out the spectroscopic potential for detecting abundant quantities of O_2 or other disequilibrium atmospheric constituents, indicative of the presence of some form of life.

As for finding extrasolar planets, indirect schemes based on state-of-the-art astrometry, interferometry, radial velocity measurements and the wide field CCD cameras on the Space Telescope were described in turn by G. Gatewood (Allegheny Observatory), D. Currie (University of Maryland), I. McLean (University of Arizona) and W. Baum (Lowell Observatory). Comparing these techniques D. Black of Ames noted their complementarity due to the intrinsically different dependences on stellar mass and planetary size and orbit sampled by the various methods. He concluded that the milli-arcsecond spatial resolution and the 10 m s^{-1} velocity precision needed to detect a Jupiter-Sun system in the local solar neighbourhood are at hand. However direct detection schemes in the visible or infrared and the micro-arcsecond/10 cm s^{-1} precisions required to detect an Earth-Sun system must await the next generation of instrumentation. While this entire field looks extremely hopeful it was suggested by the participants that it may require a 'dialectic unification' to get two different groups of astrometrists to agree on the question of the existence of a planet orbiting around Barnard's star. □

The nucleolus at Weimar

from E. G. Jordan

THE workshop* opened with an outline of our present understanding of nucleolar structure given by M. Bouteille (University of Paris) in which he emphasised the importance of the identification of the discrete pale-staining islands of the nucleolus as the nucleolus-organising regions. These areas which have been given many different names in the past, are clearly distinguishable from the two major parts of nucleoli, the fibrillar and the granular components. P. Hernandez-Verdun (University of Paris) showed that in micronuclei induced with colchicine treatment no organisation of nucleolar material into nucleoli occurred in the absence of such a pale-staining 'fibrillar centre', hereby shown to be functionally related to the nucleolus organisers. C. Mirre (Faculty of Medicine, Marseille) reported that the number of fibrillar centres contributing to the generation of a new nucleolus in meiotic cells was the same as the number of organising chromosomes involved. Many workers agreed that the use of the silver staining procedure identifies these 'fibrillar centres' and hence the nucleolus organisers. However, the specificity of the silver stain is known to depend critically on the conditions used and some workers reported silver staining of structures other than nucleolus

*The Sixth European Nucleolar Workshop was held in Weimar on 1–6 July, 1979 under the auspices of the European Cell Biology Organisation (ECBO) and was organised by Dr. S. Rosenthal of the Central Institute of Molecular Biology, Academy of Sciences GDR, Berlin.

The answer lies in the blood

by Mary Lindley

Tiny, dried up bloodstains of indeterminate age may not be the biochemical geneticist's dream, but for those who work in the forensic world they are routine specimens. The continual challenge of obtaining more information from less and less material was in the minds of delegates at a recent international gathering of forensic haemogeneticists*. With the elucidation of the kinetics of the reaction between antigen and antibody, it has become possible to identify blood group antigens immunologially with greatly improved efficiency. P.J. Lincoln (London Hospital Medical College) explained that by careful manipulation of *p*H, ionic strength and the amount of antiserum used, it is possible to identify an antigen on a single bloodstained thread, so that even a minute bloodstain can provide sufficient material to examine for several antigens. Sixteen red cell antigens, including those of the A,B,O and Rhesus systems, can be identified by an elution technique. The thread is incubated with a specific antibody, which is subsequently eluted and examined by a sensitive agglutination test. Antibodies corresponding to the antigens in the bloodstain bind to the dried blood, are recovered by elution and detected in the eluate. The serum markers of the Gm and Km system, determining differences in immunoglobulin constant regions, can be detected by inhibition tests. Antiserum is incubated with the bloodstained thread and if antigen is present, the antibodies are absorbed and the activity of the antiserum inhibited.

Some antigens remain detectable by these methods for only a short time, while others such as ABO can be detected after many months, or even years. The age as well as the amount of material available thus determines the antigens used to establish the origin of a bloodstain. A combination of a few of these antigens, Lincoln said, can distinguish between the bloods of two individuals in nearly every case.

Inhibition tests also form the basis for detecting HLA antigens in bloodstained thread, described by D. Hodge (London Hospital Medical College). This work is very preliminary and so far only the HLA-A antigen has been tried, largely because it is well represented in European and Caucasian populations and because good antisera were available. Best results have been obtained when several antisera have been used in parallel to type a stain. Even assuming success, Lincoln said, HLA typing of bloodstains is unlikely to become routine in casework in the near future but it could provide a valuable specialised proceedure.

More than 20 systems of enzyme polymorphisms can be identified in bloodstains as a result of recent improvements in electrophoresis and the introduction of isoelectric focusing, described by B.J. Culliford (Metropolitan Police Forensic Science Laboratory, London). Using 18 such systems, he and his colleagues know that when they identify a bloodstain according to its profile of enzyme polymorphisms it has come from no more than one in 1,800 people. When a specimen is very meagre, it can be tested sequentially for two or more systems. G.B. Divall (Metropolitan Police Forensic Science Laboratory) said that one piece of bloodstained thread can be used first to identify Gm, Km and enzyme polymorphisms by electrophoresis, and then A,B, and O by an absorption-elution technique.

Early results reported by B. Brinkmann (Institüt für Rechtsmedizin, Universität Hamburg) suggest that measurement of enzyme activities could be a guide to the age of a bloodstain. In test bloodstains the activities of acid phosphatase, phosphoglucomutase, adenylate kinase, adenosine deaminase, and phosphogluconate dehydrogenase declined, rapidly at first and then more slowly, at rates correlated with the enzyme phenotype and the time and temperature of previous storage. Much more has to be learnt about the effects of environmental conditions, however, before any routine application for assessing the age of bloodstains would be possible.

J.L. Thomsen (University Institute of Forensic Medicine, Copenhagen) reported his success in identifying the Y chromosome of leukocytes extracted from bloodstains. He has managed to obtain sufficient leukocyes to treat them with the fluorescent stain that reveals the Y, the only chromosome identifiable in dead cells. In spite of the difficulty of the procedure, Thomsen suggested that it could offer a reliable means of sex determination in blood. His claim to have obtained no false positives was greeted with some scepticism however.

*The Eighth International Congress of the Society for Forensic Haemogenetics was held in London on 23-27 September, 1979. The congress presidents were Professors B.R. Dodd and C.P. Engelfreit. The proceedings will be published by the Society and further information can be obtained from Dr P.J. Lincoln, Department of Forensic Medicine, London Hospital Medical College, Turner Street, London E1.

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