

# The PLANET MAPPERS

*An Adventure Story of the Space World  
of Tomorrow*



by  
**E. EVERETT EVANS**

# **The Planet Mappers**

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*Books by E. Everett Evans*

MAN OF MANY MINDS  
ALIEN MINDS  
THE PLANET MAPPERS

*The characters and situations in this book are wholly  
fictional and imaginative: they do not portray and are not  
intended to portray any actual persons or parties.*

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*To my boys—  
Carl, Dave,  
Tommy, Billy,  
Edward, Freddy*

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# THE PLANET MAPPERS

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## 1

As he heard that dread yet telltale *spang* against the hull of their spaceboat, young Jon Carver dropped his reelbook and sprang to his feet. His eyes looked swiftly to help his ears trace the sudden *hiss* he knew was their precious air escaping.

In the back of his mind he heard the sudden grunt his father made, the sound of a falling body, his mother's frightened scream, and his brother's "What's wrong?" But he did not stop his own lanky, gangling body in its leap toward the outer bulkhead. And as he jumped, he pulled his handkerchief from his hip pocket.

"Leaping tuna! If that isn't fixed quick, we'll lose our air," was his near-panicked thought. "We won't be able to get where we're going. Be lucky if we come out of it alive!"

So, guided by the whistling, escaping air, Jon found the hole, nearly half an inch in diameter. Into it he wadded the corner of the cloth as best he could. The outward loss of their precious air slackened, although there was still some leakage he could not stop this way. He jumped to the nearest of the many emergency repair kits scattered about the ship. From it he grabbed a metal patch and an electric torch.

Swiftly he plugged the latter into a wall socket. With it he quickly welded the patch into place, after pulling—with considerable difficulty—his handkerchief from the hole. "It'll do for now," he decided, after carefully examining his work and listening closely to make sure there was no more

whistling-out of air. "But we'll have to go outside and really fill in and weld-plug that hole in the hull, but quick."

He re-stowed the torch, then opened a flagon of emergency oxygen-helium mixture in front of the electric blowers that kept their air circulating—to replenish what had been lost. Only then—although it had been less than two minutes, really—did he turn back to the rest of the family. He had been somewhat surprised that his father had not come to help him; he had not been at all surprised that his brother had not. Jak was a grand guy—Jon thought the world of him—but he just wasn't worth a dead salmon in an emergency like this; he did not have a mechanical type of mind.

Now, as he turned, Jon saw his mother and brother kneeling beside the prone body of his father, and noted with astonishment that she was crying. There was something stiff and unnatural about the man's body, too, lying there on the deck beside his recline seat.

A sudden fear sent the boy leaping across the room. "What ... what happened? Pop isn't dead, is he?"

"No. Something made him fall, and he hit his head on the deck and knocked himself out," Jak said without looking up. "His foot caught in the footrest, and as he fell over the seat arm his leg broke."

Jon dropped to his knees beside his weeping mother and threw an arm about her. His eyes were wide and damp with swift tears, for, in spite of the rapid growth his body had undergone in the past few years, he was still only sixteen—and he loved this splendid father of his with genuine devotion.

It just couldn't be that Pop wouldn't live, he thought in panic. He couldn't make himself believe that he might no longer have the wonderful companionship and guidance and counsel of this grand man who had been his world.

His mother, seeming to realize what the boy was undergoing, forced back her own grief to turn and gather this younger son into her arms, comforting him as only mothers can.

They watched the elder brother's swift, competent hands as he bathed with soft cotton, soaked in some kind of medicine taken from the open first-aid kit beside him, the bruised place on the back of the father's head. Jak had already

shaved away the hair about this bruise. Now he took an atomizer and sprayed on a clear, plastic bandage.

Mrs. Carver turned anxiously to her younger son. "Jon, you know how to run the ship. Turn it around and get us back to the nearest hospital as fast as it will go."

Jon looked at her in astonishment, for it had never before occurred to him that she did not know at least something about inter-stellar astrogation. "We can't, Mom. You don't run a ship in space like you do a ground car. We're on negative acceleration now, but it'll be close to two days before we've slowed enough for any kind of maneuvering."

"That's right, Mother," Jak came unexpectedly to his brother's aid. "You can't stop or turn a spaceship at will. But I don't think we need worry too much. Father's head wound is not serious, although there's a slight concussion. And we can set his leg so it will heal straight—it's a clean break."

"Besides, it would take at least a month to get back to the nearest colonized planet," Jon took up the explanation. "You know we're almost six weeks out of Terra."

Mrs. Carver still looked doubtful, but responded, as did Jon, when Jak began issuing instructions to them to help him in setting the broken leg. He had cut away the trousers and removed the boot and sock. Now he asked his mother to grasp his father's shoulders and hold tightly. He then showed Jon how to hold the toes and heel of the injured leg, and pull steadily downward while he manipulated the bone ends into place.

When the break had been adjusted, Jak dissolved certain plastics into a heavy, viscous liquid which he sprayed onto the leg. This mixture hardened almost instantly, forming a cast that was far stiffer and yet less weighty than either the ancient plaster casts or cumbersome splints.

When it was finished, they all rose, and while their mother hurried ahead to prepare the bunk, the boys stooped and lifted their father's inert body. Staggering a bit under the load, yet handling him tenderly, they carried him to his wall bunk and lowered him onto the sheeted mattress. After their mother had tucked in the top sheet and blankets, the boys buckled the acceleration straps about the bunk, and Jak made an extra binder with a folded blanket

about the broken leg. Now, if their father regained consciousness, or moved about restlessly in partial awakening, he could not fall out and perhaps hurt himself more.

When all had been done to make the wounded man as comfortable as possible, Mrs. Carver turned to Jon questioningly.

"What happened, Son? Do you know?"

"Meteoroid broached the hull, then must have gone on and almost hit Pop. If it was a close miss, the force of its passage must have made him duck and fall."

"But I don't feel any air escaping."

"There isn't now. I patched the hole, inside. Temporary job, though. Pop'll—" He stopped in sudden realization, then straightened resolutely and his voice was calmer, more sure, as he went on. "I mean, I'll have to go outside and make a permanent weld. Might as well do it now."

His mother's face showed the pride she felt in this young son who could plan and do the things that had to be done, even while she knew he was upset by his father's accident.

"Yes, it should be done at once." But she gripped his arm convulsively. "Be sure your lifeline is fastened securely, Jon."

He patted her hand awkwardly. "I will, Mom. I've been outside a lot, you know, and understand just what to do."

He broke away and ran toward the airlock. From the closet just inside the inner lockdoor he took his spacesuit, and put it on as quickly as he could. He was still working on the zippered seam down the front, smearing on the quickly-drying plastic that made it doubly airtight, when his brother came in.

"Can I help, Chubby?"

"Sure, give me a hand with my helmet. Say, Owl, will Pop really be all OK?"

"I ... I think so. He got a bad smack when he fell. But his heart seems to be beating strongly, and I think the concussion'll wear off soon. The leg'll heal, but he'll be out of commission about six weeks."

He picked up the quartzite "fishbowl" and slipped it over Jon's head. They

settled it firmly in place on the suit-ring, and screwed tight the lugs that held it in place. As Jon turned on his oxygen he motioned to the plastic, and Jak smeared it carefully all around the seam.

When he had finished, Jon increased the oxygen flow until the suit bulged, while Jak minutely inspected every point for any possible leakage. Finding none, he made the OK sign with thumb and bent forefinger, and Jon reduced his air-flow and opened the escape valve until the suit deflated enough so he could move about easily.

From a chest of repair supplies the younger boy took a can of metal-seal and a self-contained acetylene torch. These he fastened to his belt while Jak was getting, from a wall hook, a coil of thin but terrifically strong, light, plastic rope that would neither freeze nor lose its pliability in the utter cold of space. While spacesuits had magnetic shoe soles to keep their wearers in contact with the hull, a lifeline was a safety factor in case they happened to break that contact and drift away from the ship.

Jon checked his suit and equipment again, making sure he had all the tools he might need, and that they were firmly in place. He snapped one end of his lifeline into a ring at his belt, tugging strongly on it several times.

Then he turned and grinned through the helmet at his elder brother. He waved him away from the inner lockdoor, then pressed a button. The inner door swung open and air rushed in to fill the vacuum between the inner and outer lockdoors.

Jon stepped into the narrow space, skirted the handling mechanism there, then pressed another button to actuate the motor that closed and locked the inner door. When the red signal light told him it was airtight, he switched on the pump that returned the air to the body of the ship. The lock empty, he twisted the knob that opened the outer lockdoor, then snapped the other end of his lifeline to a ring just beside the opening doorway. He switched on his suit-heater as he felt the chill of space.

Slowly, ponderously, the mechanism swung the great eighteen-inch-thick outer door partially open, and Jon was facing deep space. Although he had spent nearly a third of his life out here, it was a sight that never tired the boy's active, imaginative mind, and even now he stood for a long minute, eagerly looking outward.

The awesome blackness of the void seemed alive with millions upon countless millions of tiny, distant, pinpointed lights he knew were giant suns. On and on they stretched, as far as the eye could see—and beyond. In the far, far distance were blotches of light Jon knew were the incredibly distant nebulae—other uncounted billions of suns that made up the far-off galaxies and universes.

He looked overhead, picking out against the backdrop of the nearer suns of our own galaxy—the Milky Way—some of the larger giant suns ... Canopus, Rigel, Deneb, Betelgeuse, Antares and others he knew by sight. The patterns familiar on Terra were somewhat distorted here because of the difference in distance and his line of sight, but those suns could not be mistaken.

He only stood there for a moment, then he reached out carefully and grasped the rung of the metal ladder welded onto the hull, and which ran completely around the ship. He pulled himself onto this, and held there while he estimated where that hole should be.

"About twenty-four feet to the left, and one or two lower than the doortop, I think," he muttered to himself. He climbed several rungs, then half-straightened and set first one foot and then the other firmly and flatly onto the hull beside the ladder rungs. He tried each of his shoes, making sure their magnetic soles were gripping tightly against the hull surface. Then he let loose the ladder and stood upright. Compared to the decks inside, he was at right angles, but there is no up, down or sideways in space—except that your feet always seem "down."

Assured that his shoes were holding firmly, he slid first one foot and then the other along the hull. In this way he walked ahead, always in full contact, yet able to progress almost at a normal pace. He counted his steps, and when he felt he was near the hole for which he was looking, stooped and began searching about the surface more minutely.

His estimate had been close, and it took him only a moment to find the place where the meteoroid had struck. He drew his lifeline taut and tied the loop to his belt, leaving the end of the line still snapped in place. Now, even though his knot might come loose, he was still fastened to the ship.

He took the can of metal-seal from his belt pouch, fumbling a bit because it

was difficult working with such heavy gloves as those attached to his spacesuit. There was plenty of light from the billions of stars, nor did it matter what hour the ship's chronoms might indicate inside, it was always the same out here.

He squatted down, still keeping both feet flat against the outer skin of the ship. Carefully he poured some of the sluggish, viscous liquid metal into the funnel-shaped hole, which was over an inch wide at the hull surface. Then he unslung his torch. He snapped the lighter and adjusted the flame to a narrow, pencil beam.

With the beam he melted the metal-seal he had poured into the hole. In the cold depths of space, where the temperature was about absolute zero, the metal cooled almost instantly as he turned his torch away. He then added more seal, melted that, then more seal, and so on, a bit at a time, until the hole was completely filled, and the hull surface once again smooth and even.

Satisfied at last that the damage to the ship was completely repaired, he hooked his torch to his belt once more, recapped the can of remaining metal-seal and stored it in his belt pouch. He rose and stood again for a few short moments, looking at the glory of the universe as it can only be seen from a spaceship. Then he made his way back to the lock and entered the ship.

He touched the stud and the motor slowly closed the great outer door. When the red signal light showed it was airtight, he punched the other button, air filled the entry, and then the inner door opened. He went through into the ship, closed the inner door, and when that was tight, started the motor that pumped the precious air from the lock back into the ship.

His brother had not stayed around to help him, so Jon had to strip the plastic from his zipper and around the base of his helmet by himself. It was an awkward job, as was trying to unscrew the lugs at the back of his shoulders, and he growled a bit beneath his breath because Jak had not waited, nor come back to help him.

But his irritation quickly passed and he grinned to himself. He knew his brother so well—Jak simply had not thought to stay and help, or he would willingly have done so.

Jak's tastes and desires ran more to other things, Jon knew. To medicine, and

to all growing things, whether plant, animal or human. Jak had always been far more interested in what made *life* grow and perform its miracles, than he had in how and why *machines* operated.

And, Jon acknowledged honestly, it was a good thing for them all in this present emergency. If good old Jak wasn't half a doctor already, Pop would really be in a bad way ... and so would all of them, if they lost that steady and competent prop on whom they all leaned so confidently.

"I sure wouldn't have known what to do," Jon admitted to himself, as the thought of his father made him hurry the removing of his suit. "I probably would have run for my tool kit, not the first-aid one."

He finally got the suit off and hung it back in the closet. He gathered up the scraps of used plastic and stuffed them into the near-by trash disposal chute. Then he ran into the living room and on to the side of his father's bunk, where his mother and brother were standing, watching.

"How is he?"

"Just the same."

"You're sure he ... he isn't...?"

"No, he's still alive, and I'm sure he'll pull out in time. Only question is, how long it'll take?"

Jon's mind began churning with problems. What would they do while Pop was "out"? Who was to run the ship; make the calculations on orbits and trajectories? Who's to handle the controls of landing when we reach our destination, which won't be very long now? Who'll do the thousand and one things Pop has always done? Who'll make the decisions?

Again the sense and knowledge of his personal loss came home—and young Jon Carver sank onto the deck of the bunkroom. Again he was just a boy who had lost his dearest pal, his ideal. Pop just couldn't die! Who'd help him with his problems; teach him the many things he was always wanting to know?

It just couldn't be that there would be no more of those tussles of friendly play; those boxing matches or wrestling bouts by which his growing body adjusted to swift action and hard knocks. He could not make himself believe that there would be no more of those hours of practical instruction, or the

long, pleasant evenings when the big man would talk of the places where he had been, the things he had seen and done in his travels about the galaxy.

For Tad Carver was one of the real pioneers of deep space. He had been an officer of the first ship to reach the stars—the planets of Sirius.

Deep-space travel was not yet a commonplace thing, although it was becoming so more swiftly with each passing year. Jon knew that there were now regular trips to the planets and some of the moons of his home solar system. One could have a two weeks' vacation trip from Terra to Luna for a thousand credits, or a month's cruise to Mars or Venus for forty hundred.

Merchant ships made fairly regular voyages to the planets of Sirius and Vega and, less often, to one or two other even more distant worlds which had been found to contain friendly and civilized beings—not all of them humanoid—who were glad to engage in inter-stellar commerce. Other spaceships plied between Terra and the many newly discovered worlds that were being colonized by Earth people.

But it had been men like Tad Carver who, co-operatively, had bought ships and surveyed the spaceways. It was they who had opened up those parts of the galaxy so far charted and who, incidentally, had made fortunes for themselves from the metals, strange jewels and other rare objects they had discovered and brought back, and for which the rich of Terra had paid so willingly and so handsomely.

That was why, after a number of years and many such trips, Carver had been able to buy his own small ship, outfit it for deep space travel, and take his family with him on his further voyages of exploration and survey. They were now en route to a new portion of the galaxy, one never—so far as they knew—visited by human beings.

"But what'll we do without Pop?" Jon's mind went back to his problem. "Who would be in command of their ship now? Mom didn't know a thing about the navigation of space. Look how she'd demanded he turn around 'right now!'" She was wonderful, and Jon loved her dearly. But he also knew she would be absolutely out of place trying to make their decisions about where to go, how to get there, how to run the ship, and so on. She had always seemed content to "keep house" on the ship, just as she had on Terra, and paid but little attention to what else was going on.

And Jak was just about as bad. The older boy was quick-and-logical thinking, and knew a lot—but not about such things. Jon had been the one who was always tagging their father around, forever asking questions about how to do this, why was that done, what did this machine do and what was the theory behind it, and so on? He had always been working with machines, almost since he could toddle. He took them apart, not destructively but questioningly, and was very soon able to put back together again correctly an endless succession of ever-more-complicated mechanisms.

Recently he had begun the study of astrogation—he had also long been a "math shark"—and now knew enough to realize how little he really did know about this complicated subject—although actually it was a great deal.

Sobered, and suddenly aware of a growing maturity brought on by the terrific problems they faced, Jon sat up. He rose and went over to his mother's side. He touched her softly on the shoulder, and she looked up at him. At sight of his anxious face she threw her arms about him.

"Jon, boy, what will we do now? How will we ever manage without Mr. C?"

At this echo of his own questionings and doubts, the boy straightened. "We'll make out all right, Mom," he said with a bravado he certainly did not feel, but which he hoped she would think was genuine. "We'll have to make up our minds what we're going to do, then do it. We'll keep on with Pop's plans, of course." This was a statement rather than a question.

"Why ... why...." She seemed startled by the realization that she had to make a decision. "I hadn't thought about that yet." She was silent a moment, then turned to her elder son, who had also risen and was listening intently. "What do you think, Jak? You're older, so you'll have to take charge now and be the man of the family."

The slender, studious eighteen-year-old looked startled. "I ... I don't know," he stammered, his eyes suddenly filled with strange fears. "I ... I suppose we might as well go home. We don't know where we're going, or what we were to do when we got there...." He suddenly looked like a little boy who has lost everything and everyone in whom he had looked for and found comfort and security. "Don't ask me, Mother. I don't know what we're going to do. We're apt to die, without Father to keep us going safely!"

Jon stared at him, this brother he had always loved and to whom he had looked up as a strong, elder companion ... in spite of their almost continuous, although friendly, bickerings, which never disturbed the warm affection underneath.

Now he just couldn't believe his eyes and ears. This couldn't be Jak—the strong, reliable Jak!

Suddenly he felt a surge of anger and distrust. Yet immediately he was ashamed of himself for such feelings. This wasn't any minnow of a predicament they were in—it was a very whale of a mess. He was scared, himself, and could understand just how Jak must feel. But, by the great horned catfish, he wasn't going to let himself cry about it any more—especially in front of Mom! Something had to be done, and it would be done!

A thought flashed through his mind, and he straightened with resolve. "*Shut up!*" he yelled at his brother ... and when Jak and their mother stared at him in amazement Jon grinned calmly and said, half apologetically, "Just trying to snap you out of the dumps. I say we've got to think this out carefully, and not make any snap decisions—or give up like this. The ship's on automatic drive and decelerating, so we don't have to worry about running it for some time. But Pop wouldn't like it if we didn't keep on. You know how important this trip is to him. Besides, he'll be waking up soon, and even if he has to stay in his bunk, he can tell us what to do."

"Do you know where we're going, and why?" Jak was still upset.

"Sure. Pop talked with me a lot about it."

Their mother looked from one to the other doubtfully, then smiled in a constrained manner. "You ... you're probably right, Jon. Mr. C. did say this would make or break us. I leave it up to my two big boys to discuss and suggest plans until your father is able to take charge again."

With an effort she pulled herself together, and now her smile was firmer, brighter. "Meanwhile, I think we'd better have something to eat. We have to keep up our strength for whatever is coming, you know."

## 2

When the boys woke up the next morning, their mother reported that their father had apparently had a restful night, coming out of his coma briefly a couple of times.

After breakfast the two boys went into the control room and began examining the various instruments and recorders on the panel, to see if they could figure out how much longer it would take them to reach the system their father was seeking. Through the visiplates they could now see not only the sun toward which Jon said they were heading, but even its nearer planets were beginning to show appreciable discs.

As they were studying these, Jak suddenly asked, "How do you suppose we happened to run into a meteor way out here in space like that?"

Jon shook his head helplessly. "Darned if I can figure it out. I always supposed such stuff was only found inside a planetary system. Must be there's some in deep space, though, since we sure as perch got hit by one." He reached in his pocket and pulled out a small marble-sized stone. "Here it is. I hunted around and found it last night. It dented the farther bulkhead, but must have lost so much momentum it couldn't penetrate."

"Just one of those billions-to-one chances, eh?" Jak looked up from his examination of the stone.

"Yes, there's still so much about space nobody knows yet."

Jak thought silently for a moment, then asked, "Well, what do you think we should do next?"

"Keep going, natch." Jon's voice was earnest. "We can't be more than a couple of days away from the nearest planets—and we're over six weeks out of Terra. Pop said this system we're heading for has four or five planets, at least, and that probably Two and Three, and maybe Four, would be fairly

Earthlike and habitable. So long as we're so close, it would be wrong if we didn't at least take a close-up looksee at them."

"Yes," slowly, "Father'd want us to do that."

"You know darned well he would. He's sunk almost everything he's got into this ship and this trip, and if we miss now, the government probably wouldn't give us another exclusive crack at it, even if we could scrape up the credits to come out here again."

"Didn't Father say something the other day about his spectro-analyzer—you know, 'Annie'—showing there was...?"

"Yes, 'Annie' popped up strong on that, and that's another reason we've got to keep going—especially since you think Pop'll snap out of it in a few days. You're sure of that, aren't you?" He peered intently into his brother's eyes.

"Yes, as far as I can tell. There's a concussion where his head hit the floor, but I don't think it's too bad, and it should wear off soon."

Jon sighed with relief. "If ... if he was dead, or dying, it would be different, and I'd say go home. But there's another thing. Before we left Terra we heard a rumor Slik Bogin was chasing around out in this sector, and we don't want to let him beat us to this system."

"Bogin? That's the notorious pirate, isn't it? No, if he's out here, we don't want to let him beat us—though what we could do if he did try, I don't know."

"We'll figure that out if he tries to hijack us."

"You hope!" There was a long silence while the boys studied their instruments again. Then, "What about landing, Chubby? Can you do it?"

"I've been studying up on it—put on the sleep-instructor last night." Jon was suddenly half-frightened with the prospect, but determined to keep his voice level. "I've helped Pop land the crate several times—even handled the controls under his instructions—so I think I can do it, with you reading off the manual to me. Anyway, if—if Pop gets worse, we've got to land some time, so we might as well try it here as any time or anywhere."

Jak stood silent a long moment, rubbing his hand through his hair as he did when concentrating. Then he looked up with determination. "Jon, you and I

have got ourselves a job to do." And now his voice was steady and earnest. "It's up to us to take care of Mother and keep her from worrying. So, whenever we're where she can hear us, we've got to act brave and sure of ourselves, no matter how we feel inside."

"Yes, she's all broken up about Pop. We ought to do most of the work, too, so she...."

"No," Jak shook his head, "that'd be the worst thing we could do. She isn't sick, physically, and if she keeps busy, she won't have time to worry so much. So we must keep her from having too much idle time."

"Oh ... maybe you're right, Owl ... yes, guess you are, at that—that's more your dish. But we can act like everything's going to jet fair. It's a deal." He held out his hand, and the two brothers clasped in agreement.

They went into the living quarters. "Hi, Mom, lunch ready yet? I'm starved."

"As usual," Jak bantered.

Mrs. Carver looked up apathetically from the recline seat where she had been sitting, worrying, during the several hours the boys had been in the control room. She looked as though she were almost shocked at their seemingly heartless question, forgetting that she, herself, had used the same excuse the night before.

But in a moment she smiled tremulously. "I guess I let myself forget my job, and that we have to go through the motions of living." She rose slowly, and the boys came and put their arms about her. "Mr. C. wouldn't want me to break down like this. I'll try to do better."

She gave her sons a quick hug and went into the little galley, where they heard her moving about from the deep-freeze to cupboards to induction-cooker. Soon the smells of appetizing food spread throughout the ship.

Jon had gone back into the control room and picked up the reelbook on astrogation, opening it to the chart of the pilot panel. He was still studying this and tracing, from the diagrams in the book, the controls, switches and recorders on the panel itself. He memorized each one as he went along, and made sure he knew its functions.

When Jak called him to lunch, Jon carried the reel with him and continued

studying it as he absentmindedly ate. His preoccupation with it raised his mother's fears again. "Can you make anything out of it, Son?"

"Huh?" He roused himself then, and grinned at her. "Sure, Mom, it's easy. Pop taught me most of it already, and I'm just refreshing my mind. I'll set us down in one piece, don't you fear."

"How soon will we arrive?"

"About tomorrow noon, I think, by our clocks. No telling what time it'll be there. I'll take measurements again and make sure, right after I'm through eating. We must be about ready to step up our deceleration."

He looked at his mother more intently, and his voice was so earnest it broke from baritone to a childish treble in places. "Mom, I'm not questioning your authority or anything, but you said yesterday that Jak was to be in charge until Pop wakes up. Now, Jak doesn't know anything at all about astrogation, and while I don't know it all, I do know more than he does, and I'll have to handle it. So what about me being in charge of the ship when we're in flight or on landings and take-offs, and Jak in charge other times? Though whatever you say goes, of course," he added hastily.

Somewhat to his surprise, his brother sided with him. The elder seemed to realize this was no time for one of their friendly squabbles about which was to be "top man"; that their very safety depended on the fact that whichever knew the most about any one thing should be the one to have the say about it.

Their mother looked from one to the other helplessly. "I ... I guess that will be all right. You two figure out things between you. You're all the men I have now until your father...." She almost broke into tears then, but pulled herself together. "Yes, you do whatever you think is best about such things."

"We'll handle it," Jak assured her. "But you'll still be boss in chief."

"You say 'when' and 'what,' and Jak and I'll figure out 'how.'" Jon grinned.

She stretched out her arms and grasped each by a hand. "My big boys! I'm sure we'll come through safely. You're getting to be real men." Then she changed her tone and asked, "You're going to land on one of those planets, then, as Mr. C. planned?"

"Being so close, it seems best," Jak answered. "How long we stay will

depend on what we do or don't find there."

"Yes, we need a few days' rest on firm ground before we start back to Terra, at least. We want to freshen our air, if we can, and maybe get some fresh food. Besides, we ought to try to get all the necessary data to prove Pop's discovery, if the planets are uninhabited but worth colonizing."

"I agree," seconded Jak, "even if we have to land in some secluded spot and just rest."

"I'll leave it up to you, then." Their mother appeared more like her usual happy self than the boys had seen her since the accident. "I'll keep house like I always have, and you boys do whatever else you think best."

Jak laughed. "We'll be like those Musketeers in that old book I read some time ago. 'All for one and one for all.'" He held out his hand dramatically. "Put your hands on mine, and we'll all swear to it."

Laughing, they did as he suggested, although their mother pretended severity. "You know I don't like swearing, Boys."

Jak grinned. "But I meant this in the sense of 'taking an oath,' not of 'cussing.'"

"Oh," she wrinkled her nose at him, grinning with her old-time impishness, "that's different."

Jon rose from the table. "I'll get back to my studying."

"You listen to your mother, and don't study too hard," she warned, knowing how he was apt to "lose himself" in his books. "You need plenty of rest for tomorrow."

"All right, Mom."

But when she went into the control room long after dinner, he was still deep in his reelbook. She took it away from him. "Get to bed, Jon. You promised."

"I'm sorry, Mom. Just got so interested I forgot time." He kissed her. "Night, Mom. And don't worry. We'll make out swell."

"I'm sure of it." Her words were brave but he could see the tears were perilously close.

"You'd better ask Jak for some barbit, or you won't sleep any better than you

did last night," he counseled. "Remember, he and I are going to take turns watching Pop."

"Thank you, Son. Good night."

He touched a switch and the glolights dimmed and went dark as he followed her out.

All the next morning Mrs. Carver and her two sons were in the control room—except for their frequent trips to Mr. Carver's bunk, to see how their patient was getting along. They were studying through the telescopic visiplates the solar system they were rapidly approaching. Jon had figured the sun was a Type G Dwarf, much like Sol, but a little larger. It had, they now knew, only five planets. Three of these—Two, Three and Four—had seven satellites among them. From their distances from the sun, the boys figured that probably Two and Three would have climates that human colonists, with some adaptation, could stand.

Now they were peering even more closely into their plates, as their ship circled the globe beneath them. Jon had maneuvered it into a spiral course about Planet Two, in such a manner that, from a height of about a hundred miles, they could get a good view of the world beneath them, in their telescopic plates.

"Lots of plant life, but I haven't seen anything that looks like cities," Jak said at last.

"Nor I," from their mother and, "Me neither," Jon added.

Their first measurements of this new planet had shown it to be almost the size of Terra, and they had been delighted to see that there was a moon of considerable size, although not as large as Luna. It was about one hundred and fifty thousand miles out.

"There's a number of large seas or oceans," Jak commented without taking his eyes from his visiplate. "Look at that plant life, though—it evidently coats the whole planet. From here it looks like jungle."

"Lots of lakes and rivers on it, and in those plains we saw." Jon was excited. "It sure looks like a wonderful world where men can live."

As they crisscrossed the planet from pole to pole, they saw small ice fields

about each.

"That means there'll be varied seasons here," Jon stated.

"Not necessarily," Jak argued. "In fact, while possible, it's not even probable."

"Says you," Jon sniffed. Then later, "I figure the year here at about three hundred days. Just an approximation, of course, but probably within five per cent. I'm not too good at such things."

"You're probably wrong," Jak snorted, and their mother interrupted what she thought was the beginning of another of their interminable arguments.

"Are you going to land here, or go on to another planet first?" she asked Jon.

"I'm going low enough to test atmosphere and temperature before I decide," he told her.

"Well," resignedly, "do as you boys think best."

Jon manipulated his controls and as the ship tilted slightly, they could see in their plates the ground coming closer. Slowly, under the increased reaction of the powerful bow tubes, the ship slowed until it was cruising at about one thousand miles an hour and about a mile above the surface—or the tops of the vegetation, at least. Then Jon leveled it off.

"You know how to test atmosphere, Jak?" he asked. "The temp now is about 99.4 degrees Fahrenheit, so it probably isn't over 110 at ground level."

"Yes, Father taught me that." Jak moved over to the hull wall where there was an atmosphere-trap and the mechanism that tested and recorded the contents of any air they might encounter on a new planet. He worked this and studied the results.

This latest invention of Terran aeroscopic technies was simple to operate. A chart, already prepared to show the constituents of Earth's atmospheric limits compatible to human needs, was placed beneath a stylus. The latter drew a curve showing the components of the new air, and if the lines did not go above or below the red one on the prepared chart, the atmosphere was safe for human consumption.

"Carbon dioxide a little higher, and when I tested density with a spring balance the ten-pound weight showed nine and a half," Jak reported. "That

means we'll feel a trifle lighter, and won't find walking and lifting as hard."

Their mother had been hovering nervously in the background. Now she stepped up and asked, "Are you sure it is safe here?"

"We will be before we go outside, Mother," Jak assured her, then turned to Jon. "Where are you going to land?"

"Soon as I find a good spot. Keep your eyes peeled for a large clearing."

But they had gone only a few more miles when Jak yelled, "There, Jon! Off to the left a mile or so."

At his first words Jon had increased the negative acceleration. His darting eyes spotted the clearing, and he put the ship into a circle and elevated the nose so they climbed to a height of some twenty miles.

"Grab that astrogation book and get ready to read me the checks, Owl. Mom, you strap in. Is Pop all right?"

Mrs. Carver assured him that on her recent trip to her husband's bunk she had seen to it that he was safely fastened down, in anticipation of their landing.

Jak picked up the book and opened it to the book-marked page. He sank into the co-pilot's seat, and fastened the safety belt. "Ready when you are."

Their mother now reported, "All fast, Jon."

A moment while the younger boy glanced quickly at his various dials, then he said tensely, "Shoot."

"Check decelerometer."

"On the hairline."

"Check outside air pressure."

"Seven four two."

"Terrain indicator."

"Level."

"Altimeter."

"Four thousand three hundred. Going down a hundred per second."

"Let her down."

Anxious seconds of jockeying, Jon's eyes flashing from indicator to gauge to telltale to screen, his hands and feet moving here and there on the controls.

The two others gasped as they saw the ground rushing toward them so swiftly. The ship landed—but with a jar that shook them all.

"Off bow retarders," Jak yelled.

The roar of the tubes ceased and they were almost stunned by the sudden silence.

"Down landing props."

The grind of a motor, then a gentle jar and the ship seemed to straighten a bit.

"Props down."

"Close fuel petcocks."

"Closed."

"Shut off fuel pump."

"Shut."

"All controls in neutral."

Jon's hands flashed over several levers, knobs and switches.

"Everything neutral." He turned in his seat then, and his face wore a wide grin of triumph. "We did it. We're down."

He noticed his mother's white, strained face, and called to her, "Relax, Mom. I set you down in one piece, just as I said I would."

Jak broke in with a scoffing comment—although his eyes showed the secret pride he felt in his younger brother's ability—"Lousy landing. What's the big idea, jolting us all like that? Want to bust up the ship?"

"Now, Boys," their mother hastened to break up this incipient quarrel before it had the chance to get started—which was exactly what Jak intended—"I think Jon did exceptionally well, considering it was his first solo landing. I'm not hurt at all, and I'm sure the ship isn't, either."

Jak pretended to look ashamed, although neither of the boys could completely hide their grins, and had to face away from her. "Yes, I was just steaming off. It was really a swell job, Chubby."