Can honeycomb weathering be ET?

from Peter J. Smith

SOME months ago (*Nature* 298, 121; 1982) I drew attention to George Mustoe's study of honeycomb weathering in the arkosic sandstone of the Chuckanut Formation, Washington state. Honeycomb weathering is the evocative name given to the pattern of small (up to 10 cm) cavities found on the surface of various rock types around the world. The phenomenon is easier to name than to explain, however. After rejecting a number of both plausible and exotic mechanisms put forward for consideration over the past 80 years or so, Mustoe (*Bull. geol. Soc. Am.* 93, 108; 1982) concluded from a detailed study that the honeycomb weathering of the coastal Chuckanut Formation was due to the physical (as opposed to chemical) action of salt crystallization. Salt crystals from spray evidently cause differential erosion, producing cavities that are prevented from growing and coalescing by a covering of algae.

As I said at the time, what goes for the

Chuckanut may or may not go for honeycomb-weathered rocks elsewhere, not least for those at arid inland sites where sources of salt are less conspicuous. What I had in mind were sites elsewhere on Earth. However, J. Garvin of Brown University, Rhode Island, has written to point out that honeycomb-type patterns also occur on rocks beyond the Earth. The accompanying NASA photograph, provided by Garvin, shows pitted rocks at the Viking Lander 2 site (Utopia Planitia) on Mars. The boulder near the centre, which may be basaltic, is about 23 cm long; and the pits in it are typically less than 1 cm long.

The most obvious possibility is that the pits are vesicles — cavities formed by the

trapping of gas bubbles during solidification of the rock. On the other hand, as Garvin *et al.* have previously pointed out (*The Moon and Planets* 24, 355; 1981), pits, flutes and other types of cavity occur so frequently in martian rocks that weathering by wind must be regarded as a highly probable cause. There is even some evidence for solution (water-assisted) erosion. Under the circumstances, Garvin considers it far from impossible that saline frosts at Utopia Planitia (48°N) could produce honeycomb weathering much as it is produced in terrestrial rocks. □

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chromosome translocations and deletions and the bands containing oncogenes, one cannot assume that this relationship is invariant. Two sets of preliminary data suggest that *c-fes* and the 15;17 translocation noted in acute promyelocytic leukaemia (APL)³² may be unrelated. First, *c-fes* appears to be located in band 15q24-25 (ref. 29). Although the breakpoint in chromosome 15 in this translocation has been localized to various bands, including q24-q25, our current interpretation is that it is in q22 (J. Rowley, unpublished). If this breakpoint is correct, then *c-fes* is at some distance from the band involved in the 15;17 translocation. Second, Sheer *et al.*³³ have determined that the 15q⁺ translocation chromosome does not contain *c-fes*, which presumably has been translocated to chromosome 17. Based on the complex variants of the simple translocations seen in leukaemia and lymphoma, I proposed that, in APL, the 15q⁺ chromosome was the critical recombinant³⁴. This prediction has been correct, up to now, in the only two translocations for which data are available; thus, the 14q⁺ chromosome and the Ph¹ chromosome were predicted to be the essential recombinants in Burkitt's lymphoma and CML respectively, and each is the recipient of DNA containing an oncogene.

In the future, we will see the

chromosome localization of the remaining oncogenes, as well as that of the other transforming DNAs that have been identified by transfection assays. The mechanism or mechanisms by which translocations or deletions of chromosomes containing cellular oncogenes are related to malignant transformations are unknown, although there is evidence that malignant transformation is a complex process that is

the result of the interaction of several genes. When the nature of the functional alterations of oncogenes is clarified, the role of chromosome aberrations in cancer, which has been a puzzle since the time of Boveri³⁵, may finally be resolved. □

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