This Week in
SCIENCE

Jupiter's stratosphere

FOR the past decade, measurements of the thermal infrared (methane) emissions from Jupiter have been made with the NASA Infrared Telescope at Mauna Kea, Hawaii. In the Jovian stratosphere, any variations in the methane emissions arise from variations of temperature and not from variations in methane abundance. Orton *et al.* find that the Jovian stratosphere is as dynamically active as is Earth's stratosphere (page 537). Temperatures vary both spatially and temporally, with global-scale and local variations and short-lived and long-term variations being detectable. Composite profiles of the dynamic features of the Jovian stratosphere that will be based on the methane-emission data, on data that will be obtained by the Galileo spacecraft after it goes into orbit around Jupiter in 1995, and on data that will be collected at other infrared wavelengths by astronomical cameras that are now under development should lead to a better understanding of the Jovian stratosphere itself, the effects of the stratosphere on global circulation, and the interactions of the stratosphere with the troposphere.

RNA as a transcription factor

THE cellular machinery that brings about the transcription of genes is protein; or so it was thought. In a study by Young *et al.*, a transcription factor that is not protein but RNA has been identified (page 542). The heretical RNA factor assists the enzyme RNA polymerase III in its activity of transcribing class III genes of silkworms. What will this discovery reveal about the transcription process? Will it alter understanding of how the transcription machinery has evolved? How does a research laboratory discover something this unexpected? And what, in fact, might the RNA be doing? These are some of the questions addressed in a Research News story by Hoffman (page 506).

Fullerenes

HOLLOW cage-like all-carbon molecules, fullerenes, are produced when carbon burns. Scanning tunneling microscope investigations by Li *et al.* show that when buckminsterfullerene (C_{60}) is deposited on gallium arsenide surfaces, the strong interaction leads to large stable monolayer islands of C_{60}; within each island the C_{60} molecules line up in ordered arrays in register with the substrate (page 547). Diederich *et al.* have identified four higher fullerenes, C_{76}, C_{84}, C_{90}, and C_{94}, and a stable oxide $C_{70}O$ as common products of the heating of graphite (page 548). Like buckminsterfullerene, these larger molecules have cage-like structures. Future characterizations should provide insights into novel physical and electronic properties of the fullerenes and into the factors that might enhance stability and account for preferential production and survival of these stable species.

Nerve growth factor and Trk

NERVE growth factor (NGF) is vital to the differentiation and maintenance of nerve cells (cover). It binds to receptors at the cell surface, initiating intracellular events that result in neuronal differentiation. Many basic elements of this process have been unclear, including the nature of the receptor and the way in which signals are transduced. Three Reports this week provide new information on the role of the proto-oncogene product Trk in NGF actions (pages 554, 558, and 561). The potential significance of these studies and of other recently published data on NGF and Trk is discussed by Barinaga (page 505).

Genome scanning

A NUMBER OF "REVERSE GENETICS" procedures have been devised for identifying mutant genes when a mutant phenotype is known but gene products or linked markers are not. One such procedure, genome scanning, has led to the identification of the gene that causes the pink-eyed unstable mutation of mice (page 566). Mice with the normal allele *p* have heavily pigmented eyes and coats; those homozygous for the disease allele p^{un} have greatly reduced pigmentation. A repetitive DNA probe was used to detect differences between the genomic DNAs of inbred normal mice and affected mice that are coisogenic; between the two strains of mice only genes relating to sex and the disease are expected to differ. The p^{un} allele was found to be duplicated in affected mice; the duplication was lost when the phenotype reverted to the wild type. Brilliant *et al.* discuss how the duplication and its loss could be directly coupled to the unusually high reversion rate of this allele, the highest known in mammals.

Cellular plasticity

WHEN, during development, does the fate of a cell become fixed? Eisen has examined this issue as it pertains to primary motoneurons of zebrafish (page 569). These organisms have relatively fast-developing embryos, and their motoneurons, which innervate axial muscles, are large and distinctive. Single cells were moved to new spinal cord locations and development was then observed. If the cells were transplanted 2 to 3 hours before they typically reach the stage of axon development (some 18 hours after fertilization), the trajectories of the axons were appropriate to the new location; thus the cells were still responsive to local positional cues. If the cells were transplanted within an hour of axogenesis, the axons developed as would be appropriate for their old location, an indication that an irreversible stage of differentiation had been reached. This type of study helps to fix both the time when cell fate is decided and the stages leading up to it, such as when an embryonic cell is destined to become a generic versus a specific motoneuron.

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