BLOCKBUSTER PHYSICS: SCI-FI'S BIGGEST HITS (AND MISSES)

COSMOS

THE SCIENCE OF EVERYTHING

Issue 93

SUMMER OF SCIENCE

+

TIME-MACHINE TREES

One garden, 900 eucalypts

OUR $1M RESCUE ROBOTS

Australia rises to the challenge

INSIDE SCOOP

Ice cream chemistry

Ri Aus

93

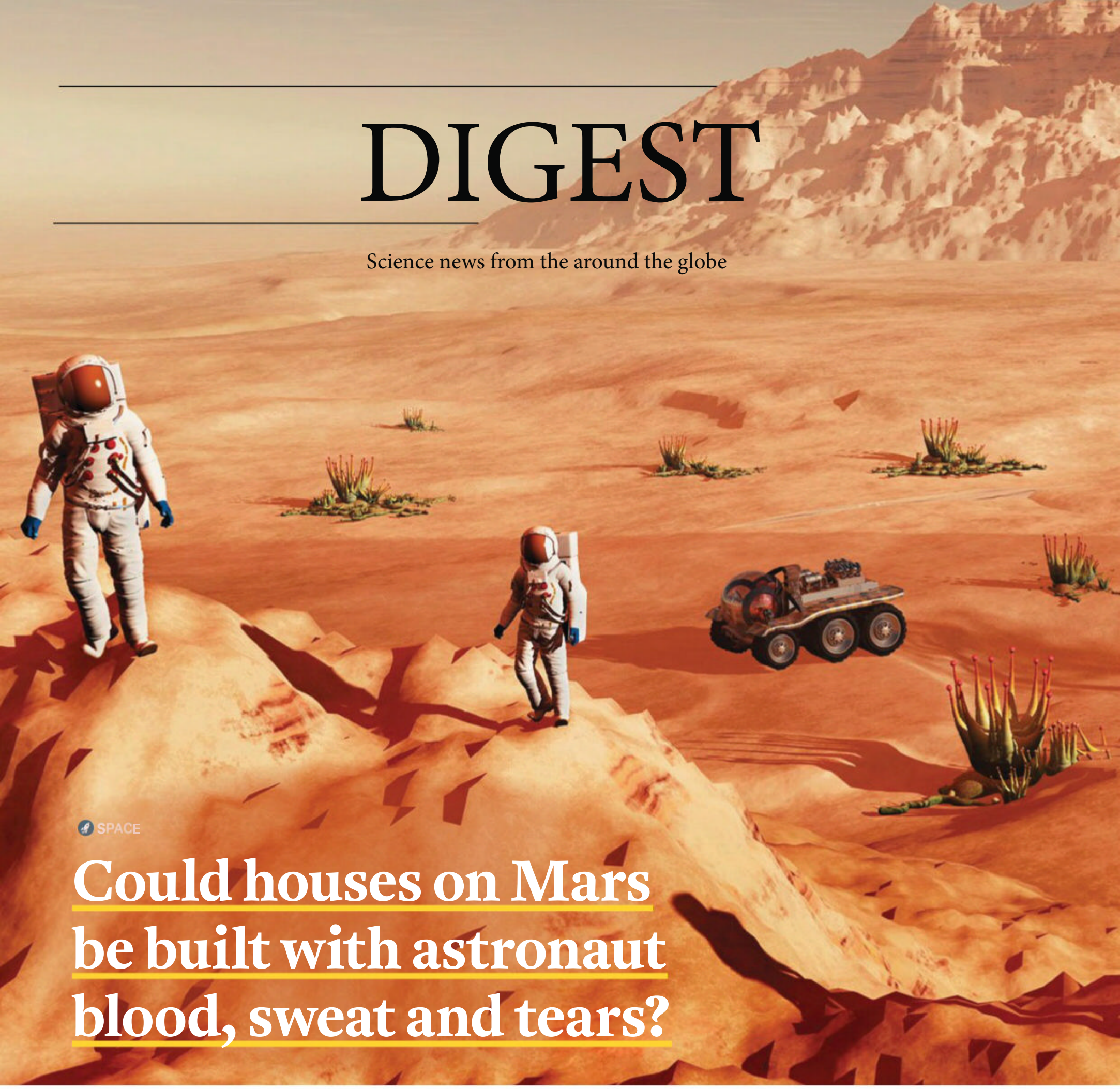
9 771832 522008

AU $15.00 NZ $16.00

ASIMOV MADE REAL? • LIFE ON MARS • MACRO GALLERY • TOOTHPASTE DECONSTRUCTED

DIGEST

Science news from the around the globe



SPACE

Could houses on Mars be built with astronaut blood, sweat and tears?

It's a bloody good day for Martian construction companies.

A dash of astronaut blood, a pinch of urine and a serving of space dust – mix it together and what do you get? Houses, according to a study published in *Materials Today Bio*.

"Scientists have been trying to develop viable technologies to produce concrete-like materials on the surface of Mars, but we never stopped to think that the answer might be inside us all along," says Aled Roberts, a researcher who worked on the project.

Moving to Mars will require huge amounts of building materials – a prohibitively expensive task if we transport all that weight from Earth.

However, this new mortar is made from human waste, easily collected on the journey to the Red Planet. The researchers calculated that a two-year, six-person Mars mission crew could accumulate enough waste to make over 500 kilograms of their material, dubbed "AstroCrete". They suggest that the resulting mortar paste could stick together sandbags and heat-fused regolith (space dust) bricks, potentially doubling the number of houses able to be built.

MARK STEVENSON/STOCKTREK IMAGES/GETTY IMAGES

▲ Artist's impression of a Martian mansion – perhaps made from, among other things, human blood.

This gruesome construction style is positively medieval in nature. Back then, builders used animal blood as a mortar binder – so, the team thought, why not try it with humans?

"It is exciting that a major challenge of the space age may have found its solution based on inspirations from medieval technology," says Roberts.

AstroCrete uses serum albumin (collected from human blood) and urea (collected from urine, sweat and tears) along with soil or rock dust. Consequently, the mixture makes mortar that is stronger than concrete and requires no imported goods.

The strength of the mixture is all in the blood. Put simply, albumin denatures – in other words, "curdles" – to form beta-sheets. These flat, layered structures bond together with enough strength to solidify, just like concrete between bricks. "The concept is literally blood-curdling," Roberts says.

Oh, and did we mention that we might even be able to 3D print the AstroCrete? The researchers simulated 3D printing with syringes. The "printed" goop solidified overnight at 65°C and maintained its concrete-like strength.

So, who is looking forward to living in blood houses on Mars?