# 授课选文

## 14 Days With (Almost) No Internet: Did My Digital Detox Pay Off?

*Ryan Holmes*

Last year, Paul Miller made waves online when *The Verge* published his article detailing a unique personal experiment: going one full year with absolutely no internet.

Of course, at the time, what we all wanted to know was what amazing discoveries Miller had made from his 365 days offline.

As it turns out, despite a promising first few months of the experiment (during which he lost weight, took time to smell the flowers and wrote a lot of stuff), what Miller discovered in the end was that the very technology he'd begun to criticize actually had very little, if anything, to do with his life's problems. In fact, Miller realized that without the net he had started becoming even more "out of touch with life."

Last month, I went on my own digital detox. It was only two weeks, but it was the longest I've gone offline in 13 years.

Why did I do it? Throughout the last decade, I've been plugged in 24–7, living in a world where the line between digital and real gets a bit blurred at times. For a while I'd felt the urge to free myself from it all, and wanted to see what would happen then.

I haven't of course forgotten that I'm CEO of a social media company. My life's work is built around the belief that being connected makes our lives richer and more rewarding. Still, I'd forgotten one key lesson along the way: moderation. As more and more of my life was spent scanning social feeds, I realized that I needed to step back and get some perspective.

So on my winter vacation to Mexico, I took a break from being active on the internet for the entire trip. For a whole 14 days, I ate a lot of delicious seafood, surfed and fixed up my hut on the beach. I didn't go online except to check my email periodically — just to make sure an emergency wasn't unfolding while I was away.

What I learned from my short experiment was actually not too unlike what

Miller learned. I didn't end up discovering that technology is evil. In fact, I found myself reflecting on how living and breathing tech has let me experience some of the most rewarding moments of my life: I've seen world events unfold before my eyes over social networks; I've seen people using new technologies to stay in touch with their loved ones. I've also seen businesses finding new and innovative methods to connect with their clients through channels like Facebook or LinkedIn.

The irony is that by stepping away from all things digital for a while, I actually felt even more appreciative of it. After all, technology is a part of me now and it's how I interact with many of the most important people in my life; it's also made me who I am both professionally and personally.

I learned a few other lessons from my short digital detox, which — as I dive back into my connected reality — I'll make sure to remember:

Snacking is fun, but it shouldn't replace full meals. With the digital explosion has come an excess of cheap, easy, and addictive pieces of online content for us to readily snack on. No wonder it's so easy to fall into the habit of spending hours online mindlessly moving from one tasty snack to another. The funny thing is that I found I didn't miss this kind of online snacking at all during my 14 days offline. In fact, what I started to crave in the absence of snacky content was longer, thoughtful articles and good books, reading that nourishes my mind.

Numerous studies have proven that such reading can improve brain function; some have even suggested it can make you a better person. So instead of funny cat pictures, dive into some of the great "long reads" that show up on your screen — stuff that actually changes how you look at the world. Better yet, pick up a novel or read a book about a topic that can benefit you in some way, whether it's related to your job or your passions.

(703 words)

## AlphaGo: Using Machine Learning to Master the Ancient Game of Go

*Demis Hassabis*

The game of Go originated in China more than 2,500 years ago. Confucius wrote about the game, and it is considered one of the four essential arts required of any true Chinese scholar. Played by more than 40 million people worldwide, the rules of the game are simple: Players take turns to place black or white stones on a board, trying to capture the opponent's stones or surround empty space to make points of territory. The game is played primarily through intuition and feel, and because of its beauty, subtlety and intellectual depth it has captured the human imagination for centuries.

But as simple as the rules are, Go is a game of profound complexity. There are $10^{170}$ possible positions — that's more than the number of atoms in the universe, and more than a googol times larger than chess.

This complexity is what makes Go hard for computers to play, and therefore an irresistible challenge to artificial intelligence (AI) researchers, who use games as a testing ground to invent smart, flexible algorithms that can tackle problems, sometimes in ways similar to humans. The first game mastered by a computer was noughts and crosses (also known as tic-tac-toe) in 1952. Then fell checkers in 1994. In 1997 Deep Blue famously beat Garry Kasparov at chess. It's not limited to board games either — IBM's Watson bested two champions at Jeopardy in 2011, and in 2014 our own algorithms learned to play dozens of Atari games just from the raw pixel inputs. But to date, Go has thwarted AI researchers; computers still only play Go as well as amateurs.

Traditional AI methods — which construct a search tree over all possible positions — don't have a chance in Go. So when we set out to crack Go, we took a different approach. We built a system, AlphaGo, that combines an advanced tree search with deep neural networks. These neural networks take a description of the Go board as an input and process it through 12 different network layers containing millions of neuron-like connections. One neural network, the "policy network," selects the next move to play. The other neural network, the "value network," predicts the winner of the game.

We trained the neural networks on 30 million moves from games played by human experts, until it could predict the human move 57 percent of the time (the previous record before AlphaGo was 44 percent). But our goal is to beat the best human players, not just mimic them. To do this, AlphaGo learned to discover new strategies for itself, by playing thousands of games between its neural networks, and

adjusting the connections using a trial-and-error process known as reinforcement learning. Of course, all of this requires a huge amount of computing power, so we made extensive use of Google Cloud Platform.

After all that training it was time to put AlphaGo to the test. First, we held a tournament between AlphaGo and the other top programs at the forefront of computer Go. AlphaGo won all but one of its 500 games against these programs. So the next step was to invite the reigning three-time European Go champion Fan Hui — an elite professional player who has devoted his life to Go since the age of 12 — to our London office for a challenge match. In a closed-door match last October, AlphaGo won by 5 games to 0. It was the first time a computer program has ever beaten a professional Go player.

What's next? In March, AlphaGo will face its ultimate challenge: a five-game challenge match in Seoul against the legendary Lee Sedol — the top Go player in the world over the past decade.

We are thrilled to have mastered Go and thus achieved one of the grand challenges of AI. However, the most significant aspect of all this for us is that AlphaGo isn't just an "expert" system built with hand-crafted rules; instead it uses general machine learning techniques to figure out for itself how to win at Go. While games are the perfect platform for developing and testing AI algorithms quickly and efficiently, ultimately we want to apply these techniques to important real-world problems. Because the methods we've used are general-purpose, our hope is that one day they could be extended to help us address some of society's toughest and most pressing problems, from climate modeling to complex disease analysis. We're excited to see what we can use this technology to tackle next!

(752 words)

## How to Get a Job at Google

*Thomas L. Friedman*

Last June, in an interview with Adam Bryant of *The Times*, Laszlo Bock, the senior vice president of people operations for Google — i.e., the guy in charge of hiring for one of the world's most successful companies — noted that Google had determined that "GPA's are worthless as a criterion for hiring, and test scores are worthless. ... We found that they don't predict anything." He also noted that the "proportion of people without any college education at Google has increased over time" — now as high as 14 percent on some teams. At a time when many people are asking, "How's my kid gonna get a job?" I thought it would be useful to visit Google and hear how Bock would answer.

Don't get him wrong, Bock begins, "Good grades certainly don't hurt." Many jobs at Google require math, computing and coding skills, so if your good grades truly reflect skills in those areas that you can apply, it would be an advantage. But Google has its eyes on much more.

"There are five hiring attributes we have across the company," explained Bock. "If it's a technical role, we assess your coding ability, and half the roles in the company are technical roles. For every job, though, the No. 1 thing we look for is general cognitive ability, and it's not I.Q. It's learning ability. It's the ability to process on the fly. It's the ability to pull together disparate bits of information. We assess that using structured behavioral interviews that we validate to make sure they're predictive."

The second, he added, "is leadership — in particular emergent leadership as opposed to traditional leadership. Traditional leadership is, were you president of the chess club? Were you vice president of sales? How quickly did you get there? We don't care. What we care about is, when faced with a problem and you're a member of a team, do you, at the appropriate time, step in and lead. And just as critically, do you step back and stop leading, do you let someone else? Because what's critical to be an effective leader in this environment is you have to be willing to relinquish power."

What else? Humility and ownership. "It's feeling the sense of responsibility, the sense of ownership, to step in," he said, to try to solve any problem — and the humility to step back and embrace the better ideas of others. "Your end goal," explained Bock, "is what can we do together to problem-solve. I've contributed my piece, and then I step back."

And it is not just humility in creating space for others to contribute, says

Bock, it's "intellectual humility. Without humility, you are unable to learn." It is why research shows that many graduates from hotshot business schools plateau. "Successful bright people rarely experience failure, and so they don't learn how to learn from that failure," said Bock.

"They, instead, commit the fundamental attribution error, which is if something good happens, it's because I'm a genius. If something bad happens, it's because someone's an idiot or I didn't get the resources or the market moved. ... What we've seen is that the people who are the most successful here, who we want to hire, will have a fierce position. They'll argue like hell. They'll be zealots about their point of view. But then you say, 'Here's a new fact,' and they'll go, 'Oh, well, that changes things; you're right.'" You need a big ego and small ego in the same person at the same time.

The least important attribute they look for is "expertise." Said Bock: "If you take somebody who has high cognitive ability, is innately curious, willing to learn and has emergent leadership skills, and you hire them as an HR person or finance person, and they have no content knowledge, and you compare them with someone who's been doing just one thing and is a world expert, the expert will go: 'I've seen this 100 times before; here's what you do.'" Most of the time the nonexpert will come up with the same answer, added Bock, "because most of the time it's not that hard." Sure, once in a while they will mess it up, he said, but once in a while they'll also come up with an answer that is totally new. And there is huge value in that.

To sum up Bock's approach to hiring: Talent can come in so many different forms and be built in so many nontraditional ways today, hiring officers have to be alive to every one — besides brand-name colleges. Because "when you look at people who don't go to school and make their way in the world, those are exceptional human beings. And we should do everything we can to find those people." Too many colleges, he added, "don't deliver on what they promise. You generate a ton of debt, you don't learn the most useful things for your life. It's [just] an extended adolescence."

Google attracts so much talent it can afford to look beyond traditional metrics, like GPA. For most young people, though, going to college and doing well is still the best way to master the tools needed for many careers. But Bock is saying something important to them, too: Beware. Your degree is not a proxy for your ability to do any job. The world only cares about — and pays off on — what you can do with what you know (and it doesn't care how you learned it). And in an age when innovation is increasingly a group endeavor, it also cares about a lot of soft skills — leadership, humility, collaboration, adaptability and loving to learn and re-learn. This will be true no matter where you go to work.

(965 words)

## Is 30 the New 20 for Young Adults?

*Jeffrey Jensen Arnett & Elizabeth Fishel*

To a lot of us, today's twenty-somethings seem like a whole new breed. On the positive side, they're often wonderfully full of zest for life and a sense of adventure — traveling, studying abroad, moving to a new city and trying all kinds of new experiences. On the not-so-positive side, they sometimes seem to have trouble finding a direction in life, and many take longer to become independent and accept responsibilities than young people did in past decades.

Consider:

- Fifty years ago the median age of entering marriage in the U.S. was 20 for women and 22 for men; today it's 26 for women and 28 for men, and still rising.
- In 1960 only 33 percent of young people went to college; today, 69 percent of high school graduates enter college the next year.
- Women used to have few options besides wife and mother; today they exceed men in college enrollment and are equal to men in law school, medical school and business school enrollment.
- Young Americans expect a lot more out of work than their parents or grandparents did. They change jobs an average of seven times from age 20 to 29 as they search for work that is personally fulfilling, not just a job but an adventure.

Put all these changes together and the result is a new life stage: "Emerging Adulthood." This period typically runs from age 18 to 25, although it lasts through the 20s for some. Based on hundreds of research interviews, I've identified five features as typical of emerging adulthood:

**Identity Explorations.** This is a time when young people focus on figuring out who they are and what they want to do with their lives, as they try out different possibilities in love and work. Your 18-year-old may head for college with pre-med in mind, then discover a love for marine biology as a sophomore, and by age 24 have moved on to international business.

**Instability.** In the course of all these identity explorations there are many changes — in jobs, in love partners, in where they live and in plans for the future. More than any other stage of life, it is difficult to predict where they'll be and what they'll be doing from one year to the next.

**Self-Focus.** Emerging adults are focusing on their self-development and have relatively few obligations to others, so they have more freedom than people of other

ages have. You can text them, and they may text you back — or they may not. It's important to them to carve out a space where they can make their own decisions.

**Feeling In-Between.** Most emerging adults feel somewhere in between adolescence and adulthood, on the way to adulthood but not there yet. And most are in no particular hurry, although nearly all get there eventually. Adulthood means paying your own bills and taking on all sorts of responsibilities, something they regard with mixed feelings.

**Sense of Possibilities.** Most are highly optimistic about their future and believe that all doors are still potentially open to them. Even though nearly all are struggling in the present, both personally and financially, they believe that eventually they'll snag that just-right job and find their soul mate.

In many ways, the rise of this new life stage is a good thing. Why shouldn't young people take most of their twenties to try out many possible paths?

Most of them make use of the freedom of emerging adulthood to have experiences they couldn't have when they were younger and probably won't be able to have when they're older, such as teaching in China for a year, perhaps, or taking a low-paid but fascinating internship with a nonprofit organization.

But there's a downside as well. Some emerging adults feel overwhelmed by the challenges of this life stage and drift along aimlessly, waiting for something to happen rather than making it happen. Sometimes parents are surprised and dismayed to find that the emotional and financial responsibilities of parenting last for many years longer than they had anticipated.

So, what should parents do? We think it's wise to be patient with emerging adults, as long as they seem to have a Plan with a capital P and are trying to move it along. Try to put aside the timetable that applied decades ago and respect the longer road to adulthood they are traveling today. Encourage them and provide support when they seem open to it, but learn when to step back and let them make their way — including their mistakes — on their own. It's a delicate balance.

Above all, parents, it can help to realize that the winding road to adulthood is the new normal. You may be relieved to learn that nearly everyone grows out of emerging adulthood and, by about age 30, takes on the roles of young adulthood — marriage, parenthood and a stable job. Seeing emerging adulthood as a normal stage of life today can help ease our anxiety and maybe even allow us to celebrate our emerging adults' energy, optimism and appetite for life.

(852 words)

## In China, Lessons of a "Hackerspace"

*Emily Parker*

Several years ago, Peng Ziyun was at the Shanghai Conservatory of Music, studying music and technology. She learned about sound engineering and wanted to build something of her own. But she didn't know how, and she didn't have anyone to teach her. An Internet search led her to Xinchejian, China's first formal "hackerspace," a community-run workshop where ordinary people tinker with everything from art projects to robots.

Ms. Peng, now 23, wanted to make a tree that could talk. With the encouragement of others at Xinchejian, she learned to drill and solder and to work with Arduino, an open-source microcontroller board that is user-friendly. Her new skills helped her to attach sensors and colored lights to an actual tree so that it would react to human touch. The tree spoke both English and Chinese: The more you interacted with it, the more it talked, its sound growing richer and its lights flashing vividly.

Ms. Peng's work, a meditation on the relationship between nature and man, was later shown in an art gallery and spent a month on display in a mall. "It definitely changed me," Ms. Peng says of the experience. "It's given me the confidence to build things like that in the future."

Already booming in the U.S., the maker movement (or DIY, for "do it yourself") is now gaining ground in China, challenging assumptions about the country's capacity for innovation. *Make* magazine co-founder Dale Dougherty defines a maker as someone who builds, creates or hacks physical materials, whether food, clothing or gadgets. Makers often gather at hackerspaces, or makerspaces, real-world locations where they can learn and work together. There are hundreds of hackerspaces world-wide and over a dozen now in China.

Lone inventors have long tinkered in garages. But today, inventors can use software to design objects to be produced by desktop machines like 3-D printers. And thanks to the Internet, DIY is thoroughly collaborative. Rather than work on projects in secret, people freely share their ideas and designs online. Chris Anderson, former editor in chief of *Wired*, describes makers as "the Web generation creating physical things rather than just pixels on screens."

Xinchejian, founded in 2010, means "new workshop." It occupies a rented room in a Shanghai warehouse. Members pay around $16 a month to use the space and tools, and on Wednesday nights it is open to the public. The Taiwan-born David Li, a 40-year-old programmer and a co-founder of Xinchejian, wants to lower the

barriers for experimentation and play. "It's not about getting together a group of geeks doing something. It's a conduit for people to say, 'This interactive stuff is not that scary, not that difficult.'"

One of these tinkerers might develop the next groundbreaking technology, or at least that is the hope of Chinese policy makers. "Chinese industry has to change. It has to migrate to the next stage. Right now it's purely contract-based. We execute what other people design," says Benjamin Koo, an associate professor of industrial engineering at Beijing's Tsinghua University. Others wonder why China doesn't have more internationally celebrated brands or a homegrown innovator like Steve Jobs.

The Chinese government has taken an interest in the maker movement. Not long after Xinchejian opened its doors, Shanghai officials announced a plan to build 100 government-supported innovation houses. Last November, according to Mr. Li, the Communist Youth League of Shanghai helped to attract over 50,000 visitors to a Maker Carnival, where makers exhibited their creations to the public.

In the city of Shenzhen, Seeed Studio works with global makers to transform their hardware designs into prototypes and samples. Seeed specializes in the small-scale manufacturing of experimental, niche-market products. The Sichuan-born Seeed Studio founder Pan Hao, also known as Eric Pan, doesn't aim to replace big manufacturing but to complement it. "When designs go big, the traditional manufacturer will have new products to make," Mr. Pan told me. "We are providing more candidates."

Seeed Studio may be a business, but it still sees itself as a frontier in China's maker revolution. Its recruitment poster for new employees features a picture of the South American revolutionary Che Guevara, his head sprouting electronic components instead of hair. The poster calls for people to come together to "challenge the hegemony of industrialized mass production in an unprecedented way!"

Some observers see China's maker movement as yet another instance of the country's tendency to produce *shanzhai*, or copycat goods. But Mr. Pan advises patience. "China is just on the way," he said. "The first time you learn to write, you cannot write novels. You have to copy from the textbook to learn to write A, B, C, D."

For now, hackerspaces give Chinese inventors a community. Ms. Peng, the maker of the interactive tree, says that her life changed when she went to Xinchejian and realized there are "people out there that are sort of like me, they just want to build things, and learn."

(826 words)

## The Lawyer Who Became DuPont's Worst Nightmare

*Nathaniel Rich*

Rob Bilott received a call from a cattle farmer. The farmer, Wilbur Tennant of Parkersburg, W. Va., said that his cows were dying left and right. He believed that the DuPont chemical company, which until recently operated a site in Parkersburg, was responsible. Tennant had tried to seek help locally, but DuPont just about owned the entire town. He had been spurned not only by Parkersburg's lawyers but also by its politicians, journalists, doctors and veterinarians. He reached out to Bilott because he knew the latter's grandmother.

He did not understand, however, that Bilott was not the right kind of environmental lawyer. Bilott worked almost exclusively for large corporate clients. His specialty was defending chemical companies. Several times, Bilott had even worked on cases with DuPont lawyers. Nevertheless, as a favor to his grandmother, he agreed to meet the farmer.

During the meeting, Wilbur Tennant explained that he and his four siblings had run the cattle farm since their father abandoned them as children. In the early '80s, his brother Jim sold 66 acres to DuPont, which wanted a landfill for waste from its factory near Parkersburg.

DuPont named the plot Dry Run Landfill after the creek that ran through it. The same creek flowed down to a pasture where the Tennants grazed their cows. Not long after the sale, the cattle began to act deranged.

Tennant showed Bilott photographs of cows with stringy tails, malformed hooves and red, receded eyes; cows suffering constant diarrhea, staggering bowlegged like drunks.

Bilott decided right away to take the Tennant case. It was, to him, the right thing to do.

Bilott filed a federal suit against DuPont in the summer of 1999 in the Southern District of West Virginia. In response, DuPont and the E.P.A. commissioned a study of the property. Their report did not find DuPont responsible for the cattle's health problems. The culprit, instead, was "poor nutrition, inadequate veterinary care and lack of fly control." In other words, the Tennants didn't know how to raise cattle; if the cows were dying, it was their own fault.

Bilott stumbled upon a letter DuPont had sent to the E.P.A. that mentioned a substance at the landfill with a cryptic name: "PFOA." He hunted through references and learned that it was short for perfluorooctanoic acid. But besides that, he could find nothing. He asked DuPont to share all documentation related to the substance; DuPont refused. In the fall of 2000, Bilott requested a court order to force them. The

order was granted. Dozens of boxes containing thousands of unorganized documents began to arrive at Bilott's office. There were more than 110,000 pages in all, some half a century old. Bilott spent the next few months on the floor of his office, poring over the documents and arranging them in chronological order.

He began to see a story.

The story began in 1951, when DuPont started purchasing PFOA from 3M for use in the manufacturing of Teflon. Though PFOA was not classified by the government as a hazardous substance, 3M sent DuPont recommendations on how to dispose of it. It was to be incinerated or sent to chemical-waste facilities, not to be flushed into surface water or sewers. But over the decades that followed, DuPont pumped hundreds of thousands of pounds of PFOA powder through the outfall pipes of its factory into the river.

In 1984, DuPont became aware that dust vented from factory chimneys settled well beyond the property line and, more disturbing, that PFOA was present in the local water supply. DuPont declined to disclose this finding.

By the '90s, DuPont understood that PFOA caused cancerous tumors in lab animals. It decided against disusing PFOA. The risk was too great: Products manufactured with PFOA were an important part of DuPont's business, worth $1 billion in annual profit.

In August 2000, Bilott called DuPont and explained that he knew what was going on. It was a brief conversation.

The Tennants settled. Bilott would receive a contingency fee. The whole business might have ended right there. But Bilott was not satisfied.

He spent the following months drafting a public brief against DuPont. It was 972 pages long, including 136 attached exhibits. He demanded immediate action to regulate PFOA and provide clean water to those living near the factory. DuPont reacted quickly, requesting a gag order to block Bilott from providing the information he had discovered in the Tennant case to the government. A federal court denied it. Bilott sent his entire case file to the E.P.A.

The letter led, four years later, in 2005, to DuPont's reaching a $16.5 million settlement with the E.P.A., which had accused the company of concealing its knowledge of PFOA's toxicity and presence in the environment in violation of the Toxic Substances Control Act. DuPont ceased production and use of PFOA in 2013.

The next step was to file lawsuits against DuPont on behalf of everyone whose water was tainted by PFOA. As of October, 2015, 3,535 plaintiffs had done so. At the rate of four trials a year, DuPont would continue to fight PFOA cases until the year 2890.

Bilott never represented a corporate client again.

(866 words)

## We Explore the Deep Sea, We Are Exploring for Our Own Survival

*Dr. Greg Stone*

In 1953, on the heels of a discovery of a second coelacanth specimen in the Comoros Islands off Madagascar's coast, J.L.B. Smith, the man who described the species, wrote in the *Times* of London: "We have in the past assumed that we have mastery not only of the land but of the sea... We have not. Life goes on there just as it did from the beginning. Man's influence is as yet but a passing shadow. This discovery means that we may find other fishlike creatures, supposedly extinct, still living in the sea."

Unlike the coelacanth, which was thought to have gone extinct, we have known for centuries that giant squid have existed in our oceans' depths. But unable to observe them alive in their deep sea home, we have understood very little about how they live, where they live and how they behave.

That is, until 2012, when Drs. Edith Widder, Steve O'Shea and Tsunemi Kobodera filmed the elusive and mysterious giant in its natural deep-sea habitat for the first time — a landmark moment in ocean exploration and an example of how technology and ingenuity can overcome the monumental challenges we face in exploring the deep. But it is a drop in the vast ocean-sized bucket of amazing discoveries waiting to be found.

As a scientist, I want to explore the great wonders our ocean has to offer. As a conservationist, I need to explore the vital human-ocean connection: how the ocean can provide for people and how our impacts affect the health of our oceans. This is critically important for us this century. Our population is rapidly growing toward 9 billion people and our demand for food, fresh water and energy is predicted to double.

Healthy oceans can help ease the increasing burden our population is placing on this planet, but we need to be able to explore, observe and learn about the oceans in their entirety in order to protect and conserve them effectively.

I am no stranger to deep-sea exploration. In fact, I was on the same research vessel, just before the filming of the squid, making a documentary that would later become the Shark Week program Alien Sharks of the Deep. We sank a whale carcass, which had died from apparently natural causes and washed up on shore, 2,000 feet below the Sea of Japan and then descended in submersibles to observe the ensuing feeding frenzy by an array of creatures.

Although we did not get to film the giant squid or observe any species new to science, we did manage to film an important and often overlooked part of the

ocean life cycle. When animals in the ocean, particularly large ones like whales, die and sink to the bottom, they create their own micro-ecosystem, sort of like an oasis in the desert. Hagfish, deep sea isopods and the large and powerful six-gill shark all showed up to feed on the buffet we had set on the sea floor.

Making these kinds of observations is incredibly important to understanding how the ocean works. Think of it like an antique watch. As long as it keeps ticking, you will know what time it is. What happens if it is not keeping accurate time or it stops? You can't understand what the problem is by just looking. You have to crack it open and when you do, you find an intricate and complicated system of gears designed to make this machine function. Unfortunately, getting inside every part of the ocean is not as simple as opening a watch.

The deep sea is the most hostile environment on Earth. Reaching it requires the same kind of methods, technology and expertise required for exploring space. Yet despite the similarity in how we employ technology to explore both the ocean and space, there is a great disparity between the amount of funding put toward space exploration and ocean exploration. The result? We have better maps of the surface of Mars than we do of our own planet's sea floor.

There are no doubt countless discoveries to be made under the surface of the sea, whether they are species we know to exist but have yet to observe in their own habitat, species new to science or those species thought long extinct.

All of these types of findings fit together in a jigsaw puzzle that, as it reaches completion, reveals to us how people fit into the picture and how we can best manage, conserve and protect the oceans for our own benefit.

It is imperative that we keep pushing the limits of our ocean. We will not find megalodon, but we might find the key to our survival on Earth.

(795 words)

## Why Do Friendships End?

*Allison Hunter*

The only danger in Friendship is that it will end.

— Henry David Thoreau

I received an email from a reader who asked, "Why do some friendships end, no matter how much you want them to last?" She referred to having seen the question in one of my articles, "Mystery of Friendship". As I wrote in it, I don't think easy answers exist as to how friendships start, why some turn into lifetime ones, and why some end. Although I've tried answering the first two questions in other articles ("To Have a Friend" and "Be a Friend"), I still get surprised by friendships that endure and disillusioned by ones that slip away. Even so, I'll try to offer some insights here as to why friendships end.

My simple answer is that friendships end because the situations friends are in or even the friends themselves change. Others have similar answers. First, the situations friends face may change. The decision to relocate for a new school or job can't help but affect a friendship. Likewise, if a friend is in an accident, develops an illness, or loses someone close, these situations can't help but affect a friendship. Does a friendship need to end because of these changes? No, but it'll require adjustments that one or both friends might not be willing to make.

Second, the friends themselves may change. A significant reason that friendships often end when friends are apart for an extended period of time (for summer camp, college, etc.) is that one or both of the friends change. I think it hurts less when both friends change, because then the breakup is more often mutual and so both friends get closure by both deciding to let go and move forward in their lives without each other. What tends to hurt most is when just one friend changes. One friend might change social circles, become involved in new social organizations, start to date, get a pet, or take on some other venture that consumes more time and passion. Again, a friendship can endure these changes, unless one or both of the friends for some reason decide not to invest the time and energy involved in the adjustment period. (For example, one friend might forget the importance of the friendship due to the high of having a new pet or might feel that the change is impossible to overcome when one gets married but the other is still single.) In this situation, breakups may not be mutual and so one or both friends feel betrayed and end up with bitter memories about what was a precious friendship to them.

There are other reasons why friendships end. For example, as much as two people might want a friendship to survive, one or both of them might unintentionally neglect it. Friendship is often compared to a flower garden. Well, if flowers don't get exposed regularly enough to sunlight and don't get watered enough, flowers will wither and even die. The same applies to friendship. If week after week passes where plans are made to spend time together but are never honored, perhaps due to taking a friendship for granted, eventually even the closest of friendships may cease to have a reason to exist.

Conflicts can also cause the end of friendships. If the flower is a fledging plant, one blow might destroy it just as sometimes relatively young friendships aren't strong enough to endure much conflict. Even those amazing close friendships, where friends love us no matter what our faults are, need care when it comes to conflicts. Sure, if a flourishing flower gets stepped on, it might revive on its own. Moreover, if it gets a little extra special care, it'll probably bounce back as if it hadn't ever been injured. At the same time, if a flower gets repeatedly trampled on, it'll probably eventually break. Especially the friendships that have been around for a long time can endure storms, and even become stronger for them, but most friendships have breaking points.

Okay, we know that friendships can end for many reasons, but now what? Can we change their course and turn them into friendships that last?

(699 words)