

## *Adam Smith and the Roomba®*

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EVERY SO OFTEN technology critics charge that despite the exponential growth of computer power, the postwar dreams of automatized living have been stalled. It is true that jetpacks are unlikely to go mainstream, and that fully autonomous vehicles are more distant than they appear, at least on local roads. And the new materials that promised what the historian of technology Jeffrey L. Meikle has called “damp-cloth utopianism”—the vision of a future household where plastic-covered furnishings would allow carefree cleaning—have created dystopia in the world’s oceans.

Yet a more innocent dream, the household robot, has come far closer to reality: not, it is true, the anthropomorphic mechanical butler of science-fiction films, but a humbler machine that is still impressive, the autonomous robotic vacuum cleaner. Consider, for example, the Roomba®. Twenty years after introducing the first model, the manufacturer, iRobot, sold itself to Amazon in August 2022 for approximately \$1.7 billion in cash. Since 2013, a unit has been part of the permanent collection of the Smithsonian’s National Museum of American History.

As the museum site notes, the first models found their way by bumping into furniture, walls, and other obstacles. They could not be programmed to stay out of areas of the home; an infrared-emitting accessory was needed to create a “virtual wall.” Like smartphones, introduced a few years later, Roombas have acquired new features steadily with a new generation on average every year. (They have also inspired a range of products from rival manufacturers.) Over 35 million units have been sold. According to Fortune Business Insights Inc., the worldwide market was nearly \$10 billion in 2020 and is estimated to increase from almost \$12 billion in 2021 to \$50.65 billion in 2028.

On the Amazon.com website, iRobot describes the most advanced model, the S9+ (retailing for about \$1,000 plus supplies), as “our smartest, most powerful robot vacuum yet.” Using onboard processors, sensors, and artificial intelligence in the cloud, it can navigate its way around furniture to cover the entire area of a room. It features a docking station into which collected dirt is automatically emptied at the end of a run; it can hold up to a month’s worth of sweepings. It can learn owners’ preferences, distinguish among rooms, and recommend extra cleanings “when pollen count is high or during pet shedding season.” Since robotic dogs and cats have gone out of style, the Roomba S9+ also is equipped with brushes that resist tangling with pet hair and a high-efficiency filter that “traps 99 percent of cat and dog allergens.” Unlike most previous models it is sensitive enough to avoid bumping into objects and rolling over pet waste, which it can photograph and transmit to an absent owner by text message. No wonder many owners treat it as a beloved household member with a personality of its own. It is the robotic pet.

Adam Smith might applaud the Roomba as a triumph of the liberal world order he had endorsed. Thanks to the global marketplace for design ideas, chips, and mechanical parts, he might remark, a division of labor—Roomba is designed mainly in the United States by an international team and manufactured in China and Malaysia—has benefited consumers worldwide. Smith would nonetheless disapprove of the economic nationalism of both the United States and China that has made managing high-technology manufacturing chains so challenging.

Yet Smith might also make a different kind of observation, highlighting the technology’s limits rather than its capabilities. For while Smith lauded ambition and entrepreneurship, he also recognized that it might benefit the community more than the striving individual. In part 4, chapter 1 of *The Theory of Moral Sentiments*, he presents a secular parable of “the poor man’s son, whom heaven in its anger has visited with ambition, [who] admires the condition of the rich. He finds the cottage of his father too small for his accommodation and fancies he should be lodged more at his ease in a palace.” Paradoxically

he works feverishly to achieve a life of leisure supported by a retinue of servants.

He makes his court to all mankind; he serves those whom he hates and is obsequious to those whom he despises. Through the whole of his life he pursues the idea of a certain artificial and elegant repose which he may never arrive at, for which he sacrifices a real tranquility that is at all times in his power, and which, if in the extremity of old age he should at last attain to it, he will find to be in no respect preferable to that humble security and contentment which he had abandoned for it. It is then, in the last dregs of life, his body wasted by toil and diseases, his mind galled and ruffled by the memory of a thousand injuries and disappointments which he imagines he has met with from the injustice of his enemies, or from the perfidy and ingratitude of his friends, that he begins at last to find that wealth and greatness are mere trinkets of frivolous utility, no more adapted for procuring ease of body or tranquility of mind than the tweezer-cases of the lover of toys.

Smith was not necessarily urging his readers to shun economic and social ambition and embrace rustic simplicity, although he could not resist wondering, “How many people ruin themselves by laying out money on trinkets of frivolous utility?” His point was rather that individual striving, while perhaps futile, creates support for countless families and communities as a positive unintended consequence. The stomachs of the wealthy, he observed, had no more capacity than those of the humble. The rich are envied most for what we would now call gadgets, “numberless artificial and elegant contrivances for promoting . . . ease or pleasure.” The benefits of wealth and power may be an illusion, but it is one that “rouses and keeps in continual motion the industry of mankind.”

The example that intrigued Smith most was the advancement of watch mechanisms. Connoisseurs of watches, he wrote, were selling their old models, which could be two minutes or more fast or slow, for others accurate to within a minute in a fortnight. But those men,

Smith observed, do not really need such accuracy. Conventional timepieces are sufficient for keeping appointments, and the owner of a costly watch does not necessarily want to know the precise time of day. “What interests him,” Smith continued, “is not so much the attainment of this piece of knowledge, as the perfection of the machine which serves to attain it.” (Centuries later, the American essayist Fran Lebowitz expressed a similar sentiment on the useless precision of digital timekeeping: “Nine-seventeen is fake time because the only people who ever have to know that it’s nine-seventeen are men who drive subway trains.”)

The Roomba, Smith might learn, was only part of a movement called the Internet of Things (IoT), linking appliances with thermostats, door locks, security cameras, entertainment systems, smartphones, digital personal assistants like Amazon Echo, and other devices in networks controlled by artificial intelligence. It is the latest version of the life of ease that Smith’s ambitious contemporaries sought, but without the personnel issues that arise when employing flesh-and-blood household staff, a utopia of technological efficiency and convenience to its enthusiasts.

There are tens of millions of smart houses. The data service Statista reports that in 2019 there were already 35 million smart homes in the United States, and it estimates annual smart-home revenue at \$47 billion by 2024. The Roomba, the Echo, and other connected devices create a kind of domestic technological theater, in which their apparently seamless interaction gratifies the owner in the manner described by Smith. The historian Neil Harris has called our fascination with observing machinery at work the “operational aesthetic.” Decades ago spectators flocked to see the automatic milking of cows at a dairy near my present home, and tourists would marvel at newspaper presses through plate-glass windows the publishers had installed to dramatize the mass communication of the day. While cheap digital timepieces are more accurate than the most precise mechanical brands, many collectors of luxury watches still cherish display cases with sapphire crystal backs displaying hand-finished escapements and

gears. Seeing a robotic vacuum return to its dock and discharge its sweepings with no human contact can be an entertaining spectacle, like observing the mechanism of an expensive mechanical watch.

Yet Smith also probably would refer back to his remark about gadgets satisfying minor needs but failing the greatest challenges. No robotic vacuum can supply the suction of a full-sized upright or canister model, or clean deeper carpets. In 2020, *Consumer Reports* found that a top-of-the-line robotic vacuum captured only 20 percent of the talc and sand swept up by a leading upright counterpart. So households with robots still need to clean periodically using full-sized equipment. There is initial trial and error in teaching the robot the proper spaces to clean and to avoid. And even if a robot can discharge itself into a dock, there is still no commercially available domestic robot that can eventually empty the dock and put out the debris with the rest of the trash. So the master of the machine must still clean up for it at some point. And the novelty of watching the robot complete its assignment can wear off as we see it day after day, just as Smith saw that strivers would grow dissatisfied once their goals were achieved. Today's social psychologists have a phrase for that: the "hedonic treadmill."

Smith's critique of material goals and consumer culture for the individual—the other side of his recognition of their value for society—was the contrast between technological conveniences and ultimate concerns. The convenience of small luxuries and gadgets like tweezer sets, Smith wrote in a famous passage, "keep off the summer shower, not the winter storm, but leave [the individual] always as much, and sometimes more exposed than before, to anxiety, to fear, and to sorrow; to diseases, to danger, and to death." Despite Scotland's renown as a center of medical education, Smith rarely discusses epidemics, yet he had to be aware of their impact. Smallpox was endemic in eighteenth-century Britain, and while its distribution and impact in Scotland has been controversial—the most common estimate is that it accounted for ten percent of all deaths—there were periodic epidemics with a far higher incidence. Inoculation with the live infected material, often by untrained practitioners, was common, especially during an outbreak, but sometimes deadly. In fact Smith's patron, the

young Duke of Buccleuch, inherited his vast estates from his grandfather because his father had died of the smallpox. The lifetime pension that Smith received when he was engaged as the duke's tutor on the Grand Tour gave him the freedom to write what became *The Wealth of Nations*.

The success of twenty-first century science in developing effective vaccines would have impressed Smith and other eighteenth-century Britons living before the adoption of vaccination around 1800. Yet Smith also probably would have invoked the contrast between the amenities and conveniences of networked app-controlled devices managing our "summer showers" and the remaining challenges of "winter storms." Consider US life expectancy. While our futurists and visionaries have been foretelling the possibility of virtual immortality, the previous decades-long growth of American longevity has been reversed. Even before COVID-19 appeared, life expectancy had been declining since its all-time peak of 78.4 years in 2014, due to increased death rates in middle age. Hopes for effective anti-Alzheimer's medication have failed; the most recent candidate for treating the disease, Aduhelm, was still unproven in spring 2022. Meanwhile, between 2000 and 2018 reported deaths from Alzheimer's disease rose over 146 percent. One in ten Americans over sixty-five has Alzheimer's dementia, according to a report from the Alzheimer's Foundation. The impressive gains in the memory of devices have done nothing to retard the threat to human memories.

Could household automation be not only irrelevant to fundamental human welfare, but harmful? As an omnivorous reader, Smith would no doubt discover in our medical literature the well-established dangers of sedentary living (he loved "long solitary walks by the Sea side") and the virtues of getting up regularly to perform minor chores, such as turning lights on and off, adjusting the thermostat, and vacuuming the room, the same sorts of fidgeting that the Roomba and the entire Internet of Things are hailed as replacing. In fact the very speed of improvement of robotic vacuums may be a hazard in itself, as obsolescent models add to the accumulation of used batteries and environmentally hazardous electronic waste.

As the sustainability movement grows, there are signs of a revival of the humble carpet sweeper, invented in 1876, as sold by legacy brands like Fuller Brush and Bissell. They offer recycled plastic parts, independence of the electric grid, and freedom from worry about hackers downloading users' home layouts from the robots' increasingly sophisticated cloud storage.

Perhaps getting up and moving things around the house will be the next operational aesthetic.