heterologous systems is apparently not equivalent to proper initiation; they imply that binding assays are no substitute for characterizing the protein product and showing that the protein product is that coded by the gene.

COMMUNITY ECOLOGY

Patterns in Rain Forest

from a Correspondent

Two articles by Janzen (*Ecology*, **53**, 258 and 350; 1972) assist in evaluating the role of animals in determining the spatial patterns and numbers of species (diversity) of trees in lowland rain forest in tropical America.

Where insects have evolved the habit of feeding on only one or a few species of plant, different insects tend to select different plants. It has long been recognized that the number of such insect species which can coexist in a community must in part depend on the number of plant species present. The converse, that plant diversity may be increased by the activities of insects, is a more recent idea.

Janzen proposes a model in which seeds and seedlings of a rain-forest tree are eaten by species-specific predators which, because of their specificity, occur in populations centred on each seed-producing tree. The density of seeds declines with distance from the parent tree in a manner dependent on the method of seed dispersal, and the probability of survival of individual seeds and seedlings increases with distance from the parent and the predators associated with it. The probability of maturation of a new tree is thus close to zero both near the parent and far from it, with a peak at some intermediate distance. If this distance is great and the probability of maturation low, then the equilibrium density of mature trees is low. Very many tree species with this type of population structure can be accommodated in a community, and Janzen argues that this model, with modifications, may account for the regular (non-clumped) distributions of lowland neotropical trees and for the high tree diversities recorded from rain forests.

This hypothesis can be tested and refined by measuring seed distributions and spatial patterns of germination, maturation and predation for individual populations of several tree species. Two such studies broadly corroborate the model.

In a Costa Rican deciduous forest, Janzen found that seeds of the tree *Sterculia apetala* are eaten by the bug *Dysdercus fasciatus*. Immature seed pods are cut open by parrots and squirrels and the seeds are eaten. Later, as the pods begin to split, smaller birds and *Dysdercus* can gain access. Janzen noticed that populations of *Dysdercus*, perhaps founded by individuals which had survived on trees fruiting out of synchrony with the majority, built up so rapidly that seeds falling under the parent tree were attacked within a few minutes, whereas those placed (experimentally) at distances of 60 m or more were very unlikely to be discovered. The seed pods contain stiff hairs which adhere to the bodies of arboreal mammals, and reproduction of the tree apparently depends on the dispersion of mature pods by these mammals, who open them and drop some of the seeds.

In a second study on the island of Puerto Rico where seed-eating vertebrates are scarce, palm trees (*Euterpe globosa*) were found to have a fruiting season which is strictly synchronized between individual trees. This enables early seeds to escape predation while the density of seed-eating scolytid beetles builds up. Later, most of the seeds were eaten but not before many seedlings had become established around the parent trees. This palm thus occurs at a much higher density than that typical of rain-forest trees. Where this type of situation is widespread, one would expect the tree species composition of the forest to be dependent more on competitive relationships between plants and less on the nature of specific plant–insect interactions.

TOXICOLOGY

Mercury Intoxication

from a Correspondent

AGAINST the background of anxiety about hazards from hard metals, several features of mercury intoxication were described at a colloquium organized by the Biochemical Society at the University of Surrey, Guildford, on July 20.

The first part of the programme dealt with the effects of mercury in the

New Data on Interstellar Gas

THERE has recently been much interest in the properties of interstellar gas, one of the reasons for this research activity being that knowledge about interstellar gas is a necessary precursor to reliable theories about star formation.

Many types of observation can be used to study interstellar gas; two of the relevant parameters are the average electron density and the electron temperature. For the immediate neighbourhood of the Sun it is possible to use a combination of observations such as the difference in arrival times of pulsar signals at different frequencies or the relative intensities of the spectral lines of neutral and ionized calcium, combined with data on free-free absorption and emission. From these data Pottasch has concluded that near the Sun there are electrons in both low temperature ($T \sim 100$ K) low ionization clouds as well as in high temperature ($T \sim 12{,}000$ K) high ionization clouds; he arrives at an average electron density of between 0.04 and 0.1 cm^{-3}.

There are, however, several indications that conditions near the centre of our Galaxy are different; these cannot be studied by pulsar measurements, for instance, because pulsars can only be observed if they lie within a few kpc of the Sun. But for a study of conditions within, say, 7 kpc from the centre of the Galaxy there is the powerful method of observing various hydrogenic recombination lines at radiofrequencies. Provided the assumption can be made that the interstellar gas is in local thermal equilibrium, one can derive from the observed intensities both the electron density and the electron temperature. Earlier measurements of this kind arrived at an electron temperature of the order of 1,000 K. Next week in *Nature Physical Science* (August 14), R. D. Davies, H. E. Matthews and A. Pedlar report their observations of the 166 α line in several directions in the plane of the Galaxy.

The measurements give the intensity of the line in a given direction as well as the position of the line; from the Doppler shift of the line, as compared with its position in the laboratory, it is possible to find the region in space where the line originates, for 21 cm line data provide a distribution of gas velocities as a function of the distance from the Sun in a given direction.

Davies *et al.* observed that the recombination line emission is strongest in the central region of the Galaxy, that is, at distances less than about 7 kpc from the centre, whereas the emission from the neighbourhood of the Sun or, in general, from other regions more than 8 kpc from the centre of the Galaxy, is at least five times weaker. They also find that the electron distribution is patchy with typical sizes of the emission regions of the order of 1 kpc; the same patchiness had earlier been observed in free-free emission studies.

From the observed intensities, Davies *et al.* conclude that the electron density is about 10 cm^{-3} in the emitting regions and that the electron temperature is about $6{,}000 \pm 2{,}000$ K, appreciably higher than earlier derived values. It is interesting to note that the extensive H II regions found by the Jodrell Bank observers in the Galaxy are very similar in size and properties to the extended Hα regions observed in the inner parts of many otner spiral galaxies.