

## #CURIOSITY

### Your brain wants you to be curious, not anxious

A new neuroimaging study from Columbia University reveals how brains process curiosity, and points to a better way to approach the unknown.



In a letter that Albert Einstein wrote to his biographer in 1952, the brilliant scientist claimed to possess no special talents other than being 'passionately curious.' False modesty aside, it was only through pursuing his interest in the world's mysteries, during his time on this planet, that Einstein managed to reveal so many hidden secrets about the universe.

Curiosity may be humanity's brightest, most powerful spotlight for illuminating the unknown, whether it's quantum mechanics in the case of Einstein or, gulp, the possibility of AI replacing all our jobs, and a new study appears to back that up. It may even offer a new way to think about anxiety.

A research team from Columbia's Zuckerman Institute recently published a study in the *Journal of Neuroscience* about what happens in the human brain when feelings of curiosity develop. By revealing how certain brain areas tend to process uncertainty as curiosity in visually ambiguous situations, the study's findings show how deeply the two elements are interrelated.

"What distinguishes human curiosity is that it drives us to explore much more broadly than other animals, and often just because we want to find things out, not because we are seeking a material reward or survival benefit," one of the study's authors, Jacqueline Gottlieb stated on the Zuckerman Institute's website. "This leads to a lot of our creativity."

Gottlieb and her team of researchers used a type of MRI scan on 32 volunteers, knowing their day will surely end with a slap in the face from a stranger than to instead have only a 50% chance of getting slapped.

But maybe they shouldn't. Another way people can deal with other forms of uncertainty is to intentionally treat it the way their brains automatically treat the visual kind. It might be as simple as a matter of reframing.

The flipside of "I'm worried about the unknown" is "I'd like to learn more about the unknown." The second option just happens to feel a lot better, and is far more constructive. It doesn't, as Einstein to understand that.



# From The Eyes Of Marianne

Marianne noticed many Arab mariners in Mandvi. "The Arab sailors, who, coming from Mocha and other ports of the Red Sea, are frequently seen here, are a wild and singularly picturesque looking race, and although wearing the flowing robe, and graceful turban, common in the East, seem strikingly dissimilar to men of other tribes." She wrote of their darker clothes and their pale blue and red turbans, that were less studiously arranged than those of Indians. "Their general bearing is that of men used to peril, but accustomed to defy it," she said admiringly.



From time immemorial, India has been an important place for travel. The reasons for travel to India were many, ranging from pilgrimage, trade, and conquest to exploration and diplomacy, etc. The British travelled to India basically for trade. Invigorated by the improvements in travel and expanding British influence, there was a spurt in travel by not only British men but British women as well. These women travellers travelled for many personal and political reasons. Many travel writers came to India from different parts of the world and depicted it in their own ways.

In 1615, the Directors of the East India Company saw only two roles that women might play in India, either they would encumber what the Company was about or they could be spiritual, emotional supports for the men, to whom they were attached. Ultimately, they would play both roles, but also carve out their own. Beginning in the 1650s, hoping to counteract the influence of Catholic, primarily Portuguese, women, the Directors lifted its earlier ban and sent out the first 'fishing fleets,' hoping that the presence of English women would improve morals and provide Protestant progeny in their factories. Besides marriage, women also became partners with their husbands in trade, as well as operating businesses of their own. The period, from 1757 to about 1800, witnessed the arrival of more women, who came out to India to 'fish' for wealthy nabobs, as in the earlier period, women could be engaged in other economic ventures, specifically the managing of taverns, millinery shops, and boarding schools. By the end of the century, however, all three sources of economic independence had disappeared. The fact of empire, however, allowed women in the early nineteenth century to not only take active roles in the area of missionary work, but to explore India far more fully than they had ever been able to, before. Their journals, letters, diaries, and commentaries indicate curiosity and often affection for India, on the one hand, but also, about two decades before the Mutiny, a closing of their minds.

On a pleasant January morning in 1834, a few officers of the 15th Regiment of the Bombay Native Infantry, along with their spouses, set sail from Bombay for Kutch on a *kotiya*, a large wooden trading dhow. Among them was a young couple that was happy to live in Bombay. Thomas Postans, a 26-year old junior officer, had married his wife, Marianne, a year earlier before taking up a position with the Bombay Army. Marianne, then 23, was passionate about drawing and writing. She began documenting her impressions of life in India almost immediately after leaving Bombay. Her sketches and notes were published in 1839 in the form of a book titled, *'Cutch or Random Sketches Taken During a Residence in one of the Northern Provinces of Western India.'*

"Few persons can leave Bombay without regret," Marianne wrote. "It's lovely scenery, hospitable society, and its civilized condition cannot but charm the English visitor, and when duty commands that he should resign its pleasures, the voyager does so with a sigh, and his boat recedes from the shore, and the gay tents on the esplanade dwindle to mere specks, full many a wistful glance does he cast back to the distant scene of life and enjoyment."

The journey from Bombay was tedious. Marianne wrote about the lack of hygiene on board the *kotiya*, calling it a scene of 'filth and confusion.' It must have been a relief for the passengers when, a few days later, the dhow arrived at Mandvi, a bustling port that was the summer resort of the rulers of Kutch. Kutch had a sizeable British military presence back then, a result of it coming under British suzerainty in 1819. Mandvi impressed Marianne immediately. "On approaching the province of Cutch, the coast affords few attractions to the traveller's eye, presenting as it does, a mere sandy outline, slightly diversified by a few patches of stunted vegetation, and straggling palm trees, but on landing at Mandavie, which is the principal sea-port, an appearance of wealth and unusual bustle excites the traveller's attention," she wrote. She also seemed to like the people of the town. "The inhabitants seem a busy, cheerful, and industrious race, and their peculiarly bright and varied costume gives an appearance of gaiety to the place, which is strikingly pleasing and seldom seen in an Indian town of second rate importance."

From the English writer's note, it is clear that the town was a major shipping building centre at the time, and the port was busy handling ships from Red Sea ports, Ceylon, eastern Africa and China. While cotton was the main export product at the port, items from far-flung places such as African ivory, Arab dates and coffee and colourful mats, were being imported in large quantities. Marianne noticed many Arab mariners in Mandvi. "The Arab sailors, who, coming from Mocha and other ports of the Red Sea, are frequently seen here, are a wild and singularly picturesque looking race, and although wearing the flowing robe, and graceful turban, common in the East, seem strikingly dissimilar to men of other tribes." She wrote of their darker clothes and their pale blue and red turbans, that were less studiously arranged than those of Indians. "Their general bearing is that of men used to peril, but accustomed to defy it," she said admiringly.

Marianne wrote of two and three-storeyed houses with terraced roofs and rich carvings, but added that Mandvi's streets were narrow, dusty, ill-ordered and swarming with 'Pariah' dogs and bulls, that were fed by grain merchants. As in most towns in Indian princely states, the grandest structure was the ruler's palace. Marianne called it the 'most strikingly curious object' in Mandvi and said that it was 'most grotesquely ornamented by a variety of carvings, of dancing girls, tigers, and roistering-looking Dutch knaves.' The locals told her that the palace was designed by a native of Kathiawar, who was kidnapped as a child and taken to Holland.



## International Tiger Day

Tigers are majestic creatures, who may face extinction, if not helped. *International Tiger Day* has been created so that people around the world can raise awareness for tiger conservation. The aim of the day is to help promote a worldwide system whereby we are dedicated to protecting tigers and their natural habitats. We can also use this day to support tiger conservation issues and to raise awareness. After all, when more people are aware of something, they are going to be more inclined to help, and that is why this day is so important.



A sketch from 'Cutch or Random Sketches Taken During a Residence in one of the Northern Provinces of Western India.' Credit: Marianne Postans.

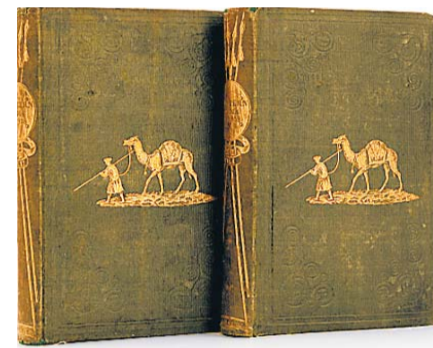
## #BHUI



A sketch from 'Cutch or Random Sketches Taken During a Residence in one of the Northern Provinces of Western India.' Credit: Marianne Postans.



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## Religion and Pilgrimages

Given that the British public knew very little about India in the early 19th century, Marianne went into great detail when describing religious practices and popular beliefs. From her book, it appears that she was genuinely keen on observing pilgrims and pilgrimages. "Hindu pilgrims are very numerous," she wrote. "They come from the distant parts of India to perform penances at D'waka and at other places which bear a holy character." "Tanks, rivers, caves and forests were sacred for Hindus," Marianne wrote, "but not as important as temples." "Immediately within reach of the devotees of Cutch is the temple of D'waka and that of Hinglal in Sindh." She noted that Kutch was a major transit point

for Mecca-bound Muslim pilgrims from Sindh, Kandahar and Kabul. The Rao of Kutch allowed the pilgrims to pass through his territory to Mandvi, from where there would board dhows for West Asia. "Many of these poor fanatics perish on the way, from fatigue, climate and privation, combined with the effect of pestilential disease, which constantly attacks their caravans," Marianne wrote.

## Beauty of the Rann

What impressed the Englishwoman the most was the *Rann of Kutch*. "Throughout Western India, nothing could, perhaps, be found more worthy of the observation of the traveller, than the great Northern Rann, a desert salt plain, which bounds Cutch on the north and east, and extends from the western confines of Guzerat to the eastern branch of the River Indus, approaching Bhuj at its nearest point, at about the distance of sixteen miles."

She explained that the Rann was passable in the dry season but the glare from the incrustation of salt, caused by the evaporation of water, was so great that few people attempted to cross it unless they were motivated by business gains or military duty. The beauty of the Rann awed her. "The distant aspect of the Rann resembles that of the ocean at ebb tide, and as some water always remains on it, the refraction of light produces the most beautiful and mysterious effects, decorating it with all the enchantments of the most lovely specimens of mirage, whose magic power, exerting itself on the morning mists, induces this desert tract with the most bewitching scenes."

The book is, by no means, a romanticised look at Kutch. The writer describes in detail the social ills of the region, such as infanticide and the practise of *sati*. She is also very critical of

the religious beliefs and customs of Hindus and Muslims. However, there is an attempt in the book to comprehensively describe the culture of the region, its bards and bardic literature, arts and crafts, and agriculture and trade, no mean feat for a woman in her 20s in that age. Making the book more interesting are her sketches that beautifully depict the region.

The book was published in London in 1839 and met with a great deal of success. Encouraged by the reception, Marianne next wrote a two-volume book titled *'Western India'*, which also covered Surat, Saurashtra, Bombay and the Deccan. She and her husband mostly lived in India, until he died in 1846. Marianne's writing career continued for another couple of decades and included non-fiction about Sindh, Egypt, Switzerland and Gallipoli, where she travelled with her second husband during the Crimean War. She passed away at the age of 86 in Somerset in 1897. Looking back, her writings and sketches were pathbreaking for women and provide rare glimpses of 19th-century India in the English language. Born Marianne Ridgway in 1811, she wrote most of her works under the name, her marital name, of Mrs. Postans. Her work was well-received prior to the Indian Mutiny, but her sympathetic attitude got a colder response to her final work in 1857.

rajeshsharma1049@gmail.com

## #RESEARCH

### Protein That Can Slow MS Damage

While probing inflammatory T cells and disabling a particular gene, a routine practice to grasp its function, researchers stumbled upon a surprise.



Researchers studying multiple sclerosis in mice identified a protein that could reshape the underlying MS (Multiple Sclerosis) treatments. The protein boosts the aggressive migration of immune cells into the central nervous system, leading to MS, an autoimmune disease affecting about 1 million adults. The intrusion of a specific type of immune cell, called Th17, is particularly harmful to the brain and spinal cord.

But when the researchers blocked the protein-integrin alpha 3, it slowed immune cells from reaching and damaging the central nervous system and improved symptoms in mice, according to a study in *Science Immunology*.

"We were studying the role of another gene when we stumbled upon integrin alpha 3," says co-lead author, Maria Ciofani, associate professor in Duke University's Integrative Immunobiology department. "We found that when it's missing, the Th17 cells don't develop as effectively, and more importantly, they face difficulties entering the central nervous system. This means less damage." The Th17 cells, which are vital for the body to fight fungal and bacterial infections, don't usually cause diseases. But for people with MS, these cells are mistakenly activated and end up attacking the central nervous system. The research team is the first to reveal the abundance of integrin alpha 3 on Th17 cells. The protein helps Th17 cells to form connections with other cells, which, in turn, helps the cells grow and become more aggressive. But in the absence of the protein, Th17 cells get

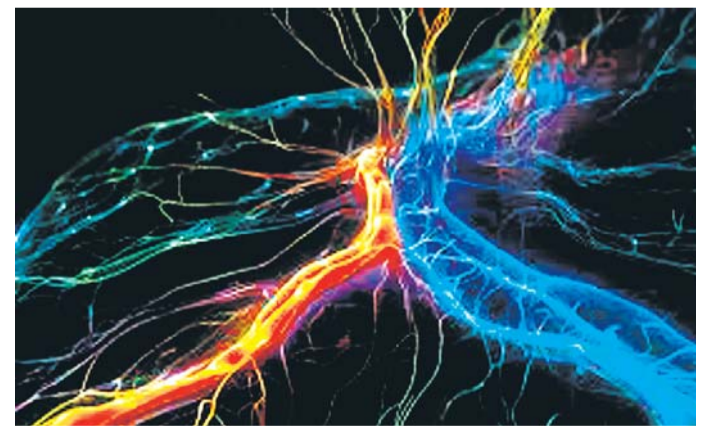
trapped outside the blood-brain barrier, the brain's protective shield.

While probing inflammatory T cells and disabling a particular gene, a routine practice to grasp its function, researchers stumbled upon a surprise. The altered mice were fully shielded from the MS-like symptoms, typically seen in such models.

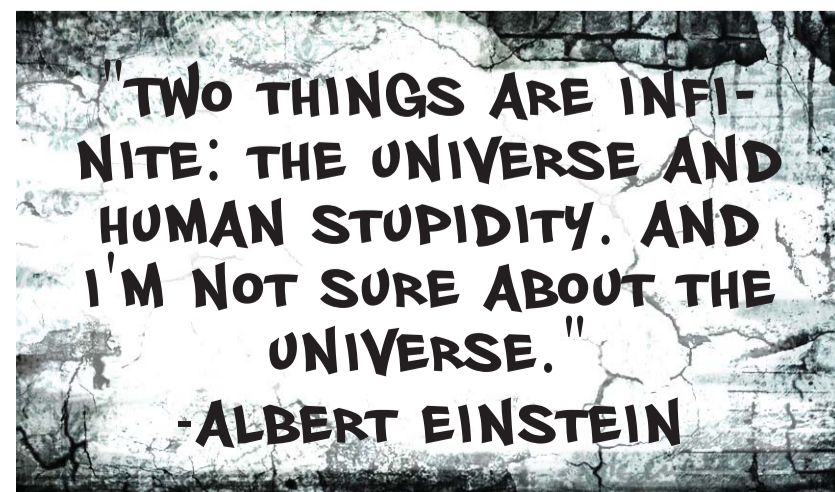
"They were walking around like nothing happened," Ciofani says. "When we looked carefully we found that none of the Th17 cells were entering the central nervous system. It was an opportunity to look at the machinery that controls these cells."

With the help of computational approaches, Ciofani's team-including co-lead study author, Eunghong Park, identified integrin alpha 3. Park, a graduate at AstraZeneca, is a former student in the Integrative Immunology department and a member of the Center for Advanced Genomic Technologies.

There's currently no drug that targets integrin on Th17 cells, but the drug natalizumab does target another kind of T-cell, Th1, that can also cause MS. But natalizumab has its side effects, emphasizing the need for alternative treatments. "One concern about targeting integrin alpha 3 is that these Th17 cells are vital for our body's defense against infections," Ciofani says. "We've done preliminary tests to see if inhibiting integrin alpha 3 stops Th17 cells from doing their protective roles, and so far, it seems that they can still do their jobs." Since integrin alpha 3 is so essential for the harmful actions of Th17 cells, it could be a potential target for new MS treatments.



## THE WALL



## BABY BLUES



By Rick Kirkman & Jerry Scott

## ZITS



By Jerry Scott & Jim Borgman