
RELIGION & PHILOSOPHY

that Sally's mother's debts, once the property of Sally's mother, have now become the property of Sally. Only if a living heir assumes a dead person's interests—by extending a copyright, paying a debt, preserving a family heirloom—are the dead person's interests preserved.

Even so, Callahan believes that those portions of the law based on the premise that the dead *can* be harmed should be kept. No fine-spun theory of morality is necessary. Living Americans are comforted to know that, through their bequests, they can reward persons or institutions they care about. And, if the legal conceit that a dead person can be protected is also the best way to comfort surviving friends and heirs, then keeping this conceit intact "is exceedingly well justified."

SCIENCE & TECHNOLOGY

Dyslexia

"Dyslexia" by Frank R. Vellutino, in *Scientific American* (Mar. 1987), 415 Madison Ave., New York, N.Y. 10017.

In 1925, American neuropsychiatrist Samuel T. Orton suggested that a problem he termed "lying in the visual system" made otherwise intelligent children perceive letters and words in reverse—*b* for *d* or *was* for *saw*. This, he thought, would also explain why dyslexics persist in "mirror writing" when normal children abandon it after age four or five.

Orton's theory underlies many of the remedial treatments used today, such as optometric training to improve binocular coordination. Vellutino, director of the Child Research and Study Center at the State University of New York, Albany, says these treatments are futile. Far from being a visual disorder, he argues, dyslexia stems from a complex brain dysfunction: the inability to store and retrieve linguistic information properly.

In experiments with second to sixth graders, Vellutino found that dyslexics could copy words accurately even when they misnamed them. Asked to read out each of the letters, they did so—yet still misnamed the words. On the other hand, dyslexics fared no worse than normal readers in trying to reproduce words from an unfamiliar language (Hebrew) after brief exposure. For all readers, in the absence of linguistic associations, Hebrew became an abstract task, like math.

Along with specific word problems, general semantic deficiencies crop up in other tests. Dyslexic children do not seem able to master phonetics. When given a series of meaningless "pseudowords," they cannot sound them out. Nor can they readily recall words just heard; their brains have not "stored" an adequate impression of how the words are formed. Indeed, these children have trouble naming many things: common objects, colors, and numerals. They may stumble, hesitate too long, even say "dog" when confronted with a picture of a cat.

Genetic research may soon unveil the mechanisms behind this strange disorder. Already certain is that males are more apt to suffer from it than females—by ratios of as high as 10 to 1. Twins are more likely to be dyslexic than other children. Researchers at the University of Colorado,

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Boulder, have tentatively isolated a particular gene in families with a history of reading problems.

Until scientists gain more knowledge, Vellutino says, the best remedies are simply intensive, one-to-one tutoring and a reading program that combines "whole word" reading with "alphabet mapping," or phonetics. Dyslexics who improve invariably follow the same route: practice, then practice some more.

Computer Mumbles

"ADA's Troubled Debut" by Jonathan Jacky, in *The Sciences* (Jan.-Feb. 1987), The New York Academy of Sciences, 2 East 63rd St., New York, N. Y. 10021.

Just before dawn on July 22, 1962, the sky flashed a brilliant orange as Mariner I, America's first rocket to Venus, lifted off from Cape Canaveral. Within four minutes, it began to veer off course. The range safety officer was forced to ignite Mariner's "self-destruct" system, turning the \$8 million missile into burning metal confetti. Several days later, analysts for the U.S. Air Force and NASA disclosed the problem: A period had been substituted for a comma in the launch's flight control computer program.

In the hope of forestalling such fiascos, the Defense Department has developed several strategies to improve its computer software. The *pièce de résistance* is a new programming language called ADA (named for Lord Byron's daughter, Augusta Ada). But critics, according to Jacky, an assistant professor at the University of Washington, charge that ADA's complexity makes it susceptible to the very errors it was designed to prevent.

During the mid-1970s, the Pentagon had a "software crisis" on its hands: More than 450 computer programming languages, mostly obscure, were in use, requiring operators to retrain each time they changed assignments. But ADA, conceived in 1979 as the military's sole programming language—to handle administration, aim weapons, guide missiles, navigate ships, and transmit vital communications—brought new chaos. As one programmer remarked of its 192-page manual, published in 1980: "There are some good ideas in ADA, but they are outnumbered."

The more functions a computer language performs, the more time is involved—both for hardware to process the commands and for technicians to figure out how to give them. To this overall concern about ADA—with its one million characters—critics add specific complaints as well.

For example, because ADA does not perform concurrent tasks "deterministically" (in the order in which commands are issued), it is unreliable in tightly scheduled "real-time" situations. Equally troublesome, most of ADA's software packages are geared to the large hardware used in data processing centers and laboratories—not to the small computers found in battlefield units or in guided missiles.

In quiet defiance of the "ADA-only" rule, some military organizations have begun to leave ADA behind—including the Pentagon's own Defense Advanced Research Projects Agency, which favors the artificial intelligence language, LISP. But ADA's *official* status has not changed since 1983, when a Defense official joked: "For six or seven years we have been digging a trench, and now that it's dug we expect people to jump in."