

In Plain Sight

Hidden illusions are the Easter eggs of the mind

He never once thought it probable, or possible, that the Minister had deposited the letter immediately beneath the nose of the whole world, by way of best preventing any portion of that world from perceiving it.

—Edgar Allan Poe,
“The Purloined Letter,” 1844

Sherlock Holmes’s predecessor and Arthur Conan Doyle’s inspiration, detective C. Auguste Dupin, conjured by Poe, used his powers of ratiocination to retrieve a stolen letter after two exhaustive police searches had failed. The police’s mistake lay in hunting for intricate hideouts: secret drawers, excavated table legs, the insides of cushions. Too obvious, clearly. When



**BY STEPHEN L. MACKNIK
AND SUSANA
MARTINEZ-CONDE**



Stephen L. Macknik and Susana Martinez-Conde are laboratory directors at the Barrow Neurological Institute in Phoenix. They serve on *Scientific American Mind*’s board of advisers. Their book *Sleights of Mind*, with Sandra Blakeslee, won the 2013 Prisma Prize for Best Book of the Year (<http://sleightsofmind.com>). Their new book, *Champions of Illusion*, will be published by Scientific American/Farrar, Straus and Giroux.



Send suggestions for column topics to editors@SciAmMind.com



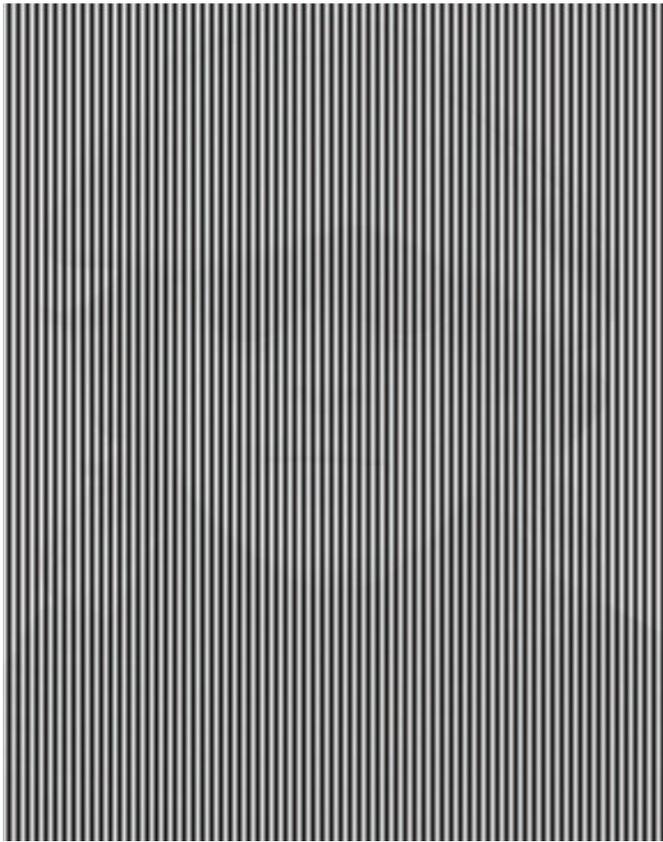
MISSING THE FACE FOR THE TREE

Mexican artist Octavio Ocampo’s “metamorphic” paintings are rarely what they seem at first sight. Can you see the portrait of a young woman in this image? Step away from your computer screen, or hold your magazine at arm’s length to see the three flying birds become delicate facial features. Our visual and oculomotor systems focus preferentially on objects rather than non-objects within a scene. This scanning bias allows the artist to hide the woman’s likeness in plain view. When we focus on the birds flying in the foreground, we tend to ignore the facial contour in the background.

the searches bore no fruit, the officers concluded that, contrary to their assumption, the letter must not be on the premises. But Dupin knew better: the police had missed the letter not because it was hidden too well but because it was lying in plain sight.

Our visual system’s search strategies depend not only on what we are trying to find but also on our expectations and experience. False assumptions about size, shape or general appearance will hamper

our examination, as will an abundance of potential search targets, a perceptual phenomenon called crowding. The authors of this column are frequent victims of the latter, especially at our unkempt desks, where we have been known to spend seemingly limitless time looking for letters—and many other documents—that were hiding in plain sight. The illusions we present here play hide-and-seek with your perception. Enjoy the hunt. **M**



IMAGINE

You may say I'm a dreamer, but I can see John Lennon's face behind this grid of vertical bars. I wonder if you can. You can reveal Lennon's portrait in many different ways: squint your eyes, step away from the image, or look at the grid while shaking your head left and right vigorously, as if saying "no." It's easy if you try. The illusion, created by a composite of Lennon's portrait and a vertical black-and-white grid, works because under normal viewing conditions, your visual system's neurons respond maximally to the high-contrast vertical bars that are presented with high frequency across space, which obliterates the more subtle features of the portrait.

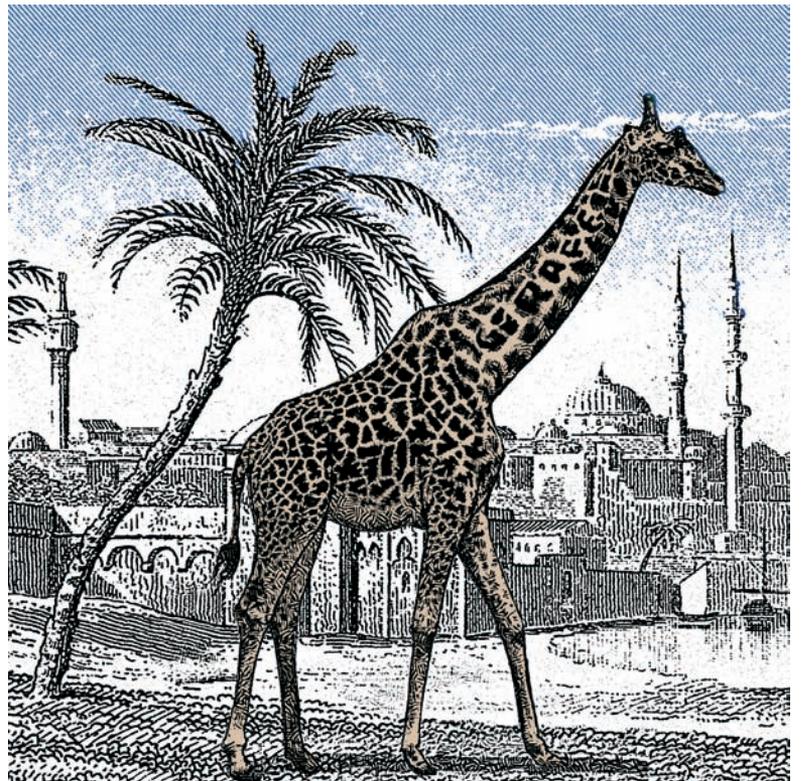


Want more? Follow these instructions to create similar illusions with your own photographs:

www.instructables.com/id/Hidden-Photo-Optical-Illusion

THE VANISHING GIRAFFE

Magician and escape artist Harry Houdini had several signature tricks; one was to vanish a five-ton, eight-foot-tall elephant in front of thousands of spectators at the New York Hippodrome Theater, which he did in 1918. Naturally, it was an illusion. As is the vanishing giraffe in this image, created by artist Gianni A. Sarccone. Can you see the second giraffe in the scene? It may take you a while if you do not know what you are looking for. Our search strategy relies heavily on having a specific target in mind. If you are looking for a large object, you may miss smaller ones, and vice versa. And if you are looking for a picture, you may miss a critical word.



ESTATE OF DAVID GAHR Getty Images (top); "HIDDEN GIRAFFE," © GIANNI A. SARCONE, WWW.ARCHIMEDES-LAB.ORG (bottom)



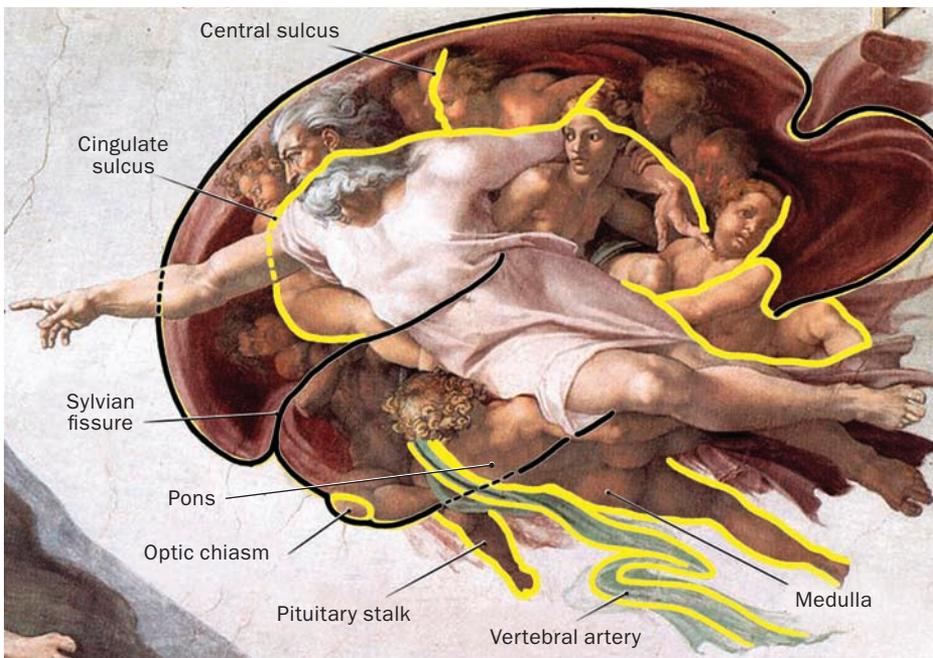
THE AMBASSADORS

This 1533 painting by German artist Hans Holbein the Younger features a legendary artistic Easter egg: a large skull centered at the bottom of the scene. The skull is painted in anamorphic perspective, so it is apparent only to viewers who observe the painting from the side but not to those who look at it from the front. The skull is a *vanitas*, from the Latin for “vanity,” a reminder of our mortality, but the meaning of its prominent placement in the tableau and anamorphic perspective is still debated, as is the significance and symbolic connotation of the other objects in the room. Holbein’s composition may incorporate a heavenly plane in the upper part of the painting—indicated by objects such as a crucifix, a celestial globe and a sundial—and an earthly plane in the lower part—symbolized by elements such as a terrestrial globe, books and the anamorphic skull.



IN THE BEGINNING WAS THE BRAIN

Michelangelo Buonarroti (1475–1564) was not only a magnificent painter and sculptor but also a master anatomist who conducted numerous dissections of human cadavers. Frank L. Meshberger of St. John’s Medical Center in Anderson, Ind., and Ian Suk and Rafael J. Tamargo of the Johns Hopkins University School of Medicine have proposed that Michelangelo’s Sistine Chapel frescoes conceal a variety of neuroanatomical structures. Meshberger’s theory that *The Creation of Adam* hides an image of the full brain, possibly to portray God’s gift of intellect to Adam, has gained support from art historians. More recently, Suk and Tamargo have put forward that *Separation of Light from Darkness*, one of the last frescoes that Michelangelo painted in the chapel, which depicts God’s first act of creation, contains a view of the brain stem. They believe that the concealed anatomical features are not accidental but instead represent Michelangelo’s wish, as a deeply religious man and accomplished anatomist, to enhance his depiction of God with his neuroanatomical knowledge. So it could be a matter of faith.



FURTHER READING

- **An Interpretation of Michelangelo’s Creation of Adam Based on Neuroanatomy.** F. L. Meshberger in *JAMA*, Vol. 264, No. 14, pages 1837–1841; October 10, 1990.
- **The Ambassadors’ Secret: Holbein and the World of the Renaissance.** John North. Bloomsbury Academic, 2004.
- **Concealed Neuroanatomy in Michelangelo’s Separation of Light from Darkness in the Sistine Chapel.** Ian Suk and Rafael J. Tamargo in *Neurosurgery*, Vol. 66, No. 5, pages 851–861; May 2010. Free download available at journals.lww.com/neurosurgery/toc/2010/05000
- **Octavio Ocampo: Arte Metamorfico.** O. Ocampo. Edition Olms, 2013.