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Striking gold

Can modern analytical methodology help in prospecting for gold? The answer is maybe, according to the results of a study by Santosh *et al.* (page 534). The group of Indian and Japanese researchers report a study of gold grains from laterites of the Nilambur region in northern Kerala using proton-induced X-ray emission (PIXE) analysis. In this region, besides the primary gold deposits, gold occurs at economic grades as dust, grains or nuggets in weathered laterite. The fineness (or purity) of gold is defined as a function of the proportion of gold and silver. Native gold often also contains copper and sulphur. Now Santosh *et al.* report that PIXE spectra of gold grains from the Nilambur laterites contain evidence of the presence of iron and titanium, but silver and copper are nearly absent. This leads them to suggest that secondary chemical processes accompanying natural weathering can lead to gold enrichment. Their optimistic conclusion is that such studies could have 'important implications in formulating exploration strategies for gold in the extensive laterite cover constituting vast expanses of peninsular India'.

Stable-isotope signature

Ground water can originate in rain water directly or in fresh surface water, or from remnants of marine water locked up during formation of a marine sedimentary bed. Ground water may even be ancient and may have undergone changes in composition. Can sophisticated analytical techniques help in clarifying the origin of ground waters? R.

Ramesh and R. A. Jani compare deuterium (D) and oxygen-18 (^{18}O) compositions of ground water samples from the Lakshadweep Islands with those of worldwide precipitation samples collected and analysed by the International Atomic Energy Agency (page 537). Two mass spectrometers were used to determine D and ^{18}O compositions of water from open dug wells. The slope of the best-fit line for the samples is similar to that of the world rain water line. The authors conclude that ground water in Lakshadweep originates mainly from local precipitation with little or no intrusion from sea water. Such studies may indeed help in identifying the origin of ground waters, a problem of some geological interest.

Nobel prizes 1991

The annual award of the Nobel prizes is usually preceded by speculation and followed by analysis of the contributions recognized by the Nobel committees. The names of the recipients of the physics, chemistry and physiology or medicine awards for 1991 have come as no surprise to the connoisseurs of these fields. The physics laureate, Pierre-Gilles de Gennes (page 497), has been one of the foremost condensed-matter theorists of recent times, with a wide-ranging impact on fields as diverse as liquid crystals and polymers. Richard Ernst (page 498), who has been awarded the prize for chemistry, has spearheaded the revolutionary transformation of NMR spectroscopy from a powerful analytical tool in chemistry to an indispensable technique in biology and medicine. Erwin Neher and Bert Sakmann (page 502) have

received the prize for physiology or medicine for their invention of the patch-clamp technique, which allows study of the electrical properties of single ion channels in cell membranes. A characteristic of all three awards is the recognition of contributions that have a sweeping interdisciplinary impact.

The Garhwal earthquake

The earthquake that rocked the Garhwal area in Uttar Pradesh on 20 October (page 503) provided a sharp reminder that seismically active zones run through several parts of India. Although classified as a moderate earthquake on the Richter scale, the loss of life and property in the affected regions has been appreciable. Earthquake prediction remains a matter of intense discussion among seismologists. While few would hazard a guess as to when and where a quake is likely to occur, the cataloguing of seismic events adds to a growing record that is useful in modelling and studying seismic activity. Work in the area of earthquake prediction goes on in many centres in the world, including India. The older empirical approach to earthquake prediction based on observations of patterns of seismicity has not been successful. An actively pursued approach today is that of probabilistic hazard assessment, which is based on records of past seismicity, current seismicity, fault mapping and knowledge of local geology. Because earthquakes are so destructive and a warning is likely to result in a costly evacuation, research aimed at finding a reliable earthquake-prediction method is of high priority.