ganglion cells are only measured relative to a field within the retina as development proceeds.

The second alternative seems more likely, both because it is extremely unlikely that the retinal cells would have received, say, the correct absolute concentrations of morphogens in the flank field, and because Feldman and Gaze (*J. Embryol. Exper. Morph.*, **27**, 381 ; 1972) have recently shown that abnormal patterns of cell division within the developing *Xenopus* retina, caused by implanting two nasal half-retinas into one orbit, do not affect the specification of relative cell position within each half retina, which behave as a single field. Indeed, it is probable that this is continually respecified during development as the retina grows and its axons form connexions with the developing tectum. Any concentration or other gradients within a retina would have to increase in extent as the retina expanded and would presumably have the retinal margin as a reference zone.

ENTOMOLOGY

Resin Eaters

from our Soviet Correspondent

SOME insects live in what would seem to be most inhospitable habitats; the larvae of certain Diptera and Lepidoptera, for example, have found a niche in the resin of conifers, which they eat. Some of these resin eating larvae possess special adaptations for their mode of life; others do not. B. M. Mamaev, of the "A. V. Severov" Institute of Evolutionary Morphology and Animal Ecology of the Soviet Academy of Sciences, has found, for example (*Zh. Obshch. Biol.*, **32**, 501 ; 1972), that the resin feeding larvae of several Lepidoptera (for instance, *Evetria resinella* and *Laspeyresia zebeana*) are not protected in any special way against the liquid resin, other than by the silk cocoon which they spin as do other lepidopteran larvae.

On the other hand, Mamaev has found, from a study of conifers in the European, Central Asian and Caucasian regions of the Soviet Union, that some dipteran larvae are highly specialized for life in the conifer resin. These larvae have an integument which is impermeable to the toxic components of the resin, enlarged spiracles to maintain adequate respiration and an extra-intestinal digestive process for dealing with the substance.

Some of these resin eating dipterans, notably *Thomasiniana*, are known to have an adverse effect on the development of young conifer seedlings so that further study on the adaptations and ecology of these resin eating larvae might be economically advantageous.

AEROSPACE RESEARCH

Effects of Altered Gravity

from a Correspondent

THE impressive advances made in space flight in the past decade have prompted much research, in the United States and in the Soviet Union, on the physiological and behavioural effects of altered gravity in space. Indeed, many workers in the field of aerospace medicine believe that the present limits of exploration in space are determined more by the tolerance of human astronauts suffering long periods of inaction and abnormal gravity than by the technological capabilities of the spacecrafts themselves.

There has thus been extensive research into the effects of altered gravity; Soviet cosmonauts, for example, have recently been testing as a countermeasure the effectiveness of exercise while they are in the Earth's orbit, and the National Aeronautics and Space Administration (NASA) has also sponsored research in the field of psychology which includes not only sensory deprivation, but also experiments on the effects of altered gravity on animals. Some of the latest research in this field has now been reported by D. F. McCoy and J. P. Jankovitch, of the University of Kentucky, who, in a NASA sponsored project, experimented with rats in a high gravity environment (*J. Comp. Physiol. Psychol.*, **78**, 305 ; 1972).

Previous work by, for example, Broderson and Lange, and Clark *et al.* (*Aerosp. Med.*, **40**, 747, 850 ; 1969) has shown that hypergravity (that is, gravity in excess of 1.0*g*) can act as an aversive stimulus and animals learn to perform tasks that will reduce this gravity. The experimental gravity is artificially produced by placing animals in parabolic centrifuges, with spiral tracks along which they are free to move. According to their radial distance from the axis of rotation, therefore, the animals can adjust the magnitude of their resultant centrifugal acceleration, and thus the value of the artificial gravity they prefer best.

One problem arising from this evidence is that it is not clear whether these animals (usually rats), reared in normal gravity, were seeking the lowest gravity available in the apparatus, or were merely selecting the environment most similar to the one in which they had become habituated. An apparatus to control this effect by providing hypogravity (that is, gravity from zero to 1.0*g*) as a choice would, however, require orbital flights.

McCoy and Jankovitch had a more practical approach to the problem by rearing rats for long periods (up to one year) in a high gravity environment (2.0*g*) and then giving them preference tests over a gravity range of 1.0 to 2.0*g*. During the testing, care was taken to bank the locomotory track to ensure that the resultant gravity vector was

Basis of Stringent/Relaxed Control

THE so-called stringent response remains one of the more enigmatic regulatory systems which control gene expression in *Escherichia coli*. When wild type *E. coli* are starved of amino-acids a variety of seemingly unrelated biochemical pathways are shut down. There is good evidence to believe that the gene product of the RC^+ gene, which confers this stringency, mediates its effect by catalysing the production of an effector molecule, magic spot or ppGpp from GTP. The RC^+ gene product must therefore presumably be able to recognize GTP and there is also good evidence that the RC^+ gene product can also recognize all species of aminoacyl-tRNA.

When Cashel and Gallant first reported the discovery of ppGpp and its involvement in stringency they noted this dual specificity of the RC^+ gene product. They also suggested that the RC^+ gene product might prove to be a factor involved in the elongation of nascent polypeptide chains, for such translation factors have the required dual specificity. Hall and Gallant, as they report in next Wednesday's *Nature New Biology* (May 31), have pursued this idea and have come up with further circumstantial evidence consonant with it.

If the *RC* gene specifies an elongation factor, which, when there are plenty of amino-acids, catalyses chain elongation but which "idles" in the absence of amino-acids to produce ppGpp, RC^- mutants that have lost the ability to produce ppGpp and the stringent response should contain a mutated chain elongation factor. This factor because of the mutation might fail to function properly during protein synthesis; it might, for example, cause enhanced misreading in RC^- *E. coli*.

In particular, Hall and Gallant compared the β galactosidase made by RC^+ and RC^- cells during starvation for arginine and found that the RC^- enzyme has a lower specific activity and a greater sensitivity to heat denaturation than has the RC^+ enzyme.

Other than by postulating changes in the primary structure of the subunits of the RC^- enzyme it is extremely difficult to account for these observations which, of course, are those predicted by the hypothesis that the *RC* gene may specify an elongation factor.