



# Cyberc in

**CONTINENTAL CABLEVISION'S VISION OF BRINGING  
THE INTERNET TO HISTORIC CAMBRIDGE, MASS., HAS**

**MET HARSH REALITY** By **Simson L. Garfinkel**

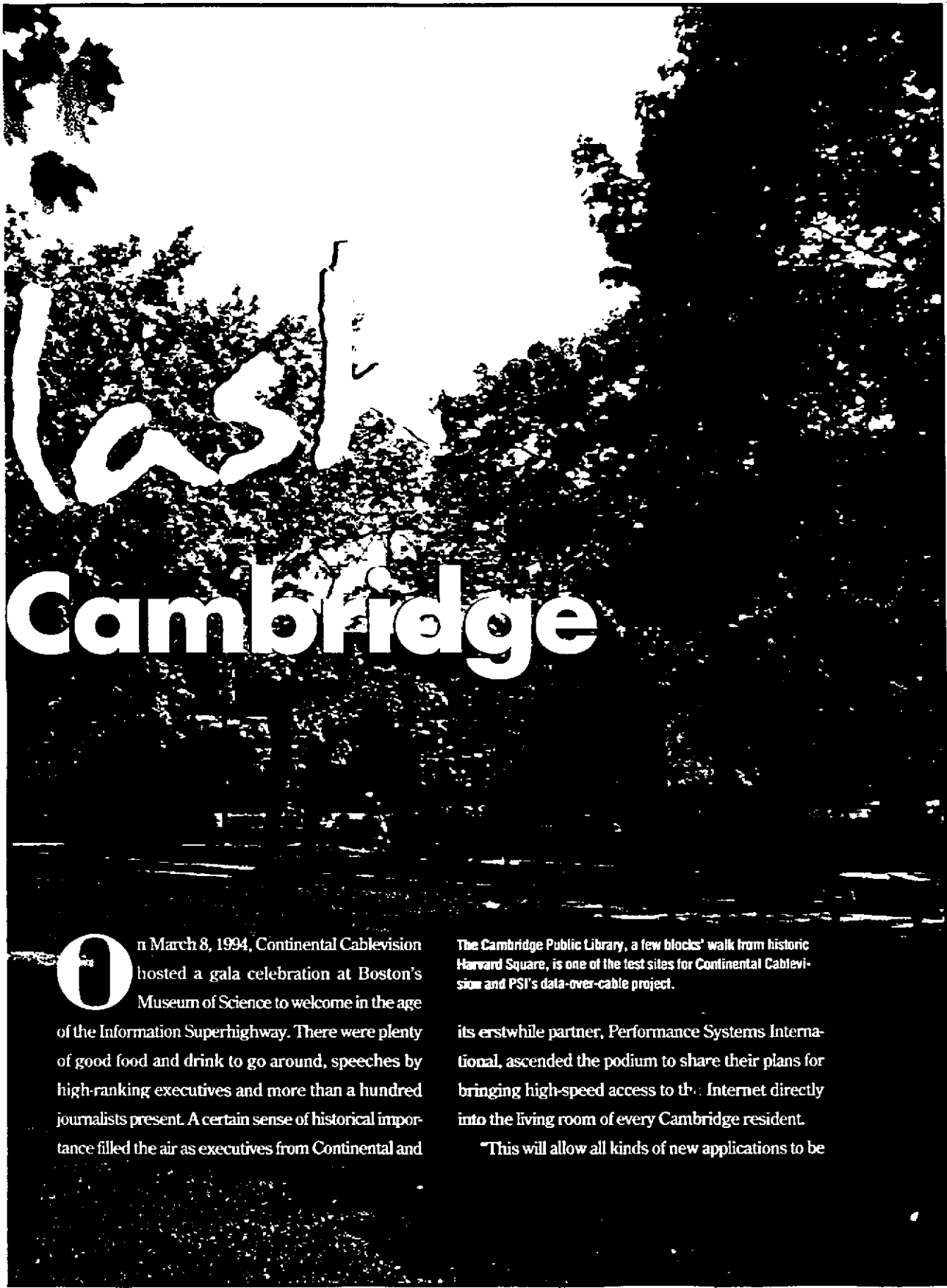
PHOTO BY RICHARD YCOO



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# last Cambridge

**O**n March 8, 1994, Continental Cablevision hosted a gala celebration at Boston's Museum of Science to welcome in the age of the Information Superhighway. There were plenty of good food and drink to go around, speeches by high-ranking executives and more than a hundred journalists present. A certain sense of historical importance filled the air as executives from Continental and

The Cambridge Public Library, a few blocks' walk from historic Harvard Square, is one of the test sites for Continental Cablevision and PSI's data-over-cable project.

its erstwhile partner, Performance Systems International, ascended the podium to share their plans for bringing high-speed access to the Internet directly into the living room of every Cambridge resident.

"This will allow all kinds of new applications to be

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within reach of a whole new audience," William Richmond, Continental's director of business development, had told *The Boston Globe* the day before.

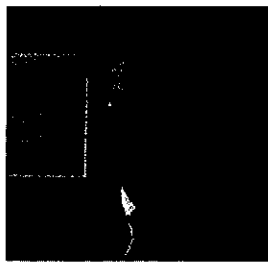
The plan sounded technically simple, but it was ambitious. The city of Cambridge, which had only recently been wired for cable, was equipped with a fully functional two-way plant—a requirement that had been laid down by the Cambridge city council as a condition for Continental to wire the city. By installing special Internet switching equipment at Continental's Cambridge headend on Sherman Street, and by distributing special "cable modems" to Continental's subs, it would be possible to bypass the telephone system and let Cambridge residents access the Internet at a whopping 500 kilobits per second. Businesses would be able to arrange special services that would offer speeds boosted to 2 megabits per second or more.

That plan was far more difficult to execute than any of the engineers working on the project—those from Continental or PSI—imagined. The two companies found that assumptions each had made about the other's business were just plain wrong. But

the lessons that have been learned—some technical, some common sense—haven't been for naught. Continental is not abandoning its data delivery efforts. And executives and engineers at other cable systems remain very interested in this part of the business: Just look at how popular cable modems were at this year's NCTA convention.

There are two attractions. For cable, data delivery or Internet access is a way to generate some unregulated revenue from upper-income households. And some of those potential users will pay a lot for this service, particularly since telephone technology—ISDN hookups or multi-line switches—is expensive and requires a special effort on the phone company's part.

For computer users, cable delivery offers a way to dramatically increase the speed at which their computers function on the Internet or any online network. And it has the potential to be less expensive and troublesome than the local phone



**'Having overpromised a year ago, we now intend to [quietly] sign up people who have contacted us ... The next time you have heard from us, we will have 100 happy users, and have modems in stock.'**

*Dave Fellows  
Continental Cablevision*

company's online delivery. There's some intense demand out there waiting for a supplier, and cable executives see an opportunity.

It's difficult for people who have only surfed the Internet over a telephone line to grasp just how fast these promised speeds actually are. Today, it is common for many home users to access the Internet using modems that transmit just 9.6 kilobits (or 9600 baud) per second—50 times slower than Continental's base offering. And many home users still have modems that plod along at just 2400 baud—2.4 kilobits per second, or 200 times slower than what Continental

was promising.

Put another way, Continental was promising Cambridge residents a connection to the Internet that was nearly 10 times faster than the connection used by the entire Massachusetts Institute of Technology just a few years before.

With the kinds of speed promised by cable, the term "net surfing" really begins

## MAKING IT WORK: A Happy Ending to a Tale of Woe

**C**harles Perkins was one of PSICable's early beta testers. In October 1994, technicians installed the PSICable box in his house. The box looks a lot more like a personal computer than a traditional set-top box: It has a floppy disk drive in the front, a thick three-prong power cable in the back and an assortment of connectors.

The box is called a router, because it takes the information from Perkins' computer and routes it to its destination—usually the switching equipment at Continental's head end. The router also listens on the cable network for information that is destined for Perkins' computer and copies the information from the Continental Cablevision network to the local area network in Perkins' apartment.

"I was the eighth node to be connected, and I was the first node to experience a new problem they had never seen before—a temperature dependence," says Perkins, a computer consultant who is trying to start a new company called Virtual Rendezvous out of his house. "When it was very cold, my link would fail."

"I'll make a long story short, but this was three months of debugging," says Perkins. "The new drop was too good. It was 6-10db too strong. It overloaded the receiver. The system would fail once in a while because of the overload." Once Continental's engineers discovered the problem, they inserted a screw-in device that gave Perkins the requisite 6db drop.

But there were still problems, Perkins says. The signal strength he was receiving would vary over time: Sometimes the data would go through, sometimes it wouldn't. "They had been setting them up by hand and tuning them by hand," says Perkins. PSI finally solved the problem by developing a piece of software that would automatically adjust the receiver's gain according to the current line conditions. When he came back from Christmas vacation, he found a floppy disk in his mailbox and a message in his electronic mailbox telling him to turn off the router, stick in the floppy disk and turn the router back on.

"It was 2 a.m. on a Sunday night," says Perkins. He stuck the floppy into the router, "turned it off and on and it worked flawlessly." **S.G.**

to make sense. Hooking up a piece of coaxial cable to the back of a PC is really just replacing a narrow pipe—the twisted pair of copper wires provided by the phone company—with a much bigger pipe. The fatter coaxial can deliver more data, and it can do it lightning fast, so that moving from one point on the Internet to the next is more like switching channels on a television set than waiting for a PC to process data.

There are some similarities between what cable offers its subscribers and what computer services—whether they're online or direct Internet access—offer their users. That's what first made Dave Fellows, Continental senior VP of engineering and technology, think computer access over cable might be a business worth exploring. After all, CNN and MTV were services unheard of 15 years ago.

The idea for using Continental's cable infrastructure to connect subscribers first occurred to Fellows at a communications forum held at Harvard's John F. Kennedy School of Government. "They said that the Internet is a subscription service today, [but] some day we are going to have to find another way to charge. I thought that cable TV is the same way. If you sign up for HBO, we know how to handle that." But Continental isn't sure how to charge for services like video-on-demand, which like online services, deliver to subscribers what they want, when they want it. Fellows continues, "They also said that the Internet doesn't work all the time, but when it works, it's great. I thought that is sort of like a cable system too. It doesn't work all the time, but when it works, it's great."

Since Continental didn't have any experience with the Internet, it started looking around for a company that it could partner with. At the same time, PSI was looking for a cable company with some two-way capacity. The two companies "found each other," according to Fellows, in 1993 and started to talk.

PSI would manage the technical side of the project. It would then begin taking orders in March, 1994, for the commercial service, and start taking residential service orders on April 15. A demonstration project was planned for the main branch of the Cambridge Public Library, a few blocks' walk from historic Harvard Square. And the entire PSICable system would be up-and-running by mid-summer.

Of course, the connection Continental

and PSI were offering to the Internet wouldn't be free—or even cheap.

Although pricing was not set, Continental and PSI said PSICable would probably cost individuals \$99 a month. Small businesses would be charged \$400 for the same service. Larger organizations would pay between \$2,000 and \$2,750, depending on a variety of service options. And

there would be an installation fee, which could run as high as \$5,000 for businesses that did not already have cable service.

Technically inclined Cantabridgians—a fair number of people in a city that boasts two of the country's best universities, Harvard and MIT—were understandably excited by the announcement, but skeptical. Making the system work in

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basic subscribers.

Pat Thompson and Tim David  
represented the seller.



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## CHARGE IT:

Is the Price Right?

**S**o what's the bottom line? How much should all this cost the consumer? Are PSI's current asking prices—\$125/month for residential use, \$400/month for small businesses and around \$2,000/month for large organizations—too expensive?

Many people contacted for this article felt that PSI's per month fees are too pricy for their intended audiences.

"I am sure that \$400/month would stop most libraries dead in their tracks," says Elizabeth Dickinson, who heads the Cambridge Public Library's reference department. Currently, the Cambridge library and all the other beta testers are receiving the service for free.

Bob Weber, who is both a beta tester and a principal at Northeast Consulting Resources, a Boston consultancy focused on information technology, says: "I'd be flabbergasted if the prices remain high. I would hope that they get the home cost down to \$50 a month."

Continental's Dave Fellows says he hopes a \$20/month service can be offered sometime in the near future. Further out, Continental isn't sure what the right price is for the service, but the company is pretty much convinced that unless it's very inexpensive—closer to the \$10 online services charge—it won't find a market.

PSI, meanwhile, maintains that the service is a bargain—considering its speed. "Let's say you are sitting at your home and you are sitting in Cambridge, and thinking \$125 is too much for this service," says PSICable product manager Jeffrey Shapard. What makes the service special, Shapard says, is the incredible speed that the system offers—speed that would cost more than \$1,000/month if purchased over the phone lines from a traditional Internet provider. "I tell you, there are a whole lot of people standing there with their \$125 in hand and waiting for it to be rolled out." **S.G.**

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the lab was one thing; making it work with a live cable plant was something else.

"Video is a lot less sensitive to error than data is," warned John Rugo, VP of Cambridge-based BBN Technology Services, in an article that was printed in *The Boston Globe* on the same day as Continental's announcement. "They are going to have to learn that fast."

## A BUMPY START

The lessons started almost immediately. As the demonstration project at the library started firming up, the residential plans for PSICable started to recede (the service is still not commercially available).

In the basement of the library, PSI set up an experimental RF modem and a network router. This connected to a local area network set up by the Center for Civic Networking, a non-profit organization. The plan was to move the system upstairs into the main reading room—once the library staff understood the ins and outs of the equipment.

"We need a lot of technical support because we don't have the expertise here in-house," says Elizabeth Dickinson, who heads the library's reference department.

Indeed, while the library's staff eventually mastered the basics of navigating around the Internet, they still needed outside consultants to configure their computer's network connections and install the appropriate software. The Macintosh computers intended for the public reading room eventually came out of the basement in July, Dickinson said.

Things weren't going well on the cable side either. Callers to Continental's offices who wanted to find out about the Internet service were greeted by confused operators who hadn't been told what to say.

Eventually, operators were told to give out PSI's 800-number. Upon calling PSI, Cambridge residents wanting PSICable were told the service wasn't yet available; they could put their name on a waiting list, or sign up for PSI's newly announced InterRamp service, and get the Internet the old-fashioned way, over phone lines with traditional modems.

In April '94, PSI announced that it would not be able to take orders by the 15th; a new deadline of June 15 was set. But within a few weeks, the date was pushed back to

sometime in the third quarter. By the middle of the summer, PSI was telling callers that it would not make any more promises about the PSICable service until it was sure that it could keep them.

Meanwhile, people who depend on the Internet said they were increasingly worried about turning over their data communications to a company that wouldn't speak truthfully with them about the cause of the delays. A Cambridge businessman, interviewed by WBUR reporter David Wright, said he would have a hard time trusting a company that answered its telephones "Cablevision. Please Hold."

## A WILD, HAIRY BEAST

What was the cause of the delays? A combination of problems with equipment suppliers, the Zenith RF modems and Continental's cable plant itself.

"I did not know this, and I don't think that the PSI guys knew this, but the version of the Zenith hardware that we wanted was another six months away" when the March announcement was made at Boston's Museum of Science, says Fellows. After the modems were finally delivered, it took another six months to make them work properly with the equipment that PSI was developing.

Another delay was caused by the nature of cable TV. Subscribers aren't served by their own individual cable wire; they share service on one piece of coax running through their neighborhood and there's no telling what's on that wire.

"Our conclusion at this point is that cable is a wild, hairy beast," says Jeffrey Shapard, PSI's product manager for PSICable. Shapard says PSI was caught off-guard by the difficulties it had in getting the initial beta testers up and running. "We were frankly a bit surprised. When we had it running in the lab, we thought it would be a lot easier to have it running over a live cable plant."

One of the first problems that he encountered, Shapard says, was that different segments of Continental's cable plant had different electrical characteristics. "Basically, when you work on a local area network, or even a telco plant, you make the assumption that conditions are pretty much the same [throughout the system]. But on a cable plant, where you are determines the condition."

Shapard learned that one segment can be completely different from the next.

That complicated things for PSI: Its original equipment had to be hand-tuned for the electrical environment of each customer's location.

Continental, for its part, was surprised that PSI hadn't expected the real-world conditions of a functioning cable plant. Fellows describes the difference in perceptions as a kind of culture clash.

"We said that it doesn't surprise us that there is ingress [on the cable]. It did surprise PSI," recalls Fellows. PSI's engineers thought that "an analog TV signal is a fragile thing, and [PSICable's] big strong digital signal—1s and 0s—will blast through anything."

It turned out that the reverse was true. If you slowly add noise to an analog transmission, all you see is increasing amounts

of snow on the TV screen. If you slowly add noise to a digital line, however, you won't see any change at all until suddenly the entire transmission will become unintelligible. PSI's initial equipment couldn't handle the changing conditions that typify real-world cable systems. The problems showed up as intermittent failures: The system would seem to be working;

then suddenly no data would go through.

The problems almost never originated from inside the house of one of the beta testers. Instead, the ingress on the cable came from another Continental subscriber. In one case, Continental's engineers discovered that the problem was a TV cable that passed close to a microwave oven in a subscriber's house.

### THE SECURITY QUESTION: I Spy

One of the lingering questions in some people's minds about the service being tested in Cambridge is security. Unlike traditional cable services, Continental's new Internet offering can carry information that is highly private and very sensitive. During a typical Internet session, a user might scan a few dozen electronic mail messages, view a sexually explicit image and even request his American Express statement through America Online. Unfortunately, as the system is currently designed, there is nothing in place to prevent Continental's users from spying on each other.

"Because it is shared [system], if somebody else went out and got a Zenith modem, they could go out there and intercept packets," says PSICable product manager Jeffrey Shapard. All the spy would need is physical access to the cable where data just runs together.

According to Shapard, PSICable was doing some amount of "scrambling" of information sent over the wire. Nevertheless, he says, users who want security should purchase their own equipment. "To really get security out of the connection, you [need to] throw encrypting routers on each end." S.G.

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In another case, a segment was working perfectly until early December. After searching, engineers from Continental discovered that one of their subscribers had wrapped his Christmas tree lights around his television cable. "Fortunately, [Continental has] had some of their best people involved in the development of this project," says Shapard.

Despite many problems, users and both companies say the technical bugs have been worked out. In early April, PSI informed Continental that it considered the beta testing period to be over, and the trial a success.

But the continuing relationship between Continental Cablevision and PSI is now in question. And until that relationship is resolved, Continental has decided not to make the service available to customers—even though users say they're satisfied and potential customers are eager to get the service.

Sources close to the Cambridge project say that one issue holding back commercial introduction is how the two parties would split the monthly subscriber fees. In addition, PSI has been devoting less attention to the project in recent months because of other services it has introduced and because it is preparing for a public offering.

Meanwhile, the beta testers in Cambridge continue to get the service free, while the cable company is reevaluating its options. "We and PSI no longer have an exclusive relationship with each other," says Fellows. Continental might partner with another Internet provider, or offer Internet service directly itself.

And there are other ideas. Instead of providing a gateway to the Internet, Continental might simply provide a bridge service for local area networks (LANs), allow-

ing engineers or stock traders to put their home computers directly on their company's networks, without going through the Internet. In another trial recently concluded, Continental used its cable plant to allow users to connect directly to the

CompuServe online network.

But perhaps the most important thing that Continental has learned is just how difficult it can be to build the info highway. "We are not giving out dates" anymore, says Fellows. "Having over-promised a year ago, we

now intend to [quietly] sign up people who have contacted us, [but] make no big deal. The next time you have heard from us, we will have 100 happy users, and have modems in stock." **CV**

*Simson L. Garfinkel is a freelance science and technology writer who lives in Cambridge, Mass.*

## A microwave oven and Christmas tree lights were cited as troublemakers

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