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Why Jobs Is No Edison

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It takes nothing away from Steve Jobs to say he is no Thomas Edison. You only need to understand what Edison accomplished.

Superlatives about Steven Jobs's tenure as the head of Apple reached new heights once he announced his retirement in August 2011. Those smitten by the sleek Apple products that Jobs liked to introduce in much-anticipated stage presentations have rarely seen them as anything but revolutionary, and claimed that they repeatedly changed not only the expectations of what modern electronics can deliver but our lives.

The encomiums reached their peak with Ken Auletta's homage in The New Yorker:

> The twentieth century's Thomas Edison has stepped from the stage ... the scope of the technologies that sprang from or were transformed by Jobs's Apple laboratories—the Mac, the mouse, the laptop, Pixar, iTunes, iPod, iPhone, iPad—is awesome, as was that from Edison's Menlo Park. And Jobs, like Edison, accomplished his imaginative feats without the crutch of survey research, of endless polls to tell him what people wanted.

I have no desire to disparage or dismiss anything Jobs has done for his company, for its stockholders, or for millions of people who are incurably addicted to incessantly checking their tiny Apple phones or washing their brains with endless streams of music—I just want to explain why Jobs is no Edison.

Any student of the history of technical progress must be struck by the difference between the epochal, first-order innovations that take place only infrequently and at unpredictable times and the myriad of subsequent second-order inventions, improvements, and perfections that could not have taken place without such a breakthrough and that both accompany and follow (sometimes with great rapidity, often rather tardily) the commercial maturation of that fundamental enabling advance. The oldest example of such a technical saltation was when our hominin ancestors began using stones to fashion other stones into sharp tools (axes, knives, and arrows). And there has been no more fundamental, epoch-making modern innovation than the large-scale commercial generation, transmission, distribution, and conversion of electricity.

I thought that perhaps the best way to illustrate the importance of electricity in modern civilization was to ask what we would not have without it:[1]

> The answer is just about everything in the modern world. We use electricity to power our lights, a universe of electronic devices (from cell phones to supercomputers), a panoply of converters ranging from hand-held hair dryers to the world's fastest trains, and almost every life saver (modern synthesis and production of pharmaceuticals is unthinkable without electricity: vaccines need refrigeration, hearts are checked by electrocardiograms, and during operations are bypassed by electric pumps), and most of our food is produced, processed, distributed, and cooked with the help of electric machines and devices.

This fundamental innovation was created during a remarkably short period of time—most of it between the late 1870s and the beginning of the 20th century—by a surprisingly small number of inventors, engineers, and scientists. In order to avoid the most obvious exclusionary injustice, even a brief list of the pioneering creators of electric systems must include the names of Charles Clarke, Sebastian Ferranti, Lucien Gaulard, John Gibbs, Zénobe-Théophile Gramme, Edward Johnson, Irving Langmuir, Charles Parsons, Emil Rathenau, Werner Siemens, William Stanley, Charles Steinmetz, Joseph Swan, Nikola Tesla, Elihu Thomson, Francis Upton, and George Westinghouse. But, justly, one name stands above them all, that of Thomas Alva Edison.

Contrary to the standard narrative, his greatest contribution was not to invent the light bulb: a score of other inventors beat him to it, and he has to share the glory of its first commercially successful and relatively durable variety with Joseph Swan. Edison's contribution was fundamentally far greater because he put in place, in a remarkably brief period between 1880 and 1882, the world's first commercial system of electricity generation, transmission, and conversion. T.P. Hughes put it best when he concluded that "Edison was a holistic conceptualizer and determined solver of the problems associated with the growth of systems."[2] And the pace and breadth of his inventiveness is perhaps best illustrated by the fact that during those three critical years he was granted not only nearly 90 patents for incandescent filaments and lamps but also 60 patents for magneto or dynamo-electric machines and their regulation, 14 patents for the system of electric lighting, 12 patents for the distribution of electricity, and 10 patents for electric meters and motors.

Perhaps no contemporary testimony of his accomplishments is as revealing and as appreciative as the impressions of Emil Rathenau, a pioneer of the German electric industry, after seeing the display of Edison's system at the Paris Electrical Exhibition of 1881:

The Edison system of lighting was as beautifully conceived down to the very details, and as thoroughly worked out as if it had been tested for decades in various towns. Neither sockets, switches, fuses, lamp-holders, nor any of the other accessories necessary to complete the installation were wanting; and the generating of the current, the regulation, the wiring with distribution boxes, house connections, meters, etc., all showed signs of astonishing skill and incomparable genius.[3]

Afterwards, Edison made many fundamental contributions to rapidly evolving sectors, using electricity in the reproduction of sounds and images (his phonograph, cameras, and projectors), as well as in such diverse technical categories as improved batteries, processing of iron ore, and construction of pre-cast concrete houses. He amassed nearly 1,100 US patents and more than a thousand foreign ones.

But the electric system remains Edison's grandest achievement: an affordable and reliably available supply of electricity has opened doors to everything electrical, to all great second-order innovations ranging from gradually more efficient lighting to fast trains, from medical diagnostic devices to refrigerators, from massive electrochemical industries to tiny computers governed by microchips.

Until 2010, none of the microprocessors in Apple's i-products were designed or made by Apple. For example, Samsung has been supplying iPhone's main processor; Wolfson chips have been handling the phone's audio; National Semiconductor chips have taken care of display interface; and Infineon chips have done power management. The same was true of the earliest Apple products: Apple II would have been impossible without innovations by Xerox's PARC—above all its Star computer—and Douglas Engelbart at the Stanford Research Institute patented the first mouse in 1967, a decade before Apple II.

Consequently, Apple's products are actually third-order innovations that use a variety of fundamental second-order innovations in the now vast realm of electronic components to assemble and to program devices whose greatest appeal has been due to their (choose your own adjective, or embrace all of them) sleek, unorthodox, elegant, streamlined, clean, functional interface design.

Not that those are unimportant attributes when trying to sell on a mass scale—Edsel, perhaps the paragon of American product failure, had the same type of engine (Ford-Edsel V8) as did a highly successful Mustang!—but looks and product appeal are far too little in order to qualify for an Edisonian mantle.

And there is also no doubt that Apple's devices have benefited from group infatuation, a phenomenon that has often favored a product or a class of designs based on an allegiance that the devotees themselves have difficulty defining in coherent terms (in contrast, during its peak power Microsoft suffered from the reverse attitude—excessive criticism). In its quotidian extremes this loyalty has been manifested by people willing to pay high premiums for German engineering even after decades of Consumer Reports evaluations have failed to demonstrate any stunning superiority of German cars over Hondas and Toyotas.

And as for the "awesome technologies" that sprang from Jobs's Apple laboratories, would not an impartial observer describe the iPad as just a small laptop computer without a keyboard and a cover (a boon for the makers of covers that people buy to protect the device) rather than an epoch-making innovation on par with electricity, vaccination, hybrid crops, or synthetic nitrogen fertilizers?

Auletta concludes that Jobs, like Edison, has been "an inventor and a man who has changed our lives." Instant history has its perils. Some 130 years after Edison's remarkable creation of the electricity system, there still remains no doubt about the fundamental and truly epochal nature of his contributions: the world without electricity has become unimaginable. I bet that 130 years from now our successors will not be able to say the same about Apple's sleek electronic devices assembled from somebody else's components and providing services that are not fundamentally different from those offered by competitors. I have no doubt that the world without iPhone or iPad would be perfectly fine.

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***FURTHER READING*: Smil also writes "Japan's Crisis: Context and Outlook." Nick Schulz discusses "Steve Jobs: America's Greatest Failure." Claude Barfield and John E. Calfee investigate "Biotechnology and the Patent System."**

Footnotes

1. Smil, V. 2005. *Creating the Twentieth Century*. New York: Oxford University Press.

2. Hughes, T.P. 1983. *Networks of Power*. Baltimore, MD: Johns Hopkins University Press.

3. Rathenau, E. 1908. Quoted in: Dyer, Frank L. and Thomas C. Martin. 1929. *Edison: His Life and Inventions*. New York: Harper & Brothers, pp. 318-319.

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