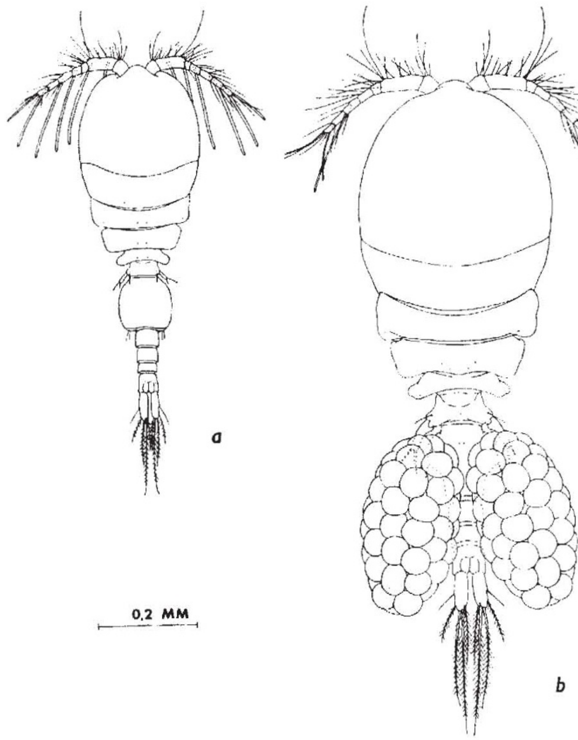
shifts the balance in favour of a mechanism whereby lead is supplied from some outside source.

He suggests that the external source of lead is oceanic sediment. Japanese tholeiite contains three times more lead than abyssal tholeiite; oceanic sediment contains more than a hundred times as much. A few per cent of oceanic sediment mixed with abyssal tholeiite would thus be sufficient to simulate Japanese tholeiite and would, furthermore, produce the correct proportions of uranium, thorium, sodium, potassium and other elements. This is where the tectonics comes in. As the oceanic lithosphere with sediment cover sinks below the Japanese island arc, partial melting could cause some of it to enter the tholeiitic basalt magma, thereby increasing its content of lead. As thrusting gets deeper in the eastward direction, the amount of partial melting of the underthrust plate near the operative magma reservoir would decrease and with it the quantity of lead entering the magma. The east–west variation of isotopic composition would be a consequence of different mixing ratios of the thrust lithosphere and the original upper mantle material beneath the island arc. This explanation is not unique, but is compatible with the underthrusting of the Pacific plate. Conversely, the underthrusting theory may be regarded as the factor which preferentially favours Tatsumoto's hypothesis at the expense of many other possibilities.

INVERTEBRATES

Cyclops in Full

THESE two creatures, members of a group commonly known as cyclops, are the male (*a*) and female (*b*) of the copepod species *Kelleria pectinata*, which, together with the similar species *K. regalis*, has recently been fully described for the first time. A. G. Humes and Ju-Shey Ho, who describe the two species in the *Bulletin of the British Museum* (*Natural History*), *Zoology*, **18**, No. 17; 1969, found their specimens in water pumped from intertidal burrows in north-western Madagascar. This is the first time that the male of *K. pectinata* has been found.

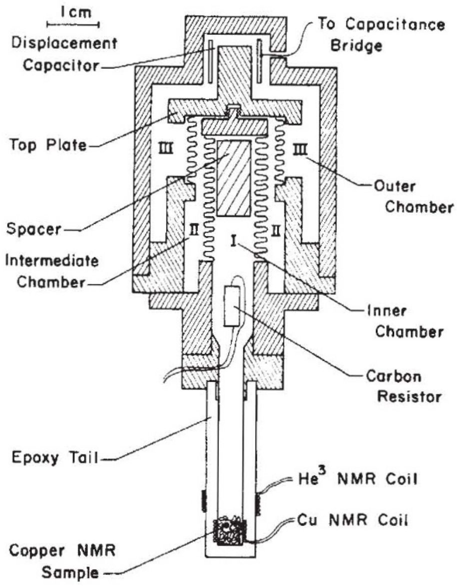


MAGNETISM

Helium-3 Explored

from our Solid State Physics Correspondent

IT seems clear now that the predictions of L. H. Nosanow and W. J. Mullin and others on the magnetic properties of solid helium-3 were well founded. Two independent experiments in the United States have produced firm evidence that solid helium-3 is indeed an antiferromagnet, with a Weiss temperature up to 3 mK. J. R. Sites, D. D. Osheroff, R. C. Richardson and D. M. Lee of Cornell University have cooled a sample of helium-3 to about 2 mK using helium-4 and a system of bellows (*Phys. Rev. Lett.*, **23**, 836; 1969) and have measured the temperature dependence



The compression apparatus used by Sites *et al.* for cooling helium-3.

of the susceptibility of the helium-3 down to about 6 mK. They have come to much the same conclusions as W. P. Kirk, E. B. Osgood and M. Garber at the Brookhaven National Laboratory in New York, who used the more conventional method of cooling by demagnetization to study the magnetic susceptibility between 5·3 and 800 mK (*Phys. Rev. Lett.*, **23**, 833; 1969).

Solid helium-3 is exceedingly compressible, and so the exchange integral J must be a function of the molar volume. Kirk *et al.* measured the susceptibility at various molar volumes and found that the Weiss constant was always negative and varied between about 0·5 and 3 mK for the volumes considered. This was taken to correspond to Neel temperatures between 0·3 and 2 mK. Sites *et al.* took their measurements at a pressure of 34 atmospheres and obtained a Weiss constant of 3 mK.

The important features of both experiments are the methods used to reach these extremely low temperatures—the lowest non-nuclear temperature ever reached