Tap, by Greg Egan

"I want you to find out who killed my mother, Ms O'Connor. Will you do that?"

Helen Sharp's voice was unsteady with anger; she seemed almost as psyched up as if she'd come here to confront the killer, face-to-face. Under the circumstances, though, the very act of insisting that there was a killer was like shouting a defiant accusation from the rooftops -- which must have taken some courage, even if she had no idea whom she was accusing.

I said carefully, "The coroner returned an open finding. I'm not a lawyer, but I imagine Third Hemisphere would still settle out of court for a significant -- "

"Third Hemisphere have no case to answer! And sure, maybe they'd pay up anyway -- just to avoid the publicity. But as it happens, I'm not interested in legalized blackmail." Her eyes flashed angrily; she made no effort to conceal her outrage. No doubt her lawyers had already given her exactly the same advice; it didn't look like the idea would ever grow on her. She was thirty-two -- only five years younger than me -- but she radiated so much stubborn idealism that I found it hard not to think of her as belonging to another generation entirely.

I raised one hand in a conciliatory gesture. "Fine. It's your decision. But I suggest you don't sign anything that limits your options -- and don't make any public declarations of absolution. After six months paying my expenses, you might change your mind. Or I might even turn up something that will change it for you. Stranger things have happened." Though nothing much stranger than a next-of-kin declining to screw a multinational for all it was worth.

Sharp said impatiently, "The TAP implant was not responsible. There's no evidence to suggest that it was."

"No, and there's no evidence to suggest foul play, either."

"That's why I'm hiring you. To find it."

I glanced irritably at the north-facing window; the allegedly smart pane was ablaze with sunlight, rendering most of the office almost as hot as the sweltering streets of Kings Cross below.

Grace Sharp had been dead for a month. I'd been following the case informally, like everyone else in Sydney, out of sheer morbid curiosity. On the evening of January 12, she'd been at work in her study, apparently alone. The immediate cause of death had been a myocardial infarction, but the autopsy had also shown signs of a powerful adrenaline surge. That could have resulted from the pain and stress of a heart attack already in progress -- or it could have come first, triggered by an unknown external shock.

Or, the Total Affect Protocol chip in her brain might have flooded her body with adrenaline for no good reason at all.

Sharp had been sixty-seven -- in reasonable health for her age, but old enough to blur the boundaries of the possible. Forensic pathologists had struggled at the inquest to allocate probabilities to the three alternatives, but there'd been no clear front-runner. Which was no doubt distressing for the relatives -- and no doubt left them vulnerable to the fantasy that there had to be a simple answer out there somewhere, just waiting to be found.

Helen Sharp said, "The media consensus is that my mother was composing a poem just before she died -- and she thought a word in TAP so 'powerful' that it killed her on the spot." Her tone was venomous. "Do they seriously imagine that ninety thousand sane people would put something in their brains which was capable of doing that? Or that the manufacturers would sell a device which would leave them open to billions of dollars worth of compensation claims? Or that the government licensing authorities -- "

I said, "Licensed pharmaceuticals have killed plenty of people. Implants are even harder to test. And 'fail-safe' software written to the most rigorous military specifications has crashed aircraft -- "

She seized on the analogy triumphantly. "And how do you know that? Because the aircraft's black box proved it! Well, the TAP implant has its own black box: an independent chip which logs all its actions. And there was no record of any malfunction. No record of the implant triggering an adrenaline release at any level -- let alone a fatal dose."

"Maybe the black box glitched, too. You say it's independent -- but if there's enough connectivity to let it know everything the implant does, the combined system might still be vulnerable to some kind of shared failure mode that the designers never anticipated."

Sharp clenched her fists in frustration. "That's not -- literally -- impossible," she conceded. "But I don't believe it's likely."

"All right. What do you think happened?"

Sharp composed herself, with the air of someone weary of repeating the same message, gathering up her strength with a promise to herself that this would be the last time.

She said, "My mother was working on a new poem that night -- the black box makes that clear. But the time of death can't be determined precisely -- and it could have been as much as fifteen

minutes after the last recorded use of the implant. I believe she was interrupted. I believe someone broke into the apartment and killed her.
"I don't know how they did it. Maybe they just terrorized her -- without laying a finger on her -- and that was enough to bring on the heart attack." Her voice was flat, deliberately emotionless. "Or maybe they gave her a transdermal dose of a powerful stimulant. There are dozens of chemicals which could have triggered a heart attack, without leaving a trace. She wasn't found for almost nine hours. There are carbohydrate analogs of stimulatory neuropeptides which are degraded into glucose and water on a time scale of minutes."
I resisted the urge to cite the lack of evidence for an intruder; it would have been a waste of breath. "Why, though? Why would anyone want to kill her?"
She hesitated. "I'm not sure how much you know about TAP."
"Assume the worst."
"Well ... it's been wrongly described as just about everything from 'telepathy' to 'computerized Esperanto' to 'the multimedia standard for the brain'. Sure, it began with a fusion of language and VR -- but it's been growing for almost fifteen years now. There's still a word for <<dog>>" -- she sketched the angle-brackets with her fingers, and I picked up on the convention later -- "which might as well be hundo -- and another for <<your beloved golden Labrador standing on the beach shaking the water from its coat before licking your face>> ... which will evoke all that and more in all five senses, if you let it.
"But at the leading edge, now, we're creating words for concepts, emotions, states of mind, which might once have defied description altogether. With TAP, ultimately there's nothing a human being can experience which needs to remain ... ineffable, mysterious, incommunicable. Nothing is beyond discussion. Nothing is beyond analysis. Nothing is 'unspeakable'. And a lot of people find that prospect threatening; it turns a lot of old power structures on their head."
If that cliche came true every time it was invoked, power structures would be oscillating faster than mains current. Helen Sharp was pushing seven on my paranoia index; on top of all her understandable grief and frustration, she belonged to a technosubculture which was poorly understood by the mainstream, frequently misrepresented -- and which clearly liked to think of itself as a "dangerously" iconoclastic elite.
I said, "I know there are people who find TAP users ... unacceptable. But what's going to drive them to extremes like murder, all of a sudden? In fifteen years, has anyone, anywhere, been killed simply for having the implant?"
"Not to my knowledge. But -- "
"Then surely -- "
"But I can tell you exactly what's changed. I can tell you why the conflict has just entered a whole new phase."
That got my attention. "Go on."
"You know it's against the law to install a TAP implant in anyone younger than eighteen years old?"
"Of course." The same restriction applied to all neural hardware, other than therapeutic chips which restored normal function to the injured or congenitally disabled.
"Early in March, a couple here in Sydney will commence legal proceedings with the aim of ensuring that they're free to install the implant in all their future children -- at the age of three months."
I was momentarily speechless. These plans had clearly been kept within a very tight circle of supporters; the saturation media coverage of the inquest hadn't mentioned so much as a rumour. After a month of intense journalistic scrutiny, I hadn't expected the TAP-heads to have any surprises left.
I said, "Legal proceedings on what basis?"
"That they're entitled to raise their family using whatever language they choose. That's guaranteed in Federal legislation: there's a 2011 bill which brings into force most of the provisions of the 2005 UN Covenant on Human Rights. They'll be seeking a ruling from the High Court which invalidates the relevant sections of the New South Wales criminal code -- which is far more difficult, from a legal point of view, than trying to defend themselves against a prosecution after the fact ... but it does save them the trouble of having to find a surgeon willing to risk martyrdom."
Sharp smiled faintly. "The same Federal law was invoked about a year ago, by a signing couple who were being pressured by Community Services to give their son a hearing implant. The parents won the first round -- and it looks like there isn't going to be an appeal. But a pro-implant case was always going to be much harder, of course. And signing is positively respectable, compared to TAP."

"I assume the police know all this?"
"Of course. They don't appear to be particularly interested, though -- and I wasn't able to raise it at the inquest. Legally speaking, I suppose it really is just static."
"But you think -- "
"I think a death widely attributed to the TAP implant would transform the prospects of the challenge succeeding from merely poor to ... politically impossible. I think there are people who'd consider that to be a result worth killing for."
Sharp fixed her gaze on me for a moment, and then nodded slightly, almost sympathetically -- as if I'd just uttered a word which expressed all the conflicting emotions running through my head: <<Neural hardware in the skull of a three-month-old child -- just to indulge its parents' whims -- would be an obscenity. But ... if the ubiquitous hearing implants which grant English-before-sign are no "whim", why is one which grants TAP-before-English? And if Grace Sharp was murdered to sway the odds against the challenge, her self-righteous killers belong in prison, regardless -- and my own knee-jerk revulsion at the prospect of infant TAP-heads only goes to show that it could easily have been a powerful enough motive.>>
She said, "And I think you're going to take the case."

I started work that afternoon, reviewing the technical literature on the TAP implant -- the closest thing to an objective account of its capabilities I was likely to find. Like most people, I imagined I already understood all the salient features -- but it turned out that I'd swallowed more misinformation from the nets than I'd realized.
The two chips -- the implant proper and the black box, both less than a millimetre wide -- sat at the back of the skull, sharing access to a fine web of conductive polymer threads which wrapped the brain, making billions of quasi-synaptic contacts with the visual and auditory cortex, and Wernicke's speech area in the temporal lobe. Other threads penetrated deeper, some as far as the limbic system. TAP could always be spoken or written, but bandwidth requirements made modulated infrared the medium of choice, so the implant was linked, via the spinal cord, to bioengineered IR transceiver cells in the skin of the palms.
Merely installing the implant didn't grant instant fluency in TAP; the language still had to be learnt. A complete, "preloaded" vocabulary would never have worked; the precise meaning of most words in TAP could only be encoded in context, once the implant resided in a particular user's brain. The implant's own electronic neural net was ninety percent blank at installation, containing only a specialized language acquisition system and a simple "bootstrap" vocabulary. And though the learning process left its mark mostly within the implant itself -- along with some relatively minor changes to the regions of the brain where a second natural language would have been encoded -- it was meaningless to talk about either brain or chip "knowing TAP", in isolation. An experienced user who exchanged his or her old implant for a new one straight from the factory would have been dragged back almost to square one (in practice, all the data from the old hardware would be copied to the new) -- but equally, an experience-enriched implant placed in a novice's brain would have been as unusable as a slice of someone else's cerebral cortex.
These observations applied strictly to adults, of course. Despite several dozen theoretical papers -- most of them cautiously optimistic -- no one really knew how a young child's brain would interact with the implant.
A TAP user could interpret a standard VR sensorium -- but there was, deliberately, no provision for interacting in the conventional way with a nonexistent environment. Immersive VR implants temporarily paralysed the organic body and diverted motor impulses from the brain into a fully computerized somatic model: a virtual body which could function as part of the virtual environment -- subject to the environment's rules. In contrast, a TAP user's idea of interaction was more along the lines of rethinking the whole sensorium and spitting it back out, or responding with something entirely different -- arguing with the whole premise, instead of passively accepting it. A VR user had little choice but to suspend disbelief, or quit -- a full-sense environment, surreal or not, was always compelling -- but a TAP user could deal with the same kind of information with as much or as little detachment as he or she desired. Words in TAP -- which included the entire sensorium-descriptor vocabulary of VR -- could evoke images ten thousand times more vivid and precise than the densest poetic English ... or they could be held at arm's length and scrutinized dispassionately, as easily as any English-speaker could contemplate the phrase "a flash of blinding radiance" or "the overpowering stench of ammonia" without experiencing anything of the kind. In the jargon of the implant's designers -- English words, predating TAP itself -- every TAP word could be scanned (understood analytically), or played (experienced subjectively) -- or interpreted in a manner lying anywhere at all between those two extremes.
In one respect, though, TAP could be more immersive than the most authoritarian VR: it could

induce emotional states directly. VR was confined to pure sense data (albeit often manipulative in the extreme), but in Total Affect Protocol there were words for <<fear>>, <<euphoria>>, <<sadness>> (or rather, nuanced subtypes of these crude English categories) -- and the implant could reach deep into the limbic system and trigger these states as easily as any VR chip could generate the illusion of an unambiguously blue sky.
The user's power to keep the language at a distance remained, of course -- and the TAP word for <<crippling despair>> could only induce the "referent state" if a conscious effort was made to play it. And though TAP's formal grammar ruled out nothing, low-level filters stood guard against potentially stupefying linguistic singularities -- such as <<the desire to play this word forever>> -- or anything physiologically dangerous.
Still, although the literature was blithely reassuring on this point, in the end it came down to a question of trusting the manufacturers and the regulators. I didn't doubt that, in theory, a TAP chip could be designed which was no more likely than the unmodified human brain to strike the user dead if the word for <<fatal adrenaline rush>> accidentally came to mind -- but whether or not Third Hemisphere had achieved that level of safety -- for every conceivable user -- was another matter.
Grace Sharp had been the oldest of the ninety thousand TAP speakers on the planet, and reputedly one of the most proficient -- but whether proficiency implied more risk, from a greater vocabulary, or less, due to better control of the language, I couldn't say.

By half past seven, I'd had enough of wading through papers on distortion-free affect-compression algorithms. I closed the office and headed for the station.
I could still smell the day's heat wafting up from Victoria Road, but there was a faint hint of a breeze from the east. The gaudy advertizing holograms never looked quite as tacky at dusk as they did at dawn, although the colours were just as washed-out; maybe it was really all down to the mood on the streets. A few sweat-stained commuters were still on their way home, radiating palpable relief -- and a few freshly laundered revellers were already arriving, full of hopeful energy. Somehow, dawn in Kings Cross never looked hopeful.
I passed a gaggle of saffron-robed monks from the Darlinghurst Temple, out hunting for alms, on the other side of the street. James didn't seem to be among them -- though it was hard to tell: they all looked interchangeable to me, and my strongest memories of him didn't encompass the terminal, shaven-headed stage. Even when I recalled the night he announced that he was leaving me and Mick for a life devoted to selfless contemplation -- "There's no point arguing, Kath," he'd explained, with an expression of transcendent smugness, "I'm not enslaved by the illusions of language anymore." -- even then, strangely enough, I pictured him as he'd looked ten years before.
Buddhism had been growing ever more fashionable throughout the country for most of my lifetime -- taking the place of retreating Christianity, as if the "vacuum" left behind needed to be filled by something equally absurd -- but in the last ten years the Federal government had started supporting the monasteries in a big way, with a program of "community spiritual development" grants. Maybe they were hoping to save on social security payments.
I hesitated outside the station, thinking: A single TAP word could capture this moment -- perfectly encoding my entire sensorium, and everything I'm thinking and feeling. A word I could speak, write, recall. Study at a distance -- scan -- or play, relive completely. Inflect and modify. Quote exactly (or not) to the closest friend or the most distant stranger.
I had to admit that it was a deeply unsettling notion: a language which could encompass, if not the universe itself, then everything we could possibly experience of it. At any given moment, there were "only" ten to the power three thousand subjectively distinguishable states of the human brain. A mere ten thousand bits of information: quite a mouthful, encoded as syllables -- but only a millisecond flash in infrared. A TAP user could effectively narrate his or her entire inner life, with one hundred percent fidelity, in real time. Leopold Bloom, eat your heart out.
I boarded the southbound train, the skin on the back of my neck still tingling. The carriage was packed, so I stood strap-hanging with my eyes closed, letting the question spin in the darkness of my skull: Who, or what, killed Grace Sharp? Work was never something I could switch on and off -- and unless I reached the stage where part of me was thinking about the case every waking moment, the chances were I'd make no progress at all.
Helen Sharp believed in some faceless conspiracy against TAP as a first language, driven by sheer linguistic xenophobia -- though the real opposition might also be motivated, in part, by perfectly valid concerns about the unknown developmental consequences for a child growing up with TAP.
The serious media favoured a simple failure of technology; several worthy editorials had rewritten the Sharp case as a cautionary tale about the need for improved quality control in biomedical engineering. Meanwhile, the tabloids had gleefully embraced the idea of the <<death>> word, quasi-

mystical enough to give their anti-tech subscribers a frisson of self-righteousness at the poetic justice of a TAP-head thinking herself into oblivion ... and their pro-tech ones a frisson of awe at the sheer Power of the Chip.
And it was still possible that Grace Sharp had simply had a heart attack, all by herself. No assassins, no fatal poetry, no glitch.
So far, I could only agree with the coroner: I wasn't prepared to rule anything out.

By the time I arrived home, Mick had already eaten and retreated to his room to play Austro-Hungarian Political Intrigues in Space. He'd been running the scenario for almost six months, along with a dozen friends -- some in Sydney, some in Beijing, some in Sao Paulo. They'd graciously let me join in once, as a minor character with an unpronounceable name, but I'd become terminally bored after ten minutes and engineered my own death as swiftly as possible. I had nothing against role-playing games, per se ... but this was the most ludicrous one I'd encountered since Postmodernism Ate My Love Child. Still, every twelve-year-old needed something truly appalling to grow out of -- something to look back on in a year's time with unconditional embarrassment. The books I'd read, myself (and adored, at the time) had been no better.
I knocked on his door, and entered. He was lying on his bed with the headset on and his hands above his head, making minimalist gestures with both control gloves: driving a software puppet body which had no sense of touch, or balance, or proprioception. He was moving its limbs with actions which had nothing to do with moving his own ... but he was seeing and hearing everything through the puppet's eyes and ears.
Most of the studies I'd read had suggested that the earlier a child took up VR (headset-and-glove, of course, not implant-based), the fewer side-effects it had on real-life coordination and body image. The skills of moving real and virtual bodies didn't seem to compete for limited neural resources; they could be learnt in parallel, as easily as two languages. Only adults got confused between the two (and did better with VR implants, which let them pretend they were using their physical bodies). The research suggested that an hour a day in VR was no more harmful than an hour a day of any other equally unnatural activity: violin practice, ballet, karate.
I still worried, though.
The room monitor flagged my presence. At a convenient break in the action, Mick slipped off the headset to greet me, doing his best to hide his impatience.
I said, "School?"
He shrugged. "Bland-out. Work?"
"I've got a murder case."
His face lit up. "Resonant! What class weapon?"
"Unkind words."
"¿Que?"
"It's a joke." I almost started to explain, but it didn't seem fair to hold up the other players.
"You'll quit at nine, okay? I don't want to have to check on you."
"Mmmm." Deliberately noncommittal.
I said calmly, "I can program it, or you can stick to the rules voluntarily. It's your choice."
He scowled. "It's no choice, if it makes no difference."
"Very profound. But I happen to disagree." I walked over to him and brushed the hair from his eyes; he gave me his I-wish-you-wouldn't-but-you're-forgiven-this-time look.
Mick said suddenly, "Unkind words? You mean Grace Sharp?"
I nodded, surprised.
"Some guru last week was prating about her TAPping herself to death." He seemed greatly amused -- and it struck me that "guru" was several orders of magnitude more insulting than anything I would have dared to say in front of my mother, at his age. At least put-downs were getting more elegant; my generation's equivalents had relied almost exclusively on references to excrement or genitalia. Mick and his contemporaries weren't at all prudish -- they just found the old scatological forms embarrassingly childish.
I said, "You don't believe in the <<death>> word?"
"Not some banana skin land mine you make yourself, by accident."
I pondered that. "But if it exists at all, don't you think it'd be easier to fight if it came from outside, than if you stumbled on it in your own thoughts?"
He shook his head knowingly. "TAP's not like that. You can't invent random words in your head -- you can't try out random bit-patterns. You can imagine things, you can free-associate, but ... not all the way to death, without seeing it coming."
I laughed. "So when did you read up on this?"
"Last week. The story sounded flash, so I went context mining." He glanced at his terminal and

made some slight hand movements; a cluster of icons for Universal Resource Locators poured into an envelope with my name on it, which darted into the outgoing mail box. "References."
"Thanks. I wasted the whole afternoon -- I should have come home early and picked your brains instead." I was only half joking.
I sat on the edge of the bed. "If she didn't stumble on the word herself, though ... I don't see how anyone could have spoken it to her: as far as the police could tell, she'd had no visitors -- or communications -- for hours. And if someone broke into the apartment, they left no trace."
"How about ... ?" Mick gestured with one gloved thumb at the shelf above his bed.
"What?" I parsed the clutter of objects slowly. "Ah."
He'd set up an IR link with his friend Vito, who lived in an apartment block across the park; they could exchange data twenty-four hours a day without either family paying a cent to the fibre barons. The collimated beam of the five-dollar transceiver passed effortlessly through both their bedroom windows.
"You think someone outside the apartment ... shot her in the palm with a <<death>> word?" The notion conjured up bizarre images: a figure taking aim with a gunless night-sight; Grace Sharp with outstretched arms and infrared stigmata.
"Maybe. Split the fee, if I'm right?"
"Sure. Minus rent, food, clothes, communications -- "
Mick mimed violin playing. I feigned a swipe at his head. He glanced at the terminal; his friends were losing patience.
I said, "I'd better leave you to it."
He smiled, held up his hand in a farewell gesture like a diver about to submerge, then slipped the headset back on. I lingered in the room for a few seconds, feeling profoundly strange.
Not because I felt that I was losing touch with my son. I wasn't. But the fact that we could comprehend each other at all suddenly seemed like the most precarious voodoo. Natural language had endured, fundamentally unchanged, through a thousand social and technological revolutions ... but TAP made it look like some Stone Age tool, a flake of crudely shaped obsidian in an era when individual atoms could be picked up and rearranged at whim.
And maybe in the long run, all the trial-and-error and misunderstandings, all the folk remedies of smiles and gestures, all the clumsy imperfect well-meaning attempts to bridge the gap, would be swept away by the dazzling torrent of communication without bounds.
I closed the door quietly on my way out.

The next morning I started going through the transcripts of the inquest -- which included a 3D image of Sharp's study. The body had been found around 8:20 AM by a domestic aid who came three times a week -- Sharp, although generally fit, had suffered from severe arthritis in her hands. Paramedics had removed the body before the police became involved, but they'd snapped the scene first as a routine procedure.
The apartment was on the 25th floor, and the study had a large window facing west. The curtains were shown fully open -- although there was nothing in the transcripts, one way or the other, about the possibility that the man who'd found the body, or even the paramedics, might have opened them to let in some light. I grafted the image into the local council's plan of the suburb, and did some crude ray-tracing from where the forensic software suggested Sharp had been standing before she fell. A bullet would have left directional information -- but a burst of IR could have come from any location with a clear line of sight. Given the uncertainty in her position, and the size of the window, the possibilities encompassed the windows and balconies of sixty-three apartments. Most were beyond the range of cheap hobbyists' IR equipment -- but I looked up skin-transceiver sensitivity, attenuation in the atmosphere, and beam spread parameters, then started checking product catalogues. There were several models of communications lasers which would have done the job -- and the cheapest was only three hundred dollars. Not the kind of thing you could buy from an electronics retailer, but there were no formal restrictions on purchase or ownership. It wasn't a weapon, after all.
The world's greatest TAP poet, shot by a word? It was a seductive idea -- and I was surprised that the tabloids hadn't seized on it, weeks ago -- but in the cold light of morning, I was finding it increasingly difficult to believe that Grace Sharp had died from anything but natural causes. The building had excellent security; the forensic team had found no sign of an intruder. The testimony of the black box wasn't watertight, but on balance it probably did exonerate the implant. And Helen Sharp herself had been convinced that the <<death>> word was impossible.
I spent the morning slogging through the rest of the transcripts, but there was nothing very illuminating. The experts had washed their hands of Grace Sharp's death. I didn't blame them: if the evidence supported no clear verdict, the honest thing to do was to say so. At most inquests,

though, someone managed to slip a speculation or two into the proceedings: a pathologist's gut-level hunch, an engineer's unprovable intuition. A few lines I could wave accusingly in their face when I cornered them in their office -- prompting them to spill the whole elaborate, unofficial hypothesis they'd been nurturing in their head for months. But there wasn't a single foothold here, a single indiscretion I could pursue; every witness had been cautious to a fault.

So I had nowhere else to go: I steeled myself and went trawling through the archives for the enemies of TAP.

Media releases (mainly from politicians and religious figures), letters and essays in edited publications, and postings to net forums gave me about seventeen thousand individuals who'd had something disparaging to say to the world about TAP. The search algorithm was multilingual, but I didn't trust it to pick up irony reliably, so even this crude first grab had to be taken with a mountain of salt. Twelve percent of the forum postings were anonymous -- and the random sample I inspected made it clear that they came from the most vehement opponents -- but I put them aside; textual analysis of a few gigabytes of invective could wait for barrel-scraping time.

Clustering software picked up some fairly predictable connections. Two-thirds of the people I'd found were officially speaking on behalf of -- or explicitly mentioned their membership or approval of -- one of ninety-six organizations: political, religious, or cultural.

The software drew ninety-six star-diagrams. The biggest cluster was for Natural Wisdom: a quasi-green lobby group set up for the sole purpose of opposing the use of neural hardware. Most members were European, but there was a significant Australian presence. Second largest was The Fountain of Righteousness, a U.S.-based fundamentalist Christian coalition; they had half a dozen local affiliate churches. Cluster size didn't necessarily measure the strength of opposition, though; the Roman Catholic church ranked a mere thirtieth -- but only because it was so rigidly hierarchical, with a relatively small list of appointed spokesmen. Most Islamic authorities weren't keen on neural hardware, either -- but many predominantly Islamic countries had simply outlawed the technology, largely defusing it as an issue. Islam's best showing was for a UK group, and that was ranked fifty-seventh.

I cut the data set down to Australia only. Nineteen organizations remained -- and the top six rankings stayed the same, for what that was worth. There was something of the flavour of a witch-hunt to this whole analysis; I wasn't publicly accusing anyone of anything -- I wasn't libelling Natural Wisdom as murderous thugs for daring to speak out against the implant -- but this kind of crude fishing expedition always made me feel distinctly uneasy.

Still, if these were the people who'd feel most threatened by the prospect of children growing up with TAP ... who among them could have known about the impending High Court challenge?

I scanned the membership databases of legal and paralegal associations, and the mailing lists of relevant journals, scooping up anyone who gave an address care of Huntingdale and Partners -- the firm who were preparing the "infant implant" brief.

There was zero overlap with the anti-TAP set -- which was no great surprise. I imagined the police would have gone at least this far, and they'd had better resources: they could have pulled the whole Huntingdale workforce from taxation records, with no chance of so much as a clerical assistant falling through the cracks.

I gazed at the screen, dispirited. All I had to show for a day's work were sixty-three apartments with a view of Grace Sharp's study, and seventeen thousand people who'd done nothing more incriminating than put themselves on the record as opponents of TAP.

The only thing left to try was intersecting the two.

Finding apartment numbers to match the physical locations in the building plans was the hardest part; architects and developers didn't have to file anything so petty when they had their projects approved. I was actually beginning to contemplate doing the necessary legwork myself, when I discovered that someone had done it for me: an ad hoc consortium of sellers of insurance, fire-alarms, security equipment and climate control had commissioned a database for the entire metropolitan area, to help them target their junk mail. The suburb I needed only cost fifty bucks -- complete with email tags.

I cross-matched with the anti-TAP set.

A single name appeared.

John Dallaporta belonged to none of my organisational clusters, and I had only one piece of data on his attitude to TAP: a short essay he'd written, seven years before, decrying the implant's potential to "erode the richness of our ancient and beautiful tongues" and "invade the still, mysterious spaces of our minds". The essay had appeared in a secondary English teachers' netzine; I summoned up the whole issue, and flipped through its innocuous contents. The majority of the articles dealt with working conditions, and concerns arising out of new technology; there was also an earnest -- almost painfully respectful -- discussion of strategies for coping with parents who

forbade their children contact with the filthy/sexist/atheistic/elitist/ superstitious/obsolete works of Shakespeare, et al. Not the kind of venue you'd seriously expect to lead you to a man who slaughtered his ideological enemies.
I reread Dallaporta's essay carefully. It was passionate, but hardly inflammatory; he sounded very much like just one more plaintive, insecure technophobe letting off steam, to a no doubt largely sympathetic audience. I was inclined to be sympathetic, myself -- in all honesty, the implant made my skin crawl -- but there was a self-serving undercurrent which detracted from the force of his arguments. Certainly, portraying English as an endangered language was ridiculous, when more people were speaking it than at any other time in history.
And though I could picture Dallaporta outside the court with a placard, once the challenge to the implant legislation began, I found it hard to imagine the author of these moderate words killing Grace Sharp in cold blood -- and harder still to imagine him discovering the means to do it.
I was growing tired of desk work, but I spent the next few hours studying the fragmentary portrait of the man offered by the net. He was forty-seven years old, divorced five years, with two daughters in their mid-teens. Presumably his ex-wife had custody of both children, since all the data suggested that he lived alone. He'd been a teacher in government high schools all his working life; in his late twenties, he'd published some poetry in literary journals, but unless he'd adopted an undocumented pseudonym, there'd been nothing since. He seemed to belong to no organization but the State School Teachers' Union, and if he subscribed to any religion, no marketing demographer had yet managed to pin it down.
So much for the electronic profile. I didn't believe for a moment that he could have killed Grace Sharp -- but I wasn't prepared to rule it out until I'd met him in the flesh.
I found a calendar of events for the Laurence Brereton Memorial High School. There was a parent-teacher night in three days' time.

I arrived late enough not to have to loiter outside for too long before catching sight of a few departing parents, still wearing their name badges. I got a good look at the style and the materials used -- but I was even luckier than that: one man dropped his badge into a recycling bin right before my eyes. I'd come prepared with a variety of cardboard samples, safety pins and clips, but all I had to do was fish out this discarded one, match the font on my notepad's printer, and spray my own -- borrowed -- name onto the blank side.
No one challenged me as I entered the crowded hall and walked straight past the desk where parents were queuing up to register their attendance and collect their badges. I spotted a row of work stations dispensing guidance; I walked up to one and tried to make an enquiry, but it was too clever by far: the only entry point was "parent's name" -- apparently all it needed in order to highlight every relevant teacher on a personalized map of the hall. I stood back and watched other people use the software, until Dallaporta's name appeared.
It seemed an odd time of year for an event like this; Mick's high school had held an orientation night before the start of term, but they hadn't yet invited me back. The buzz of conversation around me sounded remarkably amiable, though; maybe it was a good strategy to drag the parents in as early as this, and try to nip any problems in the bud.
John Dallaporta was tall and slender, clean-shaven, slightly balding. He was being talked at loudly by someone's proud father -- and though his eyes were glazed, and his smile a little wooden, he didn't strike me as a man who'd been sleepless with guilt for the past five weeks.
When the father departed, I approached purposefully. Dallaporta offered his hand and said smoothly, "Good to see you, Ms. Stone." He hesitated. "I'm sorry, but I don't think I -- "
I smiled disarmingly. "No, you don't teach my daughter. But I wanted to speak to you, and this seemed like too good an opportunity to pass up. I hope you don't mind."
"Not at all. But I should explain: I'm not the head of department this year. It rotates between the senior teachers, so Carol Bailey -- " He glanced around, then pointed her out. "Do you see -- ?"
I shook my head apologetically. "It's not a departmental matter. I just wanted to meet you. I read an essay you wrote, a few years ago: The Bit-Stream of the Rose. And I liked what you had to say there, very much. So when I realized you were teaching in my daughter's new school ... "
Dallaporta eyed me curiously, a little bemused, but he betrayed no obvious unease or suspicion. "That's so long ago now, I'm surprised you remember it at all. Let alone the name of the author."
"Of course I remember! And I just hope the rest of the department share your values on those ... issues. I used to teach English, myself. I know the kind of pressures you're facing. And of course I want my own children to be technologically literate -- but some of us have to take a stand, or who knows what 'technologically literate' will mean, in twenty years' time?"
Dallaporta nodded affably, but now I could see muscles tightening at the sides of his jaws -- the

ones which contract when you're trying too hard not to let anything show. Proving what? Nothing at all -- except that he had stronger feelings about TAP than he cared to discuss with a total stranger in a crowded hall.
I kept pushing. "When I started high school, myself, if you didn't have your own PC on your desk at home, you were marginalized. These days the work stations come for free -- if you sign up for a thousand-a-month worth of 'vital' net access. And any child who can't interview Afghani nomads for a geography assignment -- or get a live feed from the latest Venus probe via JPL -- might as well quit and go work at McDonalds. When does it stop? When my grandchildren are twelve, what will 'entry level' be, for them?"
Dallaporta laughed, not quite naturally. "I wouldn't dare hazard a guess. But I have faith in people. In common sense."
I made direct eye contact, trying to decide if he was genuinely rattled -- or just didn't trust himself to get on the soapbox, even for such an obviously sympathetic listener.
"Common sense? I hope you're right. I've heard some rumours lately which don't bear thinking about -- "
Dallaporta blanched visibly. Meaning he knew about the court case? And now assumed that I had some connection to whoever had given him the news? I offered him a conspiratorial smile: Relax, I'm a friend, we're on the same side.
I said, "Look, I didn't mean to take up so much of your time. But it was so nice to meet you, finally." I held out my hand, and Dallaporta shook it, slipping back onto autopilot with obvious relief.
I walked out into the warm evening. There was a real Lydia Stone, with a daughter who'd just started Year 8; Dallaporta might check the records, but I didn't think he was likely to confront the girl's teachers and ask them to sketch an identikit for comparison.
I glanced up at the washed-out sky, at the handful of visible stars -- and thought once more: this moment would be a single word, in TAP. <<The scent of cut grass from the playing fields, the rumble of suburban traffic, the melancholy yellow lights of the hall beside the darkness of the empty classrooms.>> A moment skewered like a butterfly? A ten-thousand-bit digital corpse of the world, shedding dead pixels in the mind's eye? Or a moment captured like a mood perfectly evoked by a phrase of music? No one had ever felt the need to murder a composer, just to safeguard the languages which couldn't compete on equal terms with fugues and sonatas. No one had ever taken a human life just to stop eccentric parents bombarding their offspring with Bach and Mozart in the womb. What made TAP so much more threatening? The fact that it could evoke images and emotions beyond the reach of any symphony? The fact that it was so much better?
I'd actually meant most of what I'd said to Dallaporta -- but the more I thought about the issues, the more ambivalent I became. No one was trying to "force" TAP onto anyone, except their own children -- and to raise a child at all was to impose a set of choices, one way or another. Actively or passively. Consciously, or through sheer conformity or neglect. The prospect of TAP-heads meddling with their children's brains -- just so they could share an artificial language -- still filled me with instinctive, visceral outrage ... but was it any more virtuous for the rest of us to insist that no child be given the implant until their brains were fully formed in the ten-thousand-year-old mould of our own Stone Age preconceptions? Weren't both sides just attempting to shape future generations in their own image?
And putting aside prejudice, instinct, and nostalgia ... which first language really would provide the best tools for dealing with the modern world?
That was a good question. It just wasn't the one I was being paid to answer.

I planted a dozen small recording devices in pay phones near Dallaporta's apartment, and the school. Which was highly illegal -- but both less risky, and more likely to succeed (if he was actually guilty of anything), than trying to bug his home. I'd sampled his voice at the parent-teacher night, so the bugs could discard everyone else's conversations. I cycled by and queried them daily.
I finally tracked down Tom Davies, Grace Sharp's domestic aid -- a TAP-head himself. The curtains of the study were always left open, he said. Grace liked to work looking out across the skyline; she'd chosen the apartment for the view.
I couldn't help asking, sarcastically, "Wouldn't it have been cheaper just to visit some rich friend's apartment -- and memorize the TAP words for everything she saw?"
He laughed. "Of course. And she could have written scenery in her head to put any ten-million-dollar harbour view to shame."
"So why didn't she?"
"Do you know how Grace defined 'reality'?"

"No."
"The ten thousand bits that are left when you've argued everything else out of existence."

After weeks of persistent harassment, I persuaded Maxine Ho, one of Third Hemisphere's senior engineers, to talk to me off the record. She stuck to the official line, though: the <<death>> word was impossible. Whatever Grace Sharp had imagined, or whatever TAP sequence some would-be assassin had confronted her with, all the safeguards operated on a separate level, independent of the language protocol -- and when the implant had been examined after the autopsy, there'd been no trace of damage or corruption to the relevant hardware or software.
"Of course a neural implant can kill you. A pacemaker can kill you. A work station can kill you. Any piece of technology can fail. But if someone died sitting at a work station -- and when I took it apart there was no sign of a loose wire or a break in the insulation -- I wouldn't say: 'She must have been running the legendary <<death>> program, which instructed the machine to electrocute her.' I'd go looking for another cause of death."
It was a specious analogy. Perfectly functioning TAP implants routinely sent signals to the hypothalamus, which in turn stimulated the adrenal gland; perfectly functioning work stations weren't set up to dispense electric shocks at any dose.
Still, I thought she was being basically straight with me. If she believed that the implant had failed at all, she believed it was a one-in-a-million glitch: less a design flaw than a tragic proof of the intrinsic unpredictability of any real device out in the real world -- the kind of thing which would have been excused as "natural causes" if an equally robust biological system had failed.

On March 5th, the High Court challenge to the implant restrictions became public knowledge. The case wasn't scheduled to be heard until September -- but the reaction to the news was immediate. Helen Sharp had been right about one thing: her mother's death was seized upon by almost every commentator as proof that a successful challenge would amount to the legalization of infanticide. Not that Their Honours could be influenced by emotive editorials -- perish the thought -- but even if they weren't, it was clear that the Federal government would be ready with the necessary amendments within days of any decision which put the State criminal law in doubt. I set my knowledge miner digging, but reasoned debate about the merits of the case -- the actual merits, not the legal ones -- could barely be found outside obscure neurolinguistics journals. (TAP speakers' netzines were in TAP, and I had no translation software.)
The night the news broke, Mick declared, "I want one."
"Then you'll just have to wait six years, won't you?"
"Not if they win."
"If they win, you'd better start mowing lawns and washing windows. Six years should do it either way."
He accepted that without protest -- but then asked innocently, "So what's your favourite medium?"
"Text. And I know: I'm a boring old fart, but you're still not -- " He wore a pained expression -- and not just because "old fart" was cringe-inducing baby-talk. I'd missed the point.
"I'm sorry. What were you going to say?"
Mick spoke carefully. "How'd you like it if every time you picked up a book, you had to swallow everything the writer said? If you couldn't stop mid-sentence and think: 'This is ... bullshit.' If you lost the power to argue in your head with every word."
"I'd hate it."
He said, "That's where VR's heading. Without TAP."
I was taken aback by the bleakness of this forecast -- but it rang true. Without a language as powerful as the medium, there was little room for argument, little room for doubt. Just unearned suspension of disbelief.
I reached over to the cable which snaked from his headset to the work station, and looped it absentmindedly around one finger. I said, "If it's as bad as that, then stop using it. It's your choice."
One look answered that; he didn't need to elaborate. Why should he be forced to abandon his own favourite medium? Why shouldn't he have the chance to salvage it, reinvigorate it, instead? Present at the birth of spoken language, would I have fought to abolish it, like some fanatical Zen terrorist afraid of its power to deceive? Or would I have fought to enrich it, to balance that power with scepticism and analysis?
I said lamely, "There's more to life than VR."
Mick grinned triumphantly. "Exactly. But there isn't more to life than TAP."

I took on other cases: runaway children, minor computer fraud -- routine work, but at least it gave me the satisfaction of swift results. Helen Sharp could no longer afford to keep me on full-time -- and I'd virtually run out of productive ways to spend her money, anyway. If her mother had died from some unrepeatable glitch, biological or otherwise, nobody would ever prove it. So I offered no false hopes, and worked on the assumption that in a few more months, she'd come to her senses and tell me that the case was closed.

Then, in the middle of April, one of my pay phone bugs finally spoke.

I was dutifully cycling past, checking them all in the pouring rain, though I no longer seriously expected anything. When my notepad chimed the code for success, I almost dropped it into a storm drain.

Playing back the recording on the bike, in the rain, would have been impossible. Playing it back on a crowded train would have been stupid -- I didn't have the headphones -- but I was tempted. By the time I reached the office, I'd convinced myself I'd hear nothing but a service call: Dallaporta complaining that his home connection was out of order.

I was wrong.

Dallaporta whispered urgently, "You have to help me. I need your advice." It was a monologue; he was leaving a message. "I didn't get rid of it, on the night. I thought: it's not illegal -- so why not keep it, just in case?" My skin crawled. He didn't elaborate, but I could guess exactly what he meant: Just in case it becomes expedient, at some time in the unforeseeable future, to kill another prominent TAP-head.

He inhaled deeply, as if trying to calm himself. "That was ... insane, I know. I wasn't thinking straight. But now ... I can't just throw it in the river! What if the police are watching me? What if they're going through my garbage?" That was unlikely, but I was grateful for his paranoia -- and his incompetence: whispering into a public phone with (I imagined) a hand shielding lips and mouthpiece wouldn't have done him much good if he had been under police surveillance.

"I've wiped the code, now." Shit. "I followed the instructions, I'm sure it worked. But I have to get rid of the machine. I need to know the best way -- the safest way -- to do it. Please. Call me back at the usual place."

I decoded the number he'd called, from the tones -- but it was a commercial message rerouting service -- and one that was far too classy to be bribed or hacked.

I sat at the desk, still dripping, trying to decide what to do next. The humidity control system in the north window was pumping water vapour into the room; I'd never get dry unless I went and stood out in the hall for an hour.

Everything I had so far would be less than useless to the police; the illegality of the phone bugs aside, every connection between Dallaporta and Grace Sharp's death remained pure speculation. And I wasn't even sure I had enough to convince Helen Sharp, who didn't believe in <<death>> words. Nothing Dallaporta had said proved that he'd been talking about an infrared communications laser -- and the crucial data it had transmitted was probably lost forever, now.

But it sounded like I still had a very slim chance to photograph "the machine", in situ.

The message had been left at 6:23 that morning. I glanced at my watch; school would be out in two hours. I had no way of knowing how long it would take for Dallaporta's backers (Natural Wisdom? The Fountain of Righteousness?) to come to his rescue -- assuming they didn't just decide to abandon him -- but I couldn't risk waiting another day.

I knew I'd be cutting it fine, but I didn't seem to have much choice.

There were six hundred apartments in Dallaporta's building -- and the sheer weight of numbers had its advantages. I stood across the street behind a bus shelter and waited for someone to approach the main entrance. When a young man appeared, key in hand, I dashed across the road and caught up with him, breathless, soaked, umbrella-less, fumbling. He let me through without a moment's hesitation. I hung back in the lobby shaking water from my coat so I wouldn't have to talk to him in the elevator; I hadn't had time to prepare any plausible lies, and if he'd so much as asked me how long I'd lived in the building, I probably would have been struck dumb.

Dallaporta's apartment, 1912, had a reinforced security door with an impressive-looking deadlock. I found a utilities room at the end of the corridor, and picked its lock easily enough. There was a hatch in the ceiling -- and even a ladder standing in a corner of the room. I rechecked the plans of the building on my notepad: not every apartment had a ceiling hatch; 1911 did, 1912 didn't.

I climbed into the ceiling and crawled across the dusty beams as quietly as I could, hoping I hadn't lost my bearings. I lay above apartment 1911, just listening, for almost five minutes -- then I realized I'd never be certain it was empty. A baby sleeping, an adult quietly reading ... I didn't even know who lived there, I hadn't had time to find out.

Cursing silently, I crawled back to the utilities room, brushed myself down, and went and rang the bell to 1911.
I rang three times. No one was home.
I retraced my path, lifted the hatch, lowered a rope into the apartment. My forearms ached as I descended; I hadn't done an illegal entry since before Mick was born. The old buzz was tinged with new anxieties: I was too old for this cat-burglar shit -- and I couldn't afford to lose my licence. But I felt a kind of defiant euphoria, too -- because everything was harder, because I had so much more to lose.
And it would all be one word, in TAP ...
The balconies of the two apartments were separated by less than a metre, but they were flush with the outside wall of the building -- no overhang at all. I climbed up onto the waist-high foot's-width concrete guard wall, steadied myself by pressing up with my left hand against the balcony's ceiling -- then with the right, reached across the naked brickwork of the outside wall and into Dallaporta's balcony. I was lucky; I was on the side of the building facing away from the wind.
I moved a foot across, too, embraced the brickwork tightly, shifted the centre of mass of my body a few crucial centimetres -- fighting down momentary panic -- and within seconds, my right hand and foot were lodged securely between Dallaporta's guard wall and ceiling, and it was far easier to go forward than back. I jumped shakily down onto his cluttered balcony, just missing a pot plant. I glanced at the street, nineteen storeys below -- and pictured Mick at my funeral, still refusing to talk to his father. There was a chance that someone had seen me cross, but there was nothing I could do about that -- and the downpour seemed to shift the odds in my favour: I could barely make out Grace Sharp's building at all, through the curtain of rain.
A sliding glass door separated the balcony from the apartment. It fitted loosely between a ceiling track and a guide rail buried in the concrete floor; it was probably designed to be lifted right out, for ease of replacement -- but only when it was unlocked. There was no question of trying to pick the lock; there was no keyhole -- just a catch operated by a lever on the other side of the door. By pressing on the glass with both gloved hands, though, I could get enough purchase to raise and tilt the whole door slightly. After almost ten minutes -- with my wrists going numb -- I managed to work the catch free.
I opened the door a few centimetres, then paused at the threshold, scanning the room for burglar alarms. It was clear.
As I moved into the apartment, I heard footsteps in the corridor, then a key going into the lock. I retreated to the balcony, but it was too late to start climbing back the way I'd come; I would have been in full view. I slid the door closed -- I couldn't re-lock it -- then dropped to the floor behind a pile of junk.
I heard at least two people enter the apartment, then turn left into the corridor which led out of the living room. I took a button-sized video camera, and stuck it to the frame of Dallaporta's bike, which was leaning against the wall of the balcony. I checked the image on my notepad, then tweaked the direction until I had a clear view of most of the room.
I dropped out of sight again just in time. The intruders -- a man and a woman, neither of whom I'd seen before -- returned, carrying a cardboard carton about thirty centimetres long. I zoomed in; the labelling suggested a presentation bottle of Scotch. Dallaporta's friends clearly didn't share his paranoia; they knew the police weren't watching the apartment. He wanted the laser to disappear -- and they'd obligingly turned up to remove it.
The woman said, "You think he wiped it properly?"
The man hesitated. "I wouldn't count on it." I wondered why they hadn't automated the process -- but then, it would have been impossible to predict exactly when the opportunity to use the code on Grace Sharp would arise, or how many attempts it would take to hit the target.
"Well, I'm not walking out of here carrying incriminating -- "
The man groaned -- but he opened the carton. I recognized the laser from the catalogues I'd scanned; most of the bulk was in the precision optics, which doubled as a kind of telescope for checking alignment -- the unit was meant for inner city rooftop-to-rooftop communications. There was a small device about the size of a matchbox plugged in to the data port; the man hit a button on the side of the box, and peered at a tiny LCD display.
"Hey, the Jackal got it right. I'm impressed." He laughed. "'I thought: Why not keep it, just in case?' The poor cretin really thought he had the <<death>> word -- and he could go on playing kill-the-TAP-head for as long as he liked."
The woman said dryly, "Don't be so ungrateful. If he'd known what he was doing, he wouldn't have done it at all."
They left. I pocketed the camera and crossed back to 1911 immediately, not wanting to be in sight when they reached the street. In the ceiling, I had to force myself not to rush; if I was

careless, I could still get caught.
In five minutes, I was out of the building. I circled the block, then spiralled out through the surrounding streets, on the slim chance of catching sight of them again.
After half an hour I gave up, and went into a coffee shop to replay the video. I should have been jubilant: I had a clear shot of a communications laser, and a soundtrack with two people discussing the killing of TAP-heads.
The only catch was, it didn't sound like they believed in <<death>> words any more than Maxine Ho or Helen Sharp.

I invited Helen Sharp to my office. I showed her Dallaporta's essay, and the geometry of the buildings. I played back the phone call, and the scene in his apartment.
I said, "You're the TAP expert. You want to tell me what's going on?"
She sat in silence for a long time before replying.
"There is one possibility."
"Which is?"
"My mother had the earliest model implant. Right to the end. She never had an upgrade -- she didn't trust them to transfer her vocabulary properly. She was afraid she'd lose everything she'd learnt."
"And you think ... the old models did have a <<death>> word?"
"No. But they could be microprogrammed externally."
"You've lost me." That wasn't quite true, but I wanted her to spell it out. I wasn't sure how much I really did know about the implant -- how much the glowing technical reports might have misled me.
Sharp looked terrible -- the fact that she'd just laid eyes on the people who'd arranged the death of her mother was finally sinking in -- but she explained patiently: "The basic hardware of any neural net computer is just ... a big array of interconnected RISC processors. The chip is mass-produced as a commodity -- hundreds of millions of them a year -- and used in tens of thousands of different devices. All the specific characteristics are added by the microcode: low-level instructions which customize the processors to make them behave in certain useful ways. The main software then takes that level for granted -- as if it's all hardwired into the silicon. But it's not.
"When they released the first consumer model of the TAP implant, Third Hemisphere were worried that there might be some undiscovered flaw in the microcode. If they'd had to take all the implants out of people's skulls to correct it, that would have been a PR nightmare. So they left a routine in the microcode which gave it the power to accept updates in infrared -- to modify any part of itself, given the right sequence of external instructions."
"So there was a special TAP word which could get at all the infrastructure? A word which said: <<Replace the old microcode with X>>?"
"No! It wasn't a TAP word -- it was a reserved sequence, right outside the language protocol! It was meaningless in TAP, it could never have been spoken. That was the whole point!"
It seemed like a minor distinction to me -- but I could understand why she attached so much importance to it. The language itself hadn't killed her mother. The poet hadn't died from a word, after all.
I said, "If that's what happened, though ... why didn't the engineers who examined your mother's implant find any evidence of it? And if you knew all this -- "
Sharp snapped back angrily, "I didn't know she still had the old microcode!" She looked away.
"Nine or ten years ago, Third Hemisphere tried to persuade her to accept a new implant -- for free. They'd finally discovered a bug in the original microcode -- a minor one, nothing dangerous, but they wanted everyone to start using the later models. They were confident enough about those that they weren't externally programmable anymore.
"She wouldn't accept it. She didn't want a new implant, she didn't want surgery. So they offered to update the microcode, to fix the bug -- and close the trap door in the process, because I think that was also making them nervous. TAP users could never have spoken the code, even if they'd wanted to -- but every consumer device on the planet was starting to put out a flood of infrared. There was always a tiny risk of triggering the modification program by accident.
"I thought she'd had the new microcode for the last ten years. She told me she'd accepted the offer. The records Third Hemisphere supplied to the coroner stated that she had -- and the engineer's report confirmed that."
I said, "But if she'd actually refused it, like she'd refused the new implant -- because she was afraid it might affect her skills with the language ... then Dallaporta's message might have done it all in one hit? Opened the trapdoor, undermined the black box, triggered a massive adrenaline

release -- then overwritten the evidence by substituting the version she was meant to have had all along?"
"Yes."
"So who'd know enough to program all that?" Natural Wisdom? The Fountain of Righteousness? Hardly -- though they could always have brought in outside expertise.
Sharp was adamant: "Only one of Third Hemisphere's own software engineers could do it. Someone who'd been involved in the TAP project from the start."
"But they'd have nothing to gain, surely? Why discredit your own work, your own product?"
The product belonged to Third Hemisphere, though -- not to any group of employees.
And people did move on.

I scanned fifteen years' worth of implant manufacturers' publications; they were full of PR releases gloating about heads successfully hunted.
In March 2008, a firm called Cogent Industries had poached a software engineer named Maria Remedios from Third Hemisphere. That in itself proved nothing, of course -- nor did the fact that an earlier article named her as a senior participant in the TAP project.
Cogent did have something to gain, though. They specialized in Virtual Reality hardware -- both immersive neural implants, and headset-based units. Third Hemisphere wasn't so much a direct competitor as the source of an entire antithetical philosophy: VR was sold to publishers and advertizers as the path to unconditional suspension of disbelief; TAP was about questioning everything, analysing everything. The day every VR user spoke TAP, the most ingeniously crafted -- and manipulative -- VR experience would disintegrate into a laughable trick with smoke and mirrors. And if that wasn't exactly an imminent threat, Grace Sharp's death had certainly made it more remote than ever.
They could have chosen Dallaporta by the same means I'd used to find him myself: a search for passionate opponents of TAP who also happened to have a clear view of Grace Sharp's study. And whoever had made contact with him could have claimed to be a member of Natural Wisdom, or some other anti-implant group; he'd hardly have cooperated if he'd known the truth. When they'd told him about the High Court challenge -- no doubt conjuring up images of a whole generation "lost to TAP" -- Grace Sharp's death must have begun to sound like a necessary evil. One old woman, for the sake of all those children. Death by her own obscene technological perversion of language. Nothing more than poetic justice.
And Maria Remedios? Had Third Hemisphere treated her badly, left her holding a grudge -- or had her new employers pressured her into it? Even if she'd had grave second thoughts about TAP -- and recoiled at the prospect of the implant being given to children -- helping to murder an innocent woman seemed like a grotesquely disproportionate response. She could have joined the public campaign against the implant; as one of its creators, the media would have given her all the coverage she desired. And though Dallaporta might have caved in to "moral" arguments offered under false pretences, Remedios could hardly have failed to understand that Cogent's motives were entirely commercial.
Nine tenths of the picture seemed to have fallen perfectly into place -- but it was clear that I was missing something crucial. And too much even of that nine tenths was still pure guesswork. For a start, I had to establish solid evidence of a link between Dallaporta and Cogent Industries -- which was going to be tricky, since he didn't even know it existed, himself.
I checked the faces of the man and woman I'd seen in Dallaporta's apartment against all the trade magazine shots of Cogent's employees.
No match.
I fed the Cogent employee names, along with my seventeen thousand TAP-haters, into the cluster analysis software -- looking for a connection, however tenuous.
There was none.
So much for the easy options.
I sent Dallaporta a message, via a rerouting service, asking if we could "continue our discussion". The real Lydia Stone was ex-directory -- and using a different number than the one she'd given the school would only prove that she was exercising suitable caution.
Three hours later, Dallaporta called me back. He was polite, but very nervous. I said I had some news which would be of interest to him; he didn't actually scream at me to shut up in case the line was being bugged, but his body language made it clear that if I so much as mentioned TAP he'd hang up immediately.
I said, "Can I meet you somewhere? We really need to talk, face to face."
He hesitated. He badly wanted me to vanish from his life -- but he needed to know what my "news" was. Why had I taken an interest in him? One old essay was hardly enough to explain it, so ... how

many people in the anti-TAP crusade knew what he'd done? And what did I know about Grace Sharp's death which no one had bothered to tell him?
Of course he was paranoid. The inquest was long over, the laser had been magicked away -- but the fact remained: he'd stood on his balcony on a summer evening and shot a perfect stranger dead. Nothing could ever be the same again.
He said flatly, "Tomorrow night, at the school. Nine o'clock."

I rehearsed the story in my head as I crossed the football field -- which was brightly floodlit for some reason, though there wasn't a soul around. A friend of a friend in a certain law firm had heard that Helen Sharp had discovered something in her mother's computer files -- something which had prompted her to start proceedings to try to gain access to Third Hemisphere's records.
I was sure that Dallaporta would pass the rumour on to his benefactors; the hardest part would be ensuring that he didn't mention "my" name. So long as he remained tight-lipped about his source of information, they'd have to take him seriously.
Helen Sharp was preparing a forged -- paper -- letter from her mother to Third Hemisphere, explicitly stating that she did not wish to accept the microcode update. I was confident that we had enough leverage now to persuade Third Hemisphere to play along, and bury the bait in the appropriate warehouse.
Maria Remedios would know at once what the "evidence" had to be. Cogent, acting on her advice, would try to arrange its disappearance. This time, they'd be caught red-handed.
At least, that was the theory.
Dallapporta had said he'd be in the "Resources Centre" -- which these days apparently meant a large room full of work stations. I'd found a map of the school in an online brochure, so I knew exactly where to go. The door was open, though the lights were out -- and as I approached the threshold I could see that all the machines inside had been switched on and connected to some net service or other. More of Dallaporta's paranoia? Maybe he thought this was an ideal source of interference for the police surveillance teams who were following him everywhere -- though the sound from most of the work stations was turned down to a whisper.
I peered into the greyness of the room, dazzled and distracted by the multitude of images: swarms of tiny red and silver fish weaving through a coral reef; a polychrome computer animation of air flow around some kind of zeppelin; a portrait of a Florentine prince sprouting a speech balloon full of modern Italian; a dead silver-haired twentieth century guru emitting platitudes about the nature of truth. An old music video was playing by the door; the singer droned: "This is the way, step insi-i-ide."
I smiled uneasily at the coincidence and walked into the room -- resisting the urge to shout a greeting, mocking Dallaporta's elaborate "precautions". It seemed far more diplomatic to play along. I stage whispered, "It's me. Where are you?"
No reply.
It was hard to get my eyes accustomed to the darkness with forty or fifty bright screens in view; I had no reason whatsoever to look at any of the images -- but it was remarkably difficult to keep looking away. I walked slowly towards the far end of the room, irritated but prepared not to show it. I called out again, a little louder; there was still no reply.
An animated supernova erupted just ahead of me -- and the sudden blue-white radiance revealed a man slumped in a chair beside the screen. I moved closer, and inspected the body by the light of the dying sun.
Dallaporta had a small-calibre pistol in his hand, and a neat hole in his temple. I put two fingers to his neck; he was certainly dead, but still warm.
I felt a flicker of guilt break through the numbness of shock -- but this wasn't the time to agonize over the way I'd treated him. He'd killed Grace Sharp, and he hadn't been prepared to live with that. If the fear of whatever I'd been about to tell him had been enough to drive him to suicide, he would have done it sooner or later, regardless.
I took out my notepad to call the police.
Then the supernova faded, and a new image took its place.
An apartment building, swept by rain. The camera zoomed in on a figure climbing between two of the balconies. The magnification kept increasing, relentlessly -- and by the time the woman turned and showed her face, it filled the screen.
My stomach tightened. I glanced back to the neat, too-professional hole in Dallaporta's skull, reassessing everything. But ... who could have videoed me? If Cogent's people had known I was on the balcony, why had they walked straight in?
The image changed again. Me, planting one of the phone bugs.
I laughed in disbelief. They'd all but slaughtered this man in front of my eyes -- and now they

were trying to blackmail me into silence with a couple of petty misdemeanours?
"There are small traces of your skin under his fingernails." The voice came from a metre behind me; I started, but I didn't actually jump. "Not enough for him to have left a mark on you, but enough for DNA analysis."
I turned around slowly. The man was about my age, and only a little taller. He wasn't pointing a gun at me, but he looked suspiciously relaxed.
"The police will find out that Helen Sharp hired you -- but they'll have no grounds for a warrant to compel you to supply them with tissue samples. Not if they don't see this." He gestured at the screen.
I said, "And why would they imagine I'd want to fake this man's suicide? Breaking into his apartment proves nothing -- "
"I think that depends on whether someone tips them off about the hundred thousand dollars in your Swiss bank account. Grace's close-knit linguistic community must have done a little whip-around, and bought themselves some justice for the man with the <<death>> word."
That shut me up. If the account really existed ... that was breathtaking. Had Cogent been watching me all along, setting this up?
He smiled. "If you're good, you can keep the hundred grand, of course. No tax; the whole thing's organized beautifully through a holding company in Macao."
I didn't have the presence of mind even to be tempted; I was still trying to come to terms with the whole Byzantine scheme.
I said, "Forget it." I walked straight past him, towards the doorway. I reached it, heart racing, then turned and looked back; I couldn't see him anymore, but I didn't think he'd moved a centimetre. Killing me would create too many problems, too many holes in their beautifully scripted VR experience -- and the odds were stacked against me even if I did go straight to the police.
I said, "So what did you expect me to tell Helen Sharp? 'Screw your mother, the case is closed -- and please don't ask any questions, I'm late for my flight to Macao'?"
"You'll think of something. Believe me, you don't want to fight us."
I laughed angrily. "One pissy little VR company, and you think you can pull all the strings?"
The man said, "I'm not working for Cogent. They have no idea you've even taken an interest in them."
I peered into the darkness between the rows of screens. "Some VR industry consortium, then." For some reason I'd started shaking; I think it was rage. "You're still not above the law."
"Oh, there's more to life than Virtual Reality." He sounded amused.
"Yeah? Who, then?"
There was silence for a while, then I could see him approaching. "I can't tell you that. But there are some people you can meet -- if you want to -- who might help you put your doubts to rest."
"Who?"
"Maria Remedios. And her daughter."
"I thought you didn't work for Cogent -- "
"She works for Cogent. I don't. Though you could say it's my job to watch over them both."

The further we drove from Dallaporta's corpse, the more compromised I knew I'd become -- but I couldn't walk away from a chance to learn what it was I'd missed all along. Even if the revelation was intended to guarantee my silence.
"Remedios was one of the first volunteers to test the TAP implant," the man explained casually. "First she'd helped design it -- and then she got to experience the results first hand. I think she must have found the reality exhilarating, in a lot of ways -- but very frustrating, too."
"Why frustrating?"
"Even with neural hardware, learning an exotic new language is always difficult. For an adult."
I didn't reply. He continued, "She managed to find a good neurosurgeon willing to give her daughter the implant. Not here, though. Overseas. Which simplified things, really -- it was easier to turn a blind eye."
That chilled me. "And you let her go ahead and do it? Just so you could see the results?"
He laughed. "Well, not me personally. But that was the general idea."
And the results? I thought back to some of the more pessimistic technical papers I'd read on the subject. Maybe natural languages -- which had co-evolved with human intelligence -- were crucial for the early stages of intellectual development ... and even if relatively "artificial" latecomers like sign made perfect substitutes, maybe TAP was just too different to perform the role of organizing the neural structures which made higher thinking possible. And maybe the fact that so much of the language was encoded in the chip, instead of the brain, meant that vital

conceptual networks were missing -- or at least, inaccessible to other regions of the cerebral cortex which needed them in order to mature.
It still made no sense, though. If the daughter was living proof that the implant would do unspeakable damage to the infant brain, why not just publicize that fact? Why had Grace Sharp died to win a court case which could have been won by simply disclosing the truth?
Maria Remedios lived in a modestly comfortable house on the north shore. My escort had phoned ahead; she was expecting us. As I followed him down the hallway, she met my eyes; there was unconcealed shame in her steady gaze -- but a strange, almost proud defiance behind it. I looked away, confused. If she'd crippled her own child with the TAP implant, no wonder she'd left Third Hemisphere -- but why was she so beholden to Dallaporta's killers that she'd let them use her to manipulate Cogent? Had they threatened to imprison her? To put her child in an institution?
We ended up in the living room, but Remedios didn't invite us to take a seat. The man said, "So, what's she been up to? Still spending every last waking moment on the nets?"
Remedios shot him a poisonous look, and didn't bother replying. I thought he was being cruelly sarcastic. Then he turned to me and explained, "Incoming data only, I'm afraid. We wouldn't want her airing her grievances to the world."
Remedios left the room. I heard her say, "Jane? Ms O'Connor's here." Then she returned, with a young girl in blue-and-white striped pyjamas, maybe eight years old.
Jane greeted me and shook my hand solemnly -- or mock-solemnly. One look at her knowing grey eyes, and I knew I'd made exactly the wrong guess about the implant's effects.
"I was hoping I'd be allowed to meet you," she said. "Uncle Daniel's been complaining about you for weeks." She glanced at the man, without obvious malice -- more like a chess player regarding a formidable adversary. "And he doesn't often let me have visitors."
I didn't know what to say. "Uncle Daniel" interjected helpfully, "I think Ms O'Connor is still in the dark, Jane. She doesn't understand -- "
"Why anyone would want to keep me prisoner? Why anyone would go to so much trouble to keep other children from growing up with TAP?" Her tone went beyond precocity; she didn't come across as some child actor mouthing an adult's lines. Every word simply negated the implications her appearance would normally have conveyed.
And her bluntness was unnerving, but it cut through my own diplomatic hesitancy. I said, "That's right. I don't understand."
Jane smiled calmly. I don't believe she was resigned to her situation -- but she was patient. Very patient.
She said, "With the implant, you can play words -- or scan them. Experience them, blindly -- or understand them, completely. Uncle Daniel's not a big fan of understanding, though. He thinks there are certain words which should be played and not scanned."
"What kind of words?"
She raised one hand, palm towards me. It was an ironic gesture; she must have known I was oblivious to IR.
"If I play this word ... I feel a boundless sense of loyalty and pride towards my team ... my city ... my State ... my nation!" Her face shone with fervent, agonized, almost hysterical joy; she looked like nothing so much as one of the flag-waving school girls they'd whipped into a patriotic frenzy as ornamentation for the 2000 Olympics. "But if I scan it ... " Her expression faded into one of faint amusement -- as if someone had just tried to dupe her with a very old, and very obvious, scam.
"This word plays as what many religions call 'faith'." Her face was radiant, but tranquil now. "The peace that defies understanding." She smiled apologetically. "Except, of course, it doesn't. Scan it, and the mechanics are transparent: one foot down hard on an entrained neurochemical feel-good pedal -- with cognitive, aesthetic, and cultural echoes linked to the context in which the training was acquired."
I glanced at Remedios; there were silent tears moving down her face. They wouldn't lock up the mother, or institutionalise the daughter. They'd kill this child, if they had to. That was the only reason she'd helped them program the death of Grace Sharp.
"Now, this is what the Buddhists call 'enlightenment'." Jane closed her eyes and smiled serenely. "Similar raw pharmacology, but the higher-level components are different. There's a kind of heavily self-affirming cognitive myopia: every mental tool which could expose the true nature of the state is explicitly negated."
I thought of James, lost in wordless tranquillity. The package he'd swallowed whole, the mind virus fine-tuned by centuries of evolution, declared: Language is dangerous, language deceives you ... because language could have shown him the way out of the hole he'd dug for himself.
"And this is ... sexual love, desire? Call it what you like, but if you scan it -- "

Something cut her short. Maybe it was a look from her mother. Or maybe it was the expression on my face.
Jane continued smoothly, "There are others. I won't list them all -- but growing up with the implant makes them obvious. And Uncle Daniel's friends don't believe that a subculture with that knowledge would be ... conducive to their idea of social cohesion. They feel very strongly about that." She turned to face him -- and her expression now contained more pity than anything else. "And I do understand. Because I've found the word for their affliction, too. I've found the word for the love of power."

By the time I got home it was almost midnight. Mick's room was in darkness, but he was still playing the game; I sat down beside him and removed the headset gently, then reached over and logged him off.
He opened his mouth to apologize, or invent some excuse. I said, "Just shut up and listen."
"What happened? I was worried." I hadn't told him everything -- but he knew I'd gone to meet someone connected with Grace Sharp's death.
I tried to speak calmly. "I've screwed up the case. Badly. I've made some stupid mistakes, and now I'm going to have to drop it. Okay? That's all I can tell you. And we're not going to talk about it again."
He stared at me, incredulous. "Why? What did you do?"
I shook my head. "I said, we're not going to talk about it."
He started blinking away tears. I took him in my arms; he didn't fight me, but he said angrily, "I don't believe you!"
I said, "Sssh."

Later, I lay on my bed in the dark, rolling between my thumb and forefinger the smooth cold object, like a small ceramic bead, which Jane Remedios had slipped into my hand.
If she'd managed to copy her implant, this chip would encode her entire TAP vocabulary. And to an adult it would be useless -- but a newborn child who started with the knowledge it had taken her eight years to acquire might surpass her in half that time.
They'd be watching me closely -- but they couldn't be watching everyone. I believed I could pass the chip on to someone willing to use it, if I was careful.
So I lay in the dark, and tried to decide.
Between the silence of power and mystification, the unearned suspension of disbelief, the way things had always been -- and the torrent of understanding which would sweep it all away.

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