which the stars as a whole are streaming and at the same time dispersing as if from some common origin. On this basis, Dr Clube is able to calculate the most probable direction and velocity of streaming and also to infer that the stars of the local cluster would have been at a common origin roughly 37 million years ago. He points out that this estimate is uncertain but that it is also comparable with the time scale for oscillations about the galactic plane, estimated to be about 80 million years. From this point of view, it is inferred that the stars of the local cluster can have had very little influence on the dynamical behaviour of other stars in the neighbourhood.

The local cluster, defined by the *B* stars, is also known as Gould's Belt, after the English astronomer Gould who worked in the Argentine in the late nineteenth century. The significance of the concentration of bright *B* stars towards the direction of galactic longitude 160 was first appreciated by Herschel early in the nineteenth century.

Hallucinogens and Psychosis

from a Pharmacology Correspondent

HALLUCINATION provoked by drugs may not be quite the same as the perceptual distortion of schizophrenia, but the two mental disturbances are close enough to lead us to seek a link between their mechanisms. One link proposed is that, in schizophrenia, an abnormal endogenous substance (or excess of a normal one) with hallucinogenic activity is present in the brain. As the recently published symposium *Amines and Schizophrenia* (Pergamon, Oxford, 1967) bears witness, the likeliest place for such a substance still seems to be among the amines where the quest was started some 15 years ago by Osmond and Smythies. Hitherto, amines that are hallucinogenic—such as mescaline, bufotenin and *N*,*N*-dimethyltryptamine—have not been indubitably detected in the human body, whether schizophrenic or normal, whereas the amines which are present—such as dopamine, 5-hydroxytryptamine and 3,4-dimethoxyphenylethylamine—have not certainly been found to induce hallucinations. If the report of Tanimukai *et al.* (*Nature*, **216**, 490; 1967) is confirmed, however, this impasse may now have been ended by the detection of bufotenin in the urine of all of six schizophrenic patients (three paranoid and three catatonic) and in one of four mental defectives.

In the search for an abnormal amine in schizophrenia, much interest and controversy has centred on the pink spot, first observed in paper chromatograms of the urine of schizophrenics by Friedhoff and Van Winkle (*Nature*, **194**, 897; 1962). That this spot contains 3,4-dimethoxyphenylethylamine has just been confirmed by Creveling and Daly (*Nature*, **216**, 190; 1967), although its chief constituent is probably *p*-tyramine (Boulton *et al.*, *Nature*, **215**, 132; 1967). The further finding of Creveling and Daly that the pink spot in the urine from two schizophrenic patients contained at least seven different compounds shows how far we are still from fully understanding the spot. The scrutiny of amines in the urine may now be expected to intensify.

Progress in this field might be quicker if a completely reliable means of detecting and measuring an hallucinatory effect in laboratory animals were available. The difficulty of knowing whether a measurable response of animals corresponds to a psychic effect in man was illustrated in the recent identification by Isbell and his co-workers (*Psychopharmacologia*, **11**, 184; 1967) of (−)Δ^9-*trans*-tetrahydrocannabinol (Δ'3,4-*trans*-tetrahydrocannabinol by another notation) as an active principle of cannabis. In dogs, this compound and cannabichromene both caused ataxia, which was thought to be a good indication of cannabis-like activity; but, in human volunteers at Lexington, only the tetrahydrocannabinol induced sensory distortion and euphoria resembling those of cannabis.

One wonders whether any of the animal tests proposed to predict hallucinogenic activity in man—such as those of Jacob *et al.* (*Med. Exp.*, **7**, 296; 1962), of Lipman *et al.* (*Arch. int. Pharmacodyn.*, **146**, 174; 1963), of Knoll *et al.* (*Arch. int. Pharmacodyn.*, **159**, 442; 1966), of Smythies *et al.* (*Psychopharmacologia*, **10**, 379; 1967) or of Corne and Pickering (*Psychopharmacologia*, **11**, 65; 1967)—would have given the correct answer with the two substances from cannabis. Although this question is unanswered, there is no doubt that, at least within a group of compounds, good correlations can be found between an animal response and hallucinogenicity in man, although no single test so far devised has been shown to predict hallucinogenicity in every group of compounds known to possess that property. The mouse head-twitch test of Corne and Pickering, for example, though usually correlating well with the human findings, fails to predict the hallucinogenicity of drugs of the nalorphine type.

Such tests are therefore likely to be most useful when applied to a single group of compounds, several of which are of known hallucinogenic activity in man. Even so, proof of hallucinogenicity in new compounds must rest on experiments in man himself. These experiments should be strictly controlled and supervised by a clinical pharmacologist; but a portion of the youth of today is so hungry for hallucinations that it may provide, unasked, a rough guide to the effects of some of the new compounds in man.

Since the fashionable hallucinogen STP is a methoxyamphetamine derivative (Snyder *et al.*, *Science*, **158**, 669; 1967), we can take the finding of Smythies and his colleagues (*Nature*, **216**, 128; 1967)—that 3,4-dimethoxyamphetamine and 4-methoxyamphetamine disrupt the behaviour of rats as mescaline does—to mean that two further potent drugs have now been added to the list of hallucinogenic amines. Unless evidence can be got that schizophrenics are able to synthesize one of these methoxyamphetamines, neither compound is likely to prove the missing piece of the jigsaw; but either may well provide the true explanation of how the psychosis of amphetamine addicts develops.

Strength of Ordered Alloys

How does the crystallographic order in alloys affect their mechanical properties? Professor R. W. Cahn, of the Department of Materials Science at the University of Sussex, considered the problem in a lecture to the London Metallurgical Society on November 2.

Professor Cahn began by drawing a contrast between alloys, such as Cu_3Au and Ni_3Fe, in which ordering of the constituent atoms is not associated with any change of symmetry, and alloys such as CuAu and CuPt, in which ordering leads to a change of symmetry and also to a substantial change of shape and dimensions of the unit cell. These two categories behave quite