during the period 1950–1970. But the average property toll has now risen to more than \$50 million per annum, an annual loss reached only twice before 1965 (in 1953 and 1957); and it is easy to see why. In Florida, for example, only a few years ago tornadoes would cut wide paths but encounter little more than sand and scrub. Now the same region is likely to contain tightly packed housing, commercial properties, trailer parks and numerous other trappings of civilization—so tightly packed, in fact, that the tornado which struck Titusville on March 5 last caused damage of more than \$1 million in only 1.9 miles. Actually, the total damage to property in 1970 was several times the average trend chiefly because of the \$135 million toll from the Lubbock, Texas, tornado of May 11, 1970.

The other natural disaster to which the United States is particularly prone is, of course, the earthquake; and 1970 was a bumper, but deathless, year for those too. A total of 238 quakes was felt in fourteen states; but this was the fifth, though final, successive year with no fatalities. Before the southern California earthquake of February 9, 1971, which killed sixty-four people, the most recent deaths from earthquakes were the seven in Seattle in 1965. In 1970, however, California led the stakes with 130 earthquakes. Alaska came second, as usual, with sixty-eight; but in view of the thinly populated areas there many quakes probably went unrecorded or unfelt.

VENUS

Surface Properties

from a Correspondent

AFTER all the ballyhoo over the Apollo programme it is encouraging to learn that probing the solar system with a ground-based radio telescope can still yield valuable information which is complementary to spacecraft experiments. Such is the case with Venus, where, in spite of the great strides in knowledge of the planet's upper atmosphere obtained by the Mariner and Venus probes, understanding of its surface remains obscure. This region can, however, be explored by radar and radio techniques, and recently two Cambridge astronomers, R. W. Hall and N. J. B. A. Branson, have published a high resolution map of the 6 cm radio emission from Venus (*Mon. Not. Roy. Astron. Soc.*, **151**, 185; 1971).

At a wavelength of 6 cm, most of the radiation seems to come from the Venus atmosphere, and the degree of linear polarization is less than 1 per cent. Hall and Branson have dovetailed their new radio results with temperature and pressure profiles of the upper atmosphere

obtained by Venera V and VI. Adiabatic gas models can be fitted to the 6 cm brightness temperature, and the Venera data are used as a guide to the atmospheric parameters at a height of 20 km.

The best model atmosphere consistent with all the observations has a surface pressure of 110 ± 15 atmospheres, a surface temperature of 790 ± 20 K, and a water vapour content of 0.4 ± 0.3 per cent. Hall and Branson also tried isothermal models of the lower atmosphere but these give too low a brightness temperature at 6 cm. These workers further claim that there can be no large scale dust clouds present in the Cytherean atmosphere.

An enigmatic feature in the high resolution 6 cm map is a bright emis-

sion region 50 K hotter than the rest of the planet. The excess is too large for it to have an atmospheric origin, and it may indicate a hot spot on the surface. Nevertheless, it does not show up at lower frequencies, and so its true nature remains obscure.

LORIKEETS

Pollen Harvesting

FOR more than a hundred years, the brush tipped tongue of lorikeets, a group of birds in the parrot family, has been thought to be an adaptation for extracting nectar from *Eucalyptus* flowers and other tree blossoms.

Site of Action of Sex Hormones

THERE seem to be specific binding sites for female sex hormones on the membranes inside male rat liver cells, and specific binding sites for male sex hormones on the membranes inside female rat liver cells. And the act of binding by the "opposite" sex hormone seems to be a precondition for the arrival of polysomes at the interior membranes of liver cells and, hence, the participation of the membranes in protein synthesis. The finding is not only an unexpected twist to the story of sexual differentiation: it also brings a fresh perspective to the vexed question of the locus of action of steroid hormones.

In two articles in next Wednesday's *Nature New Biology*, B. R. Rabin and his colleagues at University College London describe how they monitored the binding of polysomes to isolated samples of liver membranes by an indirect but ingenious technique based on a membrane-borne disulphide interchange enzyme. Rabin and his group have been exploiting the fortuitously useful characteristics of this enzyme for some years now: it probably has a hand in the synthesis of proteins (such as insulin and ribonuclease) which contain several disulphide bridges in their structure, and its activity can be followed fairly straightforwardly by exposing it to an inactive form of the enzyme ribonuclease in which the disulphide bridges are randomly cross-linked, and measuring the rate of reappearance of the ribonuclease's catalytic activity (Williams, Gurari and Rabin, *FEBS Lett.*, **2**, 133; 1968).

What makes the enzyme really useful is the fact that it is situated in the membrane in or near the binding sites for ribosomes. As ribosomes or polysomes bind, they mask the enzyme's catalytic activity, and the fall in activity is directly proportional to the extent of

ribosomes binding, as independently measured by electron microscopy or RNA assay. And using the enzyme in this way, Rabin *et al.* have now shown that "smooth" membranes from rat liver cells (lacking bound ribosomes *in vivo*) can be persuaded to take up ribosomes if the female sex hormone oestradiol is added to the male membrane preparation, and the male sex hormone testosterone to the female. Simple calculation suggests that one molecule of steroid is sufficient to attach one ribosome.

And conversely, the carcinogen aflatoxin B₁ strips "rough" membranes of their *in vivo* complement of bound ribosomes (Williams and Rabin, *FEBS Lett.*, **4**, 103; 1969), and oestradiol protects male membranes against this stripping action, and testosterone protects female membranes. The "appropriate" sex hormones have essentially no action in these experiments. Rabin *et al.* have also measured directly the binding of labelled steroids to "smooth" membrane fractions from rat liver: the same pattern emerges. Membranes of each sex seem to have separate tight binding sites for testosterone and oestradiol, but female membranes bind more of the former than the latter, and vice versa. Of course the membranes may come out of the rat nearly saturated with their own sex hormone, and the group is at present investigating this possibility. But it is very surprising that the membranes should have such a marked affinity for the other sex hormone of the pair, an affinity that seems certain to have functional consequences in terms of the cell's pattern of protein synthesis. For there is considerable evidence that polysomes bound to the cell's inner membranes differ markedly from those floating free in the cytoplasm in their protein output.