

The High-Entropic Life in the United States

The harder we try to control time, the more time controls us. *Why should that be?*²

—Ralph Keyes

We are taught from childhood that time is a precious commodity. So when I first came to the United States, I quickly made some comparisons between life here and life in Alexandria, Egypt, where I grew up, to see whether I was going to have more time for myself. The differences were immediately noticeable. Here, the schools and businesses are open five days a week, while in Alexandria they are open six days. Because the weekend is twice as long, my first impression was that Americans must have lots of time for themselves.

A few days after my arrival in Fresno, California, my cousin took me to California State University at Fresno, where I was to begin my undergraduate studies in physics. When we arrived, I noticed the parking lots were full of cars, prompting me to comment that there must be quite a few professors and employees at the university. “No,” said my cousin, “the great majority of these cars belong to the students.” I translated this fact to mean that students here—and people in general—have more available time than their counterparts in Alexandria, because they do not have to wait for buses, tramways, or other means of transportation. They can go directly to their points of destination.

I also compared the supermarket system with the neighborhood stores that we had in Alexandria. Here, instead of going from one store to the other for meat, chicken, fish, bread, fruits, and vegetables, Americans can purchase everything from one large super-

market. Because of refrigerators and freezers, canned foods, and preservatives, Americans do not have to go every day to the market—another savings of time.

The widespread use of labor-saving devices like vacuum cleaners, dishwashers, telephones, washers, and dryers was also noticeable. And because there is no afternoon siesta, Americans commute to work only once, thus accruing more time for themselves. The situation was enviable. I was elated, thinking that I will have, like everybody else, plenty of time for myself.

As it turned out, the observations were accurate, but the conclusions were incorrect. As I gradually began to know people from this quiet community of Fresno, the most often-heard complaint was the “lack of available time” to get things done. I could not figure out the puzzle: How can people be surrounded with so much timesaving machinery, and yet be suffering from such an intense thirst for more available time? “It cannot be,” I said, “it’s just impossible.”

Had I known the Laws of Thermodynamics then, I would not have been so perplexed, because thermodynamics compels us to look at the total thermodynamic equation before jumping to conclusions. In fact, the First and Second Laws of Thermodynamics explain nicely why people in the United States have less and less available time as they produce and attempt to use a wide spectrum of timesaving devices, which are not only increasing in numbers but also becoming increasingly complex and delicate.

We normally forget that it takes energy (work) to produce all these productivity-boosting machines. If work is required to build machines, it means that the users of cars, vacuum cleaners, microwaves, computers, washers, and dryers must also perform some work to pay for them. Consequently, more and more people are now working to pay for all the timesaving machines we all have in our possession.

“It was not supposed to be this way, of course,” remarked the *Los Angeles Times*. The newspaper points out that in the 1950s and 1960s, when machines began replacing workers at an amazing rate, many economists, sociologists, and futurists predicted that the shift away from an economy dominated by the production of food, clothing, and other necessities of life would soon lead to less work and more leisure for everyone. “But it hasn’t worked out.”³

Time magazine also recalls “the silvery vision of a postindustrial age.” In a cover story entitled “How America Has Run Out of

Time," the magazine remarked that "computers, satellites, robotics and other wizardries promised to make the American worker so much more efficient that income and GNP would rise while the workweek shrank." A testimony before a Senate subcommittee in 1967 indicated that by 1985 people could be working only 22 hours a week or 27 weeks a year, or could retire for good at age 38. This would leave plenty of leisure time for everyone to enjoy.⁴

The dream of working just 22 hours a week or retiring at 38 did not materialize because we live in a thermodynamic world, not a mechanistic one. There are many hidden thermodynamic variables. For example, in the case of automobiles, we cannot operate them in a vacuum. We need to build and maintain an intricate infrastructure of roads, highways, and bridges. Consequently, we have to work and pay for their expenses. Moreover, because automobiles can cause bodily harm and property damage, we have to work extra to pay for car insurance.

Automobiles emit many gaseous substances, which we call "pollution." Auto emissions change the composition of the air we breathe by adding unpleasant and often hazardous materials to the environment. The accumulated entropy creates a host of problems that demand more and more of our attention: the air pollution irritates our eyes and affects our lungs and general health, requiring additional medical attention.

The degradation of the quality of our environment necessitates the formation of watchdog bureaucracies—such as the Environmental Protection Agency—that are supported through additional work and taxes. These bureaucracies conduct studies, and write regulations that require our compliance. These regulatory laws call for research and development, usually resulting in the introduction of more gadgetry to "control pollution." All these activities require work and energy transformations, which in turn generate entropy and dissipate time.