

Off the Beat

Not as smart as his liver, but a scientist with a conscience

The Lives of a Cell by Lewis Thomas (The Viking Press, N.Y., 1974, \$6.95) is the meandering of one man's highly convoluted mind. As such, it speaks as much about him as it does about science, nature and society, the formal topics. He shows himself to be a scientist with a conscience, a philosopher with the facts, and an excellent writer, besides. He presents a highly readable book that is worth pause and reflection.

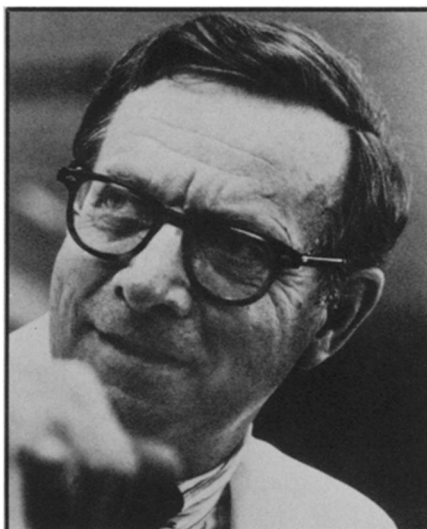
The book is a collection of essays which appeared in the *NEW ENGLAND JOURNAL OF MEDICINE* during the past three years. Thomas is the president of the Memorial Sloan-Kettering Cancer Center in New York, and is obviously no stranger to science. Yet, he retains a sense of wide-open amazement and appreciation of the intricacies of nature that so often dies early in the research scientist. He is not a mechanist, but not outrageously vitalistic, either—he leaves plenty of room for the findings of future inquiries into the secret of life.

One of Thomas's main themes is the dependence of the human body on its own organelles. The endosymbiosis theory of mitochondrian development—that mitochondria were at one time independent, free-living primitive cells which invaded other primitive cells, giving rise to a more complex cell with built-in respiratory organelles—has apparently been fertile ground for his imagination. In his entertaining and scientifically enlightening essay, "Organelles as Organisms," he says:

My mitochondria comprise a very large proportion of me. I cannot do the calculation, but I suppose there is almost as much of them in sheer dry bulk as there is the rest of me. Looked at in this way, I could be taken for a very large, motile colony of respiring bacteria, operating a complex system of nuclei, microtubules, and neurons for the pleasure and sustenance of their families, and running, at the moment, a typewriter.

The evolution of mitochondria links humans with all other animals, he says.

They are much less closely related to me than to each other and to the free-living bacteria out under the hill. They feel like strangers, but the thought comes that the same creatures, precisely the same, are out



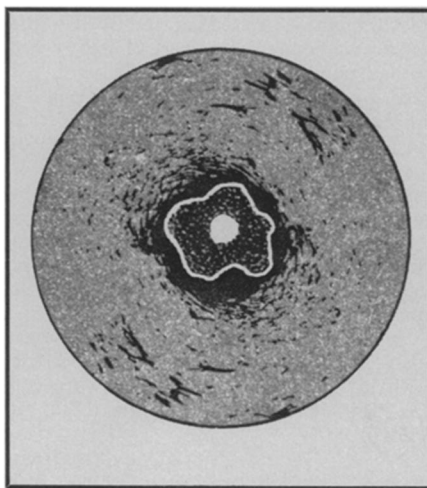
"Biology watcher" Lewis B. Thomas.

there in the cells of sea gulls, and whales, and dune grass, and seaweed, and hermit crabs . . . Through them, I am connected; I have close relatives, once removed, all over the place.

In "Autonomy," he toys with the idea of taking personal charge over one's own autonomic physical systems, then dismisses it. Precision control over smooth muscle function, blood vessels, tubules and secretory cells would be boggling to the conscious mind. "Nothing would save me and my liver, if I were in charge. For I am, to face the facts squarely, considerably less intelligent than my liver. I am, moreover, constitutionally unable to make hepatic decisions, and I prefer not to be obliged to, ever. I would not be able to think of the first thing to do."

Some might find his anthropomorphic characterizations distressing. I find them delightful.

Thomas is obviously a cultured man—he dabbles in Zen philosophy, finds music in science and science in music, and is an amateur linguist. Several essays are devoted to language and communication. In "On Various Words," he



traces two Indo-European words, *gene* and *bheu*, from which, he says, "we have constructed the notion of Everything." From these two words, passed back and forth between cultures and ages like a Rosetta stone, arise the words for birth and beginning, kin and kind, gentle, genius, genital, nature, live, dwell, build, grow and physic. In this and other essays, he dusts off half-buried linguistic connections and reveals the evolution and common heritage of many science words. They are cousins to each other just as man is to other animals through his mitochondria.

It is comforting to think that such a humanistic scientist is responsible, in part, for the directions fundamental research will take. Some bioengineering efforts have given rise to the spectre of scientist as amoral manipulator. Thomas's conscience seems alive and well. He puts forth "an earnest proposal" in an essay by that name to save the world from nuclear Armageddon. He proposes that the world defer further aggressive military action until a complete set of information can be compiled on one living organism. If the scientists of the world were to put forth a decade-long united research effort aimed at unlocking all the secrets in the protozoan *Myxotricha paradoxa*, and the results were computerized, we would be saved.

This protozoan is an ecosystem in itself—it lives inside termites, and provides the enzymes needed to break down cellulose. It leaves the nondigestible lignin, which the termites excrete in little blocks and use to build their nests. It has flagella that turn out to be spirochetes, attached to bacteria nestled in the protozoan's outer membrane. If we could understand the force which allows these animals to function as one unit, he says, perhaps we "would catch a glimpse of the process that brought single separate cells together for the construction of metazoans, culminating in the invention of roses, dolphins, and of course, ourselves. It might turn out that the same tendency underlies the joining of organisms into communities, communities into ecosystems, and ecosystems into the biosphere." At the end of the decade, he says, not totally tongue-in-cheek, when all of the information was fed into the computer, it would print out the following message: "Request more data. How are spirochetes attached? Do not fire."

—Janet H. Weinberg

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