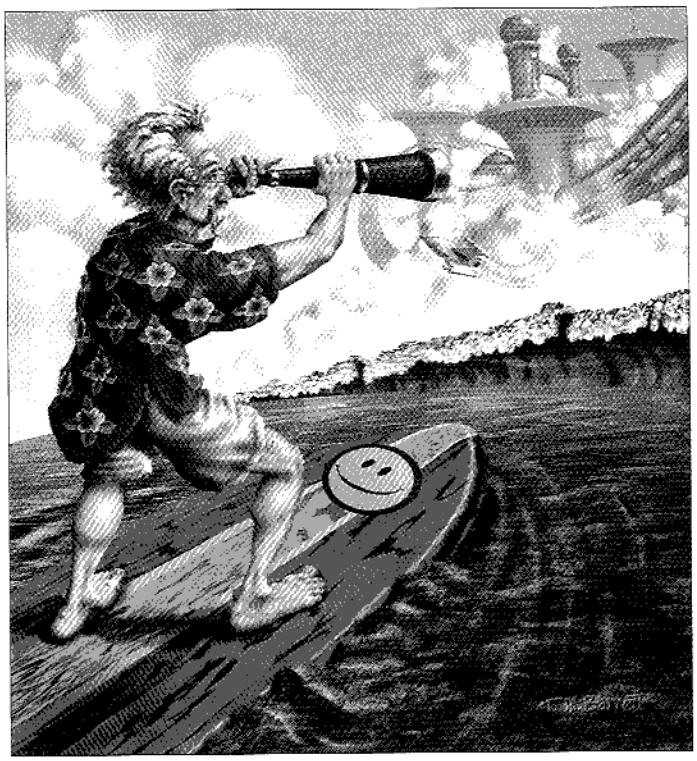
Ask Mr. Protocol

by Michael O'Brien



TOM BARRETT

"It'll never fly."
– Someone wrong

"It'll never fly." – Someone right, under different circumstances

"The all-diesel kitchen of tomorrow!" – Cairo World's Fair 1938

Mr. P. and the Boring '90s

Q: *I have to say that, incomprehensible as he is, Mr. Protocol has always been the most even-tempered–whatever–I've come across. Why is he macerating that magazine article?*

A: Same reason you'd do it: He's irritated. He's been reading one of those unfortunate articles by glassy-eyed people trumpeting the march of technology, and it's all gotten a bit much for him. He lives life on an Internet timescale, and he's bored, bored, bored. Complains there hasn't been any spice in life since the cutover from NCP to TCP/IP. Stories about gigarouters bore him to tears. We were in the supermarket the other day, and an advertisement that temporarily interrupted the Muzak read out a URL. I thought he was going to throw the shopping cart through the nearest loudspeaker. Then he ran out into the parking lot, screaming "URN! URN! With festering boils, die! U-R-N!" I think he's discouraged in that particular case by the failure of Uniform Resource Name technology to keep up with the distribution of Uniform Resource Locators, which were never intended for humans to see or use.

It's all emblematic of a slowdown in a certain type of technology, one that almost no one seems to have remarked on. I don't know if it's journalistic laziness, or because it goes against the current religion, or what. Look at it this way: How often have you read some report that mentions how amazing things were for our grandparents? You know the sort of thing–"From horse and buggy to transcontinental jetliner in one lifetime! Zowie!" It's all true enough, but it's so trite by now that most editors throw the copy back with orders to get rid of 300 words of excess baggage without thinking twice about it. If you look at the history of those stories, though, there's a much more revealing truth.

Originally, those stories were part and parcel of the "iron foundry uber alles" pro-technology outlook that the Western press followed without question back in the days of Empire. It led to such pieces of nonsense as the university graduation speech that extolled the virtues of pushing out the decimal places now that all of the fundamental truths of science had been uncovered. It was easy enough to string together a staggering list of real-world accomplishments that, after all, represented the best technological runup the world has ever seen.

Around 1955 or 1960, though, those 20-minute public-relations films that were shown on Saturday morning under the title "Industry on Parade" (probably because animation was still too expensive to produce in sufficient quantity to fill up the time slots after Buffalo Bob and Andy Devine's extraordinary talents) began to pall. I mean, not only does watching a bottling plant run full-tilt become mind-numbing in pretty short order, but the steel plants and automated factories shown in those films looked...old!

Well, they were old, after all. They'd seen us through World War II while we stomped all the factories in Europe and

Japan flat, so after those got rebuilt, the Rust Belt was pretty much a certainty, at least, after they figured out how to use those new factories to make structural steel that didn't have great big flaws in it, which only took 20 or 30 years after that. Funny how nobody talks about that, and everyone pretends there was just nothing going on in between the Marshall Plan and Deming's quality management.

Those were the golden years when Don Martin in *Mad Magazine* instructed us in the amazing noises that really big things make when they fall down, and that's no coincidence. But aside from all that, there just wasn't the quantity of whizzo technology that there used to be. In the old days, it seemed to flow right from the workshop to the streets, bypassing the laboratory completely most of the time.

From Horses to Airplanes

Let's at least take a poke at the litany. Look at transportation, which has got to be the poster child for this sort of argument.

Number one, the automobile. Gangbusters. 1900 to 1950, we go from Dobbin to Datsun. No argument there. Our road system goes from a local system to a national system, at least by designation. People get their kicks on Route 66. The Lincoln Highway, a bit too early to be enshrined in television history, carries a whole lot of people west. Stand in the great hall of the Mammoth Hotel at Mammoth Hot Springs in Yellowstone National Park, and you can see the great map of the 48 states, each shown in a wood native to that state, and the highways that crossed the land in those days. The industry of horses and horse care is relegated to bluebloods in the mid-South, and garages spring up where livery stables used to be. The "coach" is now known only through the "coach house apartment."

From 1950 to the 1990s, what we mostly get is the Defense Interstate Highway System. Eisenhower kicked it off, and it's only mostly finished today. It is extremely unlikely that it will ever be truly "finished," because the planners never get exactly what they want, and a lot of students of inner-city neighborhoods now believe they shouldn't have gotten nearly as much as they did in the first place. Be that as it may, now we have a road system that's truly national. Cars haven't changed much, except they're a lot more energy-efficient, a lot lighter, and you can ram them together at a lot higher speed and have a lot better success at putting the passengers back together afterwards.

No big technology has come along to replace cars. Popular Science has been unstintingly, courageously and consistently wrong for 100 years: Personal fliers aren't here and likely never will be. That niche has been too well filled by the airplane, which is the big long-distance people mover. If you've got the money, and you need to get yourself (and not too much other stuff) from here to there in a hurry, you do fly, but you don't do it by yourself.

That's the airplane, the other big

transportation success story of the first half of the 20th century. In 1900, zip. You want to fly, you jump off something tall. A once-in-a-lifetime experience. Or you take a hot-air balloon. Now you're talking! You can stay up for days. Where you come down is mostly a matter of conjecture. Sometimes the results are the same as Method A.

By 1950, we have cross-country aviation, and we're beginning to think about replacing prop planes with jets. This conversion does change commercial aviation from a service used by the hardy and necessitous to one used by the common run, but it's a much smaller change than the change from no airplanes to a commercial fleet.

Or consider the field of medicine. In 1900, we could cure practically nothing. In 1950, almost all infectious diseases were within our scope, and immunization was a standard public health regimen. Surgery was a going concern, and although anesthetic was not unknown in 1900, few, if any, surgeries could be considered "routine." By 1950, operating rooms ran on a schedule.

To be sure, there have been many medical advances since 1950, including practically everything in the way of cancer treatment: imaging techniques, radiation and chemotherapy, the works. But while genetic engineering is definitely out of the starting gate, it will take the next 50 years to show us fundamental gains, and most of the gains in the fight against heart disease have had to do with prevention rather than cure. Mind you, if what you happen to have is something for which a recent cure has been found, these sorts of arguments are not likely to carry a lot of weight. On the whole, though, most medical miracles happened between 1900 and 1950. Ironically, the only clear way for genetic engineering to save as many lives as penicillin does, would be to engineer an immortal strain of the tobacco mosaic virus and destroy the world's tobacco crop. This effort is unlikely to win much support in the House Science and Technology Subcommittee.

How sure are we that this isn't being undertaken as a basement science project, anyway?

Mr. Protocol is glad you asked. Not sure at all, at all.

In military technology we have a sort of special case. It's not clear that anything in military technology could be said to better the human condition, but if there were to be a counterexample to the argument that everything happened in the first half-century, this would be it. In the first half-century, we had two world wars. In the second half-century, we've had a whole bunch of bush-league wars, and a really zippy technology to make sure that anything bigger than that would be a really, really bad idea.

Everyone believes that the arguments of the peaceniks in the '60s and '70s were straightforward, and you either agreed with them or not. Nothing could be further from the truth. The doctrine of Mutual Assured Destruction, a type of political thinking so loathsome that even the straightforward antiwar activists could only debate it through parody, did in fact operate completely successfully throughout the Cold War, merely because the planners on each side agreed that it should. That this exercise in voluntary schizophrenia should ever be accounted a success will stand as a pivotal point in human history, overshadowing practically every other accomplishment of the entire century. History will determine whether those who operated under its guidelines are painted as heroes or villains, but MAD did give us one other pivotal piece of 20th-century technology: games theory.

Movie Mania

In the field of communications, the first half-century gave us radio. The second half-century gave us television. One could argue either way here, but hearing live events as they happen around the world, versus seeing and hearing them, seems to Mr. Protocol to be a matter of protocol. Is the gap from nothing to radio larger than the gap from radio to television? On the whole, Mr. P. believes that it is. The difference is similar if you regard the Internet as a natural outgrowth of the phone system, which still carries most Internet traffic anyway (as television is a specialized form of radio). The difference between having to travel two weeks or two months to speak to someone, versus calling them on the telephone, is probably more profound than the difference between talking to someone on the phone and putting up a Web page.

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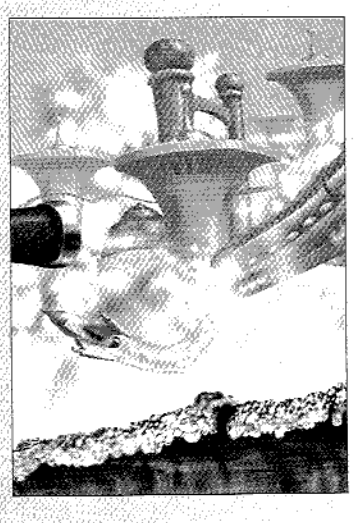
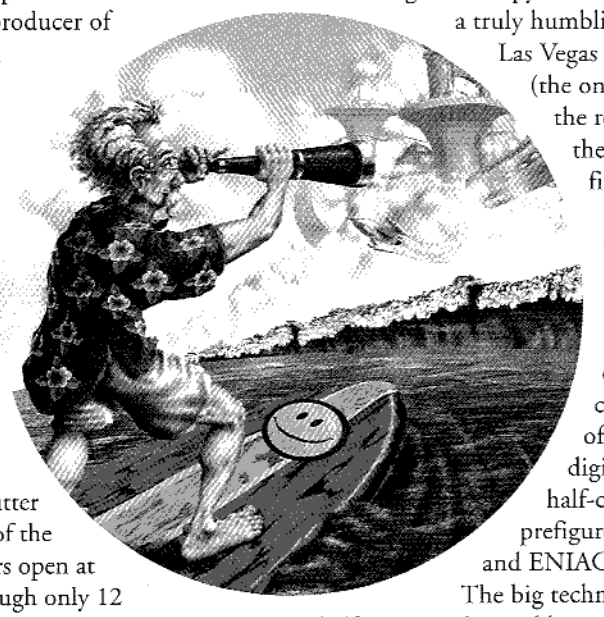


Motion pictures are a sterling example of technological slowdown. When they were first invented, they were a novelty. Entrepreneurs purchased not only films, but the equipment to show them, which was of necessity portable, as there were no "picture palaces" yet. Instead, movies were a vaudeville act, slotted in between the Sweet Belle of Savannah and the Incredible Barking Boy. It would be hard to overestimate their impact. One of the earliest movies was taken by a fellow who set up his camera in the middle of train tracks and waited for a train. He either leapt out of the way at the last second or yanked the camera away with a rope, it would be hard to say which. The result was all he could have hoped for. In spite of the lack of sound and color, audiences screamed, fainted or ran out of the theater according to personal inclination. One fellow is reported to have jumped to his feet and yelled, "Hold on, boys! She's going to hit!"

The only major technological change to occur in

movieland in the latter half-century has been to replace the original tinny speakers with something like a modern sound system. The original soundtrack, encoded optically onto film, was replaced in around 1950 with a magnetic stripe. The first "mag-stripe" film, literally produced in a garage, was made by Arch Oboler, producer of "The Shadow" radio shows. It was a delightful adaptation of the Henry Kuttner short story, "The Twonky," starring Hans Conreid. Another 30 years or so had to go by before Dolby Logic introduced Dolby stereo, encoded on a separate magnetic tape synchronized with the film, and Industrial Light and Magic came forward with the THX sound system.



To be sure there have been improvements. The old silents appeared to flicker because early projectors opened and closed the shutter slower than the "flicker fusion rate" of the human visual system. Today's shutters open at a rate of 24 frames per second, although only 12 frames of film actually move through the projector in this time: Each frame is shown twice. This frame doubling is responsible for hideous visual artifacts in animation, which has no blurring due to motion. Computer-generated special effects have only begun to look "real" since "motion blur" was calculated and added to the film. (Trivia alert: "Dragonslayer" was the first film to do this.)

Special effects master Doug Trumbull has come up with a new type of movie, shot on 70mm film stock at a rate of 60 frames per second with no frame doubling. This type of movie, called Showscan, is like looking through a window and makes regular movies look ridiculously primitive. It's going nowhere because it requires all the old projection equipment to be junked. If you want to see Showscan, you'll have to go to one of the few Showscan theaters, which at present are set up as motion simulator thrill rides near amusement parks. There's one just outside the gates of Universal Pictures Studio Tour in Los Angeles, and another as one segment of the three-part attraction inside the Luxor Hotel in Las Vegas.

The Luxor itself is worth a look. The first skyscrapers were produced at the end of the last century, and the efforts of those like Paolo Soleri notwithstanding (Soleri developed the theory of "arcology," a concept of cities that embody the fusion of architecture with ecology), not much fundamentally new has happened in architecture since then. It isn't that technology hasn't progressed, it's just that no one has found a more economical way of throwing up more interior space in less square footage than a skyscraper. Consider the Luxor. Rip out all the really tacky stuff inside (Showscan unfortunately included: The film shown in that theater will remove actual IQ points), and what is left is an architectural triumph. It is a completely hollow pyramid of incredible size with no internal roof or wall supports whatsoever. From any point on the interior floor, you have an unobstructed view of all four walls, all the way to the apex. Even elevators have been eliminated. Instead, "inclinators" move up the four edges of the pyramid, at an angle of 37.5 degrees. It is a truly humbling accomplishment, making the Las Vegas kitsch inside even more irritating (the only really worthwhile content is the reconstruction of Tut's tomb in the basement, which is definitely first-rate).

So, what's going on here? Or, what isn't going on, and why?

I've purposely skipped computers to this point, which has exposed me to a ceaseless barrage of empty Big Stuf Ding-Dong cartons from the general direction of Mr. Protocol. Stored-program digital computers hit at about the half-century mark just about exactly, prefigured by such machines as Colossus and ENIAC.

The big technological innovations of the first half-century changed human life directly. Autos took people places, antibiotics cured them, airplanes flew them, telephones let them talk to people whose voices they might not otherwise hear again in their lives. Computers don't work that way. Very few people have had their lives as dramatically influenced by computers as they have been influenced by these other developments. Certainly, computers have reshaped the retail and banking industries, so in that sense they affect how and where we shop and bank. But we don't deal with the computers. They affect businesses, and the businesses affect us. We still shop, we still bank and we still go to the same places to do it. Up until the Internet came along to give them a purpose, most home computers were no more than adjuncts to other home activities and, in many cases, they were pure toys.

The Internet – Nothing New

So what about the Internet? It bucks the trend, certainly. It could be viewed, as I said above, as an extension of the phone system. It doesn't put any more people in contact than there were before. In fact, it could be argued that all it does is provide more players in the "information content" game than could be accommodated in the radio broadcast régime. For one-to-one contact via email, it provides something between the telephone and the postal service. Viewed this way, nothing it provides is fundamentally new; new in some ways, of course, but not fundamentally new. You and the Zulu tribe aren't in any better communication. You can view the Finn-Russian border in real time, but it doesn't give you access to the Stasi archives. Is there anything fundamentally new it can give you?

Mr. Protocol thinks we've all been fooled by this "march of technology" nonsense. Technology doesn't march. It

proceeds in fits and starts. We had a whole bunch of fits happen in the first half of this century, more or less by accident. There'll be more fits to come; right now we're in sort of a lull. Some new advances are needed before we can expect further fundamental changes in our way of life. The Industrial Revolution was already complete by the time most of the changes of the first half-century came about, but its social effects hadn't come to roost yet. We're still working them out. But there are definitely more fundamental changes to come.

We need cheaper energy. Energy costs will have to fall by a factor of at least 10 before we can contemplate sustaining our current rate of consumption, let alone changing to a more energy-intensive way of life. We know perfectly well how to live a less energy-intensive life; some excellent scientific work done in the '60s and '70s has shown us how to do that, and some people have adopted this way of life by choice. Some of its tenets, such as recycling, have been adopted en masse. Research continues into alternative energy sources, so far either fugitive (fusion) or not cost-effective (wind and solar). A thousandfold or ten-thousandfold drop in the cost of energy seems more likely for a really big advance, and that would change our lives plenty.

We need more portable energy. Current energy-storage techniques are miserable. The problem is that you can store plenty of energy in a small space, but it's very dangerous. It's hard to keep it from letting go all at once. We've had hydroxy fuel cells for decades but they tend to blow up real good if you whack them hard enough, like in a traffic accident.

We need room-size quantum effects. Every time we get a quantum effect we can actually see, like semiconductors or superconductivity, things begin to get really interesting.

Genetic engineering. Just wait.

In the meantime, we'll do what we always do: consolidate and integrate. And that's where the Internet comes in. It's the greatest consolidator and integrator of information ever devised. It can act as a coupled set of machines, as in the Great Mersenne Prime Search, or as a mostly uncoupled sea of information to be mined. The Internet isn't a life-changing technology, really. Instead, it allows us to use the technologies we've already got to their fullest. ➸

Mike O'Brien *has been noodling around the UNIX world for far too long a time. He knows he started out with UNIX Research Version 5 (not System V, he hastens to point out), but forgets the year. He thinks it was around 1975 or so.*

He founded and ran the first nationwide UNIX Users Group Software Distribution Center. He worked at Rand during the glory days of the Rand editor and the MH mail system, helped build CSNET (first at Rand and later at BBN Labs Inc.) and is now working at an aerospace research corporation.

Mr. Protocol *refuses to divulge his qualifications and may, in fact, have none whatsoever. His email address is* `amp@cpg.com`.