

Voice Lessons for Psychotics

People suffering from hallucinations caused by schizophrenia and other brain disorders sometimes obey what their voices tell them to do—and sometimes they don't. Predicting such behavior isn't high on most psychiatric research agendas. But according to psychologist John Junginger of Louisiana State University, answers are needed to help courts evaluate the danger posed by psychotic individuals. Right now, says Junginger, most expert testimony on the subject "could probably best be described as a fraud."

With a \$145,000 grant from the National Institute on Mental Health, Junginger wants to see if it's possible "to predict compliance with command hallucinations." He plans over the next 2 years to compile profiles of 75 patients who have reported such hallucinations. He will then see if he can predict which patients in a comparable sample will obey their voices.

Fortunately for Junginger's work, patients are apparently quite reliable at telling researchers what they're hearing. So far, his preliminary research suggests that a patient is more likely to comply with orders if he thinks he knows who's speaking—God, for example, or a deceased relative—or if the aural hallucination is supported by a deluded belief, such as the case of a patient who believes he is Jesus Christ.

Blocking the Backdaters

The growing use of computers may endanger one part of the classic Capitol Hill inquiry—the part where investigators spill memos out on the table and grill witnesses about what they wrote and when they wrote it. These days, computers make it easy to alter dates and edit documents retroactively. And, for someone in

Human Deathtraps for Mosquitoes

If a promising line of research pans out, you may someday get a chance to help stamp out malaria while inflicting poetic revenge upon one of man's oldest insect enemies. Stanford immunologist Leon Rosenberg believes it may eventually be possible to inoculate humans—not against viruses, but against mosquitoes.

Inspired by a series of studies in which cattle injected with ground-up ticks developed antibodies that interfered with the ticks' digestive processes, Rosenberg thinks he might be able to develop a similar antigen for certain mosquito species. Used in a vaccine that is harmless to people, such an antigen would quickly kill any mosquito unwitting enough to bite a vaccinated person.

The most obvious application of this technique would lie in controlling the spread of malaria, Rosenberg says. The vaccine wouldn't protect people from the malaria parasite itself, but by inoculating malaria victims against the parasite's carrier—the *anopheles* mosquito—further spread of the disease could be halted.

Right now, Rosenberg is trying to find an antigen that will interfere with flea digestion so he can protect mice from their hungry parasites. If successful, he hopes to move on to the problem of malaria and mosquitoes. Rosenberg admits that even if all the scientific hurdles can be overcome, it might prove difficult to vaccinate people with something that won't actually help them; he hopes people will be amenable to "altruistic immunization." Surely he's got it backwards. Anyone who's ever waged a backyard war against a swarm of mosquitos should welcome the opportunity to inflict some lasting revenge.



Her last meal? Someday, a bite like this may spell doom for the little bloodsucker.

a predicament like Oliver North's, they make it easy to purge incriminating files.

This thought occurred to a couple of mathematicians at Bellcore Labs last year as they read about Thereza Imanishi-Kari. She's the Tufts researcher whose notebooks were examined by the U.S. Secret Service under orders from Representative John Dingell (D-MI). Agents questioned many of her notes because the vintage of the inks she used didn't gibe with the dates of entry. But researcher Scott Stornetta at Bellcore couldn't help wondering: what if the entire notebook had been recorded in digital form? How could anyone check for backdating?

After working on this puzzle for several months, Stornetta and his colleague Stuart Haber

have come up with two solutions involving what they call foolproof "digital time stamping." These methods—which are cheap, simple, and private—can not only date documents, but can also render them unique and unalterable. They would be invaluable for cases in which a researcher wanted to lay a proprietary claim on a document, such as when priority or simple authenticity of lab notes is at stake. Or they might be used routinely in an office by employers who want to ensure that computer files are not altered surreptitiously.

One technique would require authors to submit the digital "hash" of a document (a number derived from operating a prespecified mathematical function on the document's digital content) to a special time-

stamping computer. The authors would get back an electronic "certificate" that included the hash, the official time, unique digital signatures of the author and the time stamper, and a crucial bit of "linking" data that ties the certificate to the just-filled time stamp request. It sounds complicated, but a computer can do all this in the flicker of a few electrons.

A second, more "democratic," approach would require authors to send a hash number to a randomly generated list of peer-timekeepers, each of whom would send back an electronic stamp. The collection of stamps would then serve as an unimpeachable certificate.

One attraction of these methods is that they guarantee the author's privacy: there's no need to show anyone the text of a document itself. Stornetta foresees a broad application—not just to certify individual papers, but to authenticate daily logs, thus preventing surreptitious deletion of computer files. Time stamping can also be used to "fingerprint" original digital audio and video recordings, making it easy to identify corrupted or counterfeit renditions, he says.

FDA Gets a New Boss

Burdened by increasing responsibilities, budget cuts, and a scandal involving its approval of generic prescription drugs, the Food and Drug Administration seems to be badly in need of new leadership. It's about to get it. According to news reports, President Bush will soon appoint David Kessler, currently director of medicine at the Albert Einstein College of Medicine, as FDA commissioner.

The selection of Kessler reportedly comes as something of a surprise since he has never held high public office before. In the early 1980s he worked as an expert consultant to Senator Orrin Hatch (R-UT) on FDA issues and is now a member of the Public Health Service Advisory Commission on the FDA.