

TRENDS & Ideas

INTERNET

Who Owns the World Wide Web?



Verisign, a corporation that started out small, has done a bit more than build hotels on Baltic and Mediterranean. According to a June 25 article in *Fortune*, it holds a remarkable near-monopoly on information flow. It operates behind the scenes and is well-known mostly to tech-savvy webheads, financial investors, and the federal Commerce Department.

In a vault with the security and austerity of nuclear missile silos, banks of computers handle data and transactions for Microsoft, Ford, GE, Texas Instruments, Bank of America, and First Union Bank. Each corporation has entrusted Verisign with the secret codes that allow the computers to sign and exchange documents with each other.

If you have ever checked into Web-based e-mail or

purchased something online, you've probably seen Verisign's calling card: the small padlock that appears in the lower right corner of your browser, telling you your connection is secure. The icon is generated by their servers, where sophisticated software protects sensitive password and credit card information. In addition, those servers are where any online purchase is actually processed. Verisign handles about \$2 billion in credit card transactions annually, and that's only one part of the \$360 billion volume of overall Internet commerce.

The design and use of security is what got Verisign started in the Internet business. Competitors such as Entrust and Baltimore Technologies also had online-authentication software, but they chose to sell

the program itself, whereas Verisign contracted itself as a service. Then, at the height of the tech-stock bubble, Verisign used its own stock to purchase Network Solutions, along with its government-sanctioned monopoly to manage any and all domain names ending in .net, .org, and .com. Its servers handle 2 billion domain name searches daily.

For every server that runs credit card transactions, companies such as Amazon.com or CDNow.com pay \$900. For every .net, .org, and .com address in its database—20 million .coms alone, and thousands more per year—its government contract pays \$6. The investments and cash-on-the-barrel-head it has on-hand could sustain profits and operations for two full years without taking on any new business.

Some people believe the amount of power Verisign wields is unsettling. In addition to hackers burning Verisign's CEO, Stratton Selavos, in effigy, the Commerce Department recently renegotiated a deal where the company would give up the .net and .org databases. With seven brand-new domain names in development (including .biz, .info, and .pro), Verisign will remain powerful if not dominant.

GENE THERAPY

Human Trial Shows Promise

Type A hemophilia is a genetic condition in which a single mutation robs the body of its ability to manufacture a protein known as factor VIII. Without this protein, patients bleed profusely from minor cuts and bruises and even suffer spontaneous hemorrhages within joints. Only injections of purified factor VIII allow their blood to clot and wounds to heal.

Science News reported on a study in the *New England Journal of Medicine* in which skin cells were harvested from six people with hemophilia A. The cells were impregnated with bacterial DNA that contained the gene for factor VIII production, then cultured for injection into the test subjects. Three subjects were administered 100 million cells, and the other three were given 400 million.

Tests administered over the course of a year indicated that all three members of the high-dose group and one member of the low-dose group had elevated levels of factor VIII in their blood. Two of the patients for whom the therapy had the strongest effect did not report any need for clotting factor injections for 10 months, beginning shortly after the treatment.

Clotting factor levels, though elevated, were still far below normal levels. Other hematologists question whether the 2 percent to 4 percent of normal factor VIII levels is in fact a therapeutic amount, or if the lack of a control group can account for any possible placebo effect. They question whether any of the subjects failed to take clotting-factor concentrates because they expected to feel better. Further research may better indicate exactly how much the treatment helps, and if the duration of benefits could be extended.

Hematology researchers are nevertheless enthusiastic about the implications of the therapy, which marks the first human trial of gene therapy for the disease. Hemophilia A has been an inviting subject for recombinant gene techniques, due to its origin in a single mutation. Delivering a viable copy of the gene in question continues to be a difficult task for researchers, though certain developments for both hemophilia A and B show promise.

DEMOGRAPHICS

Young Adults *Can* Go Home Again

Birds of prey such as condors and eagles often return to the same nests year after year for many generations, but a recent trend seems to indicate that many young Americans aren't waiting that long. Increasingly, young adults are moving back in with their parents more often and for longer periods of time.

According to an article by Pamela Paul in the June issue of *American Demographics*, 18 million unmarried 20- to 34-year-olds currently live with their parents. Given the total number of the generation's singles, that's 38 percent—and the number seems likely to increase. This year, 56 percent of college students (670,000) plan to live at home for a period of time

after graduation, and 19 percent anticipate staying longer than a year.

This marks a shift in both numbers and attitudes. Thirty years ago, only nine percent of men and seven percent of women lived at home. As recently as 1998, those figures had risen to only fifteen and eight percent.

American Demographics speculated that the shift is at least partly generational. In the early 1990s, Gen Xers were often forced to live at home by a job market that wouldn't fulfill the promise of their college degrees. The ongoing trend softened the negative judgments toward the end of the decade, making both parents and children more comfortable with the situation. Since the late

1990s, the generation of college graduates has shifted from Generation X and their Silent Generation parents to so-called Gen Y, whose baby boomer families are much more flexible in support of their children.

The current job market also lends itself to the security of the home. Young adults could pursue vocational or associate's degrees, or earn their bachelor's, master's, or doctorate. Job options run from full-time to only temporary, and as of the year 2000, 27 percent of college students didn't expect to work longer than a year at their first job. This outweighs by five points the percentage who planned to stay longer than three years.

In addition, the home



may be preferable to a generation that is choosing to marry and start homes of their own at later ages. In 1960, women typically married at around 20 years old. Today, women tend to marry near 25, and men near 27.

Many historical markers

of adulthood have lost significance or have been delayed: marriage, college or high school graduation, military service, religious ritual, or the onset of puberty. As definitions fluctuate, so too do does resistance to a crowded nest.

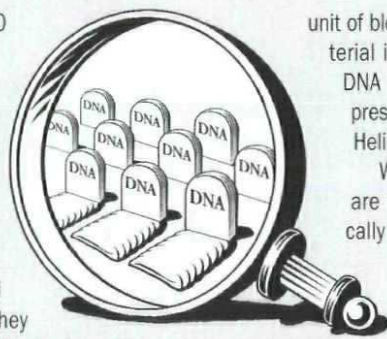
MEDICINE

New Device Destroys Blood-Borne Pathogens

Discover magazine's editors' choice award for 2000 was given to Laurence M. Corash of Cerus Corporation for his development of a device to purify whole blood and plasma before transfusion. Dubbed the Helinx blood purification box, the device disables any DNA molecules contaminating donated blood.

Blood plasma, platelets, and red blood cells all contain no DNA of their own, and thus pass through unaffected. White blood cells have cell nuclei, and thus DNA. Their destruction is essential because they can trigger a rejection response in the recipient. Standard practice is to subject the blood to gamma rays, but unfortunately that procedure is not 100 percent effective.

In addition to the risk of immune response, infectious diseases are also a constant problem. Blood banks test for hepatitis B and C, HIV, and syphilis and destroy contaminated supplies. But it is prohibitively expensive to screen 90 million units of blood each year for other pathogens, such as malaria, herpes, and Lyme disease. The risk of viral infection per



unit of blood is 1 in 34,000 and climbs to 1 in 1,700 for a bacterial infection via platelet transfusion. Helinx attacks all DNA indiscriminately, however. A constant danger is the presence of some unknown, emerging pathogen, and so Helinx's blanket effect is even more appealing.

When certain organic compounds, called psoralens, are introduced into a sample of blood, they are chemically attracted to DNA and begin orbiting the molecules.

But when activated by ultraviolet light, they react with two of the four base amino acids that comprise DNA. Suddenly bound in a chemical straightjacket, the DNA can no longer replicate itself, leading to the rapid death of all afflicted bacteria and white blood cells. Because the same bases are also present in RNA, Helinx disables viruses as well. Red blood cells absorb UV light, and so the technique was refined to incorporate psoralens that activate in response to a shift in pH.

Cerus Corporation projects that blood banks in Europe could be cleaning blood supplies as early as next year, and the year after in the United States.

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