The New York Times
nytimes.com

November 3, 2006

# The Memory Hole

By DAVID SHENK

ONE hundred years ago today, a 42-year-old German psychiatrist and neuropathologist named Alois Alzheimer shocked colleagues with his description of one woman's autopsied brain.

The woman was named Auguste Deter. Five years earlier, her husband had admitted her to Alzheimer's psychiatric hospital in Frankfurt with a disturbing set of symptoms: memory trouble, aphasia (loss of the ability to use words), confusion, bursts of anger and paranoia. She had become a danger to herself in the kitchen and needed constant care.

Alzheimer found his new patient sitting on a bed with a helpless expression.

"What is your name?" he asked.

"Auguste," she replied.

"Last name?"

"Auguste."

"What is your husband's name?"

"Auguste, I think."

"How long have you been here?"

(She seems to be trying to remember, he wrote in his notes.)

"Three weeks."

It was her second day in the hospital. "I have lost myself," she told her doctor. Over the next four and a half years, she grew increasingly disoriented, delusional and incoherent. She would scream for hours on end. Eventually, Auguste Deter became bedridden, incontinent and largely immobile, and then, in April 1906, at age 55, she died.

What was this strange disease that would take an otherwise healthy middle-aged woman and slowly -- very slowly, as measured against most disease models -- peel away, layer by layer, her ability to remember, to communicate her thoughts and finally to understand the world around her?

It looked like senile dementia, the sharp unraveling of memory and mind that had, for more than 5,000 years, been accepted by doctors and philosophers as a routine consequence of aging. But she was too young for senile dementia.

Alzheimer was able to look inside her brain for answers, thanks to a whirl of European innovation. Ernst Leitz and Carl Zeiss had just invented the first distortion-free microscopes. Franz Nissl had revolutionized tissue-staining, making various cell constituents stand out, opening up what was characterized as "a new era" of the study of brain cells and tissues.

(The Nissl method, by the way, is still in use. Nissl, a friend and close collaborator of Alzheimer, became a medical school legend with his instructions on how to time the staining process: Take the brain out, he advised. Put it on the desk. Spit on the floor. When the spit is dry, put the brain in alcohol.)

With Auguste Deter's brain tissue fixed, frozen, sliced, stained and pressed between two thin pieces of glass, Alzheimer put down his habitual cigar, removed his pince-nez, and peered into his state-of-the-art Zeiss microscope. Then, at a magnification of several hundred times, he finally saw her disease.

It looked like measles, or chicken pox, of the brain. The cortex was speckled with crusty brown clumps -- we now call them plaques -- too many to count. They varied in size, shape and texture and seemed to be a hodgepodge of granules and short, crooked threads, as if they were sticky magnets for microscopic trash.

The plaques were nestled between the neurons, blocking their communication with one another. They were so prominent that Alzheimer could see them without any stain at all, but they showed up best in a blend of magenta red, indigo carmine and picric acid.

A different stain revealed what Alzheimer called "a tangled bundle of fibrils" -- weedy, menacing strands of rope bundled densely together. These tangles grew inside the nerve cells, strangling them.

Auguste Deter had not lost herself. Rather, her "self" was taken from her.

On Nov. 3, 1906, Alzheimer presented his findings at the 37th meeting of South-West German Psychiatrists with a paper titled, "Regarding a Curious Disease of the Cortex." What he did not realize was that these very same plaques and tangles were not just responsible for this rare, middle-aged dementia, but also for the majority of cases of senile dementia.

Nor could he have foreseen that with the significant rise in longevity over the 20th century, cases of Alzheimer's disease would skyrocket into the millions. Paradoxically, we have created a civilization of such health and longevity that a disease that was once rare now threatens us all.

There's no good way to die, but some are far worse -- and far costlier -- than others. The plodding progression of Alzheimer's devastates not only the patient but also a wide circle of family and friends forced to witness and participate in the long decline. The disease costs a fortune in medical and nursing fees and lost wages; a conservative estimate is that the current five million cases in the United States add up to more than $100 billion annually.

If that sounds like a lot of money, keep in mind that the baby boomers have not started turning 65 yet. By the middle of this century, 15 million Americans could have Alzheimer's -- about 100 million people worldwide -- and national costs could reach $1 trillion, threatening to bankrupt our entire health care system.

This is a disease that, if left on course, will greatly affect our economy, our politics and our communities.

The good news is that scientists now understand much about how the disease ravages the brain, and have

many good ideas about how to stop it. The bad news is that Alzheimer's research is expensive, slow and, even in the face of this growing epidemic, underfinanced.

The political will to find a cure has long been hampered by the stigma and lack of understanding that surrounds this disease. But we must do what it takes to cure Alzheimer's before it saps our economy and steals another generation.

David Shenk is the author of "The Forgetting: Alzheimer's, Portrait of an Epidemic."