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Alohamora! Unlocking Magic with the Wonders of Science

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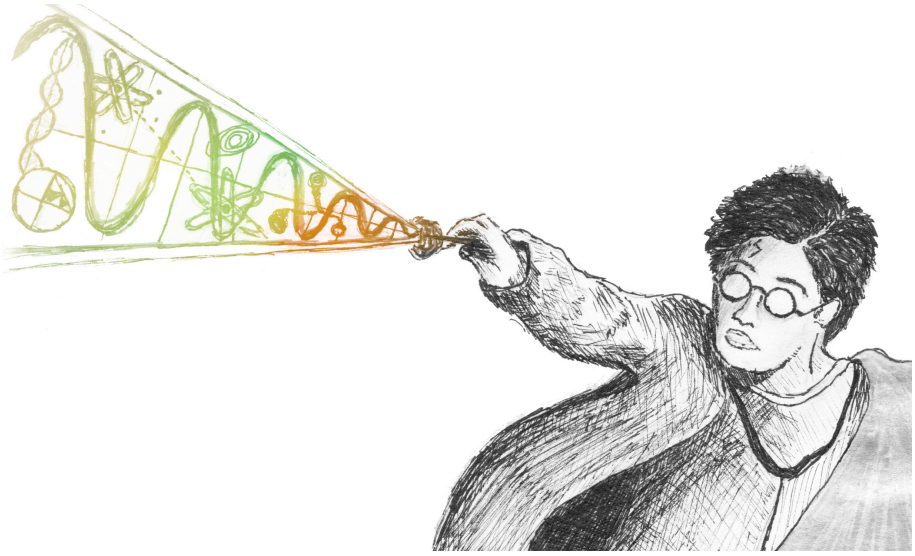


Jessica Lam

By Anna Dardick

Still waiting on your Hogwarts letter? Fear not, for as technology advances, one thing becomes clear: science is the new magic. Whereas miraculous and devastating events, from earthquakes to hallucinations, used to be ascribed to supernatural forces, science can now explain it all (or at least try). In a modern world, science is not only our method of explanation but also our way of creation. Engineers are developing new transport mechanisms reminiscent of Apparition, time-turners, and the Weasley family's Ford Anglia. You might even find yourself able to track the locations of your friends and family by glancing at a Weasley-esque magic clock. Those Obies who wish to sneak into Mudd late at night could utilize an upcoming military-grade invisibility cloak. After educational midnight sojourns leave you inundated with new knowledge (perhaps gleaned from talking newspapers with flexible LCD screens), you may not be able to shed unnecessary information into a Pensieve, but you will be able to catalogue your memories. We can only hope that Oberlin becomes the new Hogwarts, but until then, we'll have to make do with what Muggles do best — science.

Second-years Harry and Ron would have been lost without the Weasleys' trusty, retrofitted, flying Ford Anglia. Luckily for us, there are several models of flying cars that are due to hit the skies within the next five years. Believe it or not — (and the engineers among us might be a little skeptical), Woody Norris's "Air Scooter," funded by an MIT invention prize, can fly for two hours at 55mph and go up to 10,000 feet above sea level. Air Scooters will sell for the low price of $50,000; so, Oberlin students, graduate early and use the extra money to snag one for yourselves! The availability date of the whole machine is a mystery, but the engine is currently being sold separately. Alternatively, the company Terrafugia gained approval from the Federal Aviation Adminitration earlier this year for The Transition®, a vehicle that will coast down the roads and up the skies. It is allegedly less than a year away from being commercially available, but it carries the hefty price tag of $194,000. Other models for flying vehicles follow a helicopter model, like the CarterCopter, which takes off and lands like a helicopter but flies as fast as a commercial jet. It is unlikely that the CarterCopter will enter the market anytime soon, but when it does, eager consumers will shell out $300,000. The bottom line: the technology is appealing but the cost is (as expected) ponderous. It might be easier and cheaper to hire Arthur Weasley to update your currently-owned car.

Unfortunately, Apparation is a far less likely potential mode of transportation. Teleportation (as the Muggles call it) has only been achieved at the level of an atom. Although the term "teleportation" suggests the physical movement of a particle, it actually refers to the transfer of information about the particle from one place to another. Within the last three decades, experimental physicists have proven that a particle vibrating in unison with a second, very distant particle can pass on information to the latter particle seemingly at the speed of light. The two particles are connected by "Schrödinger waves", so that any change to one of them will almost immediately affect the other. Expanding upon this idea, what if large groupings of particles (like humans) could be linked? There is a pressing concern: to do this, the person would have to be frozen at nearly 0 Kelvin, -273° C, or absolute zero, which would undoubtedly kill them. In fact, physicists have theorized that any act of teleportation would kill the original copy of the person involved, though they would be "reborn" at the other end.

Wormholes, as popularized by Sci-fi television shows, movies, and literature, could work for both teleportation and time travel. However, they are also unfeasible because a traversable wormhole (one that you can enter and leave) requires something to hold it open, much like a column holds up the roof of a building. The "column" would be composed of negative mass and negative energy, neither of which have ever been observed. Additionally, even if negative mass existed, it would be nowhere near Earth because it is repelled by gravity. The amount needed to keep a wormhole open for 1ms would be the negative mass of one Jupiter, which at this point is considered to be impossible. Until these issues are overcome, time travel by wormhole is unattainable.

Scientists are much closer to recreating the invisibility cloak, though it will be

used mainly for cloaking tanks and other military pursuits. Electricity is applied to heat carbon nanotubes quickly, which then transfer the heat to the surrounding area. The concentrated heat causes light rays to bend away from the nanotubes (and the object cloaked behind it), effectively making the object invisible. The high temperatures and energy involved make this device impractical for personal cloaking, but engineers are currently developing other methods that utilize more flexible polymers.

While engineers focus on flying cars, wormholes, and invisibility cloaks, researchers in informatics, the science of information, are discovering ways to categorize and present personal information that are similar to those used by witches and wizards of the *Harry Potter* series. One man, Alan Parekh, developed a way to synthesize Twitter feeds from his family members into a "magical clock" that would inform him of their locations. A unique idea, if slightly creepy.

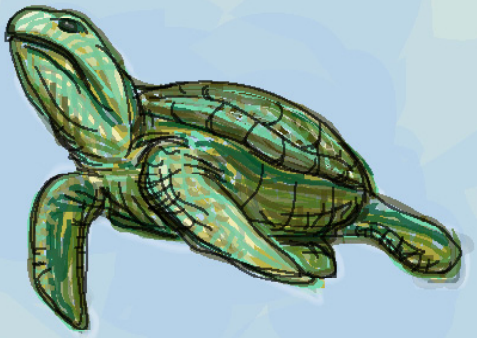
If you're looking for a Pensieve, IBM research lab is formulating a Personal Memory Organizer that would store images, sounds, and text along with the contexts, locations, and people involved. You would not be able to relieve yourself of burdensome memories, but you would be able to search within them to "remember" events — even that Safer Sex Night freshman year that you would rather forget.

And finally, something that will actually hit newsstands within the next year — color e-paper with flexible LCD screens from LG, so that everyone from politicians to pop stars will be able to talk at you from within the folds of magazines. Of course, the technology will first be used for advertisements, but at least they can be avoided by the turn of a page.

We live in what has been called the "Age of Information." This means that researchers are constantly discovering and inventing new technologies, including some that mimic magical devices. Although hopes are wearing thin for wormholes through space and time, remember that industrial robots, microwaves ovens, and the internet were all invented in the last 50 years and changed human existence. The rate at which new technologies are being developed is growing exponentialy, building on the concepts of preceding discoveries and creations. Maybe the next 50 years of research and innovation will bring a little more magic into our lives, whether or not that Hogwarts letter ever arrives.

IN SEARCH OF SHELL SPACE

A Look at a Unique Sea Turtle Nesting Behavior



Stella Rosen

By Mia Dawson

By the fourth or fifth day, it's only the weak and the maimed turtles that return, effortfully hauling themselves from the ocean. Turtles that have lost limbs to predators and boating accidents struggle futilely to dig out nests for their eggs. It's an urgent task — a turtle preparing to nest is so filled with eggs that her internal organs must make significant adjustments. But these devoted animals are slow to accept their limits, and will keep trying to build sound and secure nests. It's the tail end of the arribada, and the healthy females have already laid their eggs and disappeared back into the ocean's immensity. According to Dr. Peter Pritchard, a leading turtle biologist, the final days of the arribada are a strange end to an altogether strange phenomenon.

For the majority of the world's sea turtles, nesting is a solitary event. But some groups of Kemp's ridley and olive ridley turtles, especially around India and Central America, participate in mass emergences in which females come to nest simultaneously on the same beach. The numbers can be immense — tens of thousands of turtles will emerge on a peak night of a larger arribada. It's a mysterious process, and two questions still puzzle sea turtle biologists: How do the turtles coordinate such large-scale group activity? And why do they do it at all?

Each arribada has its own culture. Olive ridleys generally nest by night, Kemp's ridleys by day. Some arribadas correspond with the phase of the moon, others with wind patterns and rain conditions. According to Pritchard, the behavior must have evolved independently in the different groups to exhibit such variance. However, there is a uniting feature that could explain the coordination of the arribada. The answer may lie in the Rathke's gland, a secretory gland located on the ridge between the carapace (top shell) and the plastron (bottom shell plate). The Rathke's gland has been found to be larger in species of turtles which nest in arribadas when than in species which don't. While the function of this gland is still unknown, there is strong evidence that points towards its role in arribada formation. In a study conducted in Costa Rica, waxy plugs with the consistency of lard were found in the Rathke's glands of turtles before an arribada. These plugs were absent after its completion. Since they break down and quickly disperse across the ocean's surface, researchers speculate that this hormonal communication, in conjunction with sensory signals, could be crucial to group formation.

The mysterious "why?" of the arribada still persists. It does not seem to serve a social function, as the females disperse randomly between nesting periods. Additionally, some arribadas are downright destructive. A large enough mass of turtles can result in the loss of up to 50% of the eggs, as females inadvertently destroy the nests of others. Most likely, the arribada evolved to combat predation. On a small scale, group nesting is favorable to hatchling survival because of predator saturation; predators can easily locate single, disparate nests, but with larger numbers of nests there is an over-abundance of prey, and therefore a limit to the amount of damage predators can cause. Perhaps this is an example of a behavior which has evolved beyond the limits of sensible design. A phenomenon that originally evolved to combat predation may have developed to an unreasonable extreme, posing even graver threats.

Interestingly, there are few historical records of arribada nesting at the sites where they occur today. Each individual arribada may be fleeting, increasing in scope until it collapses under its own weight, but on the larger scale the arribada is here to stay. The behavior is deeply ingrained and the methods of group formation are sophisticated. As long as the Ridleys survive in stable numbers, they will continue to grace beaches with their strange processions.