Roman sites to the west, Greek and Egyptian to the east, and Berber to the south. And its boundless desert is home to one of the world's largest and earliest collections of prehistoric rock art, as well as to clues to early Saharan civilizations and human movement between Africa and Europe (see *Nature* http://dx.doi.org/10.1038/news.2011.132; 2011).

For foreign and local archaeologists unable to return safely to work on such sites, the present instability is a source of extreme frustration. Yet they seem reticent to start pressing for archaeology and cultural heritage to be given attention. The revolutions in both countries mark a chance for a radical change of past structures and practices. Revitalizing archaeology in Egypt and Libya will not happen immediately, but it is not too soon to start planning. When the security situation allows foreign researchers to return to Egypt and Libya, funding agencies must be ready to boost collaborations between them and their colleagues in the host nations.

In Egypt, as the News Feature on page 464 shows, the picture for researchers was volatile even before the recent upsurge in violence. The challenge now is to get moving again what was a reasonably well functioning national archaeological service. The tourists will not be back in numbers for years to come, depriving Egypt's archaeology of precious funds. But given the nation's solid archaeology base, there are few reasons to be pessimistic about its long-term prospects.

By contrast, Libya's infrastructure is nowhere near commensurate with the size and diversity of its cultural heritage (see *Nature* http://dx.doi.org/10.1038/nature.2011.9396; 2011). Libyan researchers hope that the revolution will bring about a sea change after Gaddafi's 42-year regime, which viewed archaeology as a vestige of colonialism.

To garner public and political support, education on the significance of Libya's heritage is needed at all levels, from schools, to stakeholders living and working near sites, to politicians and business people. Plans must be drafted to reform and develop the country's archaeology, and to train abroad a corps of young archaeologists in modern techniques.

Until then, foreign researchers' input will be essential. They can also play a key part in helping to counter the immediate threat to Libya's heritage posed by the likely reconstruction boom in housing, infrastructure and the oil industry. Libya urgently needs to be surveyed to map all of its heritage sites accurately, catalogue their contents in databases, and then protect the densest concentrations with national parks. Its archaeological services have none of this — when NATO asked for GPS coordinates for the most important sites, to avoid them in airstrikes, no list existed and researchers worldwide scrambled to assemble a rough guide.

"Revitalizing archaeology will take time, but it is not too soon to start planning."

Libya's revolution marks a diplomatic success for NATO, and for France, the United Kingdom and the United States in particular. If researchers put forward sensible proposals for cultural management, they may get more political support from those international politicians who helped topple Gaddafi than they think. Oil firms operating in Libya should also fund projects and help to preserve sites, as some already are by sharing their maps.

The new leaders in Libya and Egypt inherit nations in flux and need to establish shared goals with their people. A sense of pride in developing and protecting cultural heritage may be one small step towards that. ■

Seeing red

Latest mission to Mars promises close-up view of planet's surface.

For generations, people gazing up at Mars could only mythologize the pink sparkle in the sky. Only in the seventeenth century did telescopes pointed at the planet reveal an orb, capped in white at the poles, with a mysterious dark splotch around its middle. Centuries on still, it took a barrage of spacecraft at the dawn of the space age to prise its secrets open: ice caps that contained not just water but frozen carbon dioxide, and Syrtis Major, a dark field of lava squeezed out by long-dead volcanoes, which seemed to be regularly scoured by wind. More recent orbiters, reaching their peak with the spy-camera resolution of the Mars Reconnaissance Orbiter, have caught Mars in action today — red-handed, if you like. Streaks on crater walls that come and go with the seasons are probably the signature of near-surface water. And little flashes of colour appear as if from nowhere as tiny asteroids penetrate and expose the blue ice below.

Mike Malin, a scientist and businessman in San Diego, California, has been a constant witness to this steady march of knowledge. Indeed, as the News Feature on page 460 makes clear, he made much of it happen, having had a hand in building the cameras on every NASA Mars orbiter that followed the 1975 Viking missions. But his cameras have not seen the surface before. Now finally, with the launch of the Mars Science Laboratory, or Curiosity, scheduled for as early as 25 November, Malin's cameras will, he hopes, at last view Mars in close-up. One of his camera systems sits at the end of the new rover's robotic arm, a microscopic imager with the power to see, for the first time, tiny grains of silt thought to exist on Mars — particles that would bear the history of billions of years of erosion from wind and water.

This is one benefit of a coordinated and sequenced NASA Mars programme. But at what cost? Getting to Mars has never been cheap. Just ask Russia, which spent US$163 million to launch on 8 November an attempt to retrieve a few cups of soil from one of Mars's moons. Now the stricken spacecraft is stuck in Earth orbit, laden with fuel: cheap as failed Mars missions go, but dearly expensive for a firework. NASA's Curiosity, at $2.5 billion, is at the luxury end of the spectrum. Part of this staggering cost is because of the checks and further checks that NASA hopes will guarantee the mission's success. But it also reflects the sophistication of the science payload, which will investigate whether ancient watery environments may have been suitable for life.

Still, NASA has largely danced around the question of whether it will pursue Martian life itself. Last week, before the US Congress, Mars exploration advocates were explaining their next steps — a joint plan with the European Space Agency — and how this question would finally be addressed. A planned orbiter in 2016 would sniff for trace amounts of methane, a potential biosignature. And then in 2018 a rover would land and drill to see if microorganisms have been living beneath the surface. This rover would also grab bits of rock and soil as the first stage in a three-pronged plan to bring samples back to Earth, a long-term priority for Mars scientists.

But sample return of any sort is expensive. One credible assessment from the National Academies' decadal survey review puts the costs of a three-stage Mars sample return at as much as $8.5 billion. That is why budget minders for the administration of President Barack Obama are rightly concerned about embarking down this road — $8.5 billion happens to be roughly the price tag for a similarly ambitious mission, the James Webb Space Telescope, a successor to the Hubble Space Telescope. But the Webb telescope at least buys diversity: the ability to investigate millions of galaxies and stars, and even to look for the atmospheric biosignatures of planets not too much larger than Earth. A Mars sample return buys you a few rocks from one specific place. After Viking, in the late 1970s and early 1980s, NASA — exploring space during a terrestrial economic slump and a time of post-Apollo drift — did not launch a Mars mission for almost a generation. And that is why Curiosity, for all its prowess, may also be the last in the current line of landed robotic Mars missions. Godspeed, Curiosity. ■

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