place: blue sky, bluer water, green trees, and fish, real fish.

Dick Brass, wunderkind developer of electronic writing aids for PCs and now president of Oracle Corporation's new electronic publishing company, laughed and said, "Isn't this better than working in Manhattan?"

He walked to the end of his boat dock and pointed across Lake Washington to a large construction site where Bill Gates, chairman of Microsoft Corporation and billionaire at 35, is building a home. Indeed, there are lots of techies around this lake, so I asked Brass, "Why?

"I have what I call the Great Restaurant Theory. Put a four-star restaurant in a French town and in three or four years the province will be a superb place to dine. Why? Because staff will start their own restaurants.

"That's what happened in Seattle with Boeing and Microsoft. These two companies have created dozens of smaller firms. Smart people and good fishing help too," he said, smiling at the silver flashes speckling the surface of the cobalt lake.

I had left Harrod's Creek, Kentucky, to journey 2000 miles to Seattle to talk with Brass about the electronification of information. He had mentioned it in a telephone conversation and said that the database and timesharing industries were on the verge of a second wave of electronic publishing. I had to know more. Brass, of course, is the gentleman who made electronic reference tools ubiquitous. He was the one person in the world who had done what no teacher could: get me to spell every word correctly.

We moved to his living room, decorated in a tasteful blend of West Coast openness and Japanese craftsmanship. The Kodachrome scene glowed through the window. No time for Thoreau. Gimme electronification.

He began, "I had always been a terrible speller and as a journalist at the New *York*

INFORMATION TERRITORIES

A FANFARE FROM Mr BRASS

Stephen Arnold

*Dateline: Seattle, Washington, USA —
Walt Disney Studios designed and built this*

Daily News I spent too much time looking up words in a dictionary or thesaurus. When I saw the first personal computers I said to myself, 'Why not put the dictionary and thesaurus on them?

Spelling misspelled

"In a couple of months I had built a spelling checker. I had seen some before on larger computers but they could only tell me that I had misspelled a word. They couldn't suggest an alternative or replace the misspelled word with the right one. Useless. In fact, the first spelling checker I saw had **misspelled** *misspelled.*

"I think it took me about five minutes to design the user interface, the program's structure, and its basic operational features. The program finds a misspelling. You see some alternatives. Put the cursor on the one you want. The software replaces the wrong word with the right one. I just implemented on the screen what I knew I wanted.

"But I needed a list of correctly spelled words. I figured that someone had to have them. So I called Random House and asked for the subsidiary tights editor. I asked 'How can I get the rights to a list of 50 000 correctly spelled words in machine-readable form?

"The editor asked, 'Electronic rights? Do you mean movie rights? What are you talking about?' I ended up with the exclusive **electronic rights to the** *Random House Dictionary, Roget's International Thesaurus,* and an armload of other major reference works for very little money.

"My products were electronic writing aids -spelling checkers, the first synonym finder, and the first grammar checkers for PCs. Eventually I sold out to Wang. My programs have become features today and virtually all word processors have them.

I leant forward and asked, "Has the wide acceptance of your idea surprised you?"

Enter the read processor

"No, not really. Word processing helps people write, and all I did was give people some tools to help writers. But word processors only help people write. They're just powerful typewriters. We need to develop what I call read processors.

"Today if I want to electronically look up more information on a subject, what do I do? I use an online service or a CD-ROM. But information transfer by telephone is expensive and slow. It works for files of 20, 50 or even a 100 kilobytes. Try to shove a couple of megabytes or a gigabyte down a phone line. Forget it. CD-ROM, the great white hope? People are selling 50 copies at $20 000 a subscription, not 20 000 copies at $50 per subscription.

"CD-ROM has other problems too. It's gone against the simple rule of a relatively sophisticated central device with a range of easy-to-use, collectable add-ons. A Nikon camera is a sophisticated and relatively expensive central device. But it is easy to buy and use another lens. The audio CD player is a complex device in some ways, but you can play new and very collectible software in it easily.

"It's easy to stick in a disc, but with CD-ROM it is hard to use the interface. There's no critical mass of titles with the same interface. You have to learn how to use every disc, and you can't mix and match data between discs. CD-ROM publishers have made it impossible for people to get into the collecting spirit."

A sail boat flashed by the house. Brass glanced at the knife-edge hull slicing through the water. "Technology, however, has sailed on. Screens have improved. Storage has grown exponentially and cost has increased by several orders of magnitude. Now we have mass storage in the gigabyte range, high-resolution display devices, and graphical user interfaces. In five, maybe ten years, we'll

have real electronic magazines, books, newspapers, and reference tools which can replace some of their paper equivalents.

"That's what I mean when I talk about electronification. Produce everything in electronic form for electronic distribution. Airline reservations and high-end financial data systems come close to the approach. But the revenue is small compared to the hundreds of billions of dollars spent for ordinary printed materials. We have only begun to scratch the surface of the electronification data. That's why we need a read processor to do for retrieval what word processing did for writing. There is an opportunity to create a universal information browser."

I hate multi-media

Out of the window storm clouds raced toward the lake. The sky grew dark, and Brass leaned forward to say, "I hate multi-media. Moving pictures and still images may be fine for special applications like point of sale displays. But it's a high-end product. As a general means of communication, multi-media is too costly in terms of labour and technology to become a substitute for print. Multi-media is brought to us by the same gang who promoted videotex and CD-ROM. Multi-media is like buying a mink coat for your dog — interesting, but too expensive to do on a regular basis."

I heard the windows rattle. Brass looked at the sky and said, "The weather changes fast here." He looked at me and picked up the thread of his idea: "The future is in the application of technology to the electronifying of information which exists only in printed form today. We now have the chance to bring the world of print into electronic access without the encumbrance of turning every book into a feature movie. I want to make tools for the retrieving and organizing of data. I want to help you read a newspaper, a marketing report, or a telephone directory."

A keyboard on the screen?

The sun broke through the clouds,

transforming a grey lake into a National Geographic video. "Think about Alan Kay's vision of the Dynabook. The ones available today are not yet successful. But look ahead to a computer the size of a sheet of paper which accepts input from a stylus, not a keyboard. Writing on a page is an appealing way to work with data. You look up something by pointing. Keyboards, however, are necessary when you want to input data fast. But why not have a pseudo-keyboard on the screen and type on that?

"Stylus-interface technology will open up computer use to people who have been excluded by the keyboard. You want information? Circle a word. The stylus-driven computer goes and gets the information and displays. Want to delete something. Cross it out. Want to write something? Use the stylus.

"This technology lets people use computers the way they work now. The success of Pagemaker is largely a result of its paste-up model. Graphic artists can use the program at once because it works the way they always have.

"Word processors and electronic writing aids are not tools for reading a document. I want a read processor. I need automatic annotation, electronic post-it notes, and retrieval based on fuzzy logic. I seek opportunities in moving from tools for writers to tools for readers. It will be new software that gives the reader as much power as the writer with a word processor.

"One other thing," he said. The room fell strangely silent and the shadows lengthened. "With the stylus-driven PC and a read processor, Asia may have one advantage it has been lacking. Their languages are incompatible with a keyboard interface. To use their character-based languages, you need a concert organ keyboard.

"The stylus-driven PC changes all of that. We'll see an explosion of PC use in the Asian

"Imagine an electronic Day-Timer calendar. A winner. That's the basic platform for electronification."

Brass stood and walked toward the large window looking over the lake. "What if you could get constant weather or traffic updates. No tuning through the radio stations or hunting through the newspaper. A dedicated device that displays the information in graphics and text. It shows traffic problems, weather, whatever you've told it you want. Always on and always ready."

Brass fell silent. He watched a flock of honking Canadian geese wheel over the lake. His gaze and concentration were electrifying.

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