$-100°$ C, compared with the nuclear magnetic resonance time scale. Last year (*J. Amer. Chem. Soc.*, **90**, 3882; 1968), Olah's group at Case Western Reserve University brought Raman spectroscopy, with its much shorter time scale, to bear on the problem and concluded that the norbornyl cation showed a much closer structural similarity to nortricyclene than to norbornane. But equilibrating edge-protonated nortricyclenes (3) seemed to fit the data as well as did (2). Olah and White have now found support for these two alternatives in ^{13}C chemical shift data (*J. Amer. Chem. Soc.*, **91**, 3954; 1969). More significantly, the same workers, utilizing a mixed solvent system, have found it possible to record ^{1}H nuclear magnetic resonance spectra at temperatures as low as $-154°$ C. In these conditions the hydrogen migration is frozen out, and the presence of two equivalent pairs of protons revealed. This is consistent with a rapid equilibration of (1A) and (1B), or with one of structures (2), but is incompatible with (3) (*ibid.*, 3956). The combined data, therefore, argue very strongly in favour of non-classical structures (2). The pentacoordination of carbon in (2) is reminiscent of that in the dimer of trimethylaluminium.

Olah argues that structures (2) also represent the cationic intermediate formed in solvolyses of norbornyl derivatives. In addition, his group have extended their spectroscopic studies to substituted norbornyl cations, and it seems that 2-methyl-2-norbornyl cation exhibits appreciable σ-bond delocalization, but in 2-phenyl-2-norbornyl cation the charge is localized as in a benzyl cation (*ibid.*, 3959).

It remains to be seen whether these compelling new conclusions will stand up to unsympathetic scrutiny.

NUTRITION

A Salty Tale

from a Correspondent

SALT licks excavated by elephants in the Wankie National Park, Rhodesia, during the dry season may represent a social centre of elephant activity comparable with the watering holes or pans at which they congregate in the evening. The licks contain a high concentration of sodium, which obviously gives them nutritive value. Brown extracts of lick soils smell strongly of stale elephant faeces and urine—a feature which may help elephants to detect sodium-rich soil regions during successive years. Nobody knows whether the organic matter in the licks is of any value to the elephant's digestive system.

Elephants excavate the licks by pounding the soil with their fore toes and shoving material into their mouths with their trunks—they appear to hold the soil by twisting the tip of the trunk into a loop. The licks, which may be 0·5 to 1·5 metres deep and 3·0 to 25 metres across, are used chiefly during July to November, although there is some indication that elephants prefer drinking water which accumulates in the licks during the wet season. The licks occur most commonly either in the centre of flat, grassy patches some hundreds of metres in diameter or at the edge of such grassy patches where the ground slopes downwards towards a pan. They are sometimes formed at the base of termite mounds.

J. S. Weir, of the Department of Biological Sciences, University College of Rhodesia, has analysed the chemical composition of salt lick soils in the north-east section of the park and his findings for 1959–66 are reported in the latest issue of the *Journal of Zoology* (**158**, 293; 1969). Salt licks have a higher concentration of water-soluble sodium than normal soils from the area, the "active" face of the lick at a depth of 0·5–1·0 metre having the highest concentration. In the absence of sodium, the minerals magnesium, calcium and potassium may be developed to a slight extent as licks, and Weir has found that termite mounds, which have high concentrations of these minerals, are occasionally used as licks by elephants, but not if adjacent soils have a higher sodium content.

Aqueous extracts of salt licks have a brown colour, the intensity of which is proportional to the sodium content. This brown matter, which smells of elephant faeces and urine, seems to be a derivative of elephant dung deposited on the licks—the quantities deposited being much higher than those found in other parts of the park. Weir says this could imply that elephants spend proportionately more time on salt licks than elsewhere or that their behaviour while on the lick is in some way different from normal. Thus the licks must play a significant part in the social life of the elephant. Superficial examination of the brown extract indicated a sodium salt complex of humic or hymatomelanic acids derived from dung, and the smell could well play some part in the detection of sodium concentrations in the soil from year to year. This hypothesis is strengthened by the absence of the brown colour from regions with a high sodium content but which have not been developed as licks.

Weir says the intensity of the present usage of salt licks by elephants is causing localized soil erosion, which could result in the filling of many clay pans with coarser sands within twenty or thirty years.

PROTEIN SYNTHESIS

Things that go Bump in the Cell

from our Molecular Biology Correspondent

THE notion has been current for some time that the polysomes attached to the endoplasmic reticulum of mammalian cells manufacture proteins for export, whereas those in the cytoplasm make only intracellular proteins. There is now some experimental support for this idea, and indeed a further example has just appeared (Takagi, Tanaka and Ogata, *J. Biochem.* (Tokyo), **65**, 651; 1969). These workers reported earlier that only the microsomes of rat liver could be shown to synthesize serum albumin in a cell-free system. They now show that this also holds *in vivo*. They administered a pulse-label of ^{14}C-amino-acids, and followed the appearance of radioactivity in the ribosomal fraction, released by treatment with EDTA. A steep maximum occurred at one to two minutes. Extraction of the nascent protein chains, followed by assay with an antiserum to rat albumin, showed that the growing albumin chains were confined to the microsomal fraction. (Related results, it may be noted, were described by Redman and by Hallinan *et al.*).

It is only the extracellular proteins that are subject to extremes of environmental conditions, especially *p*H, and it is presumably for this reason that disulphide bonds occur in these, rather than intracellular enzymes