Reflections

<div align="right">Robert Silverberg</div>

Borges, Leinster, Google

Today I mean to sing the praises of Google, which I think is the most important single component of the phenomenon that is the Internet. That is no small statement, and, lest I be thought to be in the pay of that vast search-engine organization, I will quickly offer some disclaimers. I am not a Google stockholder. I am not a Google executive or a Google employee. (I have never been anybody's employee since the day, fifty-eight years ago, when I graduated from college.) I don't even *know* any Google executives or employees, even though I live just a hop and a skip from Silicon Valley. What I am, just as most of you are, is a Google user, day in, day out. I understand that some of Google's expansionist ways as a corporation have drawn criticism. But my concern here is with Google as a search engine, not as a corporation. That search engine is essential to modern life. Without it, we might very well drown in our own data. It has rescued us from that dire fate, and, in so doing, I believe it has changed the world.

Isaac Asimov outlined the problem of information retrieval in an essay, "The Sound of Panting," *Astounding Science Fiction,* June 1955. He tells of the difficulties that biochemists had, even back then, in keeping up with the scientific literature of their own field. He was then a professor of biochemistry at Boston University, writing science fiction on the side. "There are literally thousands of journals printed. The aristocrat of biochemical journals is the *Journal of Biological Chemistry*. It comes out once a month. . . . The September 1954 issue contains 480 pages and 45 articles." Coping with it was a major chore. Then, also, there were the *Journal of the American Chemical Society, Science,* its British equivalent *Nature,* the British *Biochemical Journal,* and. . . . He lists another column and a half of English-language scientific periodicals before he gets to the French, German, Spanish, Russian, Dutch, Swedish, and Japanese journals, all of which the biochemists of that day needed to follow in order to stay in touch with current research. These were summarized twice monthly in *Chemical Abstracts,* a bulky tome printed in microscopic type. Its annual index alone occupied three big volumes totaling more than a thousand pages. "There is now a whole branch of human effort devoted to attempting to coordinate the accumulating data of the physical sciences at a rate roughly equivalent to that at which it is accumulating," Asimov said. "This includes the formulation of special types of indices and codes, the use of screening programs, the preparation of special punched cards, micro-card files, and so on."

Special punched cards! Micro-card files! And yet it was all hopeless. No one could stay current. If you were to go past his lab at the university, he said, you would hear "the sound of panting. . . . It is just I. Asimov trying to keep up with the literature."

The great fantasist Jorge Luis Borges, who for many years was director of the National Library of Argentina, gave us in his story "The Library of Babel" a depiction of the universe as a library made up of an infinite number of hexagonal galleries on whose shelves all books that had ever been written or ever *would* be written were stored. "Everything is there: the minute history of the future, the autobiographies of the archangels, the faithful catalog of the Library, thousands and thousands of false catalogs, a demonstration of the fallacy of these catalogs . . . a version of each book in all languages, the interpretation of every book in all books. . . ."

And how does one find one's way around in an infinite library? With difficulty, and only if one has an infinite amount of time at one's disposal: "In order to locate book A,

first consult book B which will indicate the location of book A. In order to locate Book B, first consult book C, and so on ad infinitum. . . . I have squandered and consumed my years in adventures of this type."

Murray Leinster, that early master of science fiction, offered a solution to the information-retrieval problem so vividly depicted by Asimov and Borges in a brilliant 1946 short story called "A Logic Named Joe." Leinster conjured up a future in which everyone was linked to an interconnected network of home computers—"logics," he called them—capable of instantaneously serving up any information one might require if one merely punched a few keys. In one glorious swoop he had imagined the PC, the Internet, and the omniscient search engine, decades ahead of their actual existence.

By the late twentieth century the Internet was here, and with it came the first search engines, replacing Asimov's punched cards and other prehistoric scanning methods. The earliest, it seems, was a Canadian entity called Archie (for "archive") in 1990, followed by Gopher in 1991, Aliweb in 1993, WebCrawler and Lycos in 1994, and then many more—AltaVista, Inktomi, Infoseek, HotBot, etc., some of which are still active.

But the arrival of Google around the year 2000 swept them all into relative obscurity. Like the rest, Google sent web-crawlers everywhere in the Internet to slurp up the nearly infinite amount of information it provided; but the key difference was a Google algorithm, PageRank, which classed web sites according to the number of other web sites linked to them, on the theory that the most useful Web pages were those with the most links to other sites. Thus—within seconds—Google could deliver a huge bundle of links to whatever subject you were asking about and arrange them in their most probable order of usefulness. At once Google became everybody's favorite search engine, and still is, though others now, like Bing, do pretty much the same thing. Its name itself has become a generic verb meaning "to search," just as such brand names as "kleenex," "xerox," "band-aid," and "zipper" have passed into generic use.

You all have Google stories to tell. Like Borges' beleaguered librarian, you dip into its infinite resources every day for all sorts of information, and at the speed of light it sends back to you, almost without fail, links to some web site that will tell you what you want to know.

My own most recent Google story involves an obscure professional basketball player named Bato Govedarica, who played a couple of dozen games for a team called the Syracuse Nationals more than half a century ago, when I was a college sophomore. I am not much of a sports fan now, but until I got to college in 1952 I did pay some attention to the doings of the teams in the city where I lived—New York. And even in the winter of 1953, despite the rigor of my undergraduate studies and my soon-to-be-successful attempts to sell stories to the science fiction magazines, I listened occasionally to broadcasts of the games of our basketball team, the Knicks. And the strange name of Bato Govedarica landed in my memory and stuck.

And stuck. And stuck. Like most writers, I have a more than usually retentive memory (becoming a little porous these days, as I start getting up into my Very Senior years, and more about that in a moment).Years went by, decades, even, and from time to time the name of Bato Govedarica would float up into my consciousness. What team had he played for? What kind of name was "Govedarica"? Why did I care?

Not even Google could answer that third question—I don't know the answer to it myself—but the first two continued to plague me, and a week or two ago I fired up the computer and asked Google to tell me about "Bedo Gobedarika," which was my approximation of the spelling of his name. But Google does have some limits. It's pretty good at coping with misspellings, but it could tell me nothing about Bedo Gobedarika. There is always a workaround, though, in the Google cosmos. I asked that infallible engine to give me the rosters of every team in the National Basketball As-

sociation, and—poof!—there they were. I scrolled through 1951, 1952, 1953—and there was Bato Govedarica, Syracuse Nationals, 23 games played, 1953-54. Now I could go back to Google with the correct spelling, which I did, and—shazam!—I had hundreds of links to web sites providing information about Bato Govedarica.

First came his Wikipedia entry (and how Borges and Leinster would have loved Wikipedia!) with the dates of his birth and death and a summary of his career, and the interesting information that his name was of Serbian origin. Then the basketball league's own compilation of his statistics; and then the Chicago *Tribune's* 2006 obituary, and something in Serbian that indicated that his middle name had been Zdravko, and an account of his college basketball career at DePaul, and the report of the scout who had checked him out as a possibility for the Syracuse pro team (six feet tall, 190 pounds), and on and on and on and on.

Too much information, all right. I didn't really need to know his middle name or how tall he was or where he went to college. I simply had had his name buzzing around in my head for sixty years, until I had begun to think that I had invented it myself, and now a few minutes with Google had confirmed that he had really existed, which was all that I had wanted to know.

As I said, I'm getting into Very Senior territory, and my memory isn't all that it used to be, despite the obstinate perpetual presence of Bato Govedarica in it. Lines of poetry that I once could quote verbatim have vanished. So have details of my own rather extensive list of stories and novels. I don't remember if the Detroit science fiction convention took place in 1959 or 1960, and there was a moment recently when I needed to know. I've been on this planet for nearly eight full decades, and my head is crammed with so much data that I feel that I'm carrying Borges' library around in it. But things fall out. Google puts them back in. So long as I remember approximate spellings, or some other vestige of a clue to what I want to look up, Google will tell me.

Consider Algis Budrys' story "The End of Summer" (*Astounding Science Fiction,* November 1954.) I had forgotten the name of the story, but Google would have given it to me had I asked for a Budrys bibliography, because I could remember the year of its publication. This time I didn't need Google, though, because my fluky memory also remembered that the issue containing it had had a bright yellow spine, unusual for that magazine, and I went right to it on the shelf. The Budrys story is about an era when humans are immortal, but the price of that immortality is short-term amnesia. So they carry their most recent memories around in a sort of external hard drive that Budrys calls a memory vault, chained to their wrists. At the end of the story the protagonist unchains his memory vault and throws it away, and the final line, which, like the name of Bato Govedarica, sticks in my memory after sixty years, is, "He flexed his curiously light arm."

We don't need memory vaults nowadays. Google is the memory vault for everybody. It's the key that opens everything—the true index to the library that is the universe in Borges' little fantasy. It gives us admission to the breathtaking immensity of humanity's accumulated store of information. Without it we'd be lost.

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