

PHILIP FRANCIS NOWLAN

THE AIRLORDS OF HAN

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CHAPTER I

The Airlords Besieged

IN a previous record of my adventures in the early part of the Second War of Independence I explained how I, Anthony Rogers, was overcome by radioactive gases in an abandoned mine near Scranton in the year 1927, where I existed in a state of suspended animation for nearly five hundred years; and awakened to find that the America I knew had been crushed under the cruel tyranny of the Airlords of Han, fierce Mongolians, who, as scientists now contend, had in their blood a taint not of this earth, and who with science and resources far in advance of those of a United States, economically prostrate at the end of a long series of wars with a Bolshevik Europe, in the year 2270 A.D., had swept down from the skies in their great airships that rode "repeller rays" as a ball rides the stream of a fountain, and with their terrible "disintegrator rays" had destroyed more than four-fifths of the American race, and driven the other fifth to cover in the vast forests which grew up over the remains of the once mighty civilization of the United States.

I explained the part I played in the fall of the year 2419, when the rugged Americans, with science secretly developed to terrific efficiency in their forest fastness, turned fiercely and assumed the aggressive against a now effete Han population, which for generations had shut itself up in the fifteen great Mongolian cities of America, having abandoned cultivation of the soil and the operation of mines; for these Hans produced all they needed in the way of food, clothing, shelter and machinery through electrono-synthetic processes.

I explained how I was adopted into the Wyoming Gang, or clan, descendants of the original populations of Wilkes-Barre, Scranton and the Wyoming Valley in Pennsylvania; how quite by accident I stumbled upon a method of destroying Han aircraft by shooting explosive rockets, not directly at the heavily armored ships, but at the repeller ray columns, which automatically drew the rockets upward where they exploded in the generators of the aircraft; how the Wyomings threw the first thrill of terror into the Airlords by bringing an entire squadron crashing to earth; how a handful of us in a rocketship successfully raided the Han city of Nu-Yok; and how by the application of military principles I remembered from the First World War, I was able to lead the Wyomings to victory over the Sinsings, a Hudson River tribe which had formed a traitorous alliance with the hereditary enemies and oppressors of the White Race in America.

BY the Spring of 2420 A.D., a short six months after these events, the positions of the Yellow and the White Races in

America had been reversed. The hunted were now the hunters. The Hans desperately were increasing the defenses of their fifteen cities, around each of which the American Gangs had drawn a widely deployed line of long-gunners; while nervous air convoys, closely bunched behind their protective screen of disintegrator beams, kept up sporadic and costly systems of transportation between the cities.

During this period our own campaign against the Hans of Nu-Yok was fairly typical of the development of the war throughout the country. Our force was composed of contingents from most of the Gangs of Pennsylvania, Jersey and New England. We encircled the city on a wide radius, our line running roughly from Staten Island to the forested site of the ancient city of Elizabeth, to First and Second Mountains just west of the ruins of Newark, Bloomfield and Montclair, thence Northeasterly across the Hudson, and down to the Sound. On Long Island our line was pushed forward to the first slopes of the hills.

We had no more than four long-gunners to the square mile in our first line, but each of these was equal to a battery of heavy artillery such as I had known in the First World War. And when their fire was first concentrated on the Han city, they blew its outer walls and roof levels into a chaotic mass of wreckage before the nervous Yellow engineers could turn on the ring of generators which surrounded the city with a vertical film of disintegrator rays. Our explosive rockets could not penetrate this film, for it disintegrated them instantly and harmlessly, as it did all other

material substance with the sole exception of "inertron," that synthetic element developed by the Americans from the sub-electronic and ultronic orders.

THE continuous operation of the disintegrators destroyed the air and maintained a constant vacuum wherever they played, into which the surrounding air continuously rushed, naturally creating atmospheric disturbances after a time, which resulted in a local storm. This, however, ceased after a number of hours, when the flow of air toward the city became steady.

The Hans suffered severely from atmospheric conditions inside their city at first, but later rearranged their disintegrator ring in a system of overlapping films that left diagonal openings, through which the air rushed to them, and through which their ships emerged to scout our positions.

We shot down seven of their cruisers before they realized the folly of floating individually over our invisible line. Their beams traced paths of destruction like scars across the countryside, but caught less than half a dozen of our gunners all told, for it takes a lot of time to sweep every square foot of a square mile with a beam whose cross section is not more than twenty or twenty-five feet in diameter. Our gunners, completely concealed beneath the foliage of the forest, with weapons which did not reveal their position, as did the flashes and detonation of the Twentieth Century artillery, hit their repeller rays with comparative ease.

The "drop ships," which the Hans next sent out, were harder to handle. Rising to immense heights behind the city's disintegrator

wall, these tiny, projectile-like craft slipped through the rifts in the cylinder of destruction, and then turning off their repeller rays, dropped at terrific speed until their small vanes were sufficient to support them as they volplaned in great circles, shooting back into the city defenses at a lower level.

The great speed of these craft made it almost impossible to register a direct hit against them with rocket guns, and they had no repeller rays at which we might shoot while they were over our lines.

But by the same token they were able to do little damage to us. So great was the speed of a drop ship, that the only way in which it could use a disintegrator ray was from a fixed generator in the nose of the structure, as it dropped in a straight line toward its target. But since they could not sight the widely deployed individual gunners in our line, their scouting was just as ineffective as our attempts were to shoot them down.

FOR more than a month the situation remained a deadlock, with the Hans locked up in their cities, while we mobilized gunners and supplies.

Had our stock of inertron been sufficiently great at this period, we could have ended the war quickly, with aircraft impervious to the "dis" ray. But the production of inertron is a painfully slow process, involving the building up of this weightless element from ultronic vibrations through the sub-electronic, electronic and atomic states into molecular form. Our laboratories had barely begun production on a quantity basis, for we had just

learned how to protect them from Han air raids, and it would be many months more before the supply they had just started to manufacture would be finished. In the meantime we had enough for a few aircraft, for jumping belts and a small amount of armor.

We Wyomings possessed one swooper completely sheathed with inertron and counterweighted with ultron. The Altoonas and the Lycomings also had one apiece. But a shielded swooper, while impervious to the "dis" ray, was helpless against squadrons of Han aircraft, for the Hans developed a technique of playing their beams underneath the swooper in such fashion as to suck it down flutteringly into the vacuum so created, until they brought it finally, and more or less violently, to earth.

Ultimately the Hans broke our blockade to a certain extent, when they resumed traffic between their cities in great convoys, protected by squadrons of cruisers in vertical formation, playing a continuous cross-fire of disintegrator beams ahead of them and down on the sides in a most effective screen, so that it was very difficult for us to get a rocket through to the repeller rays.

But we lined the scar paths beneath their air routes for miles at a stretch with concealed gunners, some of whom would sooner or later register hits, and it was seldom that a convoy made the trip between Nu-Yok and Bos-Tan, Bah-Flo, Si-ka-ga or Ah-lannah without losing several of its ships.

Hans who reached the ground alive were never taken prisoner. Not even the splendid discipline of the Americans could curb the wild hate developed through centuries of dastardly oppression,

and the Hans were mercilessly slaughtered, when they did not save us the trouble by committing suicide.

Several times the Hans drove "air wedges" over our lines in this vertical or "cloud bank" formation, ploughing a scar path a mile or more wide through our positions. But at worst, to us, this did not mean the loss of more than a dozen men and girls, and generally their raids cost them one or more ships. They cut paths of destruction across the map, but they could not cover the entire area, and when they had ploughed out over our lines, there was nothing left for them to do but to turn around and plough back to Nu-Yok. Our lines closed up again after each raid, and we continued to take heavy toll from convoys and raiding fleets. Finally they abandoned these tactics.

So at the time of which I speak, the Spring of 2420 A.D., the Americans and the Hans were temporarily at pretty much of a deadlock. But the Hans were as desperate as we were sanguine, for we had time on our side.

It was at this period that we first learned of the Airlords' determination, a very unpopular one with their conscripted populations, to carry the fight to us on the ground. The time had passed when command of the air meant victory. We had no visible cities nor massed bodies of men for them to destroy, nothing but vast stretches of silent forests and hills, where our forces lurked, invisible from the air.

CHAPTER II

The "Ground Ships" Threaten

ONE of our Wyoming girls, on contact guard near Pocono, blundered into a hunting camp of the Bad Bloods, one of the renegade American Gangs, which occupied the Blue Mountain section North of Delaware Water Gap. We had not invited their cooperation in this campaign, for they were under some suspicion of having trafficked with the Hans in past years, but they had offered no objection to our passage through their territory in our advance on Nu-Yok.

Fortunately our contact guard had been able to leap into the upper branches of a tree without being discovered by the Bad Bloods, for their discipline was lax and their guard careless. She overheard enough of the conversation of their Bosses around the camp fire beneath her to indicate the general nature of the Han plans.

After several hours she was able to leap away unobserved through the topmost branches of the trees, and after putting several miles between herself and their camp, she ultrophoned a full report to her Contact Boss back in the Wyoming Valley. My own Ultrophone Field Boss picked up the message and brought the graph record of it to me at once.

Her report was likewise picked up by the Bosses of the various

Gang units in our line, and we had called a council to discuss our plans by word of mouth.

We were gathered in a sheltered glade on the eastern slope of First Mountain on a balmy night in May. Far to the east, across the forested slopes of the lowlands, the flat stretches of open meadow and the rocky ridge that once had been Jersey City, the iridescent glow of Nu-Yok's protecting film of annihilation shot upward, gradually fading into a starry sky.

In the faint glow of our ultronolamps, I made out the great figure and rugged features of Boss Casaman, commander of the Mifflin unit, and the gray uniform of Boss Warn, who led the Sandsnipers of the Barnegat Beaches, and who had swooped over from his headquarters on Sandy Hook. By his side stood Boss Handan of the Winslows, a Gang from Central Jersee. In the group also were the leaders of the Altoonas, the Camerons, the Lycomings, Susquannas, Harshbargs, Hagersduns, Chesters, Reddings, Delawares, Elmirans, Kiugas, Hudsons and Connedigas.

MOST of them were clad in forest-green uniforms that showed black at night, but each had some distinctive badge or item of uniform or equipment that distinguished his Gang.

Both the Mifflin and Altoona Bosses, for instance, wore heavy-looking boots with jointed knees. They came from sections that were not only mountainous, but rocky, where "leaping" involves many a slip and bruised limb, unless some protection of this sort is worn. But these boots were not as heavy

as they looked, being counter-balanced somewhat with inertron.

The headgear of the Winslows was quite different from the close-fitting helmet of the Wyomings, being large and bushy-looking, for in the Winslow territory there were many stretches of nearly bare land, with occasional scrubby pines, and a Winslow caught in the open, on the approach of a Han airship, would twist himself into a motionless imitation of a scrubby plant, that passed very successfully for the real thing, when viewed from several thousand feet in the air.

The Susquannas had a unit that was equipped with inertron shields, that were of the same shape as those of the ancient Romans, but much larger, and capable of concealing their bearers from head to foot when they crouched slightly. These shields, of course, were colored forest green, and were irregularly shaded; they were balanced with inertron, so that their effective weight was only a few ounces. They were curious too, in that they had handles for both hands, and two small reservoir rocket-guns built into them as integral parts.

In going into action, the Susquannas crouched slightly, holding the shields before them with both hands, looking through a narrow vision slit, and working both rocket guns. The shields, however, were a great handicap in leaping, and in advancing through heavy forest growth.

The field unit of the Delawares was also heavily armored. It was one of the most efficient bodies of shock troops in our entire line. They carried circular shields, about three feet in

diameter, with a vision slit and a small rocket gun. These shields were held at arm's length in the left hand on going into action. In the right hand was carried an ax-gun, an affair not unlike the battle-ax of the Middle Ages. It was about three feet long. The shaft consisted of a rocket gun, with an ax-blade near the muzzle, and a spike at the other end. It was a terrible weapon. Jointed leg-guards protected the ax-gunner below the rim of his shield, and a hemispherical helmet, the front section of which was of transparent ultron reaching down to the chin, completed his equipment.

THE Susquannas also had a long-gun unit in the field.

One company of my Wyomings I had equipped with a weapon which I designed myself. It was a long-gun which I had adapted for bayonet tactics such as American troops used in the First World War, in the Twentieth Century. It was about the length of the ancient rifle, and was fitted with a short knife bayonet. The stock, however, was replaced by a narrow ax-blade and a spike. It had two hand-guards also. It was fired from the waist position.

In hand-to-hand work one lunged with the bayonet in a vicious, swinging up-thrust, following through with an up-thrust of the ax-blade as one rushed in on one's opponent, and then a down-thrust of the butt-spike, developing into a down-slice of the bayonet, and a final upward jerk of the bayonet at the throat and chin with a shortened grip on the barrel, which had been allowed to slide through the hands at the completion of the down-slice.

I almost regretted that we would not find ourselves opposed

to the Delaware ax-men in this campaign, so curious was I to compare the efficiency of the two bodies.

But both the Delawares and my own men were elated at the news that the Hans intended to fight it out on the ground at last, and the prospect that we might in consequence come to close quarters with them.

Many of the Gang Bosses were dubious about our Wyoming policy of providing our fighters with no inertron armor as protection against the disintegrator ray of the Hans. Some of them even questioned the value of all weapons intended for hand-to-hand fighting.

As Warn, of the Sandsnipers put it: "You should be in a better position than anyone, Rogers, with your memories of the Twentieth Century, to appreciate that between the superdeadliness of the rocket gun and of the disintegrator ray there will never be any opportunity for hand-to-hand work. Long before the opposing forces could come to grips, one or the other will be wiped out."

But I only smiled, for I remembered how much of this same talk there was five centuries ago, and that it was even predicted in 1914 that no war could last more than six months.

THAT there would be hand-to-hand work before we were through, and in plenty, I was convinced, and so every able-bodied youth I could muster was enrolled in my infantry battalion and spent most of his time in vigorous bayonet practice. And for the same reason I had discarded the idea of armor. I felt it would

be clumsy, and questioned its value. True, it was an absolute bar against the disintegrator ray, but of what use would that be if a Han ray found a crevice between overlapping plates, or if the ray was used to annihilate the very earth beneath the wearer's feet?

The only protective equipment that I thought was worth a whoop was a very peculiar device with which a contingent of five hundred Altoonas was supplied. They called it the "umbra-shield." It was a bell-shaped affair of inertron, counterweighted with ultron, about eight feet high. The gunner, who walked inside it, carried it easily with two shoulder straps. There were handles inside too, by which the gunner might more easily balance it when running, or lift it to clear any obstructions on the ground.

In the apex of the affair, above his head, was a small turret, containing an automatic rocket gun. The periscopic gun sight and the controls were on a level with the operator's eyes. In going into action he could, after taking up his position, simply stoop until the rim of the umbra-shield rested on the ground, or else slip off the shoulder straps, and stand there, quite safe from the disintegrator ray, and work his gun.

But again, I could not see what was to prevent the Hans from slicing underneath it, instead of directly at it, with their rays.

AS I saw it, any American who was unfortunate enough to get in the direct path of a "dis" ray, was almost certain to "go out," unless he was locked up tight in a complete shell of inertron, as for instance, in an inertron swooper. It seemed to me better to concentrate all our efforts on tactics of attack, trusting to our

ability to get the Hans before they got us.

I had one other main unit besides my bayonet battalion, a long-gun contingent composed entirely of girls, as were my scout units and most of my auxiliary contingents. These youngsters had been devoting themselves to target practice for months, and had developed a fine technique of range-finding and the various other tactics of Twentieth Century massed artillery, to which was added the scientific perfection of the rocket guns and an average mental alertness that would have put the artilleryman of the First World War to shame.

From the information our contact guard had obtained, it appeared that the Hans had developed a type of "groundship" completely protected by a disintegrator ray "canopy" that was operated from a short mast, and spread down around it as a cone.

These ships were merely adaptations of their airships, and were designed to travel but a few feet above the ground. Their repeller rays were relatively weak; just strong enough to lift them about ten or twelve feet from the surface. Hence they would draw but lightly upon the power broadcast from the city, and great numbers of them could be used. A special ray at the stern propelled them, and an extra-lift ray in the bow enabled them to nose up over ground obstacles. Their most formidable feature was the cone-shaped "canopy" of short-range disintegrator rays designed to spread down around them from a circular generator at the tip of a twenty-foot mast amidship. This would annihilate any projectile shot at it, for they naturally could not reach the

ship without passing through the cone of rays.

It was instantly obvious that the "ground ships" would prove to be the "tanks" of the Twenty-fifth century, and with due allowance for the fact that they were protected with a sheathing of annihilating rays instead of with steel, that they would have about the same handicaps and advantages as tanks, except that since they would float lightly on short repeller rays, they could hardly resort to the destructive crushing tactics of the tanks of the First World War.

AS soon as our first supplies of inertron-sheathed rockets came through, their invulnerability would be at an end, as indeed would be that of the Han cities themselves. But these projectiles were not yet out of the factories.

In the meantime, however, the groundships would be hard to handle. Each of them we understood would be equipped with a thin long-range "dis" ray, mounted in a turret at the base of the mast.

We had no information as to the probable tactics of the Hans in the use of these ships. One sure method of destroying them would be to bury mines in their path, too deep for the penetration of their protecting canopy, which would not, our engineers estimated, cut deeper than about three feet a second. But we couldn't ring Nu-Yok with a continuous mine on a radius of from five to fifteen or twenty miles. Nor could we be certain beforehand of the direction of their attack.

In the end, after several hours' discussion, we agreed on

a flexible defense. Rather than risk many lives, we would withdraw before them, test their effectiveness and familiarize ourselves with the tactics they adopted. If possible, we would send engineers in behind them from the flanks, to lay mines in the probable path of their return, providing their first attack proved to be a raid and not an advance to consolidate new positions.

CHAPTER III

We "Sink" the "Ground Ships"

BOSS HANDAN, of the Winslows, a giant of a man, a two-fisted fighter and a leader of great sagacity, had been selected by the council as our Boss *pro tem*, and having given the scatter signal to the council, he retired to our general headquarters, which we had established on Second Mountain a few miles in the rear of the fighting front in a deep ravine.

There, in quarters cut far below the surface, he would observe every detail of the battle on the wonderful system of viewplates our ultrono engineers had constructed through a series of relays from ultroscope observation posts and individual "*cameramen*."

Two hours before dawn our long distance *scopemen* reported a squadron of "ground ships" leaving the enemy's disintegrator wall, and heading rapidly somewhat to the south of us, toward the site of the ancient city of Newark. The ultrosopes could detect no canopy operation. This in itself was not significant, for they were penetrating hills in their lines of vision, most of them, which of course blurred their pictures to a slight extent. But by now we had a well-equipped electronoscope division, with instruments nearly equal to those of the Hans themselves; and these could detect no evidence of *dis* rays in operation.

Handan appreciated our opportunity instantly, for no sooner

had the import of the message on the Bosses' channel become clear than we heard his personal command snapped out over the long-gunners' general channel.

Nine hundred and seventy long-gunners on the south and west sides of the city, concealed in the dark fastnesses of the forests and hillsides, leaped to their guns, switched on their dial lights, and flipped the little lever combinations on their pieces that automatically registered them on the predetermined position of map section HM-243-839, setting their magazines for twenty shots, and pressing their fire buttons.

For what seemed an interminable instant nothing happened.

Then several miles to the southeast, an entire section of the country literally blew up, in a fiery eruption that shot a mile into the air. The concussion, when it reached me, was terrific. The light was blinding.

And our *scopemen* reported the instant annihilation of the squadron.

WHAT happened, of course, was this; the Hans knew nothing of our ability to see at night through our ultrosopes. Regarding itself as invisible in the darkness, and believing our instruments would pick up its location when its *dis* rays went into operation, the squadron made the fatal error of not turning on its canopies.

To say that consternation overwhelmed the Han high command would be putting it mildly. Despite their use of code and other protective expedients, we picked up enough of their messages to know that the incident badly demoralized them.

Their next attempt was made in daylight. I was aloft in my swooper at the time, hanging motionless about a mile up. Below, the groundships looked like a number of oval lozenges gliding across a map, each surrounded by a circular halo of luminescence that was its *dis* ray canopy.

They had nosed up over the spiny ridge of what once had been Jersey City, and were moving across the meadowlands. There were twenty of them.

Coming to the darker green that marked the forest on the "map" below me, they adopted a wedge formation, and playing their pencil rays ahead of them, they began to beam a path for themselves through the forest. In my ears sounded the ultrophone instructions of my executives to the long-gunners in the forest, and one by one I heard the girls report their rapid retirement with their guns and other inertron-lightened equipment. I located several of them with my scopes, with which I could, of course, focus through the leafy screen above them, and noted with satisfaction the unhurried speed of their movements.

On ploughed the Han wedge, while my girls separated before it and retired to the sides. With a rapidity much greater than that of the ships themselves, the beams penetrated deeper and deeper into the forest, playing continuously in the same direction, literally melting their way through, as a stream of hot water might melt its way through a snow bank.

Then a curious thing happened. One of the ships near one wing of the wedge must have passed over unusually soft

ground, or perhaps some irregularity in the control of its canopy generator caused it to dig deeper into the earth ahead of it, for it gave a sudden downward lurch, and on coming up out of it, swerved a bit to one side, its offense beam slicing full into the ship echeloned to the left ahead of it. That ship, all but a few plates on one side, instantly vanished from sight. But the squadron could not stop. As soon as a ship stood still, its canopy ray playing continuously in one spot, the ground around it was annihilated to a continuously increasing depth. A couple of them tried it, but within a space of seconds, they had dug such deep holes around themselves that they had difficulty in climbing out. Their commanders, however, had the foresight to switch off their offense rays, and so damaged no more of their comrades.

I SWITCHED in with my ultrophone on Boss Handan's channel, intending to report my observation, but found that one of our swooper scouts, who, like myself, was hanging above the Hans, was ahead of me. Moreover, he was reporting a suddenly developed idea that resulted in the untimely end of the Hans' groundship threat.

"Those ships can't climb out of deep holes, Boss," he was saying excitedly. "Lay a big barrage against them—no, not on them—in front of them—always in front of them. Pull it back as they come on. But churn h—l out of the ground in front of them! Get the rocketmen to make a penetrative time rocket. Shoot it into the ground in front of them, deep enough to be below their canopy ray, see, and detonate under them as they go over it!"

I heard Handan's roar of exultation as I switched off again to order a barrage from my Wyoming girls. Then I threw my rocket motor to full speed and shot off a mile to one side, and higher, for I knew that soon there would be a boiling eruption below.

No smoke interfered with my view of it, for our atomic explosive was smokeless in its action. A line of blinding, flashing fire appeared in front of the groundship wedge. The ships ploughed with calm determination toward it, but it withdrew before them, not steadily, but jerkily intermittent, so that the ground became a series of gigantic humps, ridges and shell holes. Into these the Han ships wallowed, plunging ponderously yet not daring to stop while their protective canopy rays played, not daring to shut off these active rays.

One overturned. Our observers reported it. The result was a hail of rocket shells directly on the squadron. These could not penetrate the canopies of the other ships, but the one which had turned turtle was blown to fragments.

The squadron attempted to change its course and dodge the barrier in front of it. But a new barrier of blazing detonations and churned earth appeared on its flanks. In a matter of minutes it was ringed around, thanks to the skill of our fire control.

One by one the wallowing ships plunged into holes from which they could not extricate themselves. One by one their canopy rays were shut off, or the ships somersaulted off the knolls on which they perched, as their canopies melted the ground away from around them. So one by one they were destroyed.

Thus the second ground sortie of the Hans was annihilated.

CHAPTER IV

Han Electrono-Ray Science

AT this period the Hans of Nu-Yok had only one airship equipped with their new armored repeller ray, their latest defense against our tactics of shooting rockets into the repeller rays and letting the latter hurl them up against the ships. They had developed a new steel alloy of tremendous strength, which passed their *rep* ray with ease, but was virtually impervious to our most powerful explosives. Their supplies of this alloy were limited, for it could be produced only in the Lo-Tan shops, for it was only there that they could develop the degree of electronic power necessary for its manufacture.

This ship shot out toward our lines just as the last of the groundships turned turtle and was blown to pieces. As it approached, the rockets of our invisible and widely scattered gunners in the forest below began to explode beneath its *rep* ray plates. The explosions caused the great ship to plunge and roll mightily, but otherwise did it no serious harm that I could see, for it was very heavily armored.

Occasionally rockets fired directly at the ship would find their mark and tear gashes in its side and bottom plates, but these hits were few. The ship was high in the air, and a far more difficult target than were its *rep* ray columns. To hit the latter,

our gunners had only to gauge their aim vertically. Range could be practically ignored, since the *rep* ray at any point above two-thirds the distance from the earth to the ship would automatically hurl the rocket upward against the *rep* ray plate.

As the ship sped toward us, rocking, plunging and recovering, it began to beam the forest below. It was equipped with a superbeam too, which cut a swathe nearly a hundred feet wide wherever it played.

With visions of many a life snuffed out below me, I surrendered to the impulse to stage a single-handed attack on this ship, feeling quite secure in my floating shell of inertron. I nosed up vertically, and rocketed for a position above the ship. Then as I climbed upward, as yet unobserved in my tiny craft that was scarcely larger than myself, I trained my telultroscope on the Han ship, focussing through to a view of its interior.

Much as I had imbibed of this generation's hatred for the Hans, I was forced to admire them for the completeness and efficiency of this marvelous craft of theirs.

Constantly twirling the controls of my scope to hold the focus, I examined its interior from nose to stern.

IT may be of interest at this point to give the reader a layman's explanation of the electronic or ionic machinery of these ships, and of their general construction, for today the general public knows little of the particular application of the electronic laws which the Hans used, although the practical application of ultrons are well understood.

Back in the Twentieth Century I had, like literally millions of others, dabbled a bit in "radio" as we called it then; the science of the Hans was simply the superdevelopment of "electricity," "radio," and "broadcasting."

It must be understood that this explanation of mine is not technically accurate, but only what might be termed an illustrative approximation.

The Hans' power-stations used to broadcast three distinct "*powers*" simultaneously. Our engineers called them the "*starter*," the "*pullee*" and the "*sub-disintegrator*." The last named had nothing to do with the operation of the ships, but was exclusively the powerizer of the disintegrator generators.

The "*starter*" was not unlike the "radio" broadcasts of the Twentieth Century. It went out at a frequency of about 1,000 kilocycles, had an amperage of approximately zero, but a voltage of two billion. Properly amplified by the use of *inductostatic* batteries (a development of the principle underlying the earth induction compass applied to the control of static) this current energized the "*A*" *ionomagnetic* coils on the airships, large and sturdy affairs, which operated the *Attractoreflex Receivers*, which in turn "pulled in" the second broadcast power known as the "*pullee*," absorbing it from every direction, literally exhausting it from surrounding space. The "*pullee*" came in at about a half-billion volts, but in very heavy amperage, proportional to the capacity of the receiver, and on a long wave—at audio frequency in fact. About half of this power reception ultimately actuated the

repeller ray generators. The other half was used to energize the "*B*" *ionomagnetic* coils, peculiarly wound affairs, whose magnetic fields constituted the only means of insulating and controlling the circuits of the three "powers."

The repeller ray generators, operating on this current, and in conjunction with "twin synchronizers" in the power broadcast plant, developed two rhythmically variable ether-ground circuits of opposite polarity. In the "X" circuit, the negative was grounded along an ultraviolet beam from the ship's repeller-ray generator. The positive connection was through the ether to the "X synchronizer" in the power plant, whose opposite pole was grounded. The "Y" circuit travelled the same course, but in the opposite direction.

The rhythmic variables of these two opposing circuits, as nearly as I can understand it, in heterodyning, created a powerful material "push" from the earth, up along the violet ray beam against the *rep* ray generator and against the two synchronizers at the power plant.

This push developed molecularly from the earth-mass-resultant to the generator; and at the same fractional distance from the *rep* ray generator to the power plant.

THE force exerted upward against the ship was, of course, highly concentrated, being confined to the path of the ultraviolet beam. Air or any material substance, coming within the indicated section of the beam, was thrown violently upward. The ships actually rode on columns of air thus forcefully up-thrown. Their

"home berths" and "stations" were constructed with air pits beneath. When they rose from ordinary ground in open country, there was a vast upheaval of earth beneath their generators at the instant of take-off; this ceased as they got well above ground level.

Equal pressure to the lifting power of the generator was exerted against the synchronizers at the power plant, but this force, not being concentrated directionally along an ultraviolet beam, involved a practical problem only at points relatively close to the synchronizers.

Of course the synchronizers were automatically controlled by the operation of the generators, and only the two were needed for any number of ships drawing power from the station, providing their protection was rugged enough to stand the strain.

Actually, they were isolated in vast spherical steel chambers with thick walls, so that nothing but air pressure would be hurled against them, and this, of course, would be self-neutralizing, coming as it did from all directions.

The "sub-disintegrator power" reached the ships as an ordinary broadcast reception at a negligible amperage, but from one to 500 "quints" (quintillions) voltage, controllable only by the fields of the "*B*" ionomagnetic coils. It had a wave-length of about ten meters. In the *dis* ray generator, this wave-length was broken up into an almost unbelievably high frequency, and became a directionally controlled wave of an infinitesimal fraction of an inch. This wave-length, actually identical with the diameter

of an electron, that is to say, being accurately "tuned" to an electron, disrupted the orbital paths and balanced pulsations of the electrons within the atom, so desynchronizing them as to destroy polarity balance of the atom and causing it to cease to exist as an atom. It was in this way that the ray reduced matter to "nothingness."

This destruction of the atom, and a limited power for its reconstruction under certain conditions, marked the utmost progress of the Han science.

CHAPTER V

American Ultronic Science

OUR own engineers, working in shielded laboratories far underground, had established such control over the "de-atomized" electrons as to dissect them in their turn into *sub-electrons*. Moreover, they had carried through the study of this "order" to the point where they finally "dissected" the *sub-electron* into its component *ultrons*, for the fundamental laws underlying these successive orders are not radically dissimilar. And as they progressed, they developed constructive as well as destructive practice. Hence the great triumphs of ultron and inertron, our two wonderful synthetic elements, built up from super-balanced and sub-balanced ultronic whorls, through the *sub-electronic* order into the *atomic* and *molecular*.

Hence also, come our relatively simple and beautifully efficient ultraphones and ultrosopes, which in their phonic and visual operation penetrate obstacles of material, electronic and sub-electronic nature without let or hindrance, and with the consumption of but infinitesimal power.

Static disturbance, I should explain, is negligible in the sub-electronic order, and non-existent in the ultronic.

The pioneer expeditions of our engineers into the ultronic order, I am told, necessitated the use of most elaborate,

complicated and delicate apparatus, as well as the expenditure of most costly power, but once established there, all necessary power is developed very simply from tiny batteries composed of thin plates of *metultron* and *katultron*. These two substances, developed synthetically in much the same manner as ordinary ultron, exhibit dual phenomena which for sake of illustration I may compare with certain of the phenomena of radioactivity. As radium is constantly giving off electronic emanations and changing its atomic structure thereby, so *katultron* is constantly giving off *ultronic* emanations, and so changing its *sub-electronic* form, while *metultron*, its complement, is constantly attracting and absorbing *ultronic* values, and so changing its sub-electronic nature in the opposite direction. Thin plates of these two substances, when placed properly in juxtaposition, with insulating plates of *inertron* between, constitute a battery which generates an *ultronic* current.

AND it is a curious parallel that just as there were many mysteries connected with the nature of electricity in the Twentieth Century (mysteries which, I might mention, never *have* been solved, notwithstanding our penetration into the "sub-orders") so there are certain mysteries about the *ultronic* current. It will flow, for instance, through an *ultron* wire, from the *katultron* to the *metultron* plate, as electricity will flow through a copper wire. It will short circuit between the two plates if the *inertron* insulation is imperfect. When the insulation is perfect, however, and no *ultron* metallic circuit is complete,

the "current" (apparently the same that would flow through the metallic circuit) is projected into space in an absolutely straight line from the *katultron* plate, and received from space by the *metultron* plate on the same line. This line is the theoretical straight line passing through the mass-center of each plate. The shapes and angles of the plates have nothing to do with it, except that the perpendicular distance of the plate edges from the mass-center line determines thickness of the beam of parallel current-rays.

Thus a simple battery may be used either as a sender or receiver of current. Two batteries adjusted to the same center line become connected in series just as if they were connected by ultron wires.

In actual practice, however, two types of batteries are used; both the *foco*

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