



Geological appropriation?

Roger Dunshea questions whether manned missions to Mars are worth the cost, given technological capabilities

The pandemic-induced lockdown has given some of us more time to explore new interests. Lunar and martian geology tickled my fancy. Back in the mid-1970s, as an undergraduate at Liverpool University, I had the pleasure of examining some anorthosite samples collected during the Apollo 17 mission—NASA's final Moon landing in 1972. After collecting the samples, Dr Harrison Schmidt, the only geologist astronaut of the programme (who incidentally 'bumped' a physicist from the launch team) was filmed throwing his rock hammer far across the lunar surface!

Scientific exploration?

Last year we celebrated the 50th anniversary of the first Moon walk, when Neil Armstrong stepped off the Eagle Lunar Module. The overall aim of the Apollo programme, as stated by President John F. Kennedy in 1961, was "... landing a man on the Moon and returning him safely to the Earth". Another mission goal was scientific exploration that included the collection of lunar samples and, indeed, Neil's first action on the lunar surface was to scoop a wee pouch of Moon soil. In reality, of course, the mission was above all about politics, national rivalries and the military industrial complex. It was not driven primarily by geological and related scientific enquiry. Geology was appropriated to help justify the costly programme to the US tax payer.

Is history repeating itself? In September 2019, at a press briefing with Australian Premier Scott Morrison, President Trump exclaimed " 'Hey, we've done the moon. That's not so exciting.' So we'll be doing the moon.

But we'll really be doing Mars". In a chat about rockets and commerce, Trump signalled his intent for manned missions to Mars.

Robotic geologists

Over on the Red Planet, the *Curiosity* rover is still going strong on its fourth Martian year and counting. During lockdown, the *Curiosity* team, who are normally based at the Jet Propulsion Laboratory in Pasadena, California, became home workers (remote working of a scientific survey vehicle averaging 140 million miles away on the Red Planet with family in the room must be great fun). The rover is a geologist's dream machine, packed with a drill, spectrometers and the wonderfully named Mars Hand Lens Imager. The rover has now also been programmed with artificial intelligence to select its own target areas.

Curiosity is essentially a robotic geologist and has been a fantastic success in revealing the geology of Mars.

The current pandemic has fundamentally reset our thinking on the use of remote working, artificial intelligence and digitalisation in many fields—amazing technical opportunities lie ahead. With such developments, a future *Curiosity* type rover would certainly deliver much more science and for much fewer bucks than sending humans to Mars. We must guard against our science being appropriated again for tenuous political justification.

Roger Dunshea holds a number of non-executive roles in the UK public sector and his main geological interest is the Moine Supergroup.

Further Reading list available online.

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Pictures should be of print quality – please take photographs on the largest setting on your camera, with a plain background.

Precedence will always be given to more topical contributions. Any one contributor may not appear more often than once per volume (once every 12 months).

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