea at least a fifty-fifty chance. Let’s try it.”

With a wide array of equipment at his disposal, it only took the inventor about seven minutes to rig up a fiber optic line into which he could feed both a steady laser light at several frequencies as well as pulsed data in digital form. He decided on an increasing number range changing at one-fifth second intervals.

He carried the fist-sized instrument carefully over to a workbench that featured a wrap-around shield made of inch-thick clear tomasite. If the thing exploded all it would manage to do would be to send things to the ceiling that could shower down on them.

They both moved back to a multi-function control board where Tom inserted the other end of the fiber optic line into a small clamping device. This not only held the line

and allowed whatever Tom fed into it to travel at light speed into the test instrument, it also had a special guillotine blade that could sever the fiber line within milliseconds should an overhead thermal camera detect overheating that might portend an impending explosion inside the shielded area.

Tom pointed to the board. “Your idea, your honors,” he stated stepping to one side.

Bud grinned but his face was set with a very serious look as he reached down and gave the small button a press.

Both boys’ eyes swung over to the test bench.

For several seconds there was nothing. This lasted several additional seconds until Tom reached past Bud and ran his fingers up over a small touch-sensitive screen.

“Just turning up the juice a little, flyboy. I had it set at half a volt for starters.”

He needed to increase the power three more times until they finally watched the face of the partly-crushed instrument face light up. Strange symbols raced over the face—possibly a self-check routine—before it settled down showing them a series of lines surrounding an icon neither recognized.

Tom began sending data down the line. For two seconds nothing registered. Then, the icon turned bright red and pulsed several times before the entire instrument shut itself off.

With some barely disguised mirth Tom watched as the fiber optic line end shot back out of the instrument almost as if the unit was rejecting it and its attempts to send incorrect data.

When his laugh came it startled Bud until he explained what he thought had just happened.

“It eventually liked the volts we were feeding it, but it became either confused or even a bit angry that the data was nothing it recognized or expected.”

Over the following three days, including the weekend, Tom worked to find some type of data the instrument

would accept. By late Monday he decided to give up for the time being. He had something else he really wanted to look into, that being the self-healing outer skin of the mystery spacecraft on the Moon.

He had already discovered the skin liked to have its power in the fifteen-to-eighteen volt range and that it should come in from the top and left to flow back out—the negative side—on the bottom and right.

What was most astounding was that along with the surface materials, the wires criss-crossing in their nearly sixteenth-inch grid also replicated and grew to cover the bottom of the new skin. His large piece grew at a daily rate of nearly five inches in all directions.

It wasn't until he tried placing another piece of the materials next to the larger one—"activating" it with electricity—that he made the discovery which told him his theory was correct. As soon as the two pieces touched, they fused together almost invisibly with electrical lines fusing and growth in that direction ceased.

It was a self-sealing skin.

Tom's mind raced over possibilities for such a product. Aircraft? Obviously. Boats, automobiles... the applications seemed endless until he thought of other factors such as tensile strength, its high flexibility, and other factors that might preclude it being used where structure was mandatory.

The word "airplane" came back into his mind and he mentally slapped his forehead. He was supposed to be working on the glider for the man who visited the previous week.

He decided to go down to his underground lab and office where he generally did his drafting and designing of physical inventions.

While it lacked many of the equipment refinements of his larger lab, it could provide an incredible silence that could not be found in most other Enterprises locations.

It meant he could do a lot of uninterrupted research which was exactly what he felt was needed at the moment.

Failing that, having someone call him out of the blue to claim the spaceship crashed on the lunar surface was theirs and of course they would be most happy to tell him all about the incredible skin and instruments would help.

Hah! he thought. *Fat chance!*

He began devising an automated system to change the two parameters on the fly and to check for feedback, positive or negative. The power range would avoid the lowest and so far unsuccessful levels and would be exceptionally careful of anything over eighteen volts.

Data would come in up to one-hundred formats ranging from pure digital using it's inherent ones and zeros in everything from base five to base ten. If necessary he had a way to up that to as high as base twenty. Lower, he believed, was too limited to provide meaningful data transfer.

After about six hours he believed he could do little more with the design. But, he now had a choice. He could either begin making the circuitry himself or he could turn to the mystery of the skin.

One phone call later and a small team of three in Electronics had been assigned to the electronic side of things. The promise made was to have the finished equipment to the large lab by noon the following day.

With that taken care of Tom pulled one of the smaller pieces of the skin he had previously placed in the safe in the underground lab. He pulled over a MLS, or Multiple Light Source, and examined it under magnification as he ran through about fifty different light ranges. The only difference he noticed came in the small gap between infrared and ultraviolet, the visible range.

Or, it might be the other way around, he considered. In the visible range the skin appeared to be about the same gray as duct tape. In fact, except for being non-sticky and absolutely smooth—plus having embedded wires—it might pass for that same product. In all other ranges it turned black.

That wasn't the most fascinating aspect, though. When

it was black it became active and started to create electricity.

The inventor sat back trying to come to terms with this. After a few minutes he sat up straight with a smile on his face. That had to be it! To test his theory he hooked up a test device to measure any voltage coming across the wires.

Back under UV light—his first test—a gentle four-point-two volts of direct current came from the wires. After moving his test clips around he found it to be the same no matter how he connected the meter.

Tom realized he needed to move back to the larger lab in the Administration building. It had the proper equipment and safety measures to go on with his investigation.

Once he had set back up he subjected the piece of spaceship skin—he still thought of it as a living organ and not an inorganic covering—to the same sweeping range of energy waves. The difference this time was the availability of equipment to look at the skins reaction under many types of sensors.

The results were, to say the least, startling.

In the lowest ranges the skin totally absorbed all energy waves. Regardless of which type or level, the electrical output was a steady, measured four-point-two volts. What was startling was that it absolutely did not reflect anything. RADAR disappeared. Like tomasite it completely blocked any radiation from getting through, but that incredible plastic had no way to use the energy. It simply deadened it. No reflection.

But, to absorb broadcast energy waves and even infrared light was unheard of.

Another amazing aspect was that it might have turned a non-reflective black, but here in the lab it did not disappear. Which was strange. If light could not escape it—

No, That was not right. Tom realized that the lab not only had the alternate energy and light sources but there was a small amount of visible light also bombarding the skin.

He blanked out the windows along the outer wall and turned off all the room lights.

Then, when exposed to everything up through infrared the skin disappeared!

Ultimate stealth, Tom thought.

As he moved up through the spectrum into the visible light the tape turned from its all-absorbing black to the light gray. It still appeared to be absorbing energy because there was still electrical activity happening.

And as the range headed upward through ultraviolet and into x-rays and gamma rays it turned black again

It was one of the strangest things he had ever encountered.

It got slightly more strange when he tried to add the entire range of light waves. As before it seemed to have turned black and was absorbing everything, but once he added a small resistance load to the wires a portion of the skin became visible in a ghostly sort of way. It could be seen when he concentrated on it but easily overlooked when he gave it a casual glance.

If it weren't so fascinating it might be disturbing.

What for instance, if some alien race was the source of this technology and they use it to attack the Earth? Or, any planet for that matter. It gave Tom an uncomfortable chill down his spine.

For the remainder of the day and part of the following one Tom experimented with the skin.

As before with the larger piece he found that adding electricity to the skin—even when it was already producing its own electrical charge—caused it to grow. But, it was more than that. Much more.

When he tried cutting into the material using a remote robotic arm and a scalpel the skin, at first, provided great resistance. When he increased the pressure the skin actually became stiffer, resisting at an even greater level. But, once he tried vibrating the sharp point of the tip he was able to breach the skin.

A small hole appeared that he used the arm to exploit. By tipping the knife into the hole and applying a sawing motion he managed to cut and tear a one-inch slit in the skin.

It was then that the impossible happened.

Over a period of less than fifteen seconds the slit disappeared and “healed.” It was as strong as before and required the same level of power to cut back into it. Again, it healed.

When time to go home arrived he turned everything off and locked the lab.

The following day he sat there looking at the small piece of skin and shaking his head. He had no idea where to go next, and the Electronics people had asked for an extension in his instrument testing device until the next day. So, with little to do he headed to the large office down the hall.

Mr. Swift listened to his explanation of the discovery and his frustrations silently before suggesting a change of focus. “Why don’t you go back to that glider project you agreed to take on for Mr. Sterling?”

Tom groaned. Every time he tried to get interested in it he found something else to work on. It was what many people called the “Shiny object” or “Squirrel!” phenomena. A shiny object could get the attention of some animals and the joke was that given just about anything, a dog would always look at and get excited over a squirrel.

He grimaced and shrugged. “I have no real reason other than inertia. There is something about his request that has me stuck and I haven’t found the mental energy to break free,” he admitted.

“Well, you ought to use this as a break for at least a day. Give it some serious thought and see if there is anything you can do. Then, if you truly cannot see any way to meet his needs, we will return his money and offer him the reasons why it isn’t possible today.”

Tom nodded. “Okay. Thanks for pushing me in the right direction, Dad.” He sat down at his desk and pulled up the files he had started earlier for the glider project.

A glider that can take off, practically like a bird, with no propeller or even a small auxiliary jet? Something that could adjust to the different flight characteristics to be found near the ground versus high over a mountain range?

Something that could fly basically where a glider ought to not tread.

His father looked up as Tom chuckled.

“Find something?” he asked.

“Not really. I was just sort of laughing at the notion of using the new space skin—that’s what I’m calling it for now—to cover the glider and provide the power to run things. Even use it for motors to flap the wings. Pretty silly, huh?”

Damon Swift pondered the question and the idea. He didn’t find it a source of humor as much as he thought of the possibility Tom had just mentioned.

When he didn’t respond to the question, Tom asked, “You don’t think that ironic at the very least?”

His father shook his head.

Tom’s lips pursed as he began giving his “silly” idea some credence.

With nothing more to say he turned to his computer. Now that he could even partially accept the notion his space skin might have an immediate application with this far-fetched glider project, he had to reset his way of looking at it.

Suddenly, the idea of flapping wings turned from preposterous to possible. Finding a way to power such a plane in the air over perhaps a twelve hour or more flight went from far-too-heavy to feasible.

Tom Swift, inventor, switched his mindset from *how can I ever try something like this* to *how can I go about making this happen*. With a small smile of satisfaction he started to create the design for Mr. Sterling’s impossible morphing glider.

CHAPTER 4/

CROSSING THE SKIES

IN THE next day Tom began the actual design of the aircraft. Unlike a standard, sleek glider he opted for a larger-than-normal cockpit, something that would allow some movement by the pilot to keep from getting cramped up. It also allowed even greater visibility all around.

He chose to add a V tail rather than vertical and horizontal stabilizers. First, it would cut down on drag, something all gliders needed to overcome, and second it would work just fine at the slower speeds the aircraft would travel.

He would need to make the wings very flexible, yet they had to be strong enough to support the rest of the craft and its passenger safely. That single aspect was going to be the most difficult to achieve. Anything that flexed built up heat and led to material fatigue.

Tom remembered his first introduction to the phenomenon when he'd been only seven. His father bought a chemistry set for his Christmas that included dozens of chemicals and also some metal strips. Damon had given one strip of zinc to his son and explained about metal fatigue. The boy listened intently but without a solid understanding of it until he was told to bend and unbend the zinc.

As he did—and Tom could still hear and feel the crunching sounds made by the soft metal—it grew warm and then hot and finally split.

That, he now knew, could never be allowed to happen. Instead of having two smaller pieces of zinc he would have a dead pilot and crashed aircraft!

He worked on through the delivery of his new electronic device to test the alien instruments and into that evening, finally heading home at about nine.

His girlfriend, Bashalli, was talking to Sandy and Anne Swift while his father sat reading a scientific journal.

Bashalli jumped up from the sofa and into his arms giving his a kiss that caused Sandy to giggle.

“Careful, girl. You don’t want to shock my mother and daddy!”

Bashalli stopped kissing Tom but left her arms around his neck as she turned her head and asked, “Jealous?”

Sandy tried to sound nonchalant, but failed. “No. In fact as I was telling Bud the other evening as we were—” She stopped suddenly realizing that the eyes of her mother and father were focused on her.

Anne Swift asked, “You and Bud were doing what, dear?” She sounded so innocent that she sounded as if she was a prosecuting attorney cross examining a serial criminal.

Sandy gulped and took a breath. “Uhh, well, ummm, we were... oh!” she said suddenly coming up with something, “We were walking downtown and talking. Just talking. That’s all. Just that.”

The other three had their own ideas of what Sandy and Bud got up to, but nobody was going to accuse her of anything.

Bashalli just said, “Well, I feel just fine kissing Tom in front of the whole family. Your family, that is. I still do not believe my father and especially my brother, Moshan, can accept any touching of lips between me and any boy.”

Tom kissed the tip of her nose and stepped back. “Isn’t anyone going to ask why I got home so late?”

“No,” Sandy said sitting back down still trying to stop blushing, “daddy told us you were working on some glider named Polly.”

Tom laughed. Actually, I am calling the aircraft a polymorphic glider.” He spelled the word. “That means something that can appear in multiple forms. The glider will be able to change forms a little to meet the specific flying requirements.”

He told the women about Mr. Sterling’s request.

“Hey,” Sandy said. “Isn’t that the guy we rescued from

being upside down in his glider a month of so ago?”

“His father. And he wants to fly from upper Europe to the bottom of Italy.”

They talked about what it would require for an hour before Bashalli said she would need to go home.

“Sandy came and picked me up since my own parents are not so modern as to allow me to drive their car. My own little runabout is in the repair shop for another three days. Can you take me home, Tom?” she asked giving him a sly smile.

“Sure.”

On the way to her house they talked about the glider and Tom ran a few ideas past her. He also, because of her art background, told her more about the design. As she was giving him a goodnight kiss she whispered, “I would love to see that design some day. I think I understand but still want to see what you have come up with.”

He agreed to have lunch with her the following day and would bring a small printout of the glider.

The next morning he received a call from Mr. Sterling asking about any progress. Tom proudly told the man he had both a basic design as well as the concept of how things would function, but asked for another week to provide either of them.

“I know it’s your money going into this, sir, but I am sure you can appreciate how difficult it is going to be. That, plus I have an artist I want to run the design past. She is very good at the aesthetics of objects and can tell me if this basic shape I have is going to provide you with both the slipstream I can put in as well as an extra helping of ‘Wow!’”

“I can appreciate the wow thing. Why don’t I call at the end of next week? That’ll give you another nine days.”

It was agreed.

At lunch Bashalli took a look at Tom’s design and smiled.

“Oh, Thomas. It is more beautiful than your description.

Is it, and forgive me if this is the wrong word, airworthy?"

"Well, I'm going to need to put a model in our air tunnel and check everything, but the computer says it will fly. At least as a solid form glider. Whether it can do the magic takeoff on its own or morph into the necessary shapes remains to be seen."

She looked puzzled. "Does that need to be changes to the entire plane?"

He shook his head. "No, mostly in the wings and perhaps a little in the tail as far as I know. Why?"

"Because I like the front as it is and would hate to find out it will turn into a ball or a square or something else."

They ate and she told him some interesting news.

"I have an interview with the Shopton Advertising Agency over on Cleveland Street later this afternoon. They are looking for an in-house artist and with my graduation coming in a month I need to find a job."

She seemed excited and so Tom was excited for her.

After he dropped her off back at the school he headed to Enterprises. Before going any farther with the design he decided the air tunnel testing was an important step. Arv Hanson, the man responsible for nearly all the scale models of his and his father's inventions, came over ten minutes after Tom called him.

"Looks like a really nifty glider, skipper. That is unless you are going to hang one or two little jet turbine engines on it. In that case it is a really nice looking little jet."

Tom admitted to the glider version but his brain decided to save a little reminder to follow up on the personal jet possibility at some point. He requested a one-tenth scale model with working control surfaces for testing.

"Three days or is this a rush?"

"Three or even four, Arv. I've got something else to look into so whatever you can do."

After the model maker left Tom went down the hall to the large lab where the new electronics had been delivered.

Within the hour he had it connected to the alien instrument and was starting the program. The way things would work it might have run on its own but he chose to remain to watch.

What he saw thirty-seven minutes into the test run nearly collapsed his legs from under him and caused him to gasp for breath!

* * * * *

Tom took the rest of the day off and went home where he headed for the basement and a set of weights his mother bought several years earlier in order for him to build up his muscles. She had worried that too many books being lifted did *not* equate to good muscle tone.

The weights had sat mostly unused since then.

Today, he felt to need to work off some energy so he spent nearly an hour lifting, grunting, puffing and sweating in an effort to get over what he had seen. It only partially worked but he was exhausted and damp so he put them away and went upstairs to shower.

He replayed the scene over and over in his mind until it began to seem like a dream. By time for dinner he felt better, but he decided to not tell anyone, not even his father.

Conversation at the table was stilted and sparse so most of the meal was eaten in silence.

“Something bothering you, Son?” Damon asked Tom.

The young man shook his head. “I think I am just bushed. I’m going to head up to bed in a few minutes unless anyone needs me.” He looked around hoping they did not and gave them a tired grin when nobody spoke up.

In his room he lay on the bed, on his back and still fully clothed, for several hours until he drifted to sleep.

By morning he was running a slight fever so Anne told him to call in sick and get some rest. “You push yourself too hard, Tom,” she told him. “Just rest for today. Tomorrow starts the weekend so you’ll have three full days to recover.”

“Okay, Momsie,” he told her. “I’ll be a good boy, but please don’t play secretary or bodyguard today. If Arv or Hank or anyone at Enterprises calls with a real *gotta have it now* question, let me talk to them. Ditto if Bash comes over or calls.”

Half an hour later there was a soft knock on his door.

“It’s open,” he called out. When the young man stepped inside Tom grinned. “I figured mom would rat me out, Doc. I suppose you’ve come to verify I’m not shirking.”

The young medico laughed. “Something like that. Actually, skipper, when your dad found out about you running a temp, he called me to ask if you could possibly have picked up anything from some rock or piece of metal you found on the Moon. I told him it is so unlikely as to be nearly impossible, but thought I’d come over, feel your forehead and take your pulse, and then take a throat culture. We’ll know by tomorrow if you have anything out of this world!”

Doc loved many technical things, but he preferred old-fashioned mercury-filled thermometers and he slipped one out of a holder in his shirt pocket, shook it down and placed it under Tom’s tongue.

As they waited he hummed a tune while Tom’s mind turned over a number of things, mostly about the glider but a few about the space skin. When a notion hit him he nearly bit through the thermometer and did spit it out into his hand.

“Doc! I think I have something.” When the physician’s eyes widened, Tom hastily added, “Not a disease, an idea. Let’s get this over with and then I’ll need my computer.” He put the thermometer back into his mouth. When it finally did come out he had about one-degree of a fever.

Doc Simpson removed a long wooden stick from a sterile tube. On one end was a bud of cotton he used to swab back and forth across the middle and back of Tom’s tongue. He returned it to the tube, tightened the lid and wrote something on the label.

“Want me to hand you the computer?” he asked as he

got ready to leave.

“No. I’ll get it in a few minutes. I need to think about this some more before I start hammering on the keyboard. Thanks, Doc.”

Doc let himself out and Tom went back to thinking. He had a crazy idea that he wanted to try, but it would take a few days to design something to assist him.

Doc called on Saturday to report that Tom had a simple bacteriological infection in his throat and said he would send a prescription for a new type of throat spray to their closest pharmacy in an hour or so. When it arrived, courtesy of Bashalli, Tom sprayed it into the back of his mouth and moved it around with his tongue.

In seconds the sore throat was gone! Doc hadn’t said anything about a numbing aspect, but it was terrific.

At the same time the phone rang. It was Arv with news about the glider model.

Tom took the call on his extension. “Good news for me?”

“Sort of, skipper. I finished the model this morning and was about to head home when I just got the urge to spend a couple hours in the air tunnel. It was worth it. The good news is the airflow over the canopy and that bulbous front end is fine. The bad news is the V tail got a terrible vibration in it.”

Oh.” Tom sounded disappointed even though he knew that it was a rare thing to get a design right the very first time. “Any ideas?”

Arv chuckled. “Yeah. I sort of cheated and built three tails for the model. The small one you designed, a traditional T tail and then one with both a slightly larger version of your V but with two small inverted fins underneath. Got the idea from an old U.S. Navy fighter jet. Guess which one worked.”

“Number three?” Tom guessed but pretty much knew it would be the answer.

“Yep. I don’t know if it was the extension of the V by

about three inches or the addition of the fins or both, but the results are a rock steady tail.”

Tom thanked him and told the man to go home.

Bashalli stayed for an hour before she went home leaving Tom feeling much better.

He spent another hour on his computer before spraying his throat again and taking a nap.

By Monday he felt on top of the world. It took most of the day but he built the new test device that had come to him on Friday. Rather than push things at the end of the day, he locked up the lab and headed home.

Next morning he arrived early and refreshed. A call had come in from Mr. Sterling after he departed the previous day asking for an update. He called the man as soon as the clock hit nine.

“Mr. Sterling? Tom Swift. My apologies for not getting back to you yesterday. I was out from late last week through the weekend with some sort of bug, but I am fine now. And, I have that update for you.”

“That’s great news, Tom. I’m ready for some.”

Tom told him about how the design had come together and tested out. With some figures he had from Arv he was able to say that the drag coefficient was among the lowest of any glider design out there.

“The thing I still need to work on is the whole idea of it taking off on its own. That is going to require quite a bit of engineering, servos, cables and finding a flexible enough material that won’t fail on you. The good thing is I might have an idea, but it will take a few weeks to see if things pan out.”

Mr. Sterling said nothing for a few seconds and Tom now worried the man was about to say he was disappointed.

“Tom. I was out at a field the other day watching a group of model glider fliers and their excellent models. Some are about one-quarter scale and quite frankly, a bit frightening. The one thing that hit me was how these young

people launch their gliders. You see, most have what equates to a long elastic band they attach to the model's nose and then have someone hold the glider firmly while they march away into the wind with the other end and their remote control."

"Yes. I'm familiar with that. Once the band gets to the proper stretch the one holding the glider lets go and the band accelerates the glider forward. It usually heads nearly straight up there is so much lift and acceleration."

"Right. And, while I still would love to have a glider that can fly itself off the ground, I might entertain switching to the elastic approach. The only thing in my rules is it cannot be launched from another aircraft or from a mechanical winch system."

"Well, let me see how close I can get to your ideal, but it is nice to know we might be able to use some forward motion, at the least, to get things started. I'll give you another update in a week. Bye."

He got up and walked out of the office, stopping long enough to tell their secretary Munford Trent, that he would be in the lab and preferred to not be disturbed for the next several hours.

"Unless the usual? Your father, Harlan Ames, your mother and your girlfriend in that order?"

Tom grinned and nodded. "In that order. Thanks!"

Once seated at the workbench, Tom attached more than four hundred tiny leads to an equal number of the micro wires in one of the larger pieces of the space skin. It was one that had not previously been electrified so it was its original size.

Tom's new control board featured six slider controls with both positive and negative positions he hoped would allow him to vary the amount and even the direction of the power going through the wires.

As his experiments began he put just twelve volts through the wires and, as expected, there was no change. As he upped the amount to fourteen and then fifteen volts, the same incredible sight of the materials beginning to

grow, slowly but noticeably, along all the edges. As the materials gained a few millimeters around its perimeter, the wires also grew.

He next reversed the direction of the charge.

The material ceased growing but did not shrink. It simply remained as it had been.

Well, he thought, there goes that theory.

The control board allowed him to send power into the skin in a number of configurations, so he now tried just sending it to the outer fifty or so wires.

Again, the skin grew. It grew at the same rate as before when all the wires were carrying a charge and this made Tom wonder if the skin knew to only use the power around the perimeter, an almost impossible notion, or whether if simple could only grow at the edges.

Or, heal when cut or ruptured.

He reset things so power was only running through the center fifty wires.

As the power passed fifteen volts, Tom's mouth sagged open and he let out a strangled cry.

The skin was bulging slightly and just in the area where the horizontal and vertical wired crossed!

Tom reached up and tapped the TeleVoc pin under his shirt collar. "Damon Swift," he silently intoned. A *ping* said the call was being opened to his father.

"Yes, Son? I'm in a little meeting upstairs with Jackson Rimmer and the other legal eagles. Can this wait?"

Tom thought a split second. "It can, but I just found out something about this space skin I think you need to see. When you get finished come to the large lab and I'll show you."

"Give me fifteen minutes. See you then," and the call *pinged* off.

When Damon did arrive and Tom showed him the incredible sight of the skin growing only in the middle he was flabbergasted.

“That is incredible, Son. Absolutely incredible. Think of the possible applications.”

Tom smiled. “I am. As in Mr. Sterling’s glider. Instead of trying to find a material that can flex constantly without fatigue, I think I can cover the wings with this. There’ll be active components inside, but hinged to give strength rather than flop around.”

Mr. Swift looked like he was trying to find the right words for his next question. “Can you make enough of this skin or will you want to go back to the Moon and harvest all you can from that wreck?”

Tom was curious about that question, but answered, “If I start working on growing it right now, I believe I can manage to make the largest piece increase in size by about a square yard a day. I’d have enough in a few weeks for this job. Why do you ask?”

Damon grinned. “That conference I was in? Well, we have received a special request from the son of a very important man in the arena a space. His name is Andrew Aldrin and his father was the second man to set foot on the Moon. It seems he is suffering from a terminal disease and his final wish is to visit the site of his father’s landing and to step his boots into the bootprints that Buzz Aldrin left up there all those decades ago.”

“Would he manage the trip? I mean, the *Challenger* is not going to rattle him too much, but is he healthy enough to go?”

“His Oncologist thinks he is but he also would like to accompany Mr. Aldrin to make certain he’s comfortable.”

It was a strange request, but Tom felt a bit of empathy for the man. He had started a company to try to put a private lander on the Moon but had never accomplished the feat. When man had ventured back to the lunar surface he had applied for a position but was deemed to be too old. Now, it was almost too late for him.

“Call his people and set things up. I can leave in three days!”

CHAPTER 5/

ADRENALINE RUSH

TOM AND BUD met with Andrew and his doctor the day before takeoff. Now using a wheelchair while on the Earth, he did have the strength to walk short distances and the doctor assured everyone that he would be up to the task under the reduced lunar gravity.

“I am so grateful that you have agreed to take me up,” Andrew told Tom. “I know dad wanted to go back and both my brother James and I wanted to go see where he stood. Now, he and my sister have passed and it is just me.” A tear formed in his right eye and slowly traced down his cheek. “This means the world to me.”

Doc Simpson asked to be allowed to perform an exam of the man. He knew the rigors of space travel, even in the *Challenger* where everyone would wear an undergarment that interacted with a system to provide the feeling of gravity—at just about any level.

Andrew Aldrin passed, barely, and signed a waiver. His doctor also signed a waiver for the man and for himself.

They all flew out to Fearing Island that evening and spent the night in the guest quarters after having a special dinner prepared for them by Enterprises’ own Chow Winkler who would come on the voyage as chef.

“Now, bein’ as how I hear you got no dietary restrictions, an’ I read a little somethin’ ‘bout your pappy and the other folk who headed up to the Moon that day, they woke up to a steak breakfast with scrambled eggs ‘n other breakfasty things. So, we’re havin’ that featurin’ some good old Texas longhorn steaks. How’d ya like yers, Mr. Aldrin?”

“First,” the man said, “call me Andy. Everyone, please. Andrew seems too stuffy for an occasion such as this. And, I like my steaks medium rare. I also like them with a good salty crust but I have been warned to avoid salt for the rest of my life, so if you have something else to put on, I’ll

appreciate any good flavors I can get!”

In the morning it was decided that Andy could not manage to climb the ladder to get to the lowest deck so a special lift was driven over and he was raised to the “porch” outside the ship’s hangar. He got up on his own, took a long look around the island, and proudly walked in through the airlock and took the elevator to the control deck.

There, he was strapped into a special acceleration couch to cushion the takeoff forces, and the ship lifted from the ground fifteen minutes later.

Tom took the normally two- to three-hour trip much more slowly and they arrived at the Moon nine hours later. During their coasting period he had turned off the artificial gravity and allowed Andy and the doctor to float around.

Andy handled it quite well but the doctor had to be handed more than one “Bag / Evacuation / Stomach” as he did not take to the loss of gravity at all well.

Because the landing location of the Apollo 11 mission was an international protected park, they touched down half a mile away. Tom had spotted the small four-wheel vehicle that had been added to the contents of the hangar on his way in, and now he and Bud lowered it to the surface while Andy and the doctor, better for having some gravity to rely on, slowly climbed down.

The four men drove as close as they were allowed to go, then set out on foot being careful to avoid any existing footprints.

“We need to stop here, Andy. Anything closer is a no-go zone, but there are some prints out here that your father and Captain Armstrong made. I just don’t know how to tell them apart.”

Andy laughed. “That’s easy. Dad’s boots were three sizes larger than Armstrong’s. Look over there? They were standing side by side and dad’s prints are on our right!”

Seeing that the man was visibly shaking, the doctor asked if he needed to go back.

“Heavens, no. It’s just that for the first time in a year or more I can feel good old adrenaline coursing through my body. It makes me feel young again!”

An hour later Andy admitted that he was fatigued so they went back to the ship. A cable hoist was used to raise him from the surface and the doctor helped get him into the couch.

After checking the man’s vital signs he turned to Tom and gave his head a slight shake. They headed to the other side of the room while Bud engaged the man in some conversation about his father.

“He isn’t doing at all well,” the doctor said. “In fact, he is very close to death.”

Alarmed, Tom asked, “Do we need to rush him back to Earth? Can you do more for him there?”

The doctor actually smiled when he told Tom, “No. But, Andy knew this was going to be a one-way trip in all likelihood. He asked if he might be buried up here but I told him that is not allowed, so he will start to fade quickly. I can and will give him medication for pain, but there is no need to rush back. In fact I understand we were added to an already planned mission. You go ahead and finish that. I’ll take care of my patient.”

Tom lifted the ship off a few minutes later and they skimmed over the surface until they were heading into the border area between light and dark.

The alien ship was where they left it. It would be.

Over the following nine hours the boys walked back and forth between the stricken ship and their own bringing over as many items as possible, concentrating on gathering as much of the skin of the ship as they could detach.

At one point Tom thought he caught a glimpse of some writing on one piece and slipped that into the right thigh pocket of his suit. He wanted to get a better look at that once they got home and believe it might just get mixed up with the three-hundred other pieces they’d picked up.

Bud found a storage locker containing more than forty

boxes, each filled with a carefully packed instrument. "Probably spares," Tom told him.

Everything was secured in the hangar before they took off.

* * * * *

Back at Enterprises Tom began growing large pieces of the space skin material.

The polymorphic glider fuselage came together and the wings were starting to take shape. Within a twelve to fifteen days he believed he would have the plane complete thanks due almost entirely to his chance discovery on the Moon of the crashed space ship.

All the computer tests he could run showed that it would still require the initial pull to get off the ground, but once airborne it would be capable of at least level flight even in the absence of an updraft. Luckily for Mr. Sterling there would be ample lift for the first seventy percent of his flight and if attempted at the right time of the year, he would gain a favorable tailwind allowing him to complete the flight.

The only thing Tom insisted on, and got, was the agreement that the skin would be removed and taken back by Tom once the flight had been completed.

He still didn't want it to get out to the public. Not just yet!

EPILOG/

THE EUREKA! MOMENT

Tom sat alone in his underground office and lab. Over the past three weeks since his return from the Moon he had been greatly bothered.

It had nothing to do with the necessity of taking a dying man with them. Or, in having him pass away on the return trip home. Even the doctor had agreed it was the best use of his final time—Aldrin did say how wonderful it had been to not just get into space after all the years of trying, that he had fulfilled a life's dream of walking on the Moon.

His death had been unspectacular. An hour above the lunar surface he closed his eyes and simply stopped. Stopped breathing, stopped thinking. He stopped living without so much as an outrush of breath.

What bothered Tom was a discovery he had made. On the moon he shrugged off something that might later reveal itself once he had his collection of goods back in Shopton.

And it now added to the shocker he had found even before returning to the lunar surface. The one that had practically knocked him over it was so startling.

While the initial set of instruments that had undergone testing had been nearly unrecognizable on the inside and out—and Tom had finally dissected one of the damaged ones to see what was in it—their readouts, once energized and provided with a data string coming down his combination fiber optic line, had sent a shiver all up and down his spine.

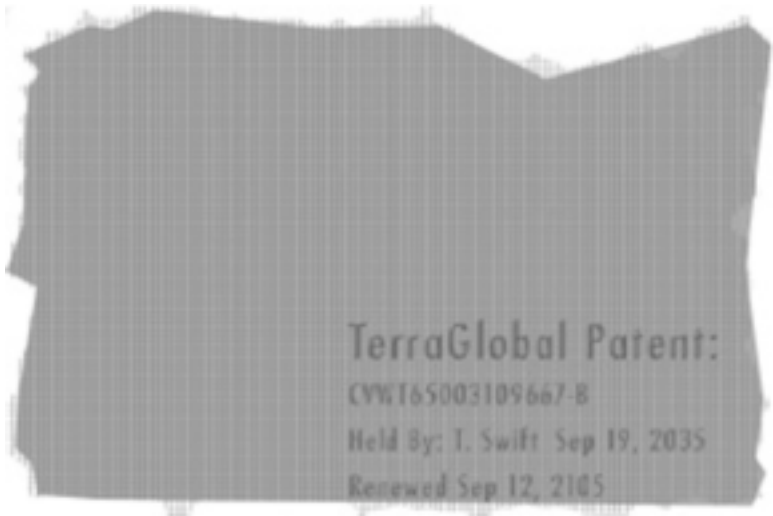
The readouts—just numerals at first followed by a string of characters—were recognizable *as English!*

To make matters far stranger, inside the instrument was a very Earth-like set of small circuit boards complete with chips containing markings that were also in English characters.

It had taken him days to get over that one.

But it hadn't been even that to make him wonder about his own sanity. It was something he found on the back of one of the smaller pieces of the spacecraft's skin. The piece he had torn away from its perilous attachment by a few of the micro-thin wires and shoved into his spacesuit pocket.

It was just about eight inches across and perhaps half that high, but it was what appeared in the lower corner that so shocked him.



Tom wondered if he ought to tell his father about it.