WAITING TO EXHALE

JOHN CORMIER HAS INVENTED A MACHINE THAT DIAGNOSES DISEASES BY ANALYZING TINY SAMPLES OF GASES IN OUR BREATH. NOW COMES THE HARD PART

BY **SCOTT MESSENGER**
PHOTOGRAPHY BY **JOHN ULAN/EPIC PHOTOGRAPHY**

JOHN CORMIER WOULDN'T much like being called a mad scientist. And he's not, not in the sense of the white-smocked, erratic caricature, anyway. He's comfortable, for instance, in black slacks, an untucked shirt, collar open, with his hair a short, wash-and-go cut. And instead of a lab cluttered with bubbling or buzzing disasters-in-waiting, Cormier's workspace at the National Institute for Nanotechnology, a new research facility at the University of Alberta, is tidy and stark white. In fact, the nanotech institute — a temple to futuristic technology of useful stuff too small to be seen — is overall a solid, practical place, plain enough to pass for dull, but saved from dreary by floor-to-ceiling windows that overlook the river valley.

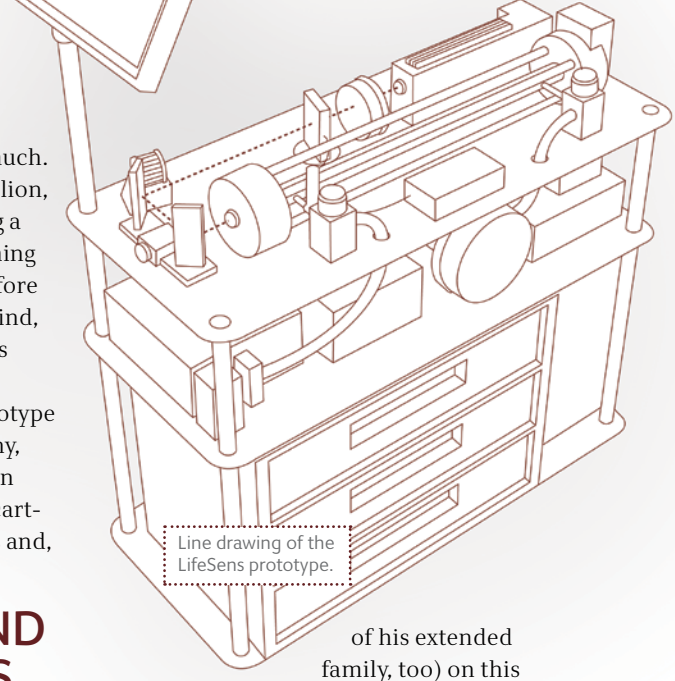
This austerity implies the 38-year-old physicist and award-winning entrepreneur is a no-nonsense kind of guy. I get the feeling this is how he sees himself, too, as he sits across from me in the institute's fourth-floor conference room, putting the lie to the scatter-brained and geeky exuberance of the Hollywood stereotype by leaning back calmly and comfortably in his chair. Regardless, there's still measurable madness in Cormier's method.

Maybe this is what happens when a brilliant scientist and an incorrigible maverick share a single body. Cormier, after all, taught himself most of what he knows about both medicine and business. Despite his intellectual capacity, he has vehemently washed his hands of academia. Instead, he's put his PhD in atmospheric physics to unlikely work: he's selling the world on an invention that's breathtaking — literally and figuratively — and may alter many lives. LifeSens has the potential to spot the earliest signs of many diseases, everything from asthma to cancer, heart trouble to transplant rejection, in five minutes, using nothing more than a breath sample.

But right now, LifeSens exists only as a prototype that cost $100,000 to build. It's bolted to a one-and-a-half-by-two-metre hydraulic table; its metal surface rests on a cushion of air to eliminate vibration. There's not much to it beyond a sealed metal tube the size of an empty wrapping-paper roll to hold the gas sample, and a laser to beam into it through lenses positioned along the table's perimeter.

How much light makes it out the other end tells Cormier, after a few calculations, not only which gas is present but how much. It detects concentrations in parts per billion, or less. As he likes to say, it's like locating a pinch of salt in an Olympic-sized swimming pool — perfect for disease diagnoses before serious symptoms show. "It blows my mind, frankly," says Cormier, "that we have this kind of detection capability."

That has Cormier convinced the prototype will inspire investors to help his company, Picomole Instruments, manufacture it. In three years, he's hoping for a shopping cart-sized unit to wheel about hospital wards and, in 10, a handheld device.



Line drawing of the LifeSens prototype.

"IT BLOWS MY MIND THAT WE HAVE THIS KIND OF DETECTION CAPABILITY."

While a revolution in diagnostic medicine might be good for business, with potential sales to 100,000 North American hospital and clinic sites, in Alberta it guarantees nothing. This province may be awash in disposable incomes and resource royalties, but to bio-tech business types, it's ruefully known by many as "commercialization death valley."

"It goes in cycles," says Byron Osing, CEO of Calgary Scientific Inc., which develops advance medical visualization software for such diagnostic machines as CT and PET scanners. "In the late '90s when the dot-com bubble was forming there were a lot more investors in Alberta willing to put money on technology ventures. But when that bubble burst a lot of people said, 'I'm comfortable with oil and gas and that's where my money's going to stay.' "

Cormier appears undeterred, even though LifeSens remains three years and $4 million from market. Throw in weeks of sleepless nights — and the odd crook eager to capitalize on the perceived naivety of a scholar-cum-entrepreneur — and he's still unfazed.

Cormier subscribes to the adage of one of his heroes, *Star Trek: The Next Generation*'s Jean-Luc Picard, captain of the USS Enterprise-D, who once said: "A good captain always gives at least the illusion of confidence." But despite his brave face, Cormier knows this risk isn't his alone; he shares it with his six-month-old Clara, and his wife Isabelle Gallant, an international education specialist.

There's some concern that he's bet the family's life savings (and savings from most of his extended family, too) on this game, where five or six out of 10 startups fail, two or three break even, and just a couple, if that, hit a homerun and actually profit their investors.

"I've been flying without a safety net for two years now, living as best I can off of Picomole. There are moments when it can be absolutely frightening," Cormier says. But "this is a better environment for me than working solo in a lab where whether or not you do great things is almost irrelevant. This is an environment where I get noticed. I like that. If I had to write a dream job I couldn't write a better description."

Though LifeSens traces its roots to his graduate studies at the University of Toronto, Cormier's memories of academia aren't particularly fond. It wasn't chasing down funding or general project frustrations that bothered him. Basically, he found the environment stifling. "There was always a lot more work to do," says Cormier. "[My supervisor] never created moments where he could celebrate what had been done, how far we got. And after years of that you're thinking, 'Why would I want to do this? Where's that cheese at the end of the maze? There's no cheese!' The academic world often has a very negative focus — what's wrong? Why doesn't this work? — because that's how you learn new things."

"In business," he says, "you're looking at it from the opposite point of view, saying, 'What resources do we have? How can we best use them?' That aspect has been very positive and enriching."

It's that opposite point of view that, in 2003, had Cormier chasing after cheese once again, in Washington, D.C., at the National Institute of Standards and Technology, a research body devoted to the science of >>

measurement. There, Cormier had refined the gas identification and quantification capability of an early incarnation of the LifeSens technology, created during his grad years, to study the greenhouse effect.

But when the standards institute suffered budget cuts following 9/11, higher-ups suggested Cormier try to access the increased funding at the nearby National Institutes of Health. After hitting the books, he discovered that the kinds and amounts of gases in a patient's breath sample were disease-dependent. Not only did he have a potential diagnostic tool to capitalize on this, but it occurred to him he might have a marketable idea. But his bosses at the standards institute said that making a product fell outside of their mandate.

He and Gallant had been considering leaving town anyway. The pall cast over the American capital by the October 2002 Beltway sniper killings had yet to fully dissipate; the bureaucratic tension post-9/11 also seemed there to stay. This made Edmonton all the more enchanting when Cormier and Gallant visited in August 2003. The weather was warm and dry, and the south side was bustling with the Fringe Festival. "I just thought, 'Wow!'" says Cormier, "Edmonton is pretty cool." A few months later, when an Edmonton friend told him that Synodon, his employer, had a job for Cormier to develop technology to check natural gas pipeline leakage, Cormier took it.

The move to Synodon proved temporary. Cormier left the company in spring 2005 to bring his LifeSens idea to life. After convincing fellow Toronto grad student Denis Dufour to pack up and join him as vice-president of technology development, the pair rebuilt the machine Cormier used in Washington, scrounging second-hand parts on eBay to keep within their meagre budget.

When a "sugar-daddy" appeared out of nowhere to finance the entire project, Cormier's suspicions trumped his excitement. He investigated, only to discover his eager financier had a history of stock fraud. It was the second time in as many years that someone had tried to cosy up to him and appropriate his invention. Cormier figures it's an important lesson to learn. "In a start-up like this, especially where you have the potential to generate tremendous revenue, it's inevitable that people are going to come around that have less than pure intentions."

The past two years have been a crash course in business leadership. But Cormier, operating on just a few undergraduate commerce electives, doesn't mind. In fact, he seems to appreciate how it has callused him. "There's a school of thought that says you shouldn't turn down money," he says. "But in some cases money's too expensive. Everyone is after their pound of flesh. You have to make tough calls as to when that pound is worth it."

"John possesses very good instincts," says John Pinsent, an early investor in Picomole. "He acknowledges that his business experiences have not been significant, but he understands that there has to be a return of value to an investor." Pinsent has witnessed this trait in other successful tech start-up entrepreneurs. As a former screener for the Venture Prize — a business-plan competition presented yearly by TEC Edmonton (a.k.a. Technology, Entrepreneur and Company Development, a joint venture of the U of A and Edmonton Economic Development Corporation) — Pinsent suspected it would give Cormier a competitive advantage. He was right. After six weeks of sleepless nights refining the Picomole business plan, Cormier won the event last May and received more than $100,000 in money and prizes to build the business. He also caught the eye of a few investors, which isn't easy in Alberta.

A 'SUGAR DADDY' APPEARED... BUT HIS EAGER FINANCIER HAD A HISTORY OF STOCK FRAUD

"A lot of money goes into the research of good ideas here," says Pinsent, who has since, through his company St. Arnaud, Pinsent & Associates, become the accountant for Picomole. "But then when you have to create the product and take it to market there's very little capital for those ventures."

Oddly enough, Cormier seems to sympathize with reluctant investors, which underscores, again, his practical personality. "I'm not sure I'd be willing to accept [the risk] if I were in their shoes. I believe very strongly in what I'm doing, but that's because I know exactly what we can and cannot do with our technology. They generally don't."

Yet there may be more at stake than just Picomole's future, depending on your faith in a fossil-fuel-based economy. "The risk for the province," says Osing, "is to assume the resource sector is going to carry us indefinitely. What happens when oil and gas drops to $20 a barrel again? What's going to happen to the province?"

Still, Pinsent, the accountant, says that for Picomole to be a homerun startup, "it [takes] a magical combination of good science, good timing, good funding support, good people, and a market that's receptive. That's a lot of stars that have to align."

Look at the recent developments at Biomira, the local makers of a cancer-inhibiting drug, and it's easy to wonder if the constellations will conspire against Cormier. Spun off from the U of A 20 years ago, the Edmonton biotech company announced in September it's relocating its head office to Seattle and reincorporating in the eastern U.S., remaining here only as a research body. "One of the things we want to be able to do," CEO Robert Kirkman told the press, "is attract a significant institutional investor base back into Biomira stock." Translation: after two decades of struggling to get its products to market, Biomira's ready to go where it will be appreciated — Delaware, apparently.

Our city may be blessed with superb research and educational institutions, many nifty startup companies and loads of enthusiasm, says Leigh Hill, the program manager for the microsystems and technology cluster at Edmonton Economic Development Corporation, but "we need to start earning as much money as we can out of our own good commercial ideas."

At the moment, Picomole seems well-situated. For one thing, the Alberta government recently announced the injection of $130 million into the nanotech industry, a move that may well validate this burgeoning market in the eyes of investors. These days, says Cormier, any setbacks and terrifying moments "are balanced by others that are richly satisfying because you make strides forward."

For instance, Picomole recently began to explore the chance to apply LifeSens to roadside drug-testing, food safety and quality control. This will mean, no doubt, more sleepless nights devoted to preparing the Picomole story, which he's come to see as part of the job. "My wife might take a different angle on that," he says.

Almost certainly, though, Cormier will find reasons to celebrate as he navigates the maze he's happily thrown himself into, searching for the cheese he's sure awaits him. If he didn't truly believe it exists, history suggests he would have climbed out by now, and faded back into the blur of the old rat race. After all, he's not mad. Not really.