

New Scientist

WEEKLY 30 September 2023

EXPERIMENTAL
TREATMENTS THAT COULD
REVERSE BALDNESS

HOW TO REACH NET ZERO
FIVE TIMES FASTER

THE BEST PLACE TO
BUILD A MOON BASE

DO YOU HAVE FREE WILL?

How neuroscience could finally reveal
whether your choices are yours to make



APOCALYPSE LATER

Why we only have 250 million years left on Earth

PLUS COVID BOOSTERS / FIRST WOODEN BUILDINGS /
HOW JELLYFISH LEARN / CHAOS IN THE MILKY WAY

No3458 £6.95 CAN\$9.99



Space exploration

The best place to build a moon base

Lots of sunlight and shade will provide lunar station inhabitants with solar power and water

Alex Wilkins

AN AREA within a pair of craters at the moon's south pole is the perfect location for a lunar base, thanks to a relatively plentiful water supply and gentle slope, researchers have determined.

The south pole has long been considered a good place for settlement because its many craters experience both permanent sunlight and shade, making it possible to generate electricity using solar panels while also having icy zones to mine for water. The areas around some of the craters have been explored by lunar rovers, like India's recent Chandrayaan-3 mission.

There have been some proposals for specific settlement spots at the south pole based on the amount of sunlight they get, such as at Malapert Massif, which is in a crater at the edge of the pole, or the Shackleton crater, but crucial information on how much ice and other resources are available wasn't included.

"Now, we have a place," says Giovanni Leone at the University of Atacama in Chile. He and his team gathered all the existing data

on the distribution of water ice, slope angles and the amount of sunlight that falls on five of the moon's southern craters and ranked them. They then decided on a list of the most important criteria, such as the amount of frozen water and carbon dioxide, potential power sources, ease of access and sites suitable for communication links with Earth.

The plot near Henson crater thought to have the right amenities for a moon base

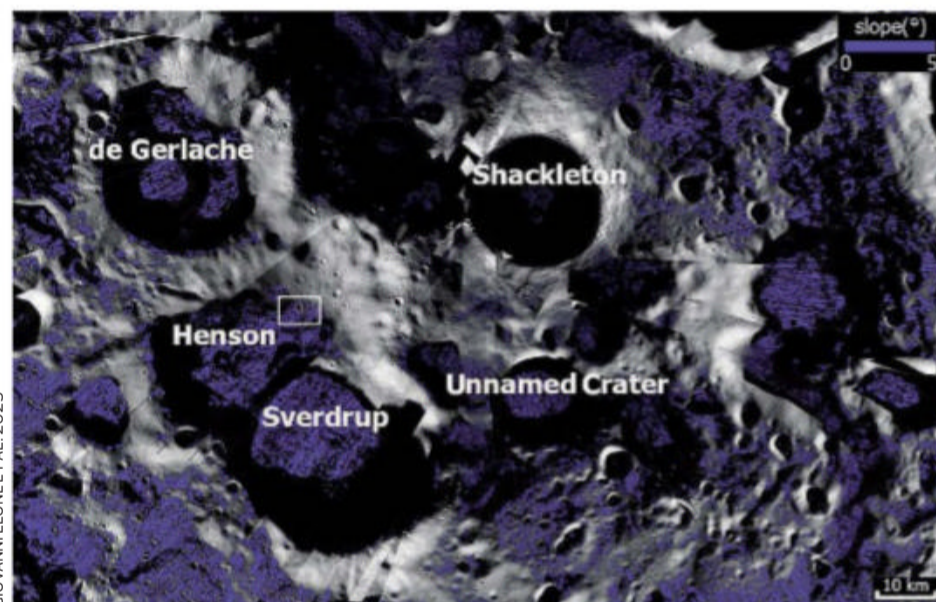
The top-rated place was an area of about 5 square kilometres within a pair of linked craters, known collectively as Sverdrup-Henson. The surface is relatively flat, making building and travel easier, and ice and minerals exist in nearby shaded zones. There are also areas of permanent sunlight, for power generation, and spots for communication links to Earth (*iScience*, doi.org/kvmf). "It's a trade-off between the water within reach and, at the same time, the base must be in light to have some

energy," says Leone. "There is a possibility to expand all around, given that there is direct access in and out of these [Sverdrup-Henson] craters."

There is still some uncertainty in the data on the craters, says Leone, and it is unclear whether there will be enough water available even in these areas that are fairly rich in ice.

The work takes into account a good amount of data and is relatively up to date, says Simeon Barber at the Open University, UK, but much of the data is from remote instruments and might not be fully accurate. "There are lots of ideas for where to build a lunar base. I think the real answers will come when we get more ground truth measurements," he says.

Upcoming missions on the moon's surface, like NASA's VIPER robot, due to land next year, should tell us more about the distribution of resources such as water and carbon dioxide. They can also tell us how difficult different regions are to drive around in, which might end up being crucial, says Barber. ■



Mental health

Therapy dogs in classrooms may boost well-being

THE use of therapy dogs in schools may improve children's mental health, encourage learning and help them fit in with their peers.

Many students struggle with learning, behavioural or emotional difficulties at school, and some experience bullying. These issues can reduce well-being and have long-term consequences, says Robert Baird at Monash University in Melbourne, Australia, with some

students going on to experience mental illness, substance abuse, social isolation and job insecurity.

Because these students tend to disengage from school, they often get little benefit from standard interventions like psychological support or anti-bullying schemes.

To investigate if bringing therapy dogs into classrooms may offer a good alternative, Baird and his colleagues turned to 118 teachers, principals, school mental health professionals and related experts with experience of therapy dogs in classrooms with age groups ranging from 5 to 18 years old.

The respondents completed a survey, mainly about the dogs' effects on students' mental health.

The educators generally considered the dogs' presence beneficial in a variety of circumstances. For example, some reported that the dogs motivate students to interact with their peers, develop friendships and learn social norms, as well as helping them learn to regulate their emotions.

"As 'non-judgemental companions', therapy dogs can also help overcome certain effects of bullying"

Children with reading difficulties also gain confidence by reading out loud to dogs, whom they trust to not judge them (*Journal of Veterinary Behavior*, doi.org/kvpv). "Being with a dog is a major incentive to engage," says Baird. As "non-judgemental companions", therapy dogs can also help overcome certain effects of bullying, he says.

The study confirms previous findings about the advantages of such schemes, says Laura Bassette at Ball State University in Indiana, helping children to improve their confidence and motivation. ■
Christa Lesté-Lasserre