

December 19, 2013

Arthur Brooks on happiness.

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The best fish story in years from [More Intelligent Life](#).

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*Ahamada was at home when the phone rang. He rushed to the CNDRS, grabbed the collecting kit and then caught a bush taxi to Hahaya. “It was very emotional,” he remembers. “I was very impatient to see the fish. And when I got there it was still moving a little. It was a very big female, close to two metres, and had already turned brown. But its eyes were still shining; it was amazing to see lights coming from its eyes.” ...*

**Wesley Pruden** writes on the scam that will not die - globalony.

*We were all supposed to be dead by now, fried to a toasty potatolike chip. Or doomed to die with the polar bears. It was to be a soggy end for the most beautiful planet in the cosmos and for all the passengers riding on it. The global alarmists never quite got their story of fright and fear straight, whether by now we would be fried or frozen.*

*First they warned of global warming, and when they needed a new narrative “global warming” became “climate change.” They finally settled on something they could prove because the climate does, in fact, change. First it rains, and then the sun comes out. Then it rains again. Rain, sun, rain, sun, drip, drip and dry. The narrative is ever new.*

*There was always a scarcity of evidence that the globe was on a wild tear, but there was never a scarcity of alarm. We got bedtime stories of ghosts and goblins from the graveyard, wild monsters from Boggy Creek, even a creature from a black lagoon and all kinds of other things that make the night a time of fearsome fun and games. Al Gore, who had a lot of time on his hands after his White House gig was aborted, even made a movie about it. It’s still popular in certain circles on Halloween night. ...*

And, as **John Hinderaker** points out, a cooling climate might be the big worry. As Steve noted a little while ago, the Northern states have been in a deep freeze for a while now. The Minneapolis Star Tribune reports that northern Minnesota hasn’t had a six-day stretch

*colder than the one the state has just suffered through since the Nixon administration, 1972. From December 6 through 11, the temperature in Duluth averaged 6 degrees. The Brainerd Dispatch went farther back in history to find the record coldest six-day stretch in December. If you're curious, it was 1927, when for six days in Brainerd, the average temperature was 7.5 degrees below zero.*

*Of course, that's just weather. But many scientists are growing increasingly concerned about the prospect of a long-term chill. The Earth has barely emerged from the Little Ice Age, and already solar activity is diminishing to an alarmingly low level. At [Watts Up With That](#), Dr. Leif Svalgaard says, "None of us alive have ever seen such a weak cycle." Here is the graph: ...*

And in the feel good story of the week, we learn from [Technology Review](#) that this cold weather is making things difficult for electric cars.

*EVs could cut gasoline consumption, but their appeal is limited by practical issues like their variable range on a charge.*

*As winter weather arrives, electric car owners are worrying about what the cold will do to the range of their vehicles. Message threads with titles like "Winter driving warning" and "Another way to stay toasty on long trips without running heat" are showing up on online customer forums run by Tesla Motors, which sells many of its cars in particularly cold places such as Norway.*

*Cold weather presents two main challenges for electric vehicles: cold air limits battery performance, and running the heater drains the battery. As temperatures go below freezing, some drivers accustomed to traveling 250 miles on a single charge have seen their car's range drop to 180 miles. Drivers in extreme climates might see the range decrease even more. That might force drivers to choose cars with bigger batteries than they would need in the summer, adding \$10,000 or more to the cost of the cars. ...*

**[Walt Mossberg](#)** has been writing tech reviews for WSJ for 22 years. He writes about the most significant 12 advances he has covered in that time.

*This is my last column for The Wall Street Journal, after 22 years of reviewing consumer technology products here.*

*So I thought I'd talk about the dozen personal-technology products I reviewed that were most influential over the past two decades. Obviously, narrowing so many products in the most dynamic of modern industries down to 12 is a subjective exercise and others will disagree.*

*Though most were hits, a couple weren't blockbusters, financially, and one was an outright flop. Instead, I used as my criteria two main things.*

*First, the products had to improve ease of use and add value for average consumers. That was the guiding principle I laid down in the first sentence of my first column, in 1991: "Personal computers are just too hard to use, and it's not your fault."*

*Second, I chose these 12 because each changed the course of digital history by influencing the products and services that followed, or by changing the way people lived and worked. In some cases, the impact of these mass-market products is still unfolding. All of these products had predecessors, but they managed to take their categories to a new level. ...*

We top off the week with Late Night Humor from [Andrew Malcolm](#).

*Leno: George Zimmerman's girlfriend is dropping assault charges against him and wants to get back together. Apparently, she heard Charlie Manson is no longer available.*

*Leno: The Washington Redskins have benched quarterback Robert Griffin III. He showed great promise at first but now his play has fallen apart. President Obama said, "Tell me about it."*

*Leno: Kanye West says he wants to be the Obama of clothing. He's designing fashions no one wants and selling them on a website that doesn't work.*

*Leno: Only one government health program is having a worse roll-out than ObamaCare: Rwanda is trying to hand out 700,000 kits for self-circumcision. Low demand so far.*

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## WSJ

### [A Formula for Happiness](#)

by Arthur C. Brooks

HAPPINESS has traditionally been considered an elusive and evanescent thing. To some, even trying to achieve it is an exercise in futility. It has been said that "happiness is as a butterfly which, when pursued, is always beyond our grasp, but which if you will sit down quietly, may alight upon you."

Social scientists have caught the butterfly. After 40 years of research, they attribute happiness to three major sources: genes, events and values. Armed with this knowledge and [a few simple rules](#), we can improve our lives and the lives of those around us. We can even construct a system that fulfills our founders' promises and empowers all Americans to pursue happiness.

Psychologists and economists have studied happiness for decades. They begin simply enough — by asking people how happy they are.

The richest data available to social scientists is the University of Chicago's General Social Survey, a survey of Americans conducted since 1972. This widely used resource is considered the scholarly gold standard for understanding social phenomena. The numbers on happiness from the survey are surprisingly consistent. Every other year for four decades, roughly a third of Americans have said they're "very happy," and about half report being "pretty happy." Only about 10 to 15 percent typically say they're "not too happy." Psychologists have used

sophisticated techniques to verify these responses, and such survey results [have proved accurate](#).

Beneath these averages are some demographic differences. For many years, researchers found that women were happier than men, although recent studies contend that the gap has narrowed or may even have been reversed. Political junkies might be interested to learn that conservative women are particularly blissful: about 40 percent say they are very happy. That makes them slightly happier than conservative men and significantly happier than liberal women. The unhappiest of all are liberal men; only about a fifth consider themselves very happy.

But even demographically identical people vary in their happiness. What explains this?

The first answer involves our genes. [Researchers at the University of Minnesota](#) have tracked identical twins who were separated as infants and raised by separate families. As genetic carbon copies brought up in different environments, these twins are a social scientist's dream, helping us disentangle nature from nurture. These researchers found that we inherit a surprising proportion of our happiness at any given moment — around 48 percent. (Since I discovered this, I've been blaming my parents for my bad moods.)

If about half of our happiness is hard-wired in our genes, what about the other half? It's tempting to assume that one-time events — like getting a dream job or an Ivy League acceptance letter — will permanently bring the happiness we seek. And studies suggest that isolated events do control a big fraction of our happiness — up to 40 percent at any given time.

But while one-off events do govern a fair amount of our happiness, each event's impact proves remarkably short-lived. People assume that major changes like moving to California or getting a big raise will make them permanently better off. They won't. Huge goals may take years of hard work to meet, and the striving itself may be worthwhile, but the happiness they create dissipates after just a few months.

So don't bet your well-being on big one-off events. The big brass ring is not the secret to lasting happiness.

To review: About half of happiness is genetically determined. Up to an additional 40 percent comes from the things that have occurred in our recent past — but that won't last very long.

That leaves just about 12 percent. That might not sound like much, but the good news is that we can bring that 12 percent under our control. It turns out that choosing to pursue [four basic values](#) of faith, family, community and work is the surest path to happiness, given that a certain percentage is genetic and not under our control in any way.

The first three are fairly uncontroversial. Empirical evidence that faith, family and friendships increase happiness and meaning is hardly shocking. Few dying patients regret overinvesting in rich family lives, community ties and spiritual journeys.

Work, though, seems less intuitive. Popular culture insists our jobs are drudgery, and one survey recently made headlines by reporting that fewer than a third of American workers felt

engaged; that is praised, encouraged, cared for and several other gauges seemingly aimed at measuring how transcendently fulfilled one is at work.

Those criteria are too high for most marriages, let alone jobs. What if we ask something simpler: “All things considered, how satisfied are you with your job?” This simpler approach is more revealing because respondents apply their own standards. This is what the General Social Survey asks, and the results may surprise. More than 50 percent of Americans say they are “completely satisfied” or “very satisfied” with their work. This rises to over 80 percent when we include “fairly satisfied.” This finding generally holds across income and education levels.

This shouldn't shock us. Vocation is central to the American ideal, the root of the aphorism that we “live to work” while others “work to live.” Throughout our history, America's flexible labor markets and dynamic society have given its citizens a unique say over our work — and made our work uniquely relevant to our happiness. When Frederick Douglass rhapsodized about “patient, enduring, honest, unremitting and indefatigable work, into which the whole heart is put,” he struck the bedrock of our culture and character.

I'm a living example of the happiness vocation can bring in a flexible labor market. I was a musician from the time I was a young child. That I would do it for a living was a foregone conclusion. When I was 19, I skipped college and went on the road playing the French horn. I played classical music across the world and landed in the Barcelona Symphony Orchestra.

I was probably “somewhat satisfied” with my work. But in my late 20s the novelty wore off, and I began plotting a different future. I called my father back in Seattle: “Dad, I've got big news. I'm quitting music to go back to school!”

“You can't just drop everything,” he objected. “It's very irresponsible.”

“But I'm not happy,” I told him.

There was a long pause, and finally he asked, “What makes you so special?!”

But I'm really not special. I was lucky — lucky to be able to change roads to one that made me truly happy. After going back to school, I spent a blissful decade as a university professor and wound up running a Washington think tank.

Along the way, I learned that rewarding work is unbelievably important, and this is emphatically not about money. That's what research suggests as well. Economists find that money makes truly poor people happier insofar as it relieves pressure from everyday life — getting enough to eat, having a place to live, taking your kid to the doctor. But scholars like the Nobel Prize winner [Daniel Kahneman](#) have found that once people reach a little beyond the average middle-class income level, even big financial gains don't yield much, if any, increases in happiness.

So relieving poverty brings big happiness, but income, per se, does not. Even after accounting for government transfers that support personal finances, [unemployment proves catastrophic for happiness](#). Abstracted from money, joblessness seems to increase the rates of [divorce](#) and [suicide](#), and the severity of [disease](#).



And according to the General Social Survey, nearly three-quarters of Americans wouldn't quit their jobs even if a financial windfall enabled them to live in luxury for the rest of their lives. Those with the least education, the lowest incomes and the least prestigious jobs were actually most likely to say they would keep working, while elites were more likely to say they would take the money and run. We would do well to remember this before scoffing at "dead-end jobs."

Assemble these clues and your brain will conclude what your heart already knew: Work can bring happiness by marrying our passions to our skills, empowering us to create value in our lives and in the lives of others. Franklin D. Roosevelt had it right: "Happiness lies not in the mere possession of money; it lies in the joy of achievement, in the thrill of creative effort."

In other words, the secret to happiness through work is earned success.

This is not conjecture; it is driven by the data. Americans who feel they are successful at work are twice as likely to say they are very happy overall as people who don't feel that way. And these differences persist after controlling for income and other demographics.

You can measure your earned success in any currency you choose. You can count it in dollars, sure — or in kids taught to read, habitats protected or souls saved. When I taught graduate students, I noticed that social entrepreneurs who pursued nonprofit careers were some of my happiest graduates. They made less money than many of their classmates, but were no less certain that they were earning their success. They defined that success in nonmonetary terms and delighted in it.

If you can discern your own project and discover the true currency you value, you'll be earning your success. You will have found the secret to happiness through your work.

There's nothing new about earned success. It's simply another way of explaining what America's founders meant when they proclaimed in the Declaration of Independence that humans' inalienable rights include life, liberty and the pursuit of happiness.

This moral covenant links the founders to each of us today. The right to define our happiness, work to attain it and support ourselves in the process — to earn our success — is our birthright. And it is our duty to pass this opportunity on to our children and grandchildren.

But today that opportunity is in peril. Evidence is mounting that people at the bottom are increasingly stuck without skills or pathways to rise. Research from the [Federal Reserve Bank of Boston](#) shows that in the 1980s, 21 percent of Americans in the bottom income quintile would rise to the middle quintile or higher over a 10-year period. By 2005, that percentage had fallen by nearly a third, to 15 percent. And [a 2007 Pew analysis](#) showed that mobility is more than twice as high in Canada and most of Scandinavia than it is in the United States.

This is a major problem, and advocates of free enterprise have been too slow to recognize it. It is not enough to assume that our system blesses each of us with equal opportunities. We need to fight for the policies and culture that will reverse troubling mobility trends. We need schools that serve children's civil rights instead of adults' job security. We need to encourage job creation for the most marginalized and declare war on barriers to entrepreneurship at all levels, from hedge funds to hedge trimming. And we need to revive our moral appreciation for the cultural elements of success.

We must also clear up misconceptions. Free enterprise does not mean shredding the social safety net, but championing policies that truly help vulnerable people and build an economy that can sustain these commitments. It doesn't mean reflexively cheering big business, but leveling the playing field so competition trumps cronyism. It doesn't entail "anything goes" libertinism, but self-government and self-control. And it certainly doesn't imply that unfettered greed is laudable or even acceptable.

Free enterprise gives the most people the best shot at earning their success and finding enduring happiness in their work. It creates more paths than any other system to use one's abilities in creative and meaningful ways, from entrepreneurship to teaching to ministry to playing the French horn. This is hardly mere materialism, and it is much more than an economic alternative. Free enterprise is a moral imperative.

To pursue the happiness within our reach, we do best to pour ourselves into faith, family, community and meaningful work. To share happiness, we need to fight for free enterprise and strive to make its blessings accessible to all.

*Arthur C. Brooks is the president of the American Enterprise Institute, a public policy think tank in Washington, D.C.*

## Intelligent Life

### A FISH FOR OUR TIME

***When it turned up unexpectedly, 75 years ago, the coelacanth was the biological find of the century. And now it is showing why. Samantha Weinberg, its biographer, tells the best fish story in 380m years***

by Samantha Weinberg





AS THE SUN was setting on August 18th 2003, the night fishermen of Hahaya village eased their wooden pirogues off the jagged lava rocks and slid into the water. The ocean off the western coast of Grande Comore was calm and as the half-moon rose, they could see the volcano of Karthala silhouetted against the darkening sky. A few hundred metres offshore, one of the fisherman, a veteran of decades of nights on the dark water, laid his paddles across the boat and prepared a line. He tied two flat black stones above a baited hook, then let the fine filament slip through his fingers until it touched the seabed, deep below.

He was waiting for the nibble and tug of a fish—a snapper or a grouper, perhaps, or if he was lucky, a marlin, which he would take the next morning to sell at the market in Moroni. But this time the tug was unfamiliar, and the old fisherman fought with the line before he managed to pull the fish to the surface.

Deep water at night is ink-black and the first thing he saw was a pair of eyes, glowing pink in the pale moonlight. As they surfaced, he could make out a large fish. He recognised it instantly as a gombessa, or coelacanth (pronounced see-la-kanth). Although rarely caught, it was known to all in the Comoros as their most precious asset, a fish that some said was the ancestor of man.

Only six coelacanths had been caught in the waters off Hahaya since 1966, and none in the previous five years, but the old fisherman knew what to do. He tethered it to the back of the boat and paddled back to the village. He knew there was little time to lose as gombessa live in the ocean depths and had never survived for more than a few hours at the surface. Determined to try, he made a safe water pool, and waited for the sun to rise.

The next morning, his nephew took the first bus into Moroni and went straight to the Centre National de Documentation et de Recherche Scientifique (CNDRS)—a handsome white building off the central roundabout in Moroni, which houses the national museum and archives. He told them about the catch. It was what they had been waiting for since the previous year, when Professor Rosemary Dorrington of Rhodes University in the Eastern Cape had visited the island to talk about a new project—the African Coelacanth Ecosystem Programme (ACEP)—that had been set up in South Africa. She had left behind some equipment and instructions on what to do if a coelacanth was caught. Her point man in Moroni was Said Ahamada, a young environmentalist.

Ahamada was at home when the phone rang. He rushed to the CNDRS, grabbed the collecting kit and then caught a bush taxi to Hahaya. “It was very emotional,” he remembers. “I was very impatient to see the fish. And when I got there it was still moving a little. It was a very big female, close to two metres, and had already turned brown. But its eyes were still shining; it was amazing to see lights coming from its eyes.”

The coelacanth was hauled out of the water and laid on white plastic sacking, where, almost immediately, it died. Following Dorrington’s instructions, Ahamada took blood samples. He paid the fisherman, then heaved the coelacanth, still wrapped in its sacking, into the boot of a red hire car and, clutching the vial of blood, careered back to Moroni.

The fish was laid out on a table at CNDRS. Ahamada cut carefully into its side and extracted samples from all the major organs—liver, heart, blood and gills. He carefully put each of them through a small manual meat-grinder, specially adapted for the task in case a lack of electricity

made it impossible to use a blender, to homogenise the tissue. The samples were stored in the CNDRS freezer.

"I was excited that this fish from the Comoros was going to be used for science," Ahamada says. "But at that time I had no idea how important it would be." It wasn't for another decade—until April this year—that he would find out exactly how important.



COELACANTHS ARE THE size of humans. They are slate-blue when alive, with white flecks on the thick scales that cover their bodies. They live in the gloaming, around 200-400 metres below the surface, where light barely penetrates and few creatures venture. They spend their days sheltering in rocky caves in small groups, coming up to feed at night as the water above them cools. Unlike most fish, they give birth to live young—small, perfectly formed baby coelacanths—and when disturbed they lift themselves into headstands, apparently using an electro-sensory organ in their snout to detect the presence of predators or prey.

The handful of people who have seen them in their natural habitat talk of their glowing eyes and their gentle demeanour. They describe coelacanths moving with surprising grace, deploying their fanned fins in a diagonal formation—right fin in front, left trailing behind—that is similar to a lizard walking.

It was those fins that first excited the attention of scientists, nearly two centuries ago. In 1839, the Swiss scientist Louis Agassiz described a fossil fish that had been found in Permian marl slate near Durham in the north of England. He named it *Coelacanthus* (from the Greek for hollow spine) *granulatus* (for the tubercular ornamentation on the surface of its scales). Over the decades, similar fossils were found across the world, dating from around 380m years ago to around 70m years ago, when the fossil record disappeared and the coelacanth was assumed to have become extinct.

The *Coelacanthus* fossils caused a stir in the scientific world, particularly after the publication of Charles Darwin's "On the Origin of Species" in 1859. In the coelacanth's lobed fins, palaeontologists thought they saw clues to the identity of the "missing link", the first fish that crawled out of the sea to evolve into amphibians, reptiles, mammals and, eventually, man. They postulated that the lobed fins of the fossil coelacanths suggested that they were the ancestor of the first fish that crawled out of the sea. Others put their money on the lungfish, the first living

specimen of which had been discovered in the Amazon in the 1830s by Johann Natterer, a Viennese naturalist.

Natterer had returned to Vienna from a collecting expedition with an eel-shaped creature, around two feet long, with both gills and functioning lungs, which he suggested in a monograph was a "new species of animal of the family of fish-like reptiles" (Ichthyodea). A year later an Englishman, Thomas Weir, came back from the Gambia with a similar lungfish, though this one was enclosed in sun-baked clay. (Scientists later discovered that it was common practice for lungfish to go into summer dormancy in the hot, dry season, and then wake up again when the rains came to melt their muddy nests.)

The debate over which of the two—lungfish or coelacanth, the one with the lungs or the leg-like flippers—was most closely related to our ancestor would rage for a century and a half. The evidence seemed to point first to one, then to the other. But without more fundamental information, especially the microbiological data locked inside genomes, it was never going to be conclusive. The lungfish was not going to provide the answers: it has a genome thought to be around 40 times the size of the human genome, and the modern lungfish was a different beast from its fossil ancestor. It was up to the coelacanth to unlock these evolutionary secrets, and, with the specimen that was caught in Hahaya, the bets were once more on the table.

BY SHEER CHANCE, Said Ahamada was due to fly to South Africa the month after the Hahaya fish's appearance, to attend the inaugural conference—in East London, on the southern coast—of the coelacanth project that Rosemary Dorrington had initiated. Dorrington and her colleague Greg Blatch had had the idea of trying to sequence the coelacanth genome. The genome is the library of hereditary material that contains both the active genes that determine how a creature looks, works and develops, and the non-coding sequences that include once-active strings of DNA. There, the scientists hoped to find clues to the coelacanth's past, present and future, what it evolved from and into. It was a mammoth task, particularly for a small lab with basic equipment, but the pay-off would be immense. Written in those long strands of DNA, similar in size to the human genome, there could be the answer to one of the fundamental questions of evolutionary science: how did we evolve from fish?

A year earlier, in 2002, Dorrington and Robin Stobbs, a former technician at Rhodes and a long-time coelacanth fanatic, had flown to the Comoros to try to get some fresh coelacanth tissue to sequence. "I thought it would be easy, but then I realised that no coelacanth had been caught there for five years," Dorrington says. "To a great extent, the fishermen had been persuaded to change their fishing techniques by the Association pour la Preservation du Gombessa, in an attempt to protect the endangered fish—and the chances of catching one by accident were close to zero. It's really incredible: the monetary value to them of catching a coelacanth used to be close to ten years' income, but they had decided they were not going to do something that would jeopardise the coelacanth. They are really amazing people."

When Dorrington booked her flight back from sabbatical in America to prepare her talk for the ACEP conference, she still didn't know about the Hahaya fish and was worried that she wouldn't be able to raise the \$100m she estimated the project needed. But Ahamada's news was a potential game-changer. As soon as he arrived from the Comoros, cradling his precious icebox, Dorrington whisked him off to her lab. She needed to see if the tissues had been harvested and frozen in time to be of use as samples.

With Ahamada at her side, she ran a quick DNA prep to see if there was enough there to work on. "I was nervous about it. But the genomic DNA from the Hahaya animal was of sufficient quality to work with. It was exciting stuff."

On October 29th 2003, following a gala reception in the Marjorie Courtenay-Latimer Hall in East London featuring an African dance performance by the Ngqoko Women's Group, and reports from marine biologists from along the African coast, Rosemary Dorrington stood up to give a speech. She explained what she had done on her trip to the Comoros, and showed pictures of herself and Stobbs with Said Ahamada and his team outside the museum in Moroni. Then she introduced Ahamada, saying that a fish had been caught in the Comoros and that he had brought samples back with him to Rhodes. With a final flourish she projected a slide showing the cells taken from the Hahaya coelacanth. The raw material was there. The genome project could go ahead.

Watching from a seat of honour in the auditorium named after her was a spry 96-year-old woman with lively black eyes. It was with her that the modern episode in the life of the coelacanth began.



**SEVENTY-FIVE YEARS** ago, on December 22nd 1938, Marjorie Courtenay-Latimer was racing to finish a display at the East London Museum, where she was curator, when she received a call from the manager of a fishing fleet. He told her that the trawler Nerine had just docked and that the captain had some specimens that he thought might be of interest. She caught a taxi to the wharf and climbed aboard the boat. There was a pile of fish on the fo'c'sle. "I picked away the layers of slime to reveal the most beautiful fish I had ever seen," she told me when I first met her, 60 years later. "It was five feet long, a pale, mauvey blue with faint flecks of whitish spots and an iridescent silver-blue-green sheen all over. It was covered in hard scales, and it had four limb-like fins and a strange little puppy-dog tail. It was such a beautiful fish—more like a big china ornament—but I didn't know what it was." The deckhand told her that it

had been trawled at a depth of 40 fathoms off the mouth of the Chalumna River in the Eastern Cape, and that it had snapped at the captain's fingers as he looked at it in the trawl net.

She managed to persuade the taxi driver to put it in his boot and took it back to the museum. Although she didn't recognise it, a faint bell was ringing in the back of her mind from a school biology lesson about ganoid fish, an ancient group characterised by their scaly armour. "But I thought it couldn't be a fossil fish because it was still alive." She knew she had to find a way to preserve it. She took measurements and drew a rough sketch while her helper, Enoch, went off to borrow a handcart, and together they set off into town.

They went first to the mortuary and then to East London's cold storage—the only two refrigeration facilities large enough to accommodate the fish—but, three days before Christmas, there was no room at either inn. In despair, Courtenay-Latimer turned to the local taxidermist, who suggested she preserved the fish in a sheet soaked in formalin until she could find someone to identify it. She borrowed a sheet from her mother and wrapped it up. Then she tried to phone Dr J.L.B. Smith, a chemistry lecturer at Rhodes and honorary curator of fishes for the museums along the south coast. But he was away and when he hadn't got back to her by the next day, she wrote to him, enclosing her sketch.

For the next few days, she waited for a response. By December 27th, oil was seeping from the fish and the taxidermist was worried that it would begin to decay. So Courtenay-Latimer told him to skin it – but carefully, so as to preserve the scales. They found pure white flesh below, no ribs and, instead of a spine, a flexible, oil-filled tube.

It was 13 long days before she heard from Smith. He was on holiday along the coast in Knysna, where he eventually received her letter and saw the sketch. "I stared and stared, at first in puzzlement," he wrote in "Old Fourlegs: the Story of the Coelacanth" (1956). "I did not know any fish of our own, or indeed of any seas like that; it looked more like a lizard. And then a bomb seemed to burst in my brain, and beyond that sketch...I was looking at a series of fishy creatures that flashed up as on a screen, fishes no longer here, fishes that had lived in dim past ages gone, and of which only fragmentary remains in rocks are known...What I suspected was so utterly preposterous that my common sense kept up a steady fire of scorn for my idiocy in even thinking of it."

He sent Courtenay-Latimer a wire urging her to save the fish's innards. "From your drawing and description," he wrote, "the fish resembles forms which have been extinct for many a long year."

On February 16th 1939, Smith finally made it to East London to view the stuffed fish, which lay on the table in Courtenay-Latimer's small office. A short man, bristling with intellect and not noted for his patience, particularly with the more dilatory students, he circled the coelacanth several times. He peered at it, stroked it, then turned to Courtenay-Latimer and said: "Lass, this discovery will be on the lips of every scientist in the world."

When Smith's paper on the coelacanth was published in *Nature*, with the first line "Ex Africa semper aliquid novi" ("there is always something new out of Africa"), it was greeted with great fanfare. Newspapers and magazines around the world were full of the find, which was memorably acclaimed in the *Eastern Province Herald* as the "Best Fish Story in 50,000,000 years", and in the *Illustrated London News* as "One of the Most Amazing Events in the Realm of Natural History in the Twentieth Century". Smith named the fish *Latimeria chalumnae*, in honour of Marjorie Courtenay-Latimer and the area in which it was found.



**Above** Caught in time: The photographer Peter Scoones was in the Comoros with David Attenborough to film coelacanths for "Life on Earth" when a local fisherman hooked this specimen



*Catch of the day: J.L.B. Smith (stroking the fish), Eric Hunt (left), Governor Pierre Coudert, Dakota crew and local fishermen with the second coelacanth, 1952*

SMITH WAS FRUSTRATED by the loss of the coelacanth's inner parts which, he believed, would have revealed much about its morphology and provenance—and, more importantly still, provide clues as to how evolution worked. He devoted the next 14 years to the search for another coelacanth. With his wife, Margaret, he scoured the coasts of southern Africa, looking for another specimen, leaving posters with a description and photograph of *Latimeria* and the offer of a £100 reward.

It was on Christmas Eve 1952 that Smith received the news he had been waiting for. Eric Hunt, the captain of a trading schooner, wired him to say that a fish had been caught off the Comoros, then still a French colony—and that he had better get there smartish to claim it.

Smith reached for a telephone. He tried to contact South Africa's ministers of defence and transport and the head of the armed services, to no avail. In the vacuum of Christmas, he realised there was only one option: the prime minister, Dr D.F. Malan, the architect of apartheid, an anti-British, deeply religious creationist. With the help of the local MP, Smith telephoned Malan at his cottage along the coast. Mrs Malan picked up the phone and said the pm was in bed and she wasn't prepared to disturb him. "10.30pm of the 26th December in the year of our Lord 1952," Smith wrote. "It was probably the lowest ebb of my life. The sands of time were running out, fate was screwing me down to the dregs...What on earth was I to do, for now there seemed no more hope?"

Then the phone rang. It was Malan. Smith, in stumbling Afrikaans, summed up the situation and ended with a plea for a plane, so he could fly to the Comoros and bring the coelacanth back to South Africa. "Your story is remarkable," Malan said when he was finished. "First thing in the



morning, I shall try to get through to my minister of defence to ask him to locate a suitable aeroplane to take you where you need to go."

Smith sent a telegram to Hunt, the captain of the trawler: HOLD ON STOP GOVERNMENT SENDING PLANE. The following morning he was sitting in the unlined hull of a military Dakota heading towards the Comoros. But he was nervous: the captain had told him that he had not been able to reach anyone on the islands to warn them of their arrival. He hadn't even been able to establish whether there was a landing strip in the Comoros.

They spent the night in Lourenço Marques (now Maputo) before flying low over the Mozambique Channel towards the Comoros. Smith soon caught sight of a string of thickly vegetated, mountainous islands, fringed by aquamarine water and, beyond, the indigo of the deep. The plane started to descend towards a slender airstrip. Looking out of the window, Smith saw a small boat tethered near a makeshift town. He realised it had to be Hunt's boat, with the coelacanth aboard.

The plane landed in a tropical downpour. As the door opened, Smith saw Hunt's face peering in. After he had been taken to meet the governor, Pierre Coudert, crisp in a white tropical uniform, Smith begged to be shown Hunt's boat. There, lying in a kapok-lined coffin by the mast, was his fish. "God, yes! It was true! I saw first the unmistakable tubercles on the large scales, then the bones of the head, the spiny fins! It was a coelacanth all right. I knelt down on the deck so as to get a closer view, and as I caressed that fish I found tears splashing on my hands and realised that I was weeping, and was quite without shame. Fourteen of the best years of my life had gone in this search and it was true...It had come at last."

Back in South Africa the next day, Smith took the coelacanth, still in its coffin, to show to the prime minister.

"My, it is ugly," D.F. Malan said. "Do you mean to say we once looked like that?"



*104 metres under the sea: In 2010 the French underwater photographer Laurent Ballesta went to the Comoros in search of coelacanths. After days of diving, he found one: "Slowly and carefully I head towards him. I am approaching a living dinosaur. I am full of emotion. Since childhood, I've wanted to look a coelacanth in the eye. I've waited, hoped, worked for this moment"*

THE COELACANTH'S ALLURE did not fade with the discovery of the second fish and what was thought—at the time, anyway—to be its ancestral home. Scientists and museums around the world clamoured for a specimen of their own, while the public queued around the block when Smith's fish was put on display in Grahamstown. A friend of the Smiths', Bee Rennie, recalled the excitement: "People were converging from all directions...From judges to candlestick-makers and heaven knows who. We saw the judge president sort of pushing his way in, next to Helen Campbell the very short hairdresser."

The French, aggrieved at having what they thought of as their poisson stolen from under their noses, decreed that, until further notice, only French scientists would be able to study any further coelacanths. For the next few decades, a handful of specimens were caught each year and taken to the laboratory of Dr Jacques Millot in Tananarive (now Antananarivo), Madagascar. Once he felt he had enough coelacanths, they started giving or selling further specimens to museums and research institutions. A coelacanth is on permanent display in the main hall of the Natural History Museum in London, and its counterparts are in most of the world's major

museums. Over 25 years of study, Millot published a highly detailed book in three volumes, "L'Anatomie de Latimeria".

The coelacanth exerted a hold on adventurers and romantics, who were attracted by its rarity—mere hundreds were thought to exist—and inaccessibility. In the 1980s, an East German scientist, Hans Fricke, hand-built two submersibles in which he succeeded in diving to depths of 300-400 metres. Here, after much searching and to his great excitement, he found—and filmed—coelacanths, hiding in rocky caves off the south-western coast of Grand Comore. "I always say it is a creature that doesn't belong in our marine world," Fricke declared. "It is a very special fish."

In 1997, a young American marine biologist called Mark Erdmann was on holiday on the Indonesian island of Sulawesi when he saw a coelacanth in the fish market. He took photographs and returned the next year to set up a base in the hope of finding another one.

Like Smith, he visited the local fishermen and put up reward posters. After months of waiting, on July 29th 1998, an Indonesian fisherman from the island of Manado Tua, Om Lamah Sonathon, caught the fish he knew as Rajah Laut, "King of the Sea". He towed it to the next-door island of Bunaken, where Erdmann was living with his wife, Arnaz. For half an hour, Arnaz swam with the coelacanth while Erdmann took pictures. But it was already dying, moving listlessly in the water. Erdmann grabbed his dissecting kit and hauled the coelacanth into a cooler chest to take it back to the main island. A few minutes later, it died.

"I was filled with excitement and adrenaline," Erdmann told me soon afterwards. "But at the same time it was heart-breaking to see it slowly dying, especially having swum with it. At risk of slipping into anthropomorphisms, I had the impression of great gentleness and intelligence. I can honestly say that if it had looked more alive when we had been photographing it, I would have had the impulse to let it go."

Erdmann's paper on the Indonesian coelacanth was published in *Nature*, as Smith's had been. It was greeted with similar excitement, both by the media and by scientists, most of whom were relieved that there was a larger world population of coelacanths than had previously been believed.

But the South Africans were not to be outdone. The first fish had been found in their waters and logic dictated there should be others. Deep-sea divers, using a technically complex method involving a mixture of three gases, tried descending to ever greater depths in the hope of finding a coelacanth. In June 1998, a South African diver died in the attempt. Two years later, three trimix divers came face-to-face with a large fish that they thought was a coelacanth, at a depth of 104 metres, off Sodwana Bay, just south of the Mozambique border.

They immediately started planning a return dive and on November 27th 2000 they found three coelacanths ranging from about 1 to 1.8 metres long. After 15 minutes on the bottom, they began their slow ascent. But at around 70 metres, two of the divers, Dennis Harding and Christo Serfontein, had a problem with their equipment. They made a dash for the surface. Harding lost consciousness and, despite his team's best efforts to revive him, died. Serfontein regained consciousness in time to be taken back down to a depth where he could safely decompress.

After 134 minutes in the water, he was taken to nearby Richards Bay, where he spent six hours in a decompression chamber. His companions, however, returned to dive again.

All these coelacanth specimens would reveal more and more about the workings of what was dubbed—like the giant sequoia tree and the horseshoe crab—a living fossil, an extant relic of ancient times. But where precisely it fitted into the evolutionary tree—whether it was indeed the direct descendant of our fishy ancestor—remained unresolved. The answer, it seemed, would only come with a more detailed examination of the coelacanth, at the cellular level. And that was what Rosemary Dorrington and Greg Blatch would set out to do.

After the 2003 ACEP conference in East London, however, Dorrington and Blatch realised that it was time to pass on the baton: their equipment was not up to the monumental task of sequencing the coelacanth genome. They arranged to meet up with Chris Amemiya, a professor of microbiology at the University of Washington in Seattle and another long-term coelacanth fan. He was excited by the idea of unlocking the secrets hidden in the coelacanth's cells and organised for the samples to be flown to America.

"As a little kid, I had read 'Old Fourlegs' and was fascinated," Amemiya says. He knew that sequencing the entire genome was going to be a long haul. Fish genomes had been sequenced before; the puffer fish was the first in 2002. But the coelacanth was of a different order of difficulty—and importance. In 2003, there were only a handful of places in the world that could do that type of work. One of them was the Broad Institute in Boston, which jumped at the chance to be involved. One of its research scientists, Jessica Alföldi from the Vertebrate Genome Biology Group, was given responsibility for running its end of the project. Together, Amemiya and Alföldi wrote white papers to raise the grants and, bit by bit, the funding and aims of the project started to come together.

By the time the tissues from the Hahaya coelacanth started being run through the Broad Institute's bank of state-of-the-art DNA sequencing machines, a team of 91 scientists from 40 institutes in 12 countries on all six inhabited continents was in place, waiting for the data to emerge. "The coelacanth genome consists of approximately 3 billion base pairs," Alföldi explained to me. "Each chromosome contains 50m to 250m base pairs. The machines we use can only sequence 100 base pairs at a time."



*Fishy fingers: The coelacanth's distinctive lobed pectoral fins*

It was an intricate process of cutting and stitching, involving geneticists and computer scientists, all working at the technology's frontline. Eventually they had a draft genome assembly with which to work. At that point, the biology began. The data had to be analysed, the interesting genes identified and isolated and then compared to similar genes in fish, mammals, humans—and lungfish.

The prize was the seat on the evolutionary tree at the fork where the fish branch met the tetrapods—the first four-limbed vertebrates and their descendants, including humans. "The coelacanth is evolutionarily a fantastic organism," Amemiya says. "Before our study, people had been using more conventional methods to determine the coelacanth's phylogeny. The lungfish seemed to show higher affinities to tetrapods – but those data sets are less clear-cut in determining relationships and not everyone subscribed to that point of view. That is why we had to use the molecules to get that data.

"We knew before the sequencing started that it was going to be big—that we would find all sorts of stories in the genome."

The team homed in on 251 genes—a far greater number than had been looked at before—from a wide range of different creatures, then compared one with another to determine where exactly the modern coelacanth sat on the tree of life. So it was that in April 2013, 174 years after Agassiz described the first coelacanth fossil, 75 years after Marjorie Courtenay-Latimer saw her beautiful fish, 74 years after Smith's first paper was published in *Nature* and almost ten years after the old fisherman caught his gombessa in the waters off Hahaya, the coelacanth was once again the cover star of *Nature*. In their report, the result of close to a decade of work, Amemiya's team concluded that "the genetic analysis strongly supports the conclusion that tetrapods are more closely related to lungfish than to the coelacanth".

J.L.B. Smith's Old Fourlegs, it seems, is not our several-million-times great-grandmother after all, but rather our great—many greats—aunt. "But the coelacanth is more closely related to us than it is to a salmon or a shark," Alföldi told me. And because of the unmanageability of the lungfish's genome, the coelacanth's genes provide the best chance to understand how life emerged from the waters to colonise the land.

The answers are appearing already. By comparing the coelacanth to land-living creatures, Amemiya and his team are starting to learn how genes changed, which were lost and which adapted, how we came to be able to breathe, smell, excrete, and walk on land. The coelacanth, for example has the same structure in its fins as we do in our arms: a stylopod (upper arm) and two zeugopods (corresponding to our radius and ulna). And unlike other fish, which have no fingers, it has the sequences in its genes to make autopods (fingers). Because it is impossible to study a living coelacanth, the scientists are now taking those autopod sequences and inserting them into the relevant place in mice embryos. Their experiments show that a mouse with those genes is able to make the proteins to grow fingers—a vital stage in the evolution of land animals.

And it's just the beginning. In September Amemiya was putting the finishing touches to a further 11 papers, to be published at the end of this year, which will reveal more about our ancient forebear and what it was about it that made us who we are. The coelacanth genome has been published—something the team were determined to do from the beginning—and is now available for any scientist to use. The fish caught that night in Hahaya has already started to answer some of the biggest questions in evolutionary science, and should continue to bear scientific fruit for decades to come.

In the Comoros, few fishermen use the old techniques any more. "It is only the old men who have the patience during the night, when the coelacanths come up to feed," Said Ahamada says. In the deeper waters of southern Africa and Indonesia, our ancient ancestors are being left in peace again, to swim and to breed as they have done, virtually unchanged, for nearly 400m years.

*Samantha Weinberg is our assistant editor and the author of six books, including "A Fish Caught in Time"*

## Washington Times

### [The global warming scam that will not die](#)

by Wesley Pruden

We were all supposed to be dead by now, fried to a toasty potatolike chip. Or doomed to die with the polar bears. It was to be a soggy end for the most beautiful planet in the cosmos and for all the passengers riding on it. The global alarmists never quite got their story of fright and fear straight, whether by now we would be fried or frozen.

First they warned of global warming, and when they needed a new narrative "global warming" became "climate change." They finally settled on something they could prove because the climate does, in fact, change. First it rains, and then the sun comes out. Then it rains again. Rain, sun, rain, sun, drip, drip and dry. The narrative is ever new.



There was always a scarcity of evidence that the globe was on a wild tear, but there was never a scarcity of alarm. We got bedtime stories of ghosts and goblins from the graveyard, wild monsters from Boggy Creek, even a creature from a black lagoon and all kinds of other things that make the night a time of fearsome fun and games. [Al Gore](#), who had a lot of time on his hands after his [White House](#) gig was aborted, even made a movie about it. It's still popular in certain circles on [Halloween](#) night.

Only 13 years ago (and 13 is the unluckiest of the numbers, which is pretty scary, too), a scientist at the climate-research unit of Britain's [University of East Anglia](#) predicted that "within a few years' time" a snowfall would be "a vary rare and exciting event. Children just aren't going to know what snow is." Some of the newspapers eagerly cooperated with spreading the "news." One of them reported that for the first time a well-known toy shop on London's Regent Street had no sleds on display. Who needs scientific evidence when you have a story like that?

That was then, and this is now, and Britain is huddled against predictions that 2013-14 will be one of the coldest and wettest winters in a very long time. "Worst winter for decades," cried the Daily Express. "Record-breaking snow predicted for November." And so it came to pass. By the end of November, British teeth were chattering, and snow, ice and plummeting temperatures were at hand all across "the scept'r'd isle," and it wasn't yet winter. The kids were getting lots of lessons in "snow," the snow they were never going to see.

The global-warming hysteria grew quickly after that early prediction of a scarcity of snow. Certain scientists with more ambition than sense saw opportunity lying close at hand. With the falling snow could come falling grants to pay for learned papers. Learned academics have learned that a feverish alarm, served with a dollop of hysteria, can move the learned nonsense out of the faculty lounge and into the newspapers and onto television screens. And not just in Old Blighty, whence the scam originated.

[James Hansen](#), whose career at NASA gave him the credentials to be taken seriously even when he didn't sound serious, predicted that in the decade after 2020 the average annual temperature would rise by 9 degrees, with more heat to come. Soon we would be boiling like lobsters. An ambitious young man with his sights on medicine or the law might set his sights higher, and consider a career in fans and air conditioning.

[Mr. Hansen](#), in an op-ed essay in The Washington Post, blames everything on "climate change" — the European heat wave of 2003, the Russian heat wave of 2010, catastrophic droughts in Texas and Oklahoma last year. To discount his view of what's at stake — a climactic version of hope and change — "would be like quitting your job and playing the lottery every morning to pay the bills."

The admiration [Mr. Hansen](#) and his like-minded colleagues have for themselves is as breathtaking as their contempt for all who disagree with them. The more their scam crumbles, the louder they shout its particulars. [Mr. Hansen](#) says he started speaking out about climate change again, after a period of relative reticence, because he did not want his grandchildren to say, "Pa, you understood what was happening, but you never made it clear." Now that events are making it clear what a scam global warming really is, those grandchildren are more likely to say, "Pa, why did you tell all those fibs and stretchers for so long?"

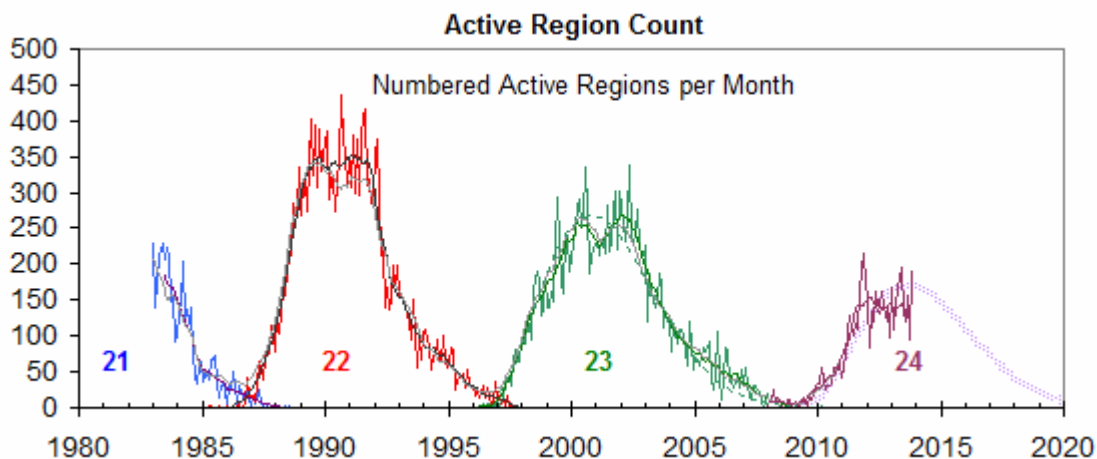
## Power Line

### Is A Big Chill On the Way?

by John Hinderaker

As Steve noted a little while ago, the Northern states have been in a deep freeze for a while now. The [Minneapolis Star Tribune](#) reports that northern Minnesota hasn't had a six-day stretch colder than the one the state has just suffered through since the Nixon administration, 1972. From December 6 through 11, the temperature in Duluth averaged 6 degrees. The Brainerd Dispatch went farther back in history to find the record coldest six-day stretch in December. If you're curious, it was 1927, when for six days in Brainerd, the average temperature was 7.5 degrees below zero.

Of course, that's just weather. But many scientists are growing increasingly concerned about the prospect of a long-term chill. The Earth has barely emerged from the Little Ice Age, and already solar activity is diminishing to an alarmingly low level. At [Watts Up With That](#), Dr. Leif Svalgaard says, "None of us alive have ever seen such a weak cycle." Here is the graph:



[Inform the Pundits!](#) amplifies:

The monthly International Sunspot Number from the Solar Information Data Center (SIDC) of the Royal Observatory of Belgium was released December 1st. It fell to 77.6 spots/day.

Most newsworthy is that this is still the weakest solar max in over 200 years, well below NASA's forecast. ...

We may be witnessing the sun's last dying gasps before entering into a long slumber. The impact of that slumber on Earth's climate remains the subject of growing scientific speculation.

## SIDC Solar Cycle Sunspot Number Progression

Measured thru Nov 2013 (Updated Dec 1, 2013)



Very soon, we may all be praying for a little global warming.

### Technology Review

#### Electric Vehicles Out in the Cold

*Electric vehicle range drops in cold weather, and technological solutions are years away.*

by Kevin Bullis

EVs could cut gasoline consumption, but their appeal is limited by practical issues like their variable range on a charge.

As winter weather arrives, electric car owners are worrying about what the cold will do to the range of their vehicles. Message threads with titles like “Winter driving warning” and “Another way to stay toasty on long trips without running heat” are showing up on online customer forums run by Tesla Motors, which sells many of its cars in particularly cold places such as Norway.

Cold weather presents two main challenges for electric vehicles: cold air limits battery performance, and running the heater drains the battery. As temperatures go below freezing, some drivers accustomed to traveling 250 miles on a single charge have seen their car’s [range drop](#) to 180 miles. Drivers in extreme climates might see the range decrease even more. That

might force drivers to choose cars with bigger batteries than they would need in the summer, adding \$10,000 or more to the cost of the cars.

There are some measures drivers can take to improve an EV's range. But with existing batteries and heaters, some loss of range is inevitable. Researchers are working on technological fixes that won't be ready for years.

Cold temperatures primarily affect how quickly the energy can be taken out of the battery or put back in—that is, how much power it can deliver for acceleration, and how quickly it can be recharged. To compensate for this, automakers sometimes use an electric heater to warm up the battery. If that heater is powered by the battery itself, it uses energy that otherwise would go to propelling the car. Nissan's Leaf is one such car.

Tesla takes a different approach. Once you start driving, heat generated by the motor is used to heat up the battery. This approach is more efficient, since it uses waste heat rather than electricity. But it takes a while to work because the motor doesn't produce much heat. As a result, it might take several minutes before the battery is warm enough to provide full acceleration. ...

**WSJ**

## **Top Products in Two Decades of Tech Reviews**

***Walt Mossberg on the products that changed the digital industry***

by Walt Mossberg

This is my last column for The Wall Street Journal, after 22 years of reviewing consumer technology products here.

So I thought I'd talk about the dozen personal-technology products I reviewed that were most influential over the past two decades. Obviously, narrowing so many products in the most dynamic of modern industries down to 12 is a subjective exercise and others will disagree.

Though most were hits, a couple weren't blockbusters, financially, and one was an outright flop. Instead, I used as my criteria two main things.

First, the products had to improve ease of use and add value for average consumers. That was the guiding principle I laid down in the first sentence of my first column, in 1991: "Personal computers are just too hard to use, and it's not your fault."

Second, I chose these 12 because each changed the course of digital history by influencing the products and services that followed, or by changing the way people lived and worked. In some cases, the impact of these mass-market products is still unfolding. All of these products had predecessors, but they managed to take their categories to a new level.

Some readers will complain that Apple is overrepresented. My answer: Apple introduced more influential, breakthrough products for average consumers than any other company over the years of this column.

## 1. Newton MessagePad (1993)



This hand-held computer from Apple was a failure, even a joke, mainly because the company promised it could flawlessly recognize handwriting. It didn't. But it had one feature that foreshadowed some of today's most cutting-edge technology: an early form of artificial intelligence. You could scrawl "lunch with Linda Jones on Thursday" and it would create a calendar entry for the right time with the right person.

## 2. Netscape Navigator (1994)

The first successful consumer Web browser, it was later crushed by Microsoft's Internet Explorer. But it made the Web a reality for millions and its influence has been incalculable. Every time you go to a Web page, you are seeing the legacy of Netscape in action.

## 3. Windows 95 (1995)



Windows 95 made the mouse a mainstay for computer users. Associated Press

This was the Microsoft operating system that cemented the graphical user interface and the mouse as the way to operate a computer. While Apple's Macintosh had been using the system for a decade and cruder versions of Windows had followed, Windows 95 was much more refined and spread to a vastly larger audience than the Mac did.

#### 4. The Palm Pilot (1997)



The Palm Pilot led to one of the first smartphones, the Treo. SSPL via Getty Images

The first successful personal digital assistant, the Pilot was also the first hand-held computer to be widely adopted. It led to one of the first smartphones, the Treo, and attracted a library of third-party apps, foreshadowing today's giant app stores.

#### 5. Google



From the start, Google was faster than its predecessors.

The minute I used Google, it was obvious it was much faster and more accurate than previous search engines. It's impossible to overstate its importance, even today. In many ways, Google search propelled the entire Web.

#### 6. The iPod (2001)





Apple's iPod was the first mainstream digital media player, able to hold 1,000 songs in a device the size of a deck of playing cards. It lifted the struggling computer maker to a new level and led to the wildly successful iTunes store and a line of popular mobile devices. ([Apple Brings Design Flair To Its Digital Music Player](#) 11/1/2001)

## 7. Facebook

Just as Netscape opened the Web, Facebook made the Internet into a social medium. There were some earlier social networks. But Facebook became the social network of choice, a place where you could share everything from a photo of a sunset to the news of a birth or death with a few friends, or with hundreds of thousands. Today, over a billion people use it and it has changed the entire concept of the Internet.

## 8. Twitter (2006)



Like Facebook, Twitter changed the way people live digitally. AFP/Getty Images

Often seen as Facebook's chief competitor, Twitter is really something different—a sort of global instant-messaging system. It is used every second to alert huge audiences to everything from

revolutions to interesting Web posts, or just to offer opinions on almost anything—as long as they fit in 140 characters. Like Facebook, it has changed the way people live digitally.

## 9. The iPhone (2007)



Apple electrified the tech world with this device—the first truly smart smartphone. It is an iPod, an Internet device and a phone combined in one small gadget. Its revolutionary multi-touch user interface is gradually replacing the PC's graphical user interface on many devices.

A year after it was introduced, it was joined by the App Store, which allowed third-party developers to sell programs, or apps, for the phone. They now number about a million. It has spawned many competitors that have collectively moved the Internet from a PC-centric system to a mobile-centric one. ([BlackJack Beats Out Palm 750, but iPhone May Well Top Both](#) 1/11/2007)

## 10. Android (2008)

Google quickly jumped into the mobile world the iPhone created with this operating system that has spread to hundreds of devices using the same type of multi-touch interface. Android is now the dominant smartphone platform, with its own huge selection of apps.

While iPhones have remained relatively pricey, Android is powering much less costly phones. ([Google Answers the iPhone](#) 10/16/2008)

## 11. The MacBook Air (2008)

The late Apple co-founder [Steve Jobs](#) introduced this iconic slim, light laptop by pulling it out of a standard manila envelope. It was one of the first computers to ditch the hard disk for solid-state storage and now can be seen all over—on office desks, on campuses and at coffee shops. It spawned a raft of Windows-based light laptops called Ultrabooks. I consider it the best laptop ever made. ([Apple's MacBook Air Is Beautiful and Thin, But Omits Features](#) 1/24/2008)

## 12. The iPad (2010)

With this 10-inch tablet, Apple finally cracked the code on the long-languishing tablet category. Along with other tablets, it is gradually replacing the laptop for many uses and is popular with everyone from kids to CEOs. Developers have created nearly 500,000 apps for the iPad, far more than for any other tablet. ([Laptop Killer? Pretty Close](#) 4/1/2010)

As I sign off from this column, I want to thank The Wall Street Journal for giving me the freedom to write these reviews all these years. And I especially owe great thanks to the readers who have followed my work. I am not retiring—I will still be doing reviews on a new online site. And the Journal will continue to offer tech reviews, penned by talented successors, which will continue to guide readers as consumer technology evolves.

**IBD**

**Late Night**

by Andrew Malcolm

Letterman: Did you hear about this? Thieves stole a half-million dollars-worth of Red Bull. They're described as armed, dangerous and really ready to go.

Leno: Hundreds of world leaders gathered at Nelson Mandela's services the other day. President Obama said it was strange to hear them in person instead of on wiretaps.

Fallon: New research finds kids today can't run as fast as their parents did when young. But then, parents didn't have phones to watch while running.

Conan: A British firm creates an underwear line to make women's buttocks appear larger. Just a tip, don't ask your girlfriend if she's wearing them.

Fallon: At Nelson Mandela's service Obama came under fire for shaking hands with Cuba's Communist leader Raul Castro. People were like, "Why would you want to be seen with that guy?" Then Castro said, "I didn't! But all of a sudden he was shaking my hand!"

Conan: Scientists have found that insects can recognize human faces. So, I don't kill insects. I wound them and say, "Remember this face and warn your friends!"

Letterman: They lit up the White House Christmas tree the other day. The whole week before Joe Biden was down in the basement untangling the lights.

Letterman: Snowstorms all over the Eastern U.S.. Sad because no one can get to the unemployment office.

Conan: A cup of coffee in Russia costs the equivalent of \$8.30. In other words, they now have Starbucks in Russia.

Conan: Wonderbra recently unveiled a new product that eliminates nip-slips and side-boob. The amazing device of the future is called "a coat."

Conan: Justin Bieber's mom recently Tweeted that she would like to have another child. Unless her demands are met.

Conan: At the Nelson Mandela service President Obama flirted with Denmark's female Prime Minister right in front of Michelle. And Obama thought the flight TO South Africa was long.....

Leno: A Chinese man killed himself, jumping off a seven-story mall when his girlfriend said she wanted to visit just one more shoe store.

Leno: Kanye West says he wants to be the Obama of clothing. He's designing fashions no one wants and selling them on a website that doesn't work.

Leno: Barbara Walters names Kanye West and Kim Kardashian among the year's most fascinating people. In related news, Barbara has been named the world's most-easily fascinated person.

Conan: A Federal judge has ruled President Obama's Kenyan uncle may remain in the United States. The judge also ruled that "President Obama's Kenyan Uncle" is an amazing name for a band.

Leno: Only one government health program is having a worse roll-out than ObamaCare: Rwanda is trying to hand out 700,000 kits for self-circumcision. Low demand so far.

Leno: Edward Snowden is so angry about finishing second to Pope Francis for Time Man of the Year, that today he leaked the name of next year's Time Man of the Year.

Leno: A British study says December 11 is the day women are most likely to become pregnant. I think it's right. Eighteen NBA teams played that night.

Leno: George Zimmerman's girlfriend is dropping assault charges against him and wants to get back together. Apparently, she heard Charlie Manson is no longer available.

Fallon: More than 200,000 people have applied for a one-way trip to Mars in 2018. The next step is to weed out the candidates who are mentally unstable--from among those who want to go on a ONE-way trip to Mars.

Fallon: Obama is also facing a lot of criticism after he posed for a selfie right in the middle of Mandela's memorial service. You know it's bad when even Joe Biden was like, "Man, that was DUMB!"

Fallon: And did you see Michelle Obama while her husband was taking a selfie with the female prime minister of Denmark? Michelle did NOT look happy. Looks like somebody's gonna be sleeping by him-selfie for a while.

Letterman: President Obama was photographed taking a selfie with the prime minister of Norway or Denmark? So he knows all about cameras, but he can't run the ObamaCare website.

Conan: Bob Barker made an appearance on "The Price is Right" to celebrate his 90th birthday. Although Bob is claiming he's only 89.99.

Conan: Oprah Winfrey says she has no regrets about having no children. Oprah said, "I feel bad enough about bringing Dr. Phil into the world."

Leno: The Christmas PC police are out all over these days. One Texas school bans the Christmas tree, changed the the celebration's name to 'Winter Holiday' and the kids must call Santa's helpers 'undocumented little people.'

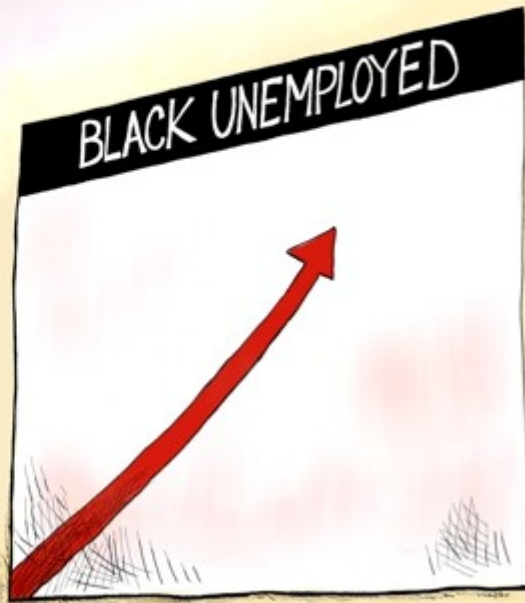
Leno: The Washington Redskins have benched quarterback Robert Griffin III. He showed great promise at first but now his play has fallen apart. President Obama said, "Tell me about it."

Fallon: Major League Baseball announces a new rule that bans intentional collisions at the plate. Or as that's ALSO known, "The only exciting thing that happens in baseball."





# A BLACK ON BLACK CRIME





Why did Karl Marx dislike Earl Grey tea?

A portrait of Karl Marx, showing him with a long, full white beard and hair, wearing a dark jacket. The background is a plain, dark brown color.

**Because all proper tea is theft.**