

Cities in Flight

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Book One

Prelude: Washington

We do not believe any group of men adequate enough or wise enough to operate without scrutiny or without criticism. We know that the only way to avoid error is to detect it, that the only way to detect it is to be free to inquire. We know that in secrecy error undetected will flourish and subvert.

— J. Robert Oppenheimer

The Shadows flickered on the walls to his left and right, just inside the edges of his vision, like shapes stepping quickly back into invisible doorways. Despite his bone-deep weariness, they made him nervous, almost made him wish that Dr Corsi would put out the fire. Nevertheless, he remained staring into the leaping orange light, feeling the heat tightening his cheeks and the skin around his eyes, and soaking into his chest.

Corsi stirred a little beside him, but Senator Wagoner's own weight on the sofa seemed to have been increasing ever since he had first sat down. He felt drained, lethargic, as old and heavy as a stone despite his forty-eight years; it had been a bad day in a long succession of bad days. Good days in Washington were the ones you slept through.

Next to him Corsi, for all that he was twenty years older, formerly Director of the Bureau of Standards, formerly Director of the World Health Organization, and presently head man of the American Association for the Advancement of Science (usually referred to in Washington as 'the left-wing Triple A-S'), felt as light and restless and quick as a chameleon.

'I suppose you know what a chance you're taking, coming to see me,' Corsi said in his dry, whispery voice. 'I wouldn't be in Washington at all if I didn't think the interests of the AAAS

required it. Not after the drubbing I've taken at MacHinery's hands. Even outside the government, it's like living in an aquarium – in a tank labeled "Piranha." But you know about all that.'

'I know,' the senator agreed. The shadows jumped forward and retreated. 'I was followed here myself. MacHinery's gumshoes have been trying to get something on me for a long time. But I had to talk to you, Seppi. I've done my best to understand everything I've found in the committee's files since I was made chairman – but a non-scientist has inherent limitations. And I didn't want to ask revealing questions of any of the boys on my staff. That would be a sure way to a leak – probably straight to MacHinery.'

'That's the definition of a government expert these days,' Corsi said, even more dryly. 'A man of whom you don't dare ask an important question.'

'Or who'll give you only the answer he thinks you want to hear,' Wagoner said heavily. 'I've hit that too. Working for the government isn't a pink tea for a senator, either. Don't think I haven't wanted to be back in Alaska more than once; I've got a cabin on Kodiak where I can *enjoy* an open fire, without wondering if the shadows it throws carry notebooks. But that's enough self-pity. I ran for the office, and I mean to be good at it, as good as I can be, anyhow.'

'Which is good enough,' Corsi said unexpectedly, taking the brandy snifter out of Wagoner's lax hand and replenishing the little amber lake at the bottom of it. The vapors came welling up over his cupped hand, heavy and rich. 'Bliss, when I first heard that the Joint Congressional Committee on Space Flight was going to fall into the hands of a freshman senator, one who'd been nothing but a press agent before his election—'

'Please,' Wagoner said, wincing with mock tenderness. 'A public relations counsel.'

'As you like. Still and all, I turned the air blue. I knew it wouldn't have happened if any senator with seniority had wanted the committee, and the fact that none of them did seemed to me to be the worst indictment of the present Congress anyone could ask for.'

Every word I said was taken down, of course, and will be used against you, sooner or later. It's already been used against me, and thank God *that's* over. But I was wrong about you. You've done a whale of a good job; you've learned like magic. So if you want to cut your political throat by asking me for advice, then by God I'll give it to you.'

Corsi thrust the snifter back into Wagoner's hand with something more than mock fury. 'That goes for you, and for nobody else,' he added. 'I wouldn't tell anybody else in government the best way to pound sand – not unless the AAAS asked me to.'

'I know you wouldn't, Seppi. That's part of our trouble. Thanks, anyhow.' He swirled the brandy reflectively. 'All right, then, tell me this: what's the matter with space flight?'

'The army,' Corsi said promptly.

'Yes, but that's not all. Not by a long shot. Sure, the Army Space Service is graft-ridden, shot through with jealousy and gone rigid in the brains. But it was far worse back in the days when a half-dozen branches of government were working on space flight at the same time – the weather bureau, the navy, your bureau, the air force and so on. I've seen some documents dating back that far. The Earth Satellite Program was announced in 1944 by Stuart Symington; we didn't actually get a manned vehicle up there until 1962, after the army was given full jurisdiction. They couldn't even get the damned thing off the drawing boards; every rear admiral insisted that the plans include a parking place for his pet launch. At least now we *have* space flight.

'But there's something far more radically wrong now. If space flight were still a live proposition, by now some of it would have been taken away from the army again. There'd be some merchant shipping maybe; or even small passenger lines for a luxury trade, for the kind of people who'll go in uncomfortable ways to unliveable places just because it's horribly expensive.' He chuckled heavily. 'Like fox-hunting in England a hundred years ago; wasn't it Oscar Wilde who called it "the pursuit of the inedible by the unspeakable"?'

'Isn't it still a little early for that?' Corsi said.

'In 1913? I don't think so. But if I'm rushing us on that one point, I can mention others. Why have there been no major exploratory expeditions for the past fifteen years? I should have thought that as soon as the tenth planet, Proserpine, was discovered some university or foundation would have wanted to go there. It has a big fat moon that would make a fine base – no weather exists at those temperatures – there's no sun in the sky out there to louse up photographic plates – it's only another zero-magnitude star – and so on. That kind of thing used to be meat and drink to private explorers. Given a millionaire with a thirst for science, like old Hale, and a sturdy organizer with a little grandstand in him – a Byrd-type – and we should have had a Proserpine Two station long ago. Yet space has been dead since Titan Station was set up in 1981. Why?'

He watched the flames for a moment.

'Then,' he said, 'there's the whole question of invention in the field. It's stopped, Seppi. Stopped cold.'

Corsi said: 'I seem to remember a paper from the boys on Titan not so long ago—'

'On xenobacteriology. Sure. That's not space flight, Seppi; space flight only made it possible; their results don't update space flight itself, don't improve it, make it more attractive. Those guys aren't even interested in it. *Nobody* is any more. That's why it's stopped changing.

'For instance: we're still using ion-rockets, driven by an atomic pile. It works, and there are a thousand minor variations on the principle; but the principle itself was described by Coupling in 1954! Think of it, Seppi – not one single new, basic engine design in *fifty years*! And what about hull design? That's still based on von Braun's work – older even than Coupling's. Is it really possible that there's nothing better than those frameworks of hitched onions? Or those powered gliders that act as ferries for them? Yet I can't find anything in the committee's files that looks any better.'

'Are you sure you'd know a minor change from a major one?'

'You be the judge,' Wagoner said grimly. 'The hottest thing in current spaceship design is a new elliptically wound spring for acceleration couches. It drags like a leaf-spring with gravity, and pushes like a coil-spring against it. The design wastes energy in one direction, stores it in the other. At last reports, couches made with it feel like sacks stuffed with green tomatoes, but we think we'll have the bugs out of it soon. Tomato bugs, I suppose. Top Secret.'

'There's one more Top Secret I'm not supposed to know,' Corsi said. 'Luckily it'll be no trouble to forget.'

'All right, try this one. We have a new water-bottle for ships' stores. It's made of aluminum foil, to be collapsed from the bottom like a toothpaste tube to feed the water into the man's mouth.'

'But a plastic membrane collapsed by air pressure is handier, weighs less—'

'Sure it does. And this foil tube is already standard for paste rations. All that's new about this thing is the proposal that we use it for water too. The proposal came to us from a lobbyist for CanAm Metals, with strong endorsements by a couple of senators from the Pacific Northwest. You can guess what we did with it.'

'I am beginning to see your drift.'

'Then I'll wind it up as fast as I can,' Wagoner said. 'What it all comes to is that the whole structure of space flight as it stands now is creaking, obsolescent, over-elaborate, decaying. The field is static; no, worse than that, it's losing ground. By this time, our ships ought to be sleeker and faster, and able to carry bigger payloads. We ought to have done away with this dichotomy between ships that can land on a planet, and ships that can fly from one planet to another.'

'The whole question of using the planets for something — something, that is, besides research — ought to be within sight of settlement. Instead, nobody even discusses it any more. And our chances to settle it grow worse every year. Our appropriations are dwindling, as it gets harder and harder to convince the Congress

that space flight is really good for anything. You can't sell the Congress on the long-range rewards of basic research, anyhow; representatives have to stand for election every two years, senators every six years; that's just about as far ahead as most of them are prepared to look. And suppose we tried to explain to them the basic research we're doing? We couldn't; it's classified!

'And above all, Seppi - this may be only my personal ignorance speaking, but if so, I'm stuck with it - above all, I think that by now we ought to have some slight clue toward an *interstellar* drive. We ought even to have a model, no matter how crude - as crude as a Fourth of July rocket compared to a Coupling engine, but with the principle visible. But we don't. As a matter of fact, we've written off the stars. Nobody I can talk to thinks we'll ever reach them.'

Corsi got up and walked lightly to the window, where he stood with his back to the room, as though trying to look through the light-tight blind down on to the deserted street.

To Wagoner's fire-dazed eyes, he was scarcely more than a shadow himself. The senator found himself thinking, for perhaps the twentieth time in the past six months, that Corsi might even be glad to be out of it all, branded unreliable though he was. Then, again for at least the twentieth time, Wagoner remembered the repeated clearance hearings, the oceans of dubious testimony and gossip from witnesses with no faces or names, the clamor in the press when Corsi was found to have roomed in college with a man suspected of being an ex-YPSL member, the denunciation on the senate floor by one of MacHinery's captive solons, more hearings, the endless barrage of vilification and hatred, the letters beginning 'Dear Doctor Corsets, You burn,' and signed 'True American.' To get out of it that way was worse than enduring it, no matter how stoutly most of your fellow scholars stood by you afterwards.

'I shan't be the first to say so to you,' the physicist said, turning at last. 'I don't think we'll ever reach the stars either, Bliss. And I am not very conservative, as physicists go. We just don't live long

enough for us to become a star-traveling race. A mortal man limited to speeds below that of light is as unsuited to interstellar travel as a moth would be to crossing the Atlantic. I'm sorry to believe that, certainly; but I do believe it.'

Wagoner nodded and filed the speech away. On that subject he had expected even less than Corsi had given him.

'But,' Corsi said, lifting his snifter from the table, 'it isn't impossible that interplanetary flight could be bettered. I agree with you that it's rotting away now. I'd suspected that it might be, and your showing tonight is conclusive.'

'Then why is it happening?' Wagoner demanded.

'Because scientific method doesn't work any more.'

'What! Excuse me, Seppi, but that's sort of like hearing an archbishop say that Christianity doesn't work any more. What do you mean?'

Corsi smiled sourly. 'Perhaps I was overdramatic. But it's true that, under present conditions, scientific method is a blind alley. It depends on freedom of information, and we deliberately killed that. In my bureau, when it was mine, we seldom knew who was working on what project at any given time; we seldom knew whether or not somebody else in the bureau was duplicating it; we never knew whether or not some other department might be duplicating it. All we could be sure of was that many men, working in similar fields, were stamping their results *Secret* because that was the easy way – not only to keep the work out of Russian hands, but to keep the workers in the clear if their own government should investigate them. How can you apply scientific method to a problem when you're forbidden to see the data?

'Then there's the caliber of scientist we have working for the government now. The few first-rate men we have are so harassed by the security set-up – and by the constant suspicion that's focused on them because they *are* top men in their fields, and hence anything they might leak would be particularly valuable – that it takes them years to solve what used to be very simple problems. As for the rest – well, our staff at Standards consisted almost

entirely of third-raters: some of them were very dogged and patient men indeed, but low on courage and even lower on imagination. They spent all their time operating mechanically by the cook-book – the routine of scientific method – and had less to show for it every year.'

'Everything you've said could be applied to the space-flight research that's going on now, without changing a comma,' Wagoner said. 'But, Seppi, if scientific method used to be sound, it should still be sound. It ought to work for anybody, even third-raters. Why has it suddenly turned sour now – after centuries of unbroken successes?'

'The time lapse,' Corsi said somberly, 'is of the first importance. Remember, Bliss, that scientific method is *not* a natural law. It doesn't exist in nature, but only in our heads; in short, it's a way of thinking about things – a way of sifting evidence. It was bound to become obsolescent sooner or later, just as sorites and paradigms and syllogisms became obsolete before it. Scientific method works fine while there are thousands of obvious facts lying about for the taking – facts as obvious and measurable as how fast a stone falls, or what the order of the colors is in a rainbow. But the more subtle the facts to be discovered become – the more they retreat into the realms of the invisible, the intangible, the unweighable, the sub-microscopic, the abstract – the more expensive and time-consuming it is to investigate them by scientific method.

'And when you reach a stage where the *only* research worth doing costs millions of dollars *per experiment*, then those experiments can be paid for only by government. Governments can make the best use only of third-rate men, men who can't leaven the instructions in the cook-book with the flashes of insight you need to make basic discoveries. The result is what you see: sterility, stasis, dry rot.'

'Then what's left?' Wagoner said. 'What are we going to do now? I know you well enough to suspect that you're not going to give up all hope.'

'No,' Corsi said, 'I haven't given up, but I'm quite helpless to change the situation you're complaining about. After all, I'm on the outside. Which is probably good for me.' He paused, and then said suddenly: 'There's no hope of getting the government to drop the security system completely?'

'Completely?'

'Nothing else would do.'

'No,' Wagoner said. 'Not even partially, I'm afraid. Not any longer.'

Corsi sat down and leaned forward, his elbows on his knobby knees, staring into the dying coals. 'Then I have two pieces of advice to give you, Bliss. Actually they're two sides of the same coin. First of all, begin by abandoning these multi-million-dollar, Manhattan-District approaches. We don't need a newer, still finer measurement of electron resonance one-tenth so badly as we need new pathways, new categories of knowledge. The colossal research project is defunct; what we need now is pure skullwork.'

'From my staff?'

'From wherever you can get it. That's the other half of my recommendation. If I were you, I would go to the crackpots.'

Wagoner waited. Corsi said these things for effect; he liked drama in small doses. He would explain in a moment

'Of course I don't mean total crackpots,' Corsi said. 'But you'll have to draw the line yourself. You need marginal contributors, scientists of good reputation generally whose obsessions don't strike fire with other members of their profession. Like the Crehore atom, or old Ehrenhaft's theory of magnetic currents, or the Milne cosmology – you'll have to find the fruitful one yourself. Look for discards, and then find out whether or not the idea deserved to be *totally* discarded. And – don't accept the first "expert" opinion that you get.'

'Winnow chaff, in other words.'

'What else is there to winnow?' Corsi said. 'Of course it's a long chance, but you can't turn to scientists of real stature

now; it's too late for that. Now you'll have to use sports, freaks, near-misses.'

'Starting where?'

'Oh,' said Corsi, 'how about gravity? I don't know any other subject that's attracted a greater quota of idiot speculations. Yet the acceptable theories of what gravity is are of no practical use to us. They can't be put to work to help lift a spaceship. We can't manipulate gravity as a field; we don't even have a set of equations for it that we can agree upon. No more will we find such a set by spending fortunes and decades on the project. The law of diminishing returns has washed that approach out.'

Wagoner got up. 'You don't leave me much,' he said glumly.

'No,' Corsi agreed. 'I leave you only what you started with. That's more than most of us are left with, Bliss.'

Wagoner grinned tightly at him and the two men shook hands. As Wagoner left, he saw Corsi silhouetted against the fire, his back to the door, his shoulders bent. While he stood there, a shot blatted not far away, and the echoes bounded back from the face of the embassy across the street. It was not a common sound in Washington, but neither was it unusual: it was almost surely one of the city's thousands of anonymous snoopers firing at a counter-agent, a cop, or a shadow.

Corsi made no responding movement. The senator closed the door quietly.

He was shadowed all the way back to his own apartment, but this time he hardly noticed. He was thinking about an immortal man who flew from star to star faster than light.