genetic comparisons of closely-related species or populations of a single species. Differences between vertebrates and invertebrates are too many and too intangible to be valuable in this type of comparison.

VAN DER WAALS

## Honoured Again

from our Statistical Mechanics Correspondent

VAN DER WAALS'S own university of Amsterdam celebrated the centenary of the publication of the famous equation by organizing a conference on statistical mechanics (under the auspices of the International Union of Pure and Applied Physics) which took place between August 26 and 31. It was on altogether a larger scale than the Centenary Conference held at the University of Kent in April (see *Nature*, **243**, 263 ; 1973), the programme of which was practically confined to liquids and critical phenomena.

The main emphasis of the conference was on the fields opened up by van der Waals—the equation of state, corresponding states and scaling laws, mixtures and surface tension. It was possible to hear all the invited papers (if not all the contributed ones), which should retain their interest as surveys for many years to come. One was continuously reminded that science almost never advances in the clean and tidy way that might be imagined from a superficial reading of its history.

For example, J. de Boer (University of Amsterdam) and M. J. Klein (Yale University) showed what a gross error it would be to say that van der Waals simply used some then current ideas to give a nice interpretation of the work of Andrews. In fact, van der Waals's real roots go back to Laplace and Newton. J. M. H. Levelt-Sengers (US National Bureau of Standards) recalled that discrepancies between experiment and the van der Waals critical exponents were known in 1900, but had to wait until 1965 for a satisfactory interpretation. Scaling laws and their possible origins were discussed by B. Widom and K. G. Wilson (both of Cornell University). J. L. Lebowitz (Yeshiva University) showed that the equilibrium van der Waals equation can now be rigorously derived, but that serious doubts remain about the metastable regions of the van der Waals loop, which were also discussed by J. S. Langer (Carnegie-Mellon University).

Difficulties become even more severe when attempting to discuss apparently simple transport phenomena in a fluid, as was shown by P. M. Résibois (Free University, Brussels) and by B. J. Alder (University of California, Livermore). R. B. Griffiths (Carnegie-Mellon University) discussed the new phenomenon of a "tricritical point" that occurs with mixtures, E. M. P. Guyon (University of Paris, Orsay) described instabilities in liquid crystals and E. B. Smith (University of Oxford) surveyed present knowledge of intermolecular potentials, the raw material of theory. Exactly soluble models of phase transitions were reviewed by E. H. Lieb (Massachusetts Institute of Technology) and melting, obviously a much more complicated phenomenon than evaporation, was dealt with by H. Mori (Kyushu University) ; this last contribution provoked a lively, but quite friendly, discussion. J. van Kranendonk (University of Toronto) showed what detailed information is now available from spectroscopy about mechanisms of collision, induced dipole moments and the formation of bound complexes.

A sad note was struck by the contribution on specific heats by A. V. Voronel (USSR) (read in his absence by C. Domb) which called attention to the difficulties caused by gravity (not fully appreciated until the 1950s), the necessity for stirring and surprisingly that, from the point of view of deriving critical exponents from experimental results, it can matter very much which of several possible alternatives one chooses as the definition of the "order parameter".

OPHIOLITES

## Troodos as Arc Volcano

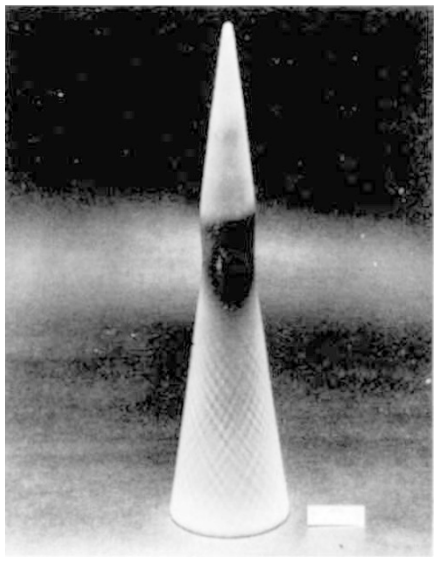
from our Geomagnetism Correspondent

THE search for evidence to support the idea that the Troodos Massif of Cyprus is an upthrust fragment of ancient ocean floor has been going on for more than a decade. During this period there have been several individual disappointments and setbacks, although the chief problem has been not so much the unwelcome discovery of evidence conflicting with the ocean floor hypothesis but the inability to obtain data giving unequivocal support. As a result, the hypothesis has had few, if any, active opponents, and most people with an interest in the situation have been content either to suspend judgment or to accept the circumstantial evidence.

But this happy consensus has now been broken by Miyashiro (*Earth planet. Sci. Lett.*, **19**, 218 ; 1973), who argues against one of the basic concepts involved. The Troodos Massif is, of course, an ophiolite complex ; and in recent years it has come to be accepted, at least by supporters of plate tectonics, that ophiolite complexes were formed at oceanic ridges. Miyashiro, however, has carried out an analysis which, he claims, shows that the Troodos rocks are chemi-

## Turbulent Gas Flows on the Moon

THE idea that surface markings on some parts of the Moon were produced by supersonic turbulent gas flows is re-examined in next Monday's *Nature Physical Science* (September 24) by Rehfuss and Larson. It has been previously thought that these lineations were produced by outgassing ; recent work by Rehfuss, however, pointed to an association with gas produced in vaporization during meteor impacts (*J. geophys. Res.*, **77**, 6303 ; 1973). The second possibility now seems to be supported by a pattern of cross-hatching found at Silver Spur, a feature near the Apollo 15 landing site.



Cross-hatching ablation pattern on teflon surface produced during tests at Marshall Space Flight Center.

Diamond shaped patterns, or cross-hatching, are a common feature of wind tunnel ablation studies (see figure) and are also found on recovered flight vehicles. Such patterns also occur on the Moon, notably where two sets of lineaments intersect about 20 km south of the Apollo 15 landing site, suggesting strongly that the area has experienced supersonic turbulent flow. Such a flow can be produced in the expanding gas cloud which forms when a meteorite strikes the Moon at a speed above 16 km $s^{-1}$, regardless of the size of the meteorite.

Clearly, if the model is correct then there should be a young crater near to the Silver Spur cross-hatching. Rehfuss and Larson discuss the plausibility of the candidature of several nearby craters, and suggest that the best possibilities are Aristillus, Autolycus and Aratus. If any of these three craters was produced by a meteorite impacting at sufficiently high speed the impact could have produced the required turbulent flow at Silver Spur.