

THE WARBLER

AN EDUCATIONAL WEEKLY



Dear Student, Artist, Thinker,

Some of you might remember Professor Bondy. She taught drawing with APAEP. I remember writing a memo to the ADOC to get a “boom-box” (we are dating the self by using that term, right?) and music CDs approved for Elmore. Professor Bondy brought in an Oliver Schroer CD (he was a fiddler, composer and producer). She handed out paper in class, pieces of vine and heavy dense charcoal, pressed play, and said, “draw the sound.”

We know what the five senses are. That was consistently schooled into us, right? But, what was not necessarily introduced was how to challenge how we interact with senses, how we are given a certain paradigm for what the senses are, and then that is it, no questioning, no pushing the idea. In Alabama, we know that rain on a July day has a smell. I wonder if that smell is different in Utah? What if we started questioning all kinds of relationships with the senses? What if we moved beyond the sight understanding of a cucumber and the taste understanding of a cucumber, and asked, “what does a cucumber sound like?” Once you get over the “you weirdo, they can’t have a sound ... ask a gardener what they sound like with a caterpillar inside. Can the stars have a smell? What does peach pie feel like? If you are like me, you are concerned with what the peach pie tastes like. But what happens when we challenge ourselves with thinking about peaches in terms of other senses? We may not know something for certain, but we can imagine it. And that imagination is the fruit of creativity, it is the seed that elicits a memory from childhood with a favorite grandfather who took you to pick peaches, or a first memory of eating a peach with the skin on. And all the sudden we are flooded — with senses, with the vastness of emotions, with our own humanness.

When I teach introductory poetry classes, we consistently focus on how to bring the reader in, to see what you see, to feel what you feel, to understand like you do. This process is rooted in our senses, which cannot be cleaved from our memory. It is our history. It is us.

My challenge to you this week: draw the sound. If you were to make the shape and movement of joy, what would it be? Don’t draw the literal representation, draw the idea as expressed in lines moving across pages, what would you find? If you were to draw the emotion of a favorite church hymn, without drawing an identifiable object, what would it look like? How would the lines move on the page?

Be bold in empowering your imagination to step wide into the world.

Kyes Stevens and the APAEP Team

“For ourselves, who are ordinary men and women, let us return thanks to Nature for her bounty by using every one of the senses she has given us.”

WORDS INSIDE

FROM “THE WEIRDEST”...

oscillating | move or swing back and forth at a regular speed; waver between extremes of opinion, action, or quality; vary in magnitude or position in a regular manner around a central point.

cavitation | the formation of an empty space within a solid object or body; the formation of bubbles in a liquid, typically by the movement of a propeller through it.

phlebotomist | the nurse or person who creates a surgical opening or puncture of a vein in order to withdraw blood or introduce a fluid.

FROM “THE FUTURE” ...

cochlear | relating to the spiral cavity of the inner ear containing the organ of Corti, which produces nerve impulses in response to sound vibrations.

prosthetic | denoting an artificial body part, such as a limb, a heart, or a breast implant.

biohackers | persons engaging in the activity of exploiting genetic material experimentally without regard to accepted ethical standards.



VIRGINIA WOOLF // English writer



SCIENCE

The Five Human Senses and Beyond

INFORMATION BY SAMUEL KINUTHIA | *Did You Know* | December 2017 + COLTON KRUSE | Ripleys.com | January 2018

The five senses ...

SIGHT | Sight manifests when light enters the eyes and travels through its special features like the pupil, lens, and the retina to the special receptors in the brain via the optic nerve. The brain then interprets the images and sends the information back to the eyes. Light travels at a high speed and the eyes receive it and transmit it to the brain equally fast.

HEARING | Sound is detected by the ear through vibrations that enter the ear canal and vibrate the eardrum. The vibrations then extend to the inner ear through special bones called the hammer, anvil, and stirrup, which further transmit the information to the brain. The brain then advises on what one has heard--hooting, screaming, music, and so on.

TOUCH | The skin detects temperature, pressure, and pain through its many receptors and transmits the impulses through the peripheral nervous system to the central nervous system and the brain. The brain then interprets this information to determine what one is feeling.

SMELL | The olfactory receptors in the nose detect scents and chemicals in the air. These scents travel directly to the olfactory cortex of the brain. The brain, on interpretation and sending back the information, enables one to recognize these odors.

TASTE | The tongue detects tastes (salty, sweet, sour, and bitter) by using tastebuds to differentiate between chemicals and minerals in food. Using these tastes, the body is able to distinguish nutritious from harmful substances.

... And beyond

VESTIBULAR SENSE | How do you know which direction is down? Why is a rollercoaster exciting? Our sense of balance relies on sensory organs known as vestibules. Located in the inner ear, three canals monitor movement via small sensory hairs. As these hairs are stimulated, they send messages to the brain conveying the direction of movement. Our sense of gravity comes from the movement of sacs next to the cochlea. These sacs contain millions of tiny crystals which stimulate small hairs signaling position. Damage or overstimulation of the vestibular system is what causes vertigo and car-sickness.

KINESTHETIC SENSE | Close your eyes and touch your finger to your nose. You just used your kinesthetic sense. Kinesthesia or proprioception is your ability to sense your

bodyparts in relation to each other. It's a sense controlled by the parietal cortex—the portion of the brain responsible for movement and touch—that combines with our sense of touch and balance to allow us to move with precise coordination. Damage to this sense can hinder bodily movement and even cause people to lose the ability to sense 3-D objects via touch. This sense is easily impaired by alcohol and is famously tested by law enforcement officers as part of sobriety tests.

THERMORECEPTION | Feelings of heat have nothing to do with touch. You may be able to feel a warm mug of coffee while touching it, but you can also sense radiant heat. These signals are captured by heat receptors in your skin and passed on to the brain. These receptors sense changes in temperatures. Many chemicals can affect or even trick this sense, making ice or liquor burn. This sense combines with touch for us to sense something as wet. The soft feeling of a liquid paired with a cooling in temperatures is added up in our brain to mean moisture or water.

PAIN | Though pain and damage can be perceived by our senses of touch and kinesthesia, we also have specific receptors dedicated to sending pain responses to the brain. Important for self-preservation, this sense covers our skin along with much of our internal organs. This sense fires whether activated by physical, thermal, or chemical pain. Many things can be used to manipulate this sense, and it is often intentionally disabled by physicians. The most direct way to disable this sense is to cut off its pathway to the spinal cord and brain, which is what anesthesia does.

INTEROCEPTION | What makes you hungry or have to pee? Interoception is any sense felt by special receptors inside your body. Scientists still aren't sure how every aspect works, but scores of stretch-sensing and chemoreceptors signal all sorts of bodily conditions to the brain. Our internal sensations have even been linked to how we feel emotions—lumps in our throats, butterflies in our stomachs. Beyond those, our brain makes thousands of subconscious adjustments based on feedback from our internal organs.

VIRTUAL SENSES | Beyond the dedicated sensory systems we have, our brain combines them in ways that allow us to perceive all manner of other virtual stimuli, including the passage of time, fear, and all manner of decision-based chemical reactions in the brain. ●



WHAT HAS **EYES** BUT CANNOT SEE?

WHAT HAS A **MOUTH** BUT CANNOT SPEAK?

WHAT HAS **HANDS** BUT CANNOT TOUCH?

The Mind of Rob Hitt

Edited for space.

NATURE

The Weirdest Senses Animals Have That You Don't

BY BRENDAN COLE | *Wired.com* | June 2016

People like to imagine that they're the pinnacle of evolution, but the animal kingdom suggests otherwise. Here are just a few animals with senses sharper than yours.

Bumblebees | Bumblebees rely on many things to find those roses in your garden, including voltage. They accumulate a small positive charge as they fly, and flowers have a negative charge just by sitting there. Mechanosensory hairs on a bee's legs respond to the attraction between these opposite charges, guiding them to a bloom. A flower's charge changes once a bee stops by, something their sisters pick up on so they know to move along to the next one.

Sharks | Beyond being among the most skillful predators on the planet, sharks possess the best biological conductor of electricity yet discovered. It's called Lorenzini jelly, and it fills a network of pores all around the shark's face. As *Jaws* swims toward lunch, the jelly detects minute differences between the electrical charge of the animal and the water around it. It's like a homing device that guides the shark right to a meal, even in the darkest, murkiest water.

Octopuses | The skin of an octopus has patterns that are entirely invisible to human eyes because they're hidden in light's polarization — the direction (up and down or side-to-side) that light waves oscillate as they travel. The world usually doesn't look too different through polarized sunglasses, which only show you light oscillating in one direction, because human eyes can't tell the difference between the two. But photoreceptors in octopuses' eyes can differentiate between them, revealing those subtle patterns that people can't see without special cameras.

Mantis shrimp | Mantis shrimp are famous for striking prey so hard that the water around them gets as hot as the sun. It's a cool trick called cavitation, but it's not their only superpower. Light's polarization can also rotate clockwise or counterclockwise, giving it what's called a circular polarization. Mantis shrimp have patterns in this circularly polarized light that are invisible to every animal on Earth — except for other mantis shrimp. To facilitate signaling and mating, their eyes have evolved filters that can distinguish between the two circular polarizations.

Vampire bats | Everyone hates a phlebotomist who keeps poking away in search of a vein. Vampire bats avoid this by sniffing out veins using the same TRPV1 proteins that tell you that your tea is scalding hot. Instead of alerting them to danger, these proteins — concentrated in a bat's nose — tell them when they're above skin warmer than about 86 degrees, where there's a big, juicy blood vessel hiding underneath.

Pit vipers | Pit vipers have night-vision goggles built into their faces. One of their namesake pits resides below each nostril, and these pits act like a pair of eyes that only see infrared light, which we feel as heat. So they distinguish temperatures instead of colors. Though the pits aren't focused well enough for the snake to pinpoint prey without visual help, they're so sensitive that they can notice temperature variations of as little as a thousandth of a degree.

Elephants | Elephants communicate in all sorts of wonderful ways. They trumpet, of course, and flap their ears and rumble at frequencies so low you might feel it, but never hear it. Cooler still, their feet and trunks are sensitive enough to pick up vibrations created by elephants as far as 10 miles away. These messages convey more than the presence of food or danger, too. Elephants can tell if the stomper is a friend or a stranger, and use subtle differences in what each foot feels to triangulate the source.

Roundworms | Even the lowly roundworm needs to know which way is up as it shimmies through dead plants or squirms in a petri dish. These creatures, just a millimeter long, rely on a single nerve that detects Earth's magnetic field and orients them accordingly. Although roundworms are among the most exhaustively studied species, no one realized this about them until last year, when scientists in Texas discovered their worms from Australia burrowing in the wrong direction.

Honeybees | Bees are another animal that can detect the Earth's magnetic field, but unlike birds and other creatures with this ability, no one is quite sure how they do it. The leading theory is a magnetic mineral called magnetite lining cells in the bees' abdomens creates something akin to a compass telling them which way is north. But others think that sunlight sets off a chemical reaction in the bees whose products are affected by magnetic fields. ●



"Smell is a potent wizard that transports you across thousands of miles and all the years you have lived. The odors of fruits waft me to my southern home, to my childhood frolics in the peach orchard. Other odors, instantaneous and fleeting, cause my heart to dilate joyously or contract with remembered grief. Even as I think of smells, my nose is full of scents that start awake sweet memories of summers gone and ripening fields far away."

HELEN KELLER //
American author,
political activist,
and lecturer

✎ Edited
for space.

MATHEMATICS

Sudoku

#25 PUZZLE NO. 8269746

			8			2		1
			2		7		3	
2				5				9
7		9	6		3			
	4					1		
5						7		
		7		6				
	6	1		9				
		5		8		6	4	

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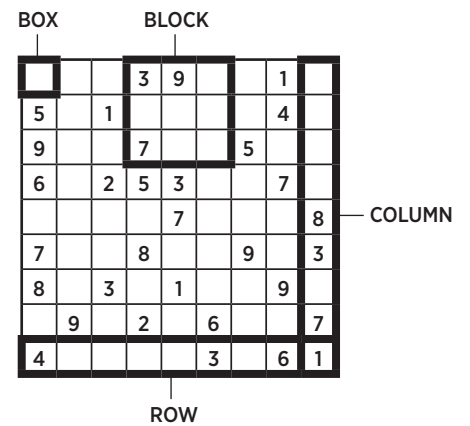
#26 PUZZLE NO. 2958638

	8					1		7
		9		1	4		3	
					7		6	
		3			8			
			2					
		1						4
5				4				
1			6			8		
	4					2	5	6

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SUDOKU HOW-TO GUIDE

1. Each block, row, and column must contain the numbers 1-9.
2. Sudoku is a game of logic and reasoning, so you should not need to guess.
3. Don't repeat numbers within each block, row, or column.
4. Use the process of elimination to figure out the correct placement of numbers in each box.
5. The answers appear on the last page of this newsletter.



What the example will look like solved

2	4	8	3	9	5	7	1	6
5	7	1	6	2	8	3	4	9
9	3	6	7	4	1	5	8	2
6	8	2	5	3	9	1	7	4
3	5	9	1	7	4	6	2	8
7	1	4	8	6	2	9	5	3
8	6	3	4	1	7	2	9	5
1	9	5	2	8	6	4	3	7
4	2	7	9	5	3	8	6	1



“...just because you see something, it doesn't mean to say it's there. And if you don't see something, it doesn't mean to say it's not there. It's only what your senses bring to your attention.”

DOUGLAS ADAMS // English writer

Icons from the Noun Project

DID YOU KNOW?

Snakes hear from their jawbones! No, really. Their inner ears are connected to their jawbones, so vibrations travel from the jawbones to the ear before being processed.

Crickets hear using organs called tympanum on their front legs.

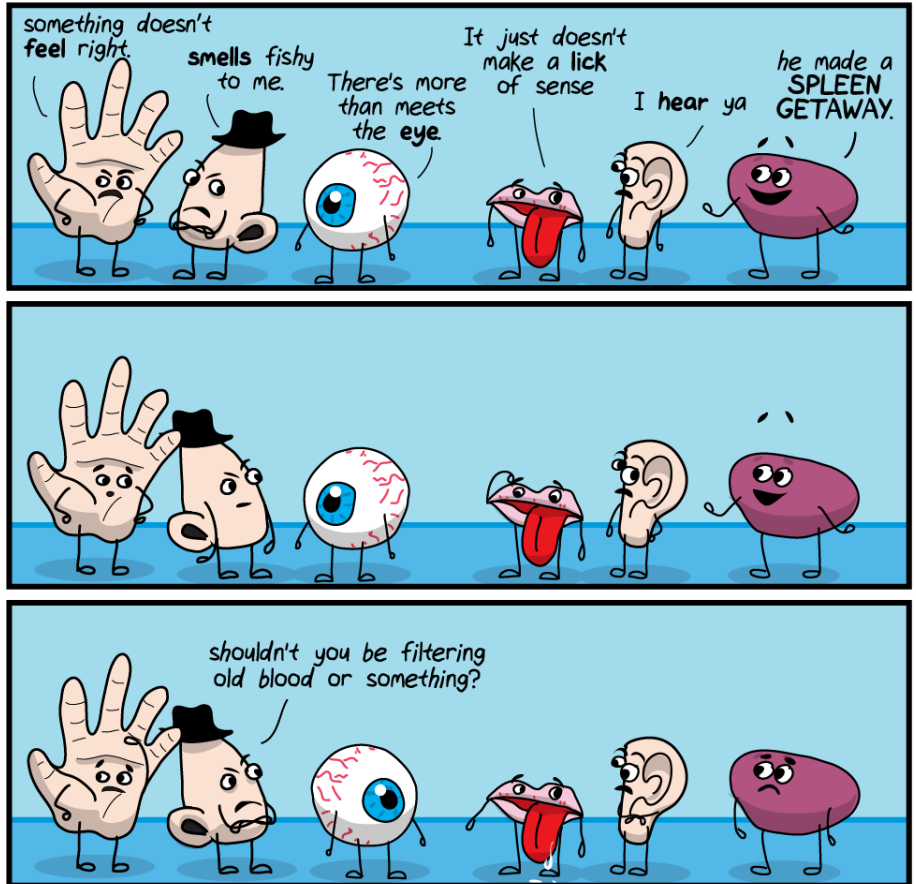
Human eyes are made of over two million working parts.

People blink 15 times per minute on average.

Grasshoppers have hairs all over the outside of their bodies to detect air movement.

Whiskers are used by animals for tactile sensing for a number of survival purposes, including navigation, detecting water currents, and texture discrimination. Research is still ongoing to determine even more purposes for whiskers.

the Sixth Sense



theAwkwardYeti.com

Idiom

“Can’t see the forest for the trees”

Meaning By focusing on detail you lose perspective and miss what is important. Even though the forest is technically the trees, this refers to being too close to the problem to see the solution.

Origin If someone ‘can’t see the wood for the trees’ (or in American English, ‘Can’t see the forest for the trees’) it means that they are so involved and concerned with all the small details (the trees) of a situation that they are unable to get a clear overview of the whole situation (the wood) and so often lose perspective and miss the most important point.

This proverbial saying is first found in Sir Thomas More’s *Confutation of Tyndals Answer*, 1533, in which More argued the case against the English cleric Robert Barnes, who he considered to be a heretic:

[Modern translation] He might tell us that of Paul’s Church we may well see the stones, but we cannot see the church. And then we may well tell him again that he cannot see the wood for the trees.

John Heywood included the saying in his 1546 glossary proverbs. Heywood’s meaning is that, by having so many good things, people can miss the fact that life as a whole is good. In more recent times people might be advised not to worry about detail when life in general is good by being told that their concerns are “First-world problems” or, in Australia, they might be told “Don’t sweat the small stuff.”

Source: “7 Everyday English Idioms and Where They Come From” by Kate Lohnes. *Britannica*.



THE CATFISH HAS ABOUT **100,000 TASTE BUDS** (THE AVERAGE HUMAN HAS ABOUT 10,000 TASTE BUDS).



PEOPLE LOSE THEIR PERCEPTION OF TASTE AS THEY AGE. **BY AGE 20**, HALF OF THEIR TASTE RECEPTORS ARE GONE (ON AVERAGE).



GRIZZLY BEARS CAN SMELL FOOD FROM UP TO **18 MILES AWAY**.

Source: EarQ

ART + CULTURE

In Defense of Small Towns

BY OLIVER DE LA PAZ

When I look at it, it's simple, really. I hated life there. September, once filled with animal deaths and toughened hay. And the smells

of fall were boiled-down beets and potatoes
or the farmhands' breeches smeared with oil and diesel

as they rode into town, dusty and pissed. The radio station
split time between metal and Tejano, and the only action

happened on Friday nights where the high school football team
gave everyone a chance at forgiveness. The town left no room

for novelty or change. The sheriff knew everyone's son and despite that,
we'd cruise up and down the avenues, switching between

brake and gearshift. We'd fight and spit chew into Big Gulp cups
and have our hearts broken nightly. In that town I learned

to fire a shotgun at nine and wring a chicken's neck
with one hand by twirling the bird and whipping it straight like a towel.

But I loved the place once. Everything was blonde and cracked
and the irrigation ditches stretched to the end of the earth. You could

ride on a bicycle and see clearly the outline of every leaf
or catch on the streets each word of a neighbor's argument.

Nothing could happen there and if I willed it, the place would have me
slipping over its rocks into the river with the sugar plant's steam

or signing papers at a storefront army desk, buttoned up
with medallions and a crew cut, eyeing the next recruits.

If I've learned anything, it's that I could be anywhere,
staring at a hunk of asphalt or listening to the clap of billiard balls

against each other in a bar and hear my name. Indifference now?
Some. I shook loose, but that isn't the whole story. The fact is

I'm still in love. And when I wake up, I watch my son yawn,
and my mind turns his upswept hair into cornstalks

at the edge of a field. Stillness is an acre, and his body
idles, deep like heavy machinery. I want to take him back there,

to the small town of my youth and hold the book of wildflowers
open for him, and look. I want him to know the colors of horses,

to run with a cattail in his hand and watch as its seeds
fly weightless as though nothing mattered, as though

the little things we tell ourselves about our pasts stay there,
rising slightly and just out of reach.

WRITING PROMPT

It's common to hold conflicting emotions about what is very important to us. In this poem, de la Paz expresses those conflicts with images that appeal to all of our senses: the sound of radio music and billiards, the scents of diesel and boiled beets, the taste of tobacco and Big Gulps, the sight of leaves and horses, and the touch of his son's hair. Write a poem about something very important to you (it could be your own home town, for example) and show the reader what it sounds, smells, tastes, looks, and feels like.

Oliver de la Paz was born in the Philippines and raised in Ontario, Oregon. Critics have described Paz's cinematic free-verse poems as "the stuff of life itself, ugly and beautiful, wherever or whenever we happen to live it." He is co-chair of the advisory board of Kundiman, an organization devoted to promoting Asian American writers and writing.

Oliver de la Paz, "In Defense of Small Towns" from *Requiem for the Orchard*. Copyright © 2010 by Oliver de la Paz. Reprinted by permission of University of Akron Press. *The Poetry Foundation*.

Word Search

C	S	S	S	E	N	E	V	I	G	R	O	F	R
E	O	G	E	Y	E	I	N	G	D	Y	F	T	T
F	D	E	S	S	T	E	E	B	F	A	D	D	O
S	O	L	P	N	B	R	R	D	C	W	U	S	U
M	S	O	I	B	O	I	I	E	A	N	S	R	G
A	S	R	T	U	S	F	L	O	G	G	T	E	H
C	S	M	V	B	R	R	G	L	I	O	Y	W	E
H	I	G	E	M	A	A	O	T	I	L	G	O	N
I	N	T	W	L	E	L	D	L	E	A	F	L	E
N	D	E	D	A	L	O	L	I	O	D	R	F	D
E	D	P	A	L	C	S	I	T	O	C	A	D	L
R	G	N	I	R	W	D	I	E	S	E	L	L	I
Y	A	U	R	R	D	L	E	I	F	Y	E	I	G
S	U	G	A	R	I	I	E	B	A	S	B	W	E

LEAF	SUGAR	SMELLS	FIELD
SPIT	RADIO	COLORS	CLAP
BILLIARD	FORGIVENESS	DUSTY	EYEING
MACHINERY	DIESEL	TOUGHENED	FOOTBALL
WRING	YAWN	WILDFLOWERS	BEETS

HEALTH & WELLBEING

Making Sense of the World, Several Senses at a Time

BY LENA GROEGER | *The Scientific American* | February 2012

Our five senses seem to operate independently, as five distinct modes of perceiving the world. In reality, however, they collaborate closely to enable the mind to better understand its surroundings. We can become aware of this collaboration under special circumstances.

Our senses must also regularly meet and greet in the brain to provide accurate impressions of the world. Our ability to perceive the emotions of others relies on combinations of cues from sounds, sights and even smells. Perceptual systems, particularly smell, connect with memory and emotion centers to enable sensory cues to trigger feelings and recollections, and to be incorporated within them. Here are a few of the best examples of the complex interactions — and extraordinary feats — of our cross-wired senses.

Seeing What You Hear

We can usually differentiate the sights we see and the sounds we hear. But in some cases, the two can be intertwined. During speech perception, our brain integrates information from our ears with that from our eyes. Because this integration happens early in the perceptual process, visual cues influence what we think we are hearing. That is, what we see can actually shape what we “hear.” This visual-auditory crosstalk, which happens every time we perceive speech, is a phenomenon called the McGurk Effect.

Beep Baseball

Blind baseball seems almost an oxymoron. But since 1975, when a few blind Minnesotans invented “beep baseball,” those who lack sight have taken part in America’s favorite pastime. Thanks to a one-pound beeping oversized softball and some tweaks to the game, players can hit a home run without ever seeing the ball. They use the sound the ball emits to orient themselves, make contact using a bat, and run to base. They might be particularly well-suited to this form of the game, as previous research suggests that blind individuals can more easily localize sounds than sighted people can.

Calling What You See

Bats and whales, among other animals, emit sounds into their surroundings — not to communicate with other bats and whales — but to “see” what is around them. They read echoes of the sound waves, which bounce off objects, to identify and locate objects. This sensory system is called echolocation. Although most of us can only imagine the pictures that form from sound, some

blind people have managed to master a form of echolocation. By uttering sounds and clicks, these individuals can use their ears to navigate. Some, such as Daniel Kish, have even taught others to use this form of human sonar. Kish once described human echolocation as “something like seeing the world in dim flashes of light.”

Let Your Fingers Do The Hearing

People who are both deaf and blind are incredibly good at using other senses such as touch to navigate and understand the world. Some use the Tadoma Speechreading Method to perceive speech by touching the lips of another person as they talk. First taught in the 1920s, lip-reading by touch was a popular form of communication among the deafblind. Helen Keller was one of its early adopters.

If taught early in development, the Tadoma Method can help a deafblind child learn to speak as well as to understand others. Those who lose their sight and hearing later in life can use it to read lips. But because the method is extremely difficult and time consuming to learn, by the 1950s it began to lose ground to American Sign Language as the dominant teaching method. In ASL, the deafblind place their hands over another signer’s hands and follow the motions with their fingers — which is easier because the movements are far less subtle. Today, only about 50 people in the world still use the Tadoma Method.

When Senses Fuse

People with synesthesia have a particularly curious cross-wiring of the senses, in which activating one sense spontaneously triggers another. They might see colors when they hear noises, associate particular personalities with days of the week, or hear sounds when they see moving dots. Synesthesia is thought to be genetic, and recent research even suggests that it may confer an evolutionary advantage. Most synesthetes don’t notice anything strange about the way they perceive their environments until it is brought to their attention. One young woman only found out she was a synesthete in her freshman year of college after attending a talk on the topic. ●

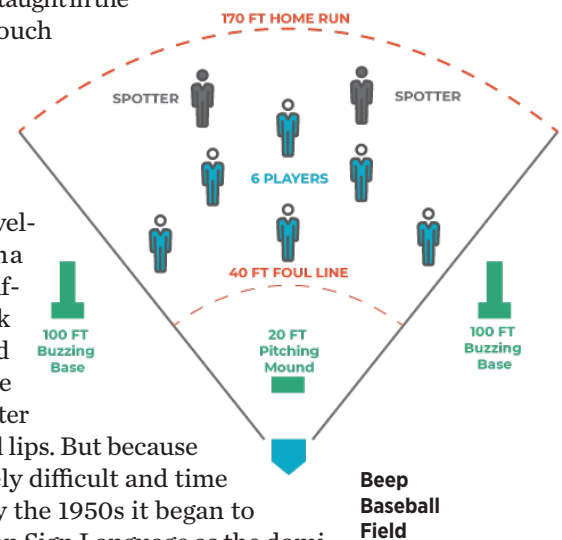


Image Source:
National Beep
Baseball Association

Edited
for space.

TECHNOLOGY

The Future of Perception

BY MATTHEW HUTSON | *The Atlantic* | July/August 2017

The world we experience is not the real world. It's a mental construction, filtered through our physical senses. Which raises the question: How would our world change if we had new and different senses? Could they expand our universe? Technology has long been used to help people who have lost, or were born without, one of the five primary senses. More recently, researchers in the emerging field of "sensory enhancement" have begun developing tools to give people additional senses — ones that imitate those of other animals, or that add capabilities nature never imagined. Here's how such devices could work, and how they might change what it means to be human.

For decades, some deaf people have worn cochlear implants, which use electrode arrays to stimulate the auditory nerve inside the ear. Researchers are working on other technologies that could restore sight or touch to those who lack it. For the blind, cameras could trigger electrodes on the retina, on the optic nerve, or in the brain. For the paralyzed or people with prosthetic limbs, pressure pads on real or robotic hands could send touch feedback to the brain or to nerves in the arm.

Autistic people might even gain a stronger social sense. Last year, MIT researchers revealed the EQ-Radio, a device that bounces signals off people to detect their heart rate and breathing patterns. A yet-to-be-invented device might infer a target's mood from those data and convey it to an autistic user — or anyone who wants to improve their emotional intuition.

We can also substitute one sense for another. The brain is surprisingly adept at taking advantage of any pertinent information it receives, and can be trained to, for instance, "hear" images or "feel" sound. For the blind, a device called the BrainPort V100 connects a camera on a pair of glasses to a grid of electrodes on a person's tongue. At first the effect just feels like tiny bubbles, but eventually users can learn to read stronger points of stimulation as bright pixels and weaker points as dark ones, and can form a mental picture.

Somewhat similarly, a Dutch device called the vOICe ("Oh I see!") uses a camera to create a soundscape that the vision-impaired wearer hears through headphones. To the uninitiated it sounds like bursts of static, but with training, people can discern images. Every second or so, the sound pans from left to right, using frequency to indicate an object's height (the taller the object, the higher the pitch) and volume to indicate its brightness.

For the deaf, David Eagleman, a neuroscientist at Stanford University, has developed a vest that turns sound into a pattern of vibrations on the torso. With practice, people can learn to use it to interpret speech and other sounds.

Scientists are also exploring ways to add senses found elsewhere in the animal kingdom. For instance, a handheld device called the Bottlenose, built by amateur biohackers, uses ultrasound to detect the distance of objects, then vibrates the user's finger at different frequencies, giving him or her echolocation. Other devices provide the navigational sense of migratory birds: A company called feelSpace sells the naviBelt, a belt that points you in your desired direction by vibrating on your waist. Another company, Cyborg Nest, sells the North Sense, a device you can attach to your chest that vibrates when pointing north.

In the future, cochlear implants could be tuned to pick up really low frequencies, such as those used by elephants, or really high ones, such as those used by dolphins. Bionic eyes could be built to allow humans to see ultraviolet rays (as butterflies, reindeer, dogs, and other animals can) and infrared light (as certain snakes, fish, and mosquitoes can).

Some researchers think we may eventually install a port in our brains that would allow us to swap in different sensors when we need them. "Maybe there's a Swiss Army Knife of sensors that you carry with you," says Rajesh P.N. Rao, the director of the National Science Foundation's Center for Sensorimotor Neural Engineering. You might



WHAT HAS
EARS BUT
CANNOT HEAR?

WHAT HAS A
TONGUE BUT
CANNOT TASTE?

The Mind of Rob Hitt

WORD PLAY

A Rebus puzzle is a picture representation of a common word or phrase. How the letters/images appear within each box will give you clues to the answer! For example, if you saw the letters "LOOK ULEAP," you could guess that the phrase is "Look before you leap." *Answers are on the last page!*



rely on a distance sensor when climbing a mountain, then plug in night vision after dark.

We might also gain senses that no other animal has. The vibrating vest Eagleman created can be programmed to receive any input, not just sound. It could be used to monitor the stock market, or sentiment on Twitter, or the pitch and yaw of a drone, or one's own vital signs. You could display these things on a computer screen, but our brains can't attend to lots of visual details at once. The body, on the other hand, is used to monitoring dozens of muscles just to keep us balanced, so would be more adept at handling multidimensional inputs.

A cortical implant could also theoretically take in just about any type of information, which the brain could process as a new sense. "You can do whatever you want," says Neil Harbisson, a "cyborg artist" who's originally from Spain. "You can design a unique sense that is related to your interests or to your curiosity."

Harbisson was born seeing in grayscale. In 2004, he had an antenna surgically attached to his skull. The antenna has a camera at the end and vibrates at different frequencies, turning colors into sound. (He can also use the antenna to take phone calls and listen to music.) He plans to implant a band around his head with a warm spot that orbits every 24 hours, giving him a temporal organ.

But, Bernd Fritsch, a neuroscientist at the University of Iowa cautions that for every patch of neural real estate we dedicate to interpreting a new sense, we leave fewer neurons for processing the others. So with each sense we add, we're also taking something away.

Perhaps we'll even achieve that so-called sixth sense: ESP. Kevin Warwick, an engineer at Coventry University, in the U.K., wirelessly connected an electrode in his arm to one in his wife's arm, so that wherever they were, they could feel when the other flexed a hand. Eagleman wants to take that idea one step further and wirelessly connect heart and sweat monitors on his wife and himself so they can sense each other's moods.

Research by Rao shows that people can send yes/no messages telepathically: An EEG senses brain activity in the sender and another device applies magnetic pulses to the brain of the receiver. Eventually, we might have brain implants connected wirelessly. "This kind of communication might get over some of the limitations of language," Rao says. It could help people share sensations or express thoughts that are hard to put into words, and enhance collaboration. "I think that will completely change how we are as humans," Warwick says. "Telepathy is the future." Indeed, Elon Musk recently started a company called Neuralink focused on connecting brains to computers; he says it could someday enable computer-mediated telepathy.

Exactly how all this tinkering will change us remains to be seen. Harbisson says that gaining animals' senses

"would allow us to connect with nature and to other species in a more profound way." But if shared senses connect us to other species, might sensation inequality pull people apart by creating new categories of haves and have-nots? We already struggle to agree on what's real and what's fake; that problem seems likely to get worse as technology creates new means of perception. "Society is stretched like an elastic band," Warwick says. Radical sensory enhancement for some could stretch it even more. "The question is, does the elastic band break?" ●

RANDOM-NEST

Grounding Techniques

CONTENT BY ANXIETY TREATMENT WISCONSIN

Grounding is an effective way to calm anxiety. In this process, you identify objects around you to help your brain recognize where you are. This creates a sense of comfort because you know where you are and you feel more in control of the situation. This can also be a helpful way to assist other people.

The 54321 Ground Method

In this method, you simply identify ...

- 5 things you can see
- 4 things you can feel
- 3 things you can hear
- 2 things you can smell
- 1 thing you can taste



Taste is sometimes hard to identify, so you could substitute that by thinking of your favorite thing to taste. Some versions of the 54321 grounding method say to name one thing you like about yourself. Regardless of how you approach this, the goal is to identify elements in the world around you. As your mind begins to focus on these things, it will be less focused on the sudden rush of anxiety. This will help slow your heart rate, control your breathing, and make you feel better overall.

Talk Yourself through the Anxiety

Another form of grounding involves self-therapy. When you feel anxiety coming on, talk to yourself (either out loud or in your head). Tell yourself that you are feeling anxious and that it is going to be OK. You have gone through this before, and you can get through it again. You are strong enough to handle your emotions, and this will not last forever. Keep repeating these positive statements until you feel yourself calming down.

Play a Game with Yourself

You could get your mind off the anxiety by playing a quick game. Ask yourself a question that has several answers:

- Name as many states as you can
- Name as many dog breeds as you can
- Name as many cities as you can
- Recite the alphabet backwards
- Practice simple times tables

You may respond better to some questions than others, but the idea is to make yourself think about something other than anxiety.

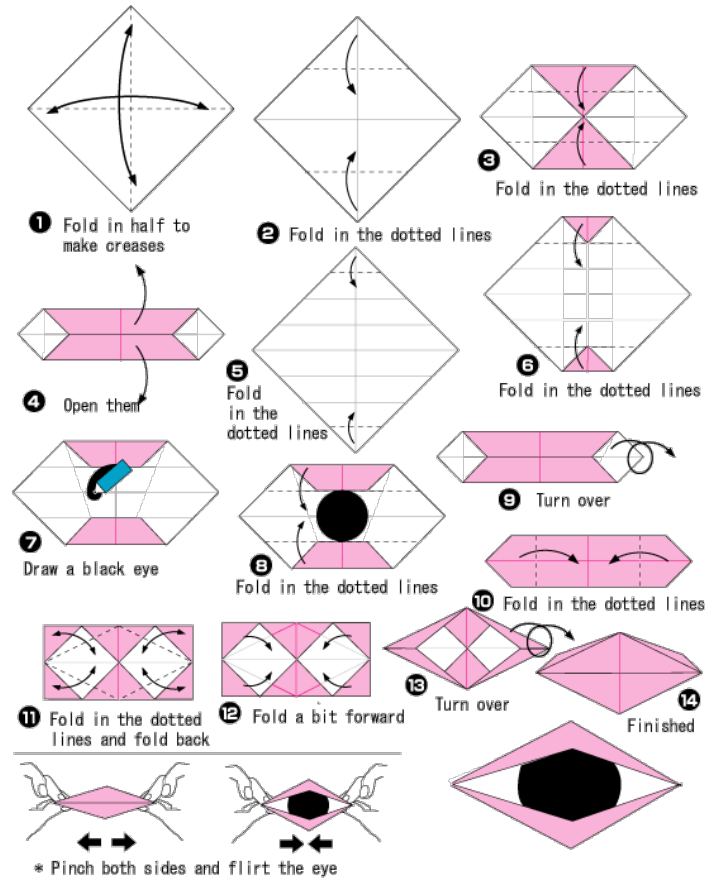
Words of Encouragement

2020: the year of clarity and clear vision. I guess it is all in our perspective. Webster's Dictionary defines perspective as "a particular attitude toward or way of regarding something; a point of view." I find it ironic that the word attitude is used here as one of my favorite quotes is by Zig Ziglar:

"It is your attitude, not your aptitude that determines your altitude."

In these times, with so much going on, there can be an increase in turmoil, internal struggle, worries, and anxiety. It can also be a time of growth, self-reflection, adventure, and excitement. As the world endures and changes, so can we. In this time, I have gone from asking myself the "why" questions to the "what" questions. Instead of "why is this happening" it is "what is this preparing me for?" I went from "Why do people act this/than way" to "What can I gain from this experience" or "What meaning does this have?" The mind is a powerful tool. How we think influences and, in some cases, determines, our feelings and actions. I hope in this season, you can take time to creatively care for yourself. I also hope that amidst an absence of a formal education setting, you are enhancing yourself. Enhancing can appear as educational engagement, but it can also be self-care, physical health increases, or reflection. I hope this passage has helped some. It is not what we think but how we think that determines where we go.

LaVarius



HOW TO MAKE A BLINKING EYE

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Answers

SUDOKU #25

6	5	4	8	3	9	2	7	1
1	9	8	2	4	7	5	3	6
2	7	3	1	5	6	4	8	9
7	1	9	6	2	3	8	5	4
3	4	6	5	7	8	1	9	2
5	8	2	9	1	4	7	6	3
8	3	7	4	6	2	9	1	5
4	6	1	7	9	5	3	2	8
9	2	5	3	8	1	6	4	7

SUDOKU #26

3	8	4	5	2	6	1	9	7
6	7	9	8	1	4	5	3	2
2	1	5	3	9	7	4	6	8
7	2	3	4	6	8	9	1	5
4	9	6	2	5	1	7	8	3
8	5	1	7	3	9	6	2	4
5	6	8	9	4	2	3	7	1
1	3	2	6	7	5	8	4	9
9	4	7	1	8	3	2	5	6



Brainteasers

Page 2 a potato; a river; a clock

Page 6 Rebus Puzzle:

1. Flat broke
2. Half-baked
3. A point in time

Page 8 An old TV with an antenna (rabbit ears) or corn; A shoe

Send ideas and comments to:

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