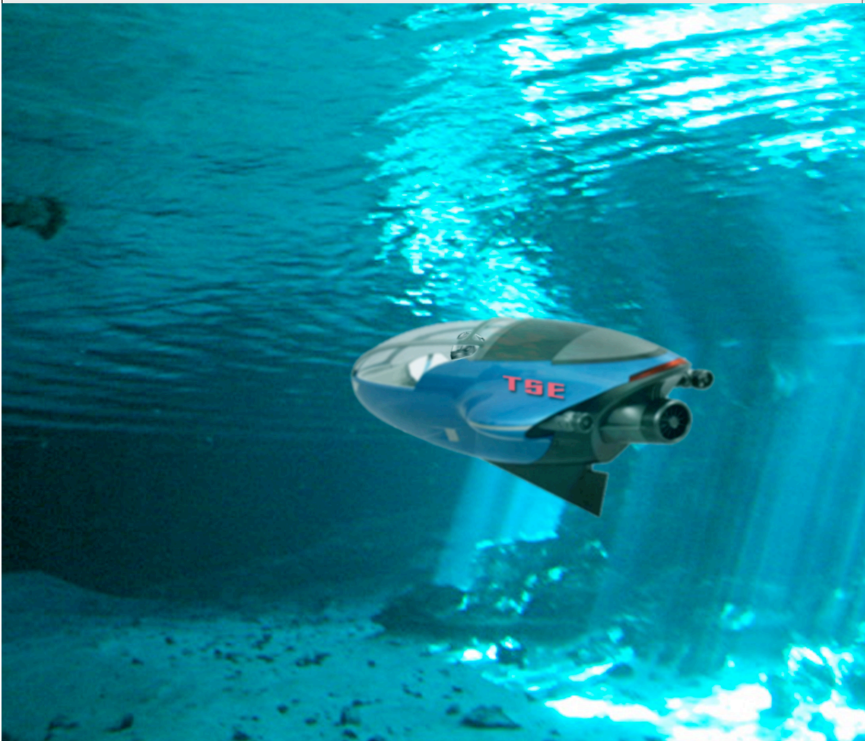


# **TOM SWIFT** and His **HydroCycle**



**By T. Edward Fox**

A SWIFT ENTERPRISES INVENTION STORY

# Tom Swift and His HydroCycle

By T. Edward Fox

Tom Swift accepts a challenge from his best friend, Bud Barclay, that he can't create an exciting, fast, safe and powerful new mode of sports transportation. It is actually a bet the flyer has with a military acquaintance that he believes only Tom can help him win.

Tom isn't certain where to start but, when he is asked to create a small submarine—by someone who turns out to not be who he says he is—it gets the inventor thinking.

With a limited budget and time he enlists the assistance of his top engineers and employees.

One test almost becomes a final voyage when his new vehicle is mistaken for an unfriendly contact by a U.S. attack submarine.

That wasn't part of the bet, but Tom won't back down!

This story is dedicated to the graphic designers Sungchul Yang and Woonghee Han who came up with the concept for the vehicle I have used as a springboard and inspiration for Tom's HydroCycle. They may never know how close their concept is to what I had been picturing but have no skills to draw. I thank them and hope they understand that I honor their efforts.

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# Tom Swift and His HydroCycle

## FOREWORD

Few people relish a challenge more than Tom Swift and few become almost giddy when they find a good challenge to issue more than Bud Barclay. While he would never knowingly bet on something that might get anybody hurt or damage property, he sometimes doesn't fully think through what he is saying.

In this case he has involved Tom with a challenge that he believes is either going to be a slam dunk or an impossibility.

He would prefer that it be impossible, but he knows his friend all too well. Just as Tom knows *his* friend better than anyone else, even Bud's parents.

This time the challenge is even more fun for Bud as he has discovered an online tool that he hopes will help him come up with the title vehicle. Now, I've tried to reign in our Bud in the past but he keeps slipping past my fingers. Looks like the slippery devil has done it again in this story.

The thing is, what he eventually gets our inventor to invent is an incredible piece of equipment.

*Victor Appleton II*

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## CHAPTER 1 /

### EAGER WAGER

“WHAT WAS that incredibly sleek little number I saw you driving during lunch?” the dark haired young man asked. “And, I don’t want to pry, but who was the equally sleek lady in the car with you?”

The questioner was Bud Barclay, a former high school football and track star who now was one of the top test pilots for Swift Enterprises, the four-mile-square industrial complex locate in upstate New York.

The person he was grilling was his best friend and world famous inventor, Tom Swift. Son of Damon Swift, also renown in science and technology, Tom had first met the flyer when they were teenagers nearly seven years earlier. They hit it off immediately and had been almost like brothers for years.

Of course, five months earlier they had become brothers of a sort—brothers-in-law—when Bud married Tom’s younger sister, Sandy. And Sandy was best friends with the woman Tom had married, Bashalli, who hailed from Pakistan but had spent her ten years in the U.S.

“That, Mr. Nosey Budworth, was Athenia Lane, the executive accounts saleswoman at Arrow Motors down in Virginia. And we were test driving the new Arrow PZ-5000.” He stopped and patiently waited for Bud to come up with the second level of questions.

“Okay. Now that you mention it I’ve seen her before. She’s in their TV ads, right? But—” and he raised his right index finger as if having a ‘eureka!’ moment, “why were you driving a car that will be in competition with the cars Swift Enterprises—I mean Swift Motor Corporation—will be building starting next month?”

“That is an even easier question, Bud. When the Arrow folks heard that we are building our own manufacturing company they begged to be able to purchase our Y-4 engines for one of their newest models. Both companies signed agreements to not disclose anything so I can’t actually tell you all the details. Suffice to say that Miss Lane was assigned to try to... impress me regarding the PZ-5000 and how it would be, she practically purred in my ear, ‘... the most wonderfully perfect combination,’ if only we would sell them the engines. She also hinted that if I ever decided to leave Bash, she would be very receptive to our getting together.”

“Jetz! But, she must be thirty or even older.”

“Yeah,” Tom said with a rueful grin. “It was all I could do to keep from laughing in her face. Talk about a transparent attempt. She’s a nice looking woman and all that, but for crying out loud. What did they expect me to do? Give her the keys to the company?”

They shared a good laugh over the mental image.

Finally, Bud inquired, “So, are you going to do the engine deal?”

Tom shook his head. “I really don’t think so. Athenia Lane notwithstanding, dad and I agree that all our production needs to go into our own cars for at least the first couple of years, and neither of us would want to let anyone build our design unless they could do it to our standards.”

Bud ventured, “And since they wouldn’t be able to use things like durastress and magnetanium, theirs would be inferior.”

“Possibly. If not inferior then probably not as robust or able to handle the stresses put on the crankshaft.”

Tom meant that the engine—basically three 4-cylinder engines arranged in an inverted Y formation and all connected to one central crank shaft—was always in a power stroke from at least two of the cylinders and that meant an enormous amount of thrust and torque—nearly five times that of a single engine of similar displacement. Traditional metal shafts would tear apart in minutes.

“Oh, well. So how does their car ride?”

Tom thought a moment. “It isn’t bad, but it isn’t as smooth feeling as other sports cars I’ve driven. If I didn’t know better I’d say the timing on their V-10 engine was off a little. I’ll never know.”

They walked a little farther before the flyer inquired, “What’s on your plate this week?”

“Not a whole lot, Bud. The Martian colony just took delivery of their third habitat and there’ll be about a three-month gap before we need to construct number four. Why? Do you have something in mind behind that slightly wicked grin on your face?”

Indeed, Bud was grinning in anticipation of something.

“I have a proposition. Actually, an Air Force friend I made when they let me test that upcoming fighter jet made me a bet. He’s a thrill junkie and does everything from sky diving to dirt bike riding. He even has done that thing where he and other fools get on special bicycles and ride down the side of volcanoes. Sometimes up to a hundred miles per hour.”

“If you are about to ask me to build you one of those, you can forget it. Your former fiancé, now wife, my little sister, would skin the both of us!”

Bud shook his head and rolled his eyes. He knew his young wife would do exactly that. “No. He sort of challenged me to come up with a new and exciting sports device. Something that can be driven or ridden that will take him places he’s never been. And when I say that he challenged me, he actually said he bets you can’t come up with something.” He looked hopefully at his friend.

“Does anything come to *your* mind?” Tom inquired.

“No.” Bud sounded disappointed. “Nothing. Well, you see I suggested either one of those little flying motocross jets you made for the folks out in Nevada, or even the little foldable planes we’re building for folks like the Australian Army.”

“And—”

“And he’s tried both and finds them to be a bit tame.”

“A hard man to impress I see,” Tom commented. “Well, you put on your thinking cap and I’ll put on mine and perhaps we can come up with something between us. Why don’t you and Sandy plan on coming to our house for dinner. Maybe the girls will have an idea.”

When they went their separate ways Tom called his wife, Bashalli, at her work to let her know.

“I am happy to have them over tonight, Tom,” she told him, “but we do not have much in the way of things for me to cook. I will do the meal if you will go to the store and get a few things. I will email you a list in ten minutes. Bye!”

When he received the list, Tom chuckled because he knew what she was going to cook. It was a favorite of his.

Five hours later and with two bags of groceries—that made Bashalli comment that Tom always spent far more at the store than she would have—he arrived home just five minutes after she did.

He put away the extra items he’d picked up because they sounded like things he might enjoy in a day or so and then assist her with the hardest part of the meal. It was to be chicken piccata and the breasts had to be thinly sliced and pounded to just the right thickness, according to her ideals for the dish.

By the time Bud and Sandy arrived the entire house smelled of

the aroma of the sautéed chicken, the onions, garlic, and lemon juice in the big pot on the stove.

Over the meal Tom brought up the subject of Bud's bet.

"Leave it to this guy to get you involved in something as silly as a 'mine is faster than yours,' bet," Sandy chided the two of them.

Bashalli wasn't so quick to condemn their efforts.

"You know, Sandra, that Tom has come up with many incredible devices. And while I can not say I fully approve of any effort to just build a toy, if he also had some other use for it, it could possibly be a wonderful thing." She looked at Tom with expectation in her eyes.

"Ummm, yes... well," he stammered. "I suppose that makes a lot of sense. Dad would probably not approve of me just spending a bunch of money on, as you put it, a toy. Of course," he continued as a gleam came into his eyes, "I might just have an answer for this."

"Are you going to tell us?" Bud asked.

"Of course he's going to tell us, Bud," Sandy said. "If he doesn't I am sure that Bashi will make his life miserable for teasing us like this. So, brother dear? What's going on in that mind of yours?"

"Let me go grab something from my notebook," he said to the other three. "It might even help me to have all of you thinking about this."

He got up and went upstairs, returning two minutes later with an envelope. As he sat down, Tom pulled out the two-page letter.

"Dear Mr. Swift," he read. "I am writing to you because of your reputation for creating amazing devices and vehicles, and because I have been made privy to one of your inventions currently in use by the British government. I refer, of course, to the one-man submarines they use to patrol their territorial waters."

Tom paused. The submarines the man mentioned were called SeaSpears and had been developed to safeguard a series of undersea nuclear reactors that had been installed around the British isle. The SeaSpears were used in either their manned or fully-autonomous modes to patrol the waters around the reactors keeping everything from foreign subs to frogmen away. Not even Bud knew their actual use and so he decided it would not be proper to mention it at this time. "It is a one-man mini submarine," he decided was the safest thing to tell them.



“He goes on to say that as an official of the Mexican government, he has been detailed to see if we might build a variation for them to use as interceptors for the small subs used by many of the drug smugglers to get their nasty wares into Mexico and the United States.” He set the letter down. “I’m tempted to tell him yes, but one of the specifications he included means that the current SeaSpears won’t do the job for him.”

“And, what is that?” Bashalli inquired.

“He wants the little subs to be capable of speeds faster than the kinds of torpedoes a few of these subs have been carrying. I don’t know if you recall but about three months ago a patrol boat suddenly disappeared off the east coast of Mexico. It wasn’t widely publicized but when they found the wreck it had a huge hole blown in one side.”

Sandy and Bashalli looked aghast.

“How fast do the SeaSpears go?” Bud asked.

“This is secret, but when manned with fewer batteries they can go above thirty knots and unmanned thirty-five.”

“How fast do these new ones need to go?” Sandy inquired.

Tom took a deep breath. “Closer to fifty knots to outrun some types of torpedo.”

Bashalli’s face was frowning as she asked, “But I do not understand. If your current tiny submarines are not capable of such speeds, what can you do?”

Tom chuckled and leaned over to kiss her on the cheek. “I guess I have to make something new that can go even faster,” he told her.

About an hour after he arrived at work the following morning, Tom’s father walked into their shared office.

“Good morning, Son. Your sister spent the morning yammering in my ear about you needing to make a torpedo or something like that. I know that can’t be right, so what is the real story.

Tom told the older inventor about both the Mexican request as well as the wager Bud and his Air Force friend had made.

Nodding thoughtfully, Damon Swift cautioned, “You could kill two birds with one sub, but I’d check out the Mexican side of things carefully. You might find that the requestor is actually not who he says he is.”

“What do you mean?”

“I mean that CarterDynamics over in Utah received a request last year for a fast and small cargo jet from someone purportedly with the Mexican government and almost began building it before the State Department ordered them to stop. Turns out the thing was destined to be a drug carrier for one of the cartels down there. So, word to the wise...”

“Well, I can build something so small that there would be virtually no room to carry anything,” Tom responded.

“Inside. But, what about them using it to rush in and plant a magnetic explosive on the side of a ship? Or, tow something filled with drugs? I’m just saying that you need to get both Harlan Ames and his Security people in on this as well as possibly contacting Washington.”

Tom agreed that this was the right thing to do and got up to take the letter over to Security.

## CHAPTER 2 /

### ELUSIVE CONCEPT

“I CAN certainly see why your dad is suggesting caution,” Harlan told the young inventor. “And, it’s a good thing you came to me with this. To begin with, although this has the crest of the Mexican government on it, I can just about guarantee that this is forged paper and not their official letterhead.”

“How can you tell?” Tom asked, surprised.

“Well, just like paper currency official governmental letterhead is carefully crafted and printed. There are hidden features that can be recognized that authenticate the paper. I can’t let you in on what they are but I know from looking at this that the paper here was printed on inferior stock by a color laser printer and most of the markers are blurry.”

“Wow!”

“Wow is correct. With your permission I will answer this in your name, requesting more information. I’ll also notify our Government and that of Mexico. We might be able to get at least this person.”

Tom left the Security building and walked across the parking lot and over to a small, nondescript shed. He typed a code into a keypad and the door opened revealing a small room with a stairway leading down and an elevator.

He took the stairs down seven flights to the floor of the underground hangar where his giant jet the *Sky Queen* was kept. He patted her underside for luck as he crossed the floor to the small personal office and the laboratory he kept there.

On the walk his mind could not shake the combination of mild anger at possibly having fallen for an illegal attempt to get him to build a submarine for the drug trade, and also the feeling that he could come up with such a submersible that might have benefits for fighting the drug trade as well as satisfying the bet Bud made.

For the next few hours he sat at his desk with a sketchpad in hand and a set of colored pencils spread out in front of him. Even though everything would be transferred into a Computer Aided Design program at some point, he preferred to start with hand drawings that could be studied, changed and even combined rapidly.

When Bud found him just before lunchtime Tom was sitting

looking at five drawings.

“Coming up with something good for the fellow in Mexico?” the flyer inquired.

Tom told him the news about the probable connection to the drug lords.

“Jetz! Not good. So, why are you drawing these?”

Tom looked at his best friend. “Uh, Bud? You did mention a little wager you made with an Air Force buddy, correct?”

Bud blushed and nodded. “Oops! I forgot about that.” He glanced down at one drawing that was very submarine like. “But, and don’t ask me why, I kinda thought you’d be working on something that flies. More along his line of things, you know?”

Now, Tom laughed and shook his head. “But, Bud. I fully intend to make something that flies. It will just fly through water, that’s all. Well, and maybe it will take leaps into the air for extra excitement. But, what I need to do to satisfy dad and Jake Aturian over at the Construction Company is to design something with actual, work possibilities.”

Bud pursed his lips in thought. “Uh, work for who?” he finally asked. “Or, is it whom?”

“For one, our own DEA, the Drug Enforcement Agency. For decades they have been locked in a never-ending race to remain ahead of the drug runners. With at least one unfriendly country down in South America able to turn out inexpensive two-man subs that can carry a couple tons of drugs—and seemingly more than willing to sell them to anyone with money—our people are hard pressed.”

“Depth charges,” Bud suggested.

Tom shook his head. “We don’t work like that, Bud. What if they dropped explosives on what turned out to be a scientific exploration? Or, a private sub on a peaceful cruise? No, the only way seems to be having the ability to chase something down and get a good, close look at it.”

Bud nodded. “Okay. I see that, but how does that win my bet?”

Tom explained that the first of the new submersibles would be both the testbed for any changes, it would also be loaned to Bud’s friend to be given a test as only a pilot might.

“We get his input and you win your bet!”

Bud pulled over a chair and the two boys sat looking over Tom’s sketches. One was quite similar to the current SeaSpear with the

difference that instead of just two ducted propellers it featured four in an X orientation. It would only be good for about 8 hours of running at moderate speed with one or two bursts to top speed, but had the advantage of being eighty percent identical to the existing craft.

Two others looked more like miniature conventional submarines and the fourth one was basically a one-man seacopter able to skim over the surface of the water at perhaps one-hundred knots and then dive under the surface and travel at nearly thirty knots, according to Tom.

It was the final design that caught Bud's eye and he could see that it was the one Tom favored.

It looked like some sort of a pod, or even the front end of a sleek sports car. Behind the wraparound canopy were two stubby wings and what appeared to be a vertical stabilizer, but it was under the craft, not above it.

What made it look *very* interesting were a pair of what looked like jet turbines coming out from the wings and a larger one right at the very back.

"Water jets?" Bud asked pointing at the trio of possible engines.

"Well, yes, but I'm not certain how to power them. I haven't done all of the computations, but if we use high-torque electric motors to run those then the space I've made for batteries is only going to give about ten hours of operation."

"That's better than the eight of the first design, isn't it?"

"Yes, it is, but I want to make this capable of running twelve to fifteen hours."

They sat in silence for another few minutes until Bud pointed at a gray-shaded area at the top rear of the body. "What's that?"

Now Tom perked up. "Air brake. Well, water brake. I figure if this is traveling at high speed and needs to slow down in a hurry, even reversing the water jets don't do it efficiently and fast. So, the stabilizer underneath splits open in a V and that panel rises up. It will remain stable that way, plus if used while making a sharp turn, one side of the stabilizer/rudder moves out farther than the other and shoves the back around."

He told his friend about several other refinements he felt he might managed to incorporate.

"For instance, the canopy will be coated like all our submersibles and there will be one of our underwater light systems up front. I can eventually put sonar-receivers around the body but won't need

to do anything about active sonar pinging since the pilot inside will have access to both the bright light that can't be seen by another vessel, and they will also have a pair of Digital BigEyes to look out long distances.”

Tom's incredible combination of powerful telephoto lens and video enhancement system could bring object many thousands of feet away into sharp focus and appearing as if they were mere yards from the viewer.

“And there will be a camera array at the back so nothing can sneak up on this. It needs a lot of work, but I'm pretty happy with the basic design. What do you think?”

Bud grinned. “I think that I want my turn in this before my junior bird man friend gets his behind in the seat!”

\* \* \* \* \*

By the following afternoon Tom was ready to call in a couple of Enterprises' top employees and the men who would take his design and turn it into reality.

Hank Sterling was the pattern maker and fabricator for Enterprises and it would be his job to take the design, figure out how to best build it from the fewest individual parts, and then create patterns, jigs and molds to do just that. If this ever went into mass production such items would be mandatory.

Arv Hanson was the model maker who always built the scale static and functional models of both Tom's and his father's inventions. Dozens of these lined shelves in the shared office.

The two men arrived together and took seats with expectant looks on their faces. Tom rarely failed to impress them with his inventions and vehicles, so they were looking forward to whatever he was about to reveal.

In order to get their real opinions, Tom showed them the entire set of drawings arranged in no particular order. Both men studied them for many minutes in silence before Hank looked at Arv and then pointed at one of the designs.

Arv nodded and it was moved to one side.

This was repeated three more times until only one drawing remained.

“Tell us about this one,” Hank requested.

Tom smiled. It was the one he and Bud both liked. Over the next half hour he detailed many of the features of the small one-man submersible. When he was nearly finished Arv inquired, “What about propulsion? I mean, those three aquajets would suck the

power out of a good trio of our largest solar batteries in no time.”

Tom nodded, sadly. “There is that, but I also have a bigger problem. My intent is to shoot these through the water at fifty knots, but the best of the underwater aquajets I can find, at least in sizes to suit this craft, would probably only get it up to around forty knots.”

“What if you lengthened it out and made the nose pointier?” Arv asked.

Hank put a hand on his friend’s shoulder. “Won’t work, Arv. Think about it. Have you ever seen a submarine or torpedo with a pointy nose?”

The model maker had to think a moment before admitting he had never seen such a thing.

“That’s because although the nose slips into the water better, that same fluid flows tightly down the sides, meaning friction, and that slows the body. Torpedo, sub, whatever. Engineers found that if they rounded the nose it makes the water swirl around just off of the main body. Kind of like a golf ball. With dimples, it flies great. Without them, it slows quickly and hits the ground.”

“Hank’s right. As it is I now believe I have to do something about the flat back end. Perhaps even carve it out a little to let the water swirl back there pushing everything forward.”

The meeting broke up with Arv promising to take Tom’s paper design, scan it into the computer, and get everything ready to make a small, working model. It would end up being about three feet long so that batteries and electric motors would be added.

“Have the design ready for your okay tomorrow afternoon,” he promised.

Tom only hoped that by that time he might have come up with a better idea for giving the little craft good forward propulsion.

By the end of the day he still had not come up with an idea, and so he shut off his lights, took the elevator to the surface, and headed home.

## CHAPTER 3 /

### DIFFICULT BUILD

TOM TOSSED his keys on the table by the front door. "I'm home, Bash," he called out. He could hear the noise of their dishwasher running in the kitchen, behind the closed door. Seconds later the door swung open and he soon had his arms full of his beautiful wife.

"I am so happy that you are home, Tom," she told him as she hung from his neck. She put her feet back on the floor when she noticed the look on his face. She had seen the same look several times in the recent past when Tom was having problems with a project at work. "What is not going correctly?" she inquired.

Tom smiled at her. She knew him very well.

"You remember the discussion we had when Bud and Sandy were over? The one about Bud's little wager and also about the Mexican request?"

She nodded. "Of course. It has not been all that many days after all. Why?"

He pointed at the sofa across the living room. "Let's sit. I've got a story and a problem and we might as well be comfortable."

She sat a few feet away from him, hands in her lap, with an attentive look. It made Tom smile again even though he was feeling less than totally happy.

"Okay. For starters, it turns out that the letter I received came not from an official of the Mexican government; it was from an intermediary of one of that country's leading drug lords. According to Harlan the man has been using his diplomatic immunity as a minor worker in the Mexican embassy as a cover for his activities supporting the drug trade. His cover has now been blown and the Mexican government turned him over to our CIA last night. The whole thing was a ruse to get me to build one or more fast subs to ship drugs into the U.S." He sighed.

"And, that is now not going to occur," she said. "Good."

"Right. But I still want to build that small sub. Not just for Bud's friendly bet, but because I now believe it can be a great weapon for use against drug smugglers." He looked into her eyes.

"Does father Swift not agree to allow you to build this little submarine?" she asked.

"No. In fact he agrees with me that it has great possibilities. The



problem is that I'm not certain how to make it go as fast as it needs to. It has to outperform the drug people."

Bashalli scooted a little closer and took both of her husband's hands in hers. She squeezed them before asking, "And, what is it that keeps you from making something to do that?"

Tom squeezed back. "Well, for starters and given current underwater technology I would have to upsize all three of the drive units by about triple to get the required output, and that would mean I either upsize the entire craft to hold even more batteries or be satisfied with it only running about two hours. Oh, and the topper to that is by making it larger I would also have to make the drives larger still to keep up the speed and that takes more power..." he left the rest unsaid.

Giving Tom a wink, Bashalli stood up and declared, "Let me have a few minutes and I will try to come up with something for you."

As she disappeared into the kitchen Tom had to let out a chuckle. She might be an optimist, but she was earnest.

Sitting at the table ten minutes later over a delicious casserole, she reopened the subject. "Tell me more about little submarine. I can not even picture it."

Tom wiped his mouth. "If you can excuse me for two minutes I'll go up and print off a picture of it." After she nodded, he raced out of the room and up the stairs to his study.

Even before Arv had been handed the drawing, Tom scanned it into his computer. He hit the PRINT button and a single sheet of paper came out seconds later.

Downstairs Bashalli was waiting, sipping her water.

"Here it is," he told her, setting the page on the table between them.

She hummed and ummmmed and ahhhed for more than a minute before looking up at him. "It is cute," she exclaimed. "What are those?" she asked pointing at the two pods that would hold the smaller propulsion systems. "And that," now pointing at the single larger unit.

He explained that they were the drive devices.

She asked a few more questions but nothing really came from their talk.

The next day Arv called Tom at around three to announce that he had the first model ready.

“I put in the same sort of screw drives I used in the original jetmarine model. It won’t give you amazing speed, even when computed up to account for scale, but they will get the thing moving.”

Tom asked if it were remote controllable.

“Ultra-thin wire control. I’m afraid someone will have to be in the water for this one. Want me to call Bud?”

Tom laughed. “No. I’ll meet you at the big tank with my trunks on. Fifteen minutes?”

“Absolutely!”

When he got to the large outside water test tank, Tom slipped into the small bathroom at the rear of the control bunkhouse and changed. He emerged a few moments later and dove right into the pool. Surfacing he saw Arv walking up to the edge of the ten-foot-deep pool with a large duffel bag slung over his right shoulder.

“That it?” he asked pointing at Arv’s bag.

“Yep. Let me grab an air tank for you and then I can have this in the water and running in a few seconds.”

Tom had actually thought he might just use a snorkel and mask, but his model maker was correct. He needed to be able to settle to the bottom and run the model all around himself. Five minutes later that is exactly what was happening.

As the model swooped and turned, rising and falling at Tom’s command, it was obvious that general shape was mostly correct. It was also obvious that it could go much faster if only Tom could figure out a good propulsion system.

“Did you test that water brake?” Arv asked as Tom rose to the surface.

“Oops! I actually forgot to ask if you were able to do that in this first model. Which button?”

“Yellow button and then middle slider. Another button press pulls it back down and returns that slider to controlling the larger, central water screw.”

With a little waive, Tom submerged and sent the model racing across the pool. As it came within fifteen feet of the edge he pressed the button and slid the control up. In just half the remaining distance the model came to a halt. Tom made a mental note to put an accelerometer into the model and to see what sort of negative G-force a pilot would be subjected to.

After getting dressed he gave Arv several verbal notes—

including the accelerometer—and asked that a small high-definition camera be added inside the cockpit area. He intended to make future tests from the dry deck around the test tank.

He dried off and headed for the shared office where he hoped to speak with his father. Mr. Swift was getting ready to leave for the day when Tom walked in.

“I have to be in Washington tomorrow at eight a.m. and promised to spend a little time with your mother tonight. What’s up?”

Tom told the older inventor the results of the test and about his frustration at not being able to outfit the potentially fast craft with an equally fast drive system that didn’t draw down the power from a bank of batteries within only a few hours.

Mr. Swift was sitting on the edge of his desk nodding as he listened. When Tom was finished and looked to see if his father had any hints or ideas, Damon changed from nodding to a slow shake of his head.

“I can’t think of another drive system that is both small so it fits inside the drive modules and is powerful without being an energy sucker. All I can say is think about outfitting at least your full size test version with one of your nuclear power pods. It would give you enough continuous power to run at full speed for ten or more hours before it needs to go into rest and recover mode.”

It was something Tom briefly had considered, but felt that the mandatory 12-hour recovery period once the pod’s energy level reached below ten percent would be too limiting. Of course, he would need to see if the submersible would draw that high level of power. Perhaps it was one part of the solution.

An hour later he also left and went home.

Bashalli was just arriving from her own job at the local advertising agency where she managed the team of three illustrators. She kissed him and suggested that they make dinner together.

After changing, they stood at the sink peeling some potatoes and parsnips for a roasted vegetable purée they both enjoyed.

“So, father Swift suggests using the power pod? Do you not agree that your small submarine will be used mostly in daylight?”

Tom nodded, unsure where this was going. “Possibly...”

“Well, I think unless it is run at top speed all day long, it should be able to operate for twelve hours in the water and then twelve hours back at the dock. I certainly would not wish to be a pilot

inside one of those for more than half a day!”

Tom had to agree and told her so.

“Tell me more about the engines or whatever you call those pusher devices.”

“Water will be taken in by two scoops in the front of the little wings and one under the pilot, like jet intakes, and then be channeled into the two side jets and the larger body jet.”

“Oh. So those are *jets*? Like in airplanes?”

“Not exactly. They take in water, compress it and expel it out the back—” he stopped. “You know, they *are* pretty much like jet engines without the burning fuel.”

She glanced back down and then up into his peering eyes. “So... they are like your Quieturbine engines. Those do not use fuel. They take in air, compress it and push it out the back. Or, have I made a mistake about that?”

Tom was looking strangely at her. “Go on, Bash.”

She wasn’t sure what he might want her to say. But, she leaned forward and took a closer look at the page. “How different is it when you try to compress water instead of air?”

“Well, water doesn’t actually compress. It can be put under great pressure but if it did get thicker, like air does, that would make it impossible to run submarines through it at more than a hundred feet or so. Why do you ask about that?”

She sat back up straight. “It is just that if you can make a jet engine that burns no fuel and runs from electricity that operates some of your small repelatrions, it is really that much different to do the same thing in the water?”

Tom looked at his wife and a small tear of joy formed under his right eye. He leaned over and kissed her.

“I am going to have to talk to dad about putting you on some sort of retainer as a special consultant. This is probably the tenth time you’ve hit on an answer to something I’m just too close to see.” He kissed her cheek.

Bashalli looked puzzled. “While I am sure that would be a nice thing, I do not really understand. What did I say that you had not already thought of?”

“Quieturbines? My Quieturbines? You basically asked why I couldn’t just use something like that. And you know what? I believe I might be able to!”

## CHAPTER 4 /

### DESIGN REFINE

WHEN BUD stepped into the underground lab the next morning he could tell that Tom had been there for several hours. Typically a neat and organized person, Tom had dozens of pages strewn across his desk and was furiously working on a lengthy calculation. When he finally looked up it was to see Bud's amazed face.

"Oh. Hey, Bud. Why the look?"

All the dark haired flyer could do was shake his head and smile. "I've never seen more than a few pieces of paper on your desk at any given time, much less than seeing you appear to have gone crazy and look like you've been at it for hours."

Tom sat back and placed his calculator to one side. Stretching he had to look around and nod. "Yeah. It does sort of look like your desk more than mine. But I have a good reason. Last night Bash gave me a great idea."

Bud raised one eyebrow that Tom chose to ignore.

He described her questions and particularly about why there could not be an underwater version of the Quieturbine engine. Basically constructed like a jet turbine but without the combustion chambers or any need for fuel, the compressor blades were turned by a series of small special repeltrons set only to repel the exact molecular structure of the blades.

They had come about when Tom was asked to find a solution to jet engine noise at airports and also a way to maximize fuel economy. They were as powerful as fuel-burning engines and, as the name indicated, nearly silent.

"Will they work in the briny deep?"

Tom tapped his calculator—actually his tablet computer running a powerful scientific calculator program—and replied, "According to everything I'm putting into this, the answer is yes. It can't do it using a set of blades like we use for the jet models, but as long as I do the water compression in stages, probably in eight increasingly acute blade sets, it will work."

He showed Bud the figures he had copied onto one of the pages on his desk.

"You do know that I never took Greek, or geek for that matter, so all of that is squiggles and wiggles to me," Bud confessed. "In fact, I have to admit to being stumped at how to even make fun of

it and come up with a great name for the system. Forgive me?”

“Well, you are slipping but I’ll give you another couple of chances as this all comes together. But,” he held up a warning finger, “nothing like SuperSquirt or Archimedes’ Revenge. Understand?”

Bud’s head hung low. He was known for always coming up with a pun name for Tom’s inventions. This time, the inventor had just told him the only thought coming to mind—SuperSquirt—was a non-starter.

“I suppose,” he sighed, in an over-dramatic voice.

Tom turned his computer screen around to show his friend a cutaway picture he had worked on when he first arrived at Enterprises that morning at 5:00 am. It was both simple and yet elegant, and Bud knew that it would be even more of both once realized as an actual machine.

“Uh, Tom? Are the repelatrions okay in the water? We’ve never used them in anything but air and outer space.”

Tom smiled. “We won’t be using them in water,” he said with a casual air.

Bud’s jaw dropped. “How’s that possible? I mean, these *are* underwater engines, aren’t they?”

“Oh, yes, they are that,” Tom replied. “But take a look a little closer at my drawing. The five small repelatrions I envision using in the small turbines and seven in the larger one are all contained in a waterproof ring here near the front. See?” He tapped the screen and the drawing increased in size for a better view of that area. “In fact, they are surrounded not even by air, but are in a vacuum.”

As the flyer looked more carefully Tom noticed that his jaw was moving almost as if he were “speaking” on one of Enterprises’ TeleVoc communication pins. But, Bud wasn’t. He was muttering things such as, “Well, I’ll be darned,” to himself.

Tom had set things up so the vanes to be pushed in rapid succession were at an absolute perpendicular angle from the emitters. This would allow maximum push, or thrust, which would be unhindered by air compression and would result in almost total transfer of power to the spinning compressor blades inside the water-filled part of the turbine.

Seeing his friend now nodding in appreciation, Tom explained a little more.

“I’ve decided the best arrangement is nine sets of compressor

blades in all. The first two sets are spaced so that an equal area to that of any blade appears directly next to it.”

Bud held up a hand. “Do you mean all those gaps?”

Tom laughed. “Yes. The gaps take up as much space all around the blade set as the blades themselves. Then, in the following sets that space drops to a lower and lower amount until the final blades, now acutely angled, are right next to each other like you would find in a regular turbine engine.”

“And the tube narrows the farther you get to the back?”

“Only slightly. Any more than about ten percent would be counterproductive.”

“So, the water comes in the front at whatever speed the sub is going—or is being sucked in at some minimum amount—and gets progressively more and more compressed and finally shoves out the back?”

“Right, Bud. Although it might be better to say ‘sped up’ than compressed. Fast enough that I believe my little craft here will do nearly sixty knots underwater. More if I upsized the two wing turbines, but I don’t plan to do that. Unless a real life test shows differently, we will just about push the limits on the shape of the rear end to not build up negative pressure that would hold the thing back. Or, worse...”

“Worse?”

“Yes. I haven’t done any of the data entry to run a simulation, but my preliminary and rough calculations tell me that above a certain speed this might build up a spiral pressure at the back that would cause the craft to suddenly begin spinning. At that point it would turn into an uncontrollable and rapid roll for the pilot. I’m not certain if anything can be done to eliminate that other than set a maximum top speed and have the craft shut down if oscillation or spinning happens.”

With an exaggerated gulp, Bud said, “Just be sure you have that all figured out before you let me take it out for a spin... oops! Bad word. Ummm, before you let me have a go with it. Okay?”

“I promise.”

“Great. And I promise to come up with a really good name for it,” Bud told Tom before leaving the inventor to get back to his work.

Just a little over an hour later Tom called Dianne Duquesne in the Propulsion department. Dianne and her team hand built all prototype engines and motors used in Enterprises’ devices. He

told her about his project and the need for an adapted version of the QuietTurbine engine.

“Two different sizes?” she asked. “I’ll be right over; I’ve got to see this design. Are you in the big office?”

“No. I’m in the underground office, but now that you mention it, maybe it would be best if we did meet over there. We can spread out all these pages I’ve been scribbling on.”

Tom looked at his watch.

“Dianne? Why don’t you come over there in an hour? I’ll have Chow set up a lunch for us. Will you be coming alone or bringing Artie?”

She laughed. “If there is food involved then Artie will tag along, invited or not. Count on two of us!”

Artie Johnson—no relation, as he kept pointing out—had been an intern a couple years back and immediately made such an impression of those around him that he had a job offer in hand before his third week at Enterprises had passed. He had a special talent of looking at a wide array of information and then boiling it down in his head to come up with suggestions that had meant the success of at least three projects. Without any fanfare, he had become Dianne’s unofficial assistant.

Over bowls of turkey and okra chili supplied by Chow, they got right to work.

Tom had spent the extra time putting his turbine drawing into his computer’s CAD program so they were able to look at it from all angles.

“The small one isn’t going to be a problem,” Artie declared. “But I think you should consider moving the repelatron ring back toward the middle of the entire assembly, especially in the larger one, to offset any uneven torque caused by the high pressure in the back.” He looked at his two bosses and blinked.

Dianne looked at him and then at the design, and then back at him. She turned slightly to look at Tom. “He’s right.”

“I know,” Tom told her, smiling. “Good call, Artie, and I see just how to do it. Right now about sixty percent of the central water turbine sticks out the back. If I pull that perhaps fifteen percent of that back inside the main body I can build the central ring around the outer casing and not have it affect the water flow or hydrodynamics. I like it!”

An hour later and with three additional, but small, refinements added to the to-do list. Dianne and Artie headed back to their



offices with the agreement to have at least one of the smaller units built in less than a week.

Even before the office door was closing Tom picked up the phone and dialed Arv's number. "Come on over to the big office. Oh, and see if you can snag Hank as well. It's time to get serious about this underwater scooter."

The two men arrived ten minutes later and sat down. Tom showed them both the CAD drawing of the new underwater turbine as well as three design changes he had made to the craft itself.

"Is that what I think it is?" Hank asked pointing at the round object that took up about seventy-five percent of the space behind the cockpit.

Tom nodded. "Assuming you think it looks a lot like one of our power pods, then you are absolutely right. And the reason I now believe we can use one is that the repelatrions need a constant and steady level of power to operate. Unless I add a couple hundred pounds of electronics to even out the power from a bank of batteries, we would have some problems once they were about half discharged. Another plus is the water turbines will not draw too much power so they can run for days without having to let the pod rest."

"How fast will these new—umm, what are you calling them, by the way?"

Tom shrugged. "I was thinking of something simple like HydroTurbine. I think Bud wants SuperSquirt or AquaShove, but I've already told him 'no'."

Arv and Hank smiled, and Hank continued his question. "How fast will the HydroTurbines move that thing?" When Tom told them it would be nearly sixty knots, both men's mouths hung open. Finally, Hank shut his and said, "In the open sea I guess that will be fine, but I'd hate to be piloting one a few yards above the ocean floor, weaving and dodging, at that kind of speed!"

Tom told them both about Bud's Air Force friend and his desire for something that would fire up his adrenaline.

Arv nodded. "This'll do it!"

## CHAPTER 5 /

### DANGEROUS TEST

OVER AT the Construction Company sat a marvelous piece of fabrication equipment. It was a giant vacuum forming tool capable of making very large pieces of such things as aircraft. In this case—using a variety of materials in layers—Hank set things up to create all of the body parts, plus the clear tomaquartz canopy, in a single session.

The machine featured interchangeable giant spools of the various materials to be used. Each one could be drawn over the appropriate area of the large mold, cut to proper size and then added to with other layers until the proper mix of materials was in place. Then, once everything was ready and the top of the machine was lowered, liquid resin, based on clear tomasite, could be pumped into the mold, vacuum pumps would draw off the excess and an ultraviolet curing light would travel end to end—top and bottom—setting everything solid.

All that remained after that was a two-hour session in one of the hot, paint curing rooms, a little trimming and then assembly.

While Hank created the molds for each component of the body, Arv worked with Tom to create the interior of the cockpit.

The single seat could accommodate anyone from about five feet tall up to six-foot-four via a combination of a sliding seat and a touch-sensitive control panel that moved toward and away from the pilot to suit their individual needs. Like an aircraft—and both Tom and Bud had it in their minds that this was more an aircraft of the sea than a submarine—control was made via a combination steering pedals and a joystick.

The computer program Tom had written in the evenings after dinner would ensure that anyone familiar with flying would have an immediate comfort with the submersible.

As the two boys stood looking at the partially assembled body sitting in a padded cradle one afternoon they discussed what to actually call it.

“Okay. I’ve discovered an online tool that helps come up with incredible names for things. Even book titles. I put in a few parameters and it came up with,” Bud said as he ticked off things on his fingers, “WaterPod, SeaScooter, MiniSub, AquaRacer, WonderWhoosh and That Fast Underwater Thing. I’m not too thrilled with any of them. Have you got any ideas?”

Tom smiled. “Just one and it isn’t mine. Dad actually suggested it. Since this thing is designed to race around under the surface and will have incredible steerability due to the aqua brake system, he gave me the name, *HydroCycle*. What do you think?”

Bud tilted his head to the left and then to the right before walking all around the twelve-foot-long craft. He periodically reached up to run his hand over the beautifully curved body and could be heard muttering to himself. He came back to stand with Tom.

“Yep! But, can we call the drives HydroBines? At least that way I get something in for this.”

The inventor laughed out loud. “Sure. HydroBines, and I’m assuming that is with a capital B in the middle...” Bud nodded, “... is what the drive pods will be known as.”

The next week Dianne delivered all three of the HydroBines to the Construction Company where they were installed before the entire craft was trucked over to Enterprises and placed into their water equivalent of a wind tunnel. Located inside one of the hangars at the northwest part of the grounds, it had first been used to test Tom’s little Jetmarine sub.

Being slightly buoyant the *HydroCycle* floated in the water while the restraining harness was placed around it. This was attached to a cable and winch system that measured the amount of pull a submersible or even a surface boat exerted. That, in turn, was used to compute the speed it would be traveling if free to move.

To submerge, the *HydroCycle* had a small ballast tank that wrapped around the lower portion of the hull. It was only necessary for the initial submersion and then would automatically empty once the craft was underway.

Bud agreed to be the test pilot for this static test. As he was settling into the seat he looked up at Tom.

“Just a small question, but since this thing has no elevators or ailerons how exactly does it steer?”

“The stabilizer underneath provides most of the left-to-right steering while the wings give yaw and the back end of the aqua brake gives you pitch up and down.”

Bud looked puzzled. “I didn’t know the wings moved. They sure don’t look like they can move. So...?”

Smiling, Tom explained. “The top and bottom rear portions of the wings flex using electrical charges to shape the composite

metal under the blue, polymer skin. At slow speeds these movements are greater by about fifty percent to give you better handling. The faster you go the less they flex so you can't oversteer or end up spiraling."

Bud flipped the power switch, watched as the indicator lights on the single, curved flat-panel screen in front of him all changed to green and then gave the joystick a little try. He craned his neck out the left side and could see what Tom meant.

"Got it. Well, let's seal up and get the test going." Pressing a switch at the top of the screen caused the hydraulics to pull the canopy down. Seconds later he heard a hiss as the pressure seals set themselves. According to what he had been told, the *HydroCycle* would be perfectly safe down to about five hundred feet.

He gave a thumbs up signal and settled into his seat.

A display outside the tank showed the countdown. As it reached "10" the harness and *HydroCycle* were pulled under the surface. His own control screen now showed the final seconds.

3... 2... 1... ACTIVATE

Bud pressed the red button on the top of the joystick. It released with a slight click and he moved it forward to increase his speed. Five seconds later his gauge was showing his apparent speed as **15 KNOTS**.

He tried the steering and found it to be wonderfully responsive. In minutes he would almost have been willing to swear that the *HydroCycle* was anticipating his actions. By the time the fifteen-minute test program had been completed, he was ready to give up his next two vacations for a chance to take it for a trial in the open ocean.

The test had been a success, at least as far as the equipment was able to measure. The test tank had not been built to register speeds above forty-five knots and so they still didn't know what it was capable of.

Two days later Tom, Bud, Sandy and Bashalli climbed into the *Sky Queen* along with Arv, Hank, Dianne, Artie and Mr. and Mrs. Swift. In the hangar at the rear of the aircraft sat the *HydroCycle*. They had decided to fly down to a small island in the Caribbean for the first open water test.

The island was uninhabited but had a large asphalt pad situated right next to the small, protected natural harbor. Typically it was used by Coast Guard and Navy helicopters on rescue missions, but Tom arranged to use it for the day.

He set down with the *Queen's* tail hanging out over the water. Using the winch inside he eased the *HydroCycle* into the water about thirty feet off shore. There was enough water underneath to float it and to allow it to sink so the HydroBines could operate.

It had been decided to have Bud wear a special helmet for the test. Because the negative G-force from a sudden stop still was unknown, Tom didn't want to take any chances. The other plus was that the helmet sealed around the pilot's neck and a built-in air tank could provide breathable air for about two minutes in case of any unforeseeable event.

With everyone else standing on the shore, Bud closed up the canopy, waived at them, and turned the *HydroCycle* to face the open ocean. In a minute he had skimmed along for over three hundred yards and then the little craft disappeared.

"That had better be the way this is suppose to go, Tomonomo!" Sandy stated in a warning voice as she and Bashalli set up folding chairs and prepared to get a little sun.

"Absolutely. The whole idea is he will take her out for a fifteen minute run. About seven minutes away from the island he tries a couple of braking events and then a run back here."

Inside the cockpit Bud was feeling like a kid in the proverbial candy store. The minimal gauges—speed, depth, inside pressure, outside pressure, power consumption and air supply—barely had to be looked at. Strapped in tightly his body felt as if it were one with the vehicle as he performed a series of turns to both sides and descended to about one hundred feet. The ocean floor was now just yards away and he used several rocky outcroppings as if they were pylons in an air race.

He was still only traveling at about thirty-five knots. The plan was to go for about five minutes before trying some harder maneuvers, and to hold off on testing the top speed until the run back to shore.

He pushed the joystick hard to the left while depressing the left pedal all the way. The *HydroCycle* practically went over on its side in the tight turn that Bud's instincts told him was probably putting 2-Gs on his body. He released the pedal and brought the stick back to the center position and the craft was quickly upright and picking up speed again.

All too soon the timer on his wrist announced that the braking maneuvers were due to happen. He gave her a little more speed—now traveling at forty-five knots—and then shoved in both pedals simultaneously to activate the braking system.

He was glad the straps of his harness were tight and that they held because the little submersible came to a halt within about fifty feet. It felt like the time he had been catapulted off an aircraft carrier in a backward-facing seat. And, just like that time, he found that he had bitten the end of his own tongue.

*Great*, he thought as he pressed the tip against the back of his upper teeth. *Sandy's gonna see that and have a fit!*

He ignored the slight pain as he got underway again, swinging the craft around for the planned high-speed run back. Seconds later he surfaced to send Tom a message.

"She's running great, skipper," he reported. "Everything to this point is exactly what we hoped for. I'll see you all in about seven minutes."

"Roger. Your voice sounds a little odd. Nothing's the matter?"

"Nope. Must be me trying to talk while smiling," Bud lied.

Seconds later he was traveling at a depth of about twenty feet and steadily increasing the speed.

Thirty...

Forty...

Fifty...

Fifty-five...

Fifty-eight.

And that is where the problems began.

Without warning, as Bud was making a small adjustment to his course, the *HydroCycle* began vibrating. This went away a few seconds later but was replaced by the entire craft starting to turn over on its left side. Bud couldn't stop the rotation and he soon had made the underwater equivalent of a barrel roll. But it didn't stop there. He kept rolling for another two complete rounds until he managed to pull back on the throttle button and also push the stick forward and in the opposite direction.

As he slowed down Bud was very happy that he was a pilot in the air first and foremost. His training had helped him recover. Somebody without such training might get into dangerous and deadly trouble if that happened at speed.

It was something he would have to talk to Tom about. But first he was trying to think of what to tell Sandy about his bloody tongue!

## CHAPTER 6 /

### ADRENALINE RUN

IT TOOK TOM three more days to come up with the solution. It was simple to install the fix and a second test off the coast of Fearing Island proved it to be effective.

“I’ve put in a simple accelerometer to measure how fast a tilt is happening,” he explained to Bud the day before the new test. “In normal maneuvers you shouldn’t ever exceed a certain rate nor should the *HydroCycle* tilt more than about seventy degrees in a turn. If either or both happen, the computer takes over and begins to right the craft.”

“Okay, but what if the pilot is trying to outmaneuver something, like maybe a torpedo from one of those drug subs, and needs to exceed that?”

Tom grinned. “Not likely, but I thought of that, flyboy. You will see that the joystick has been replaced with one that features a new, spring-loaded trigger for the index finger. Pull that in and you have temporary override of the safety protocol. Let it loose and the computer takes over and gets you upright as fast as possible.”

“I should never have had any doubt,” Bud admitted.

The test went so well that Bud asked for an extension. This time, unlike the Caribbean test, Tom accompanied his friend using one of the newest jetmarines so he gladly gave the go-ahead. While it couldn’t keep up with the *HydroCycle* in a straight run, Tom had Bud performing enough maneuvers so that the submarine’s straight run kept pace with the overall course of the *HydroCycle*.

They both surfaced nearly thirty miles from the island. The sea was relatively calm and so Bud climbed aboard the jetmarine while Tom stepped into the *HydroCycle*. As he was getting situated, Bud leaned over the side of the sub.

“You are absolutely going to love it, skipper. Guaranteed. And, once you say the word I’d like to call my pilot friend, Roger, and get him out to fly this so I can win that bet.”

“Roger?” Tom asked looking up at his companion. “Doesn’t that cause problems with radio transmissions?”

Bud grinned. “At first it led to a lot of exchanges more like old comedy routines, but now he goes by his nickname, Dodger.”

Tom groaned. “Let’s head back and once I’ve got the feel of this then you might call him.”

The trip in was a slight variation of Bud’s planned run out. Every maneuver felt smooth and natural to the inventor. When he tried to bring the speed up above fifty-eight knots, a little red light began blinking on the control panel—another small addition—and the computer took a more active role in keeping his on the straight and level. He did experiment with the override button but gladly released it seconds later.

Other than the computer assist he wasn’t certain what might be done to avoid the tendency to roll other than a redesign of the entire craft. And, since he had reached the far end of the money string—according to Damon Swift—this would have to do until a customer could be found to foot any further development costs.

He soon found that he was having a lot of fun. If anything would catch the attention of the Air Force man, it had to be the HydroCycle.

On the way back Tom tried something that Bud had not. Traveling about fifty feet down and at fifty-two knots, he pulled back on the joystick, shooting not just to the surface but about three feet into the air before thumping back down onto the water.

*Nuts!* he thought to himself deciding to not try that a second time. *How am I going to explain a bleeding tongue to Bash?*

\* \* \* \* \*

Roger Gerhart, a Major in the Air Force, flew out to Fearing Island the next Monday. His superiors decided to classify his flight as a combination training mission and “official” check of Fearing’s runways for possible emergency landings, and so he was allowed to fly one of the old T-38 trainer jets they kept at the recently reopened Seymour Johnson Air Base in North Carolina. Now more a living museum than active base, it was one of his responsibilities to periodically fly the many retired and obsolete aircraft kept there.

“Hey, Bud!” he called out as he jumped off the fuselage and down the final three feet to the ground. “What’sa?”

Bud walked up to the older man—nearly twenty-seven—and gave him a hearty handshake, saying, “Nada. What’sa with you?”

They were laughing when Tom stepped over.

“Oh, wow,” Major Gerhart said. “You are actually Tom Swift! Man, I am so glad to meet you.” He shook Tom’s hand for several



seconds before releasing it.

“Nice to meet you, Major. Call me Tom and unless you’ve got an alternative I’ll call you Roger. We just have to work out something for any radio communications.” He smiled at their visitor.

“Call me Sam when I’m piloting. Ground, air, water... Sam makes it easier on everybody. Say, I am really looking forward to seeing this amazing new vehicle Bud has practically told me nothing about.” He looked around at the very flat expanse of the island. “Uh, I don’t see a lot of hills or anything that might make some sort of super sports car or motorcycle much to write home about. And it’ll take one hell of a bird to win the bet. But, Buddy here says you’ve got a topper. Lead me to it!”

They walked the half mile to the nearest submarine pen where the *HydroCycle* was resting in a rubber cradle.

Gerhart stopped about fifty feet away and just stared. It took Bud prodding him in the back a minute later to get his feet moving once again. But, fifteen feet from the *HydroCycle* he came to a halt. Then, like most people seeing it for the first time he slowly walked all around it paying particularly close attention to the two small wing HydroBines and the single larger one.

With a face that spelled honest astonishment he asked Tom, “Aircraft or spaceship?”

Keeping a very straight face, Tom told him, “Neither. Want to take another guess?”

Roger looked around at the other craft bobbing in the peaceful waters of the Atlantic Ocean. “Uhh, boat?”

Tom and Bud both shook their heads, but the flyer remarked, “Not unless you are thinking more like a Navy man.”

Their guest appeared to be thinking that over when it must have hit him. His face brightened and he asked enthusiastically, “Submersible?”

“Spot on!” Tom told him and proceeded to tell the Major about the capabilities—and speed—of the *HydroCycle*. He ended with, “Tomorrow morning, once the Navy departs the area from their latest exercise, you are going to take it for a run. No limits. I want you to get the full effect and then decide if Bud wins your bet.”

Bright and early the following morning the three walked from the guest quarters to the dock area. Earlier, the dock crew had lowered the *HydroCycle* into the water and had it waiting in one of the smaller slips.

Roger climbed in and was about to put on the helmet when Tom stopped him. “I want to go over everything one more time. This is a prototype and all the costs came out of my personal budget, so I want to make sure you understand the few differences between this and that jet you flew in with.

It only took a few minutes for Tom to be satisfied that Sam would be able to handle the craft just as easily as Bud had on his first run. With no simulator to run anyone through, he had to trust that the skills they all shared as pilots were immediately transferable.

Giving the boys a nod and a wink, the Air Force man put the helmet on, checked the seal, put on the harness and gave it a good yank to tighten it. A moment later the canopy was down and sealed and the little craft was backing up.

“Hey!” Bud said in a complaining voice. “I never knew it could do that. Why didn’t you say something?”

“It couldn’t when you and I tested it. I had Dianne retro fit thrust deflectors like on a jet engine. At least on the two smaller units. It can only back at about one knot, but this is the only time it needs that. By the way, do you think he’s got it all?”

Bud chuckled and placed a hand on Tom’s shoulder. “Skipper, you remember how you have said on more than one occasion that I am a natural?” Tom nodded. “Well, Roger Dodger Gerhart can *teach* natural! Yes, he’s got it.”

Once he got the *HydroCycle* spun around facing out of the dock area Roger lowered the nose and had the craft submerged by a few feet and pushed the throttle to about half. In seconds he was flying through the clear water. The floor of the ocean all around the island was only about twenty to fifty feet deep for the first three miles, and then it dropped off by more than a thousand feet on the ocean side and three hundred feet on the side facing the mainland.

He hugged as near the floor as he dared during his first few minutes at the controls, and then felt that he could anticipate what anything he did would mean to the craft. He moved the throttle even farther open and watched as the speed indicator topped fifty knots. A few minutes later he shot out over the Atlantic rift and had a moment of lost orientation as his brain sought to cope with the disappearance of everything under him.

He tried a little trick that worked in the air. Closing his eyes, he reached up to tap his nose only to find the helmet’s visor in the way. He laughed, reopened his eyes, and in a second his mind reset to accept the new conditions.

For ten minutes he swooped, overrode the controls and did his own slow barrel rolls, and even attempted a loop that was only partially successful. He was about to attempt the maneuver again when he heard something vibrating through the canopy. It sounded vaguely like a voice, but he could not make out what it was saying. Shaking off an ominous feeling he pushed the joystick forward and shot down even deeper.

It was just as he was pulling back that something flashed past the canopy, just eight or ten yards away.

*Torpedo!*

Someone had fired a torpedo at him and as he watched its trajectory he believed he could turn and see where it came from. He wanted to see that before hightailing it out of the area.

The *HydroCycle* swung around. He peered into the dark blue water but could see nothing until he recalled the special lights Tom had told him about. His left hand shot out and pressed the spot on the touch-sensitive control panel that turned the lights on.

There, perhaps a half a mile in front of him, was the shape of a nuclear submarine. He reached to his left and brought up the BigEyes for a better look, and what he saw made his blood freeze. One of the torpedo tube covers was just closing and a new one was opening. But what really caught his eye was the incoming torpedo. They had fired a second one at him!

As his mind flashed on all sorts of evasive maneuvers he might make in the air, he recalled a little something he had learned years earlier. Torpedoes, like air-to-air missiles, can't arm themselves until they get far enough away from the firing source. It was a safety measure... Or, was that just a movie thing?

He didn't have any time to consider it before he shoved the throttle all the way forward and shot toward the sub. He was forced to make a maneuver hard to the right and then back to the left—only possible by using the computer override—to keep out of the way of the torpedo as it raced past. He again aimed right at the submarine. The *HydroCycle* closed the gap quickly and he slammed his feet onto the pedals to come to a halt almost directly over the nose of the sub.

*Ah, rat nuggets!* He could taste the blood in his mouth from biting his own tongue but now wasn't the time to dwell on that!

Unsure what to do next, he spun around and kept over the front of the submarine as it began to pick up speed. This lasted three minutes before the sub slowed to another stop. He turned back to see what was happening. With his lights on, Roger saw a hatch just

in front of the “sail” of the sub lift up and open and watched as first a rush of trapped air bubbled upward and then a trio of men in diving suits exited, heading toward him. Two of them stopped thirty feet away but one came right up to the canopy and peered in.

Roger pulled his helmet off and smiled at them, and in finger spelling sign language gave them his name and that he was with the U.S. Air Force.

The frogman made a “that figures” shrug but all three were soon occupied listening to something coming over a sonaphone speaker. It was the same almost human voice he had heard before. This time it was clearer. The voice explained that they were on an extended maneuver and had believed the *HydroCycle* to be some new type of target drone. The divers were being recalled and he was asked, politely, if he would please “leave this exercise area ASAP.”

He did and was heading back to Fearing seconds later.

When he pulled into the little slip at the docks, Tom and Bud were sitting on collapsible chairs that had been brought to them by the dock crew.

“Have any fun?” Bud asked.

While the crew tied up the *HydroCycle* and prepared to move it into the sling, Roger approached the pair.

He nodded, his face flush with excitement.

“Bud. Tom. I owe both of you the biggest and best steak and lobster dinner we can find in Boston. That was the most incredible time I’ve ever had, and I’ll tell you all about it right after I finish my second beer!”