blood by the liver. These results were confirmed by Dr G. L. S. Pawan (Middlesex Hospital), who suggested that fructose affects alcohol metabolism by causing the conversion of NADH to NAD, making more of the unreduced nucleotide available for alcohol dehydrogenation. This effect of fructose makes it useful in the management of unconscious inebriated patients but is not sufficiently rapid to be of comfort to those in fear of the breathalyser.

INFRARED GALAXIES

Dust not Implicated in Nuclei

by our Astronomy Correspondent

BRIGHT stars surrounded by clouds of dust particles continue to be the most likely explanation of infrared stars, according to G. R. Burbidge and W. A. Stein in the current issue of the *Astrophysical Journal* (**160**, 573; 1970), but it still seems impossible to say for certain that a similar explanation holds for the infrared source at the centre of the Galaxy. The same doubts are present for the infrared radiation from quasars and from the nuclei of Seyfert galaxies—galaxies with small bright nuclei having broad emission lines indicative of rapid motions.

When the shapes of the infrared spectra themselves have been used to rule out the possibilities that the radiation could be due to line emission, thermal bremsstrahlung, and scattering of photons by plasma oscillations, the processes that are left are inverse Compton scattering, synchrotron radiation or thermal radiation from cool material.

Some of the sources within the Galaxy are undoubtedly simply very cool stars, but what interests Burbidge and Stein are the galactic sources which are very bright in the infrared. As none of these stars are, of course, radio sources, which would have indicated non-thermal processes, the case for the infrared emission coming from cool circumstellar clouds of dust is immediately very attractive.

This is well known thinking, and what Burbidge and Stein are doing is to see to what extent it can be applied to the strong infrared sources at the centre of the Galaxy, at the centres of other galaxies and in quasars. They conclude that for the galactic centre the dust and synchrotron hypotheses are equally acceptable, although in the second case the source would have to be made up of several small components and in the first case it is difficult to see what is the underlying energy source exciting the dust.

When it comes to Seyferts and quasars, however, Burbidge and Stein cite three reasons why the dust hypothesis is unsatisfactory: the shape of the spectrum differs from that of the galactic objects in which dust is implicated; variations in the infrared flux which have been recorded with time scales down to less than a day indicate that the sources are smaller than expected for thermal radiation, and the amount of dust required is excessive. Clearly the synchrotron hypothesis is more attractive, but it seems again that several small sources must be involved, otherwise the hypothesis requires magnetic fields up to 100 gauss throughout the nuclei with electrons able to travel short distances only.

The point to be taken from their article is that without much ado they place the centre of the Galaxy in the same category as the nuclei of Seyfert galaxies. A multiple source model seems to fit both cases, and quasars as well. Burbidge and Stein point out that the only other sources that have the same kind of distribution of high energy particles as seems to be required for the galactic nuclei are solar flares and the ubiquitous Crab Nebula.

MAGNETO-EMISSION

Twisting a Light Beam

WHEN incandescent bodies are placed in a magnetic field the light may emerge partially polarized, according to an experiment carried out by J. C. Kemp, J. B. Swedlund and B. D. Evans at the University of Oregon (*Phys. Rev. Lett.*, **24**, 1211; 1970). Although this result is not itself surprising on even the simplest of harmonic oscillator models, it seems not to have been directly observed before nor has its possible exploitation been discussed.

Kemp *et al.* have studied the magneto-emission from metals and insulators in terms of the fractional polarization of radiation expected for a set of electronic harmonic oscillators. Predictions, based on transitions due to the orbital Zeeman interaction, suggest that the effect will be too small to be seen by simply placing a light bulb in a magnetic field—in any case such sources tend to emit light already partially polarized—and so a specially shaped magnet and sample were used. Wavelengths about 1·5 μm in the near infrared were measured with a germanium photodiode detector and an infrared linear polarizer.

Platinum, gold and copper all produced radiation circularly polarized to a few parts in 10^{-5}, as expected. The field was 25 kG. Insulators, on the other hand, showed no magneto-emission, at least at temperatures below 1,500° C in the near infrared. Kemp *et al.* noted that magneto-emission dropped to below the noise level as the metals copper, tungsten and aluminium were oxidized during heating, but the emissivity increased. They suggest an intriguing explanation for this in which the incandescence in insulators is not electronic at these temperatures, for which kT is only a fraction of the band gaps, but comes instead from multiple optical phonon transitions excited harmonically. More experiments are being designed to investigate whether semiconductors behave in the same way.

Further measurements on the magneto-emission from an oxy-acetylene flame yielded a partial polarization in the opposite sense from that for metals. Although Kemp *et al.* mention several possible explanations it is clear that they see the chief outcome of their experiments as opening up some new lines of research on magneto-emission. The theory presented is clearly intended to be only cursory, and some considerable refinements will be needed to bear out the results. They dangle the carrot, however, of a new analysis which predicts a fundamental type of magneto-emission that must characterize light from any semi-transparent electronic system. Apart from the obvious interest in magneto-emission from the solid state point of view, they draw attention also to its potential importance in both astrophysics and high temperature research. In any case it will be interesting to see how far these results are corroborated by polarization measurements at other wavelengths.