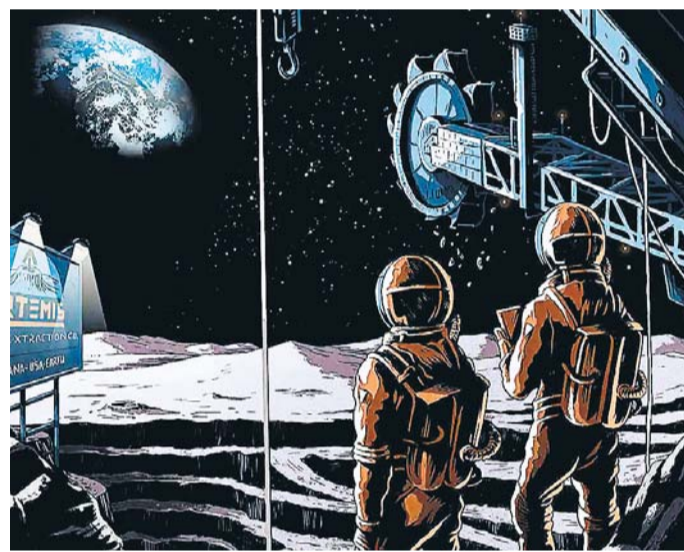


#SCIENCE

Astronauts could mine asteroids for food someday

Material harvested from asteroids could be used to sustain astronauts during long-duration space missions.



Material harvested from asteroids could be used to sustain astronauts during long-duration space missions. Researchers from Western University's Institute for Earth and Space Exploration have identified a way to produce edible biomass, aka food, using microbes and the organic compounds found in asteroids. Their proposed process addresses the issue of how to pack enough food for future missions to the outer reaches of the solar system - or even beyond.

To deeply explore the solar system, it will be necessary to become less reliant on the resupply tether to Earth," the researchers said in the study, which was led by Eric Pilles.

Currently, crew on the International Space Station (ISS) rely on resupply missions from Earth, which is costly and logistically complicated.

Farming in space, although possible, is also complex. That's why the researchers suggest a more local source of food: space rocks. Their solution requires using high heat to break down the organic compounds found in asteroids in oxygen-free environments - a process known as pyrolysis. The resulting hydrocarbons could then be fed to microbes that would consume the organic material and produce biomass of nutritional value to humans, according to the study. The researchers focused on a specific type of asteroid called carbonaceous chondrites, which contain up to 10.5% water and substan-



The Now Not So Common Sparrow



Instead of sparrows, human-friendly birds, who also serve as indicators of air quality; bird species such as kites, crows and mynas have occupied the skies of these cities." Human-friendly birds like sparrows and parrots mean a lot in terms of the quality of the air. If they leave a place, that simply means the quality of the environment has alarmingly declined there," says Abdul Razzaq Khan, a Karachi-based ornithologist. Leaving big cities, according to Khan, cannot save sparrows either, as they fall prey to predatory birds.



Anjali Sharma
Senior Journalist &
Wildlife Enthusiast

ne of the famous quotations from 'Hamlet' by William Shakespeare is 'There is Providence in the fall of a sparrow.' The import of which is that God has a hand in every-

thing that goes on, even the death of a pretty little bird. No matter how small or insignificant something seems, God cares about it and has control over it. But in recent times, one has had occasion to muse on the fall of the sparrows, or, to be specific, of the House Sparrow, whether or not there is Providence in it.

The House Sparrow (scientific name, *Passer domesticus*) is so named because it has always been associated with human habitation. The Wiki entry for the bird says, "it occurs naturally in most of Europe, the Mediterranean region, and much of Asia. Its intentional or accidental introductions to many regions, including parts of Australia, Africa, and the Americas, make it the most widely distributed wild bird." The IUCN (International Union for Conservation of Nature) list has the bird's conservation status as "least concern". However, the scenario in India belies this rating.

In the fifties and sixties, urban Indians grew up in a world where these perky birds were abundant in the cities. I remember that my mother used to put out rice and grains along the edge of our balcony; it had railings that prevented bigger birds from coming in, and a House Sparrow mother, who'd built her nest in the ventila-



Passer montianus Baikounur.

tor of our neighbour's home, would come regularly to peck at the grains and regurgitate them to her nestlings. She often brought along the refuse-sac of the nestlings, and my mother would joke that she was getting paid for setting out the rice!

From this comfortable scene, to today... the House Sparrow's populations in India seem to be in decline. From being a very commonly seen bird a few decades ago, amateur bird watchers as well as learned ornithologists have found the species getting rarer, and various theories have been advanced to explain this decline in the House Sparrow numbers.

One theory, of course, was the loss of habitat for the birds. Older houses had ventilators, lofts, holes between the walls, spaces in the eaves of the roof, and between roof tiles, for these little birds to nest and breed, free from disturbance. The winning of grain resulted

#OUSTED



as long-standing a monitoring exercise as that of CBMI, a recent survey done between April and July 2012, by Citizen Sparrow has been an intense exercise in monitoring the species, with 10,666 records, from 5655 participants across 8425 locations in India. This was a big initiative involving every citizen possible; the oldest participant was 91, and the youngest, 7. The findings do indicate a fall in the numbers of House Sparrows. Data continues to come in, and is still being logged.

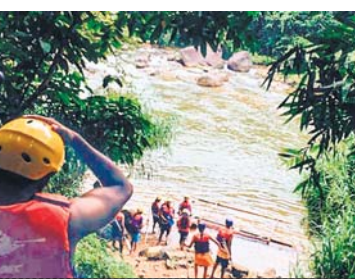
Citizen Sparrow Survey

1. There has been a definite decline in House Sparrow numbers.
2. The absence of Sparrows is the least in Central and North-east India.
3. Sparrows are likely to be found in large numbers, in Central and North-west India.
4. Sparrow nests were seen more frequently in the past, as compared to now.
5. 62.3% of respondents were from cities, and 27.7% were from towns and villages.
6. Setting up of nest-boxes and providing food and grain will form part of the key to increasing sparrow numbers.

However, there is a lesser-liked side to the House Sparrow, too. It's commonly regarded as a pest, since it consumes agricultural products and spreads disease to humans and their domestic animals. Even birdwatchers sometimes hold it in little regard because of its molestation of other birds; it is a very aggressive bird. In most of the world, the House Sparrow is not protect-

ed by law. Attempts to control House Sparrows include the trapping, poisoning, or shooting of adults; the destruction of their nests and eggs; or less directly, blocking nest holes and scaring off sparrows with noise, glue, or porcupine wire. However, attempts at the large-scale control of the House Sparrow have failed. The most notorious campaign against sparrows was in China, where under the perceived notion that Eurasian Tree Sparrows were eating too much grain, hundreds of millions of sparrows were killed in 1958. By 1960, the catastrophe happened...without the sparrows to keep it in check, the insect population exploded, and this contributed to the Great Chinese Famine between 1958 and 1961, where three million people died of starvation due to lack of food-grain, especially rice. I have personally seen a sign in the city of St.Louis, asking everyone to kill House Sparrows, and destroy their nests, as they are an "invasive species".

How is the fate of the House Sparrow being tracked? There are, of course, the expert ornithologists' observations and reports, in journals such as Indian Birds and also the website of Common Bird Monitoring of India (CBMI), a Citizen Science Programme of Nature Forever Society. Many organisations and individuals are part of the programme. The aim of the programme is to collect data on common Indian birds. It is a pioneer project, certainly a first of its kind in the country to monitor the common birds, and it depends on the participation of as many laypersons and interested bird-watchers to be successful. CBMI includes the House Sparrow in its list of common birds. Though not



Adventure Day

Do you know yourself well? Did you make up adventures as a child just to escape the grind of daily life, or do you still? There's nothing like using your imagination when jumping out of a tree and for a few moments imagining you are flying. As we get older, we have the choice of taking the risk and living our lives with wide-eyed joyfulness or holding our breath for fear of what is around the corner. Adventure Day reminds us that we're only here for a short while, and any day is a good day to have an adventure.

Absence of sparrows means pollution

Instead of sparrows, human-friendly birds, who also serve as indicators of air quality; bird species such as kites, crows and mynas have occupied the skies of these cities.

Human-friendly birds like sparrows and parrots mean a lot in terms of the quality of the air. If they leave a place, that simply means the quality of the environment has alarmingly declined there," says Abdul Razzaq Khan, a Karachi-based ornithologist.

Leaving big cities, according to Khan, cannot save sparrows either, as they fall prey to predatory birds.

Rapid drop in nesting

According to the latest surveys, Khan said, the sparrow population has dwindled 40% in Karachi, Lahore and other big cities over the past decade.

The cutting of trees and destruction grasslands for lumber and construction purposes, on the one hand, has deprived these birds of their nesting places and proper diet, whereas the increasing pollution and garbage sites on the other have led to increases in the populations of "opportunistic" birds like kites, crows and mynas.

This has also led to the emergence of vast populations of non-native trees, like the *Conocarpus*, mesquite, and eucalyptus, though these carry no disadvantage except that they do not provide nesting places to sparrows and parrots, experts maintained.

"The main reasons behind the disappearance of sparrows from big South Asian cities like Mumbai, Kolkata, Karachi, New Delhi and Lahore is loss of habitat and changes in the traditional architecture that allowed sparrows to make their nests in the holes, roofs, and crevices of old houses, replaced by modern architecture that introduced box-styled flats that provide no (shelter) for sparrows to nest and lay eggs," said Amita Kanaujia, a professor at the Zoology Department of Lucknow University.

There are a few studies in the European countries which have tried to evaluate the effect of Mobile Towers on House Sparrow population. But the results are not convincing enough to jump to conclusions that Mobile Towers are responsible for House Sparrow decline. In India, there is no scientific proof to believe that Mobile Towers are a factor in the decline of House Sparrows.

Global trend

Mohammed Dilawar, president of the Nature Forever Society, an Indian organization working for the conservation of house sparrows, observed that the bird's declining population is not only observed in India but is a global trend across the natural ranges of sparrows, which are spread across the Afro-Asian region and part of Europe. "From the point of harvest, there is very little scope of seepage of grains. Previously, they would eat grains by opening the gunny bags, which were made from jute. Now it has become sophisticated...All these things have led to a declining (of the sparrow population)," he went on to say.

Echoing Dilawar's observation, Rasheed said: "Sparrows are facing this decline not only in Pakistan, and there are many countries that have faced the same due to these factors."

This is all tied to rapid changes in cities and rural and agricultural areas, he added.

rajeshsharma1049@gmail.com

To many people across the world, however, the House Sparrow is the most familiar wild bird, and because of its association with humans and familiarity, it is quite popular. But for most of us, the value of the House Sparrow is only apparent when its numbers start falling, and we are no longer able to see the feisty, perky little birds that hop around so cheerfully around human habitation.

Let's hope that this little bird, which has been immortalized in song and verse in many cultures, holds its own in our country in the years to come.



Passer italiae pair.

#TESTING

Steroid Shot To Ease Neck Pain

Injected steroids can reduce the swelling and pressure on nerves that contribute to pain.

A quick clinical test can predict which people with neck pain are more likely to benefit from epidural steroid injections, researchers report. These injections deliver drugs directly around the spinal nerves to stop nerve inflammation and reduce pain. The uncomfortable injections are a common treatment for neck pain, but can cost hundreds of dollars each, carry risks, and help only a minority of patients, studies show. A new variation on physical exam, as described in the journal *Mayo Clinic Proceedings* among 78 people with neck pain, could help guide best use of the treatment.



"Until now, it was really a 50/50 coin flip whether an epidural steroid injection would help any given neck pain patient," says Steven P. Cohen, professor of anesthesiology and critical care medicine at Johns Hopkins University School of Medicine.

"We looked at many different variables and believe we've figured out a quick and reliable way to provide patients with much more accurate, personalized information on their chances of getting better, and actually improve their odds of treatment success."

According to the American Medical Association, neck and back pain are among the ailments that incur the highest amounts of total health care spending in the United States. Each year, doctors administer more than 10 million epidural steroid injections for back and neck pain. Injected steroids can reduce the swelling and pressure on nerves that contribute to pain. However, the underlying causes of back and neck pain are diverse, and not all patients experience pain relief from the injections. As a result, the procedure is facing increased scrutiny by hospital systems and insurers, fuelling a search for ways to better identify patients most likely to benefit. In the new study, Cohen and collaborators adapted Waddell signs-a group of eight physical signs, named for the physician who developed them, more than 50 years ago, as a tool to identify patients whose back pain may not be due to physical abnormalities that can be treated surgically-for neck pain patients.

The signs, which can be assessed in a few minutes by a clinician, include checking for tenderness, overreaction to light stimulation,



weakness not clearly explained by any physical injury or abnormality, pain that disappears when the patient is distracted, and pain that extends beyond expected areas of the body. "These physical exam manoeuvres are incredibly simple to perform and easy to identify," says Cohen.

For back pain, Waddell signs are used primarily to determine whether back pain is non-organic (not associated with a direct anatomic cause). Previously, many clinicians interpreted these signs as indicative of malingering or psy-



chological factors. More recently, however, researchers have shown that such non-organic signs may also point to complex underlying causes of pain. In general, studies have shown that back pain patients with more Waddell signs are less likely to benefit from treatment.

To conduct the new study, clinicians examined 78 neck pain patients for the eight non-organic physical signs before treating them with epidural steroid injections. Overall, 29% (23) of the patients showed no non-organic signs; 21% (16) had one non-organic sign; and 50% (39) of patients had two or more signs before injections.

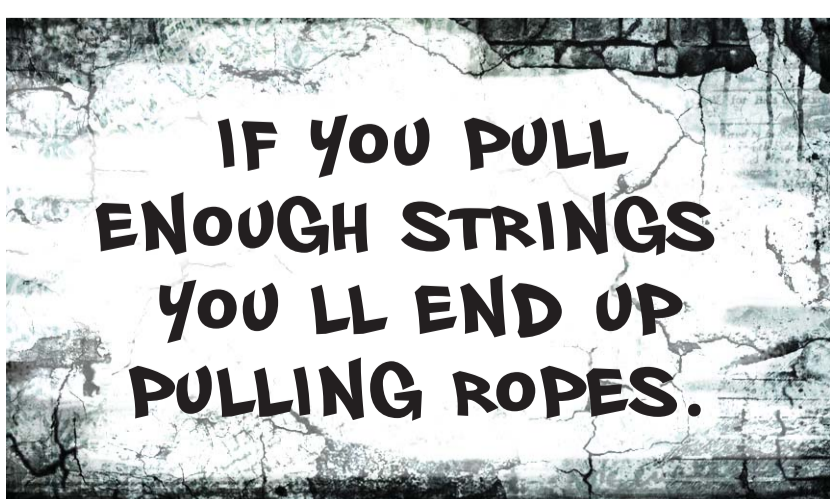
One month later, patients whose pain was still decreased by the epidural steroid injection had, on average, just 1.3 non-organic signs, while those whose pain was not decreased at the one-month mark had, on average, 3.4 non-organic signs. Some of the individual Waddell signs were highly correlated with a lack of response to the injections. For example, 55% of injection non-responders showed apparent overreactions to light touch, while only 11% of those helped by the injections showed this sign. The researchers also found that people with more non-organic signs associated with their neck pain were more likely to report chronic pain in other areas of the body, as well as fibromyalgia and psychiatric conditions.

Cohen says it appears that the presence of multiple non-organic signs are identifying patients who might benefit from other treatment approaches, before trying epidural steroid injections. "But further research must be done to determine the best options."

For now, Cohen says the findings can immediately help guide conversations between patients with neck pain and their doctors, when weighing the potential risks and benefits of an epidural steroid injection.

Additional co-authors are from Walter Reed National Military Medical Center, the District of Columbia Veterans Affairs Medical Centre, Seoul National University in Korea, and Johns Hopkins.

THE WALL



BABY BLUES



ZITS



By Rick Kirkman & Jerry Scott

By Jerry Scott & Jim Borgman