ded on biochemical tests, but this difference was minimized when identification depended upon a technique such as Lancefield grouping. Performance in antibiotic sensitivity testing did not differ significantly with the two specimen types.

Urinary cytology in the assessment of progress after renal transplantation

MARGARET BISSON, P. BISSON, D. SPRATT, AND SYLVIA DAVIES (*Renal Unit, Whipton Hospital and Area Department of Pathology, Exeter*) Cytological examination of the urine has provided immediate indication of early rejection after renal transplantation. The appearance of activated lymphocytes and immunoblasts in the urinary deposit correlates well with other parameters of rejection, such as reduced renal function and increased peripheral blood lymphocyte count. Other abnormalities, including tubular necrosis and infection, can be identified and differentiated from those of rejection. Results can be reported within an hour after receipt of a fresh sample of urine.

Hyphomycetes in the hands of laymen

D. O. HAINES (*Royal Naval Hospital, Haslar, Hampshire*) Chance consultation in 1973 led the author into an otherwise foreign territory when asked to provide services to a (non-microbiological) products assessment laboratory. The service required was to prepare and standardize fungal spore suspensions during comparative testing of US and British standards for resistance to mould growth of electronics equipment and assemblies.

This, because of the now recognized infectivity, especially in certain chronically ill or iatrogenically induced sub-immune workers, of some of the organisms used, especially species of non-pathogenic *aspergillus*, has brought about a re-examination of the principles, scientific validity, and technical performance of these tests.

Examination of mortality statistics and PHLS reports has not enabled any direct link between cases of *Aspergillus* infection and work in factories employing mould growth resistance tests to be made. The author would be grateful for reports from morbid anatomists and microbiologists coming across patients suffering from *Aspergillus* infection or allergy whose occupation may have been the source. The address for any such reports, which will receive 'medical and commercial confidential' handling is: Dr D. O.

Haines, Health and Hygiene Laboratories, Health and Safety Executive, 403-405 Edgware Road, Cricklewood, London NW2 6LN.

Leucocyte ascorbic acid in abnormal leucocyte states

G. M. G. BARTON AND O. S. ROATH (*Department of Pathology, General Infirmary, Salisbury, and Department of Haematology, Southampton University*) The leucocyte ascorbic acid (LAA) content is the most commonly used method of examining body vitamin C status, but no corrections or interpretations are made relating to the type or maturity of the leucocytes or whether a recognizable leucocyte disorder is present. Disorders with a high preponderance of one type of leucocyte were therefore investigated, noting that abnormal or immature cells might be present. The LAA was estimated in cases of infectious mononucleosis, reactive leucocytosis, and various types of leukaemia. Note was made of patients on cytotoxic drugs. Results show that the LAA content in most of the leukaemias, acute and chronic, was abnormally low. In infectious mononucleosis, some 50% were low. In patients with leucocytosis there was a wide scatter of levels. About half of the patients on cytotoxic drugs showed low levels. This might reflect their underlying condition. A significant depression of LAA values was found in pregnant patients. In none of these subjects was there any evidence of overt scorboutism or deficiency of vitamin C in the diet. It is therefore concluded from these studies that LAA resides largely in normal mature polymorphs, and that its assay in abnormal leucocyte states may be misleading as an index of body vitamin C status.

Value of microbiological examination at necropsy on the newborn

ROSALINDE HURLEY AND J. PRYSE-DAVIES (*Institute of Obstetrics and Gynaecology, Queen Charlotte's Hospital for Women, London*) Microbiological examination was made on material taken at necropsy on 585 of 613 (95.4%) neonates over a seven-year period. The specimens examined included cerebrospinal fluid, heart blood, and bronchial swabs. Bacteriological studies were made routinely, and virological studies where indicated by the necropsy findings. The microbiological findings, particularly those relating to neonatal meningitis or septicaemia, will be

described briefly, and the value of the investigations as a routine adjunct to necropsy will be illustrated.

Grade of histological differentiation, glutamate dehydrogenase activity and alphafetoprotein production in human hepatocellular carcinoma

P. P. ANTHONY (*Bland-Sutton Institute of Pathology, Middlesex Hospital, London*), C. L. VOGEL AND R. I. GLAZER (*Emory University, Atlanta, Georgia, USA*) and K. R. MCINTIRE (*National Cancer Institute, Bethesda, Maryland, USA*) Activity of glutamate dehydrogenase (GDH) in the liver and serum levels of alphafetoprotein (AFP) were correlated with the degree of histological differentiation in cases of human hepatocellular carcinoma to see if a metabolic behaviour pattern, similar to that seen in experimental animal tumours, could be detected.

GDH activity was measured spectrophotometrically in tumour tissue as well as in adjacent normal or cirrhotic liver in 19 patients. AFP levels were determined in these as well as in a further 163 patients by qualitative immunodiffusion and quantitative radioimmunoassay.

No differences in GDH activity were detected between normal or cirrhotic liver tissue. In hepatocellular carcinoma tissue enzyme activity was significantly reduced and this decrease was proportionately greater in poorly differentiated tumours. In this latter group qualitative immunodiffusion for AFP was more frequently positive and quantitative radioimmunoassay showed higher serum levels. Concurrent estimations of serum procollagen proline hydroxylase, glutamic-oxalacetic transaminase, and alkaline phosphatase showed elevated levels in most patients irrespective of the grade of tumour.

These data suggest that patterns of metabolic behaviour exist in human hepatocellular carcinoma which can be related to the degree of differentiation and growth rate of the tumour.

Fatal post-traumatic vertebral-basilar ischaemia

R. A. GOODBODY (*Department of Neuro-pathology, Southampton University General Hospital*) Hutchinson and Yates (1961) reported spasm and thrombosis of an extracranial carotid artery as being responsible for fatal cerebral infarction. Animal experiments have suggested that simple spasm of these arteries may

sufficient to damage the brain. A fit man of 23 received manipulation for a minor neck injury from an osteopath. Two hours later he was dizzy and nauseated before collapsing. Headache followed and he became drowsy and comatose. Investigations suggested a brain stem lesion but he died in coma undiagnosed after 38 hours.

Necropsy revealed bilateral symmetrical cerebellar infarction but the vertebral-basilar arterial tree was healthy and patent. One vertebral artery was surrounded by a recent haematoma within its canal. Microscopy showed acute haemorrhagic cerebellar infarction and widespread anoxic ischaemic damage in the medulla and distal pons. Brain stem lesions were symmetrical and included generalized acute congestion and acute haemorrhagic infarction of the floor of the fourth ventricle. At the cellular level damage varied from acute neuronal swelling to ischaemic change and homogenizing change. Myelin sheaths were swollen and beaded.

This case demonstrates that injury to the neck may be followed by arterial spasm sufficiently severe and prolonged to result in fatal cerebral infarction. The potential danger of manipulative therapy to a healthy young subject is illustrated. The recognition of arterial spasm is of great importance in treating these cases.

Serial liver biopsies in hepatitis B antigen carriers

E. TAPP (*Department of Pathology, Withington Hospital, Manchester*) Initial liver biopsies from asymptomatic antigen-positive blood donors showed a range of histological appearances varying from minor parenchymal lesions to cirrhosis. Twenty of these individuals have now been followed up for periods of between two and four years and during that time have had at least one further liver biopsy.

The histological appearances of these biopsies will be described and it will be seen that while the one case which showed cirrhosis initially and one which showed chronic aggressive hepatitis initially now have less inflammatory cell activity in the liver, there are two cases of chronic aggressive hepatitis which appear to have progressed to cirrhosis and one which now shows increased inflammation of the liver. Further evidence of the progressive nature of the liver disease is seen in two cases which showed chronic persistent hepatitis initially and which now have evidence of aggressive hepatitis, and three cases which

showed only focal parenchymal lesions in the first biopsy and which now have the portal tract infiltrations of chronic persistent hepatitis.

Incidence of auto-immune thyroiditis

T. BIRD (*Department of Pathology, Newcastle General Hospital*) An area near Newcastle upon Tyne, whose adult population is closely matched for age, sex, and socioeconomic groups to the population of Great Britain, has been studied for the prevalence of subclinical hypothyroidism and its possible association with hyperlipidaemia and ischaemic heart disease. A random one-sixth of the population, 2779 adults, were seen in 1973-74. Antibodies to thyroglobulin and thyroid cytoplasm were present in 6.8% (2.7% of men and 10.3% of women). Serum thyroid stimulating hormone (TSH) was raised above 6m U/l in 5%, and 3.5% had both thyroid antibodies and raised TSH. Thus half of the people with antibodies were regarded as having evidence of subclinical hypothyroidism (Evered *et al*, 1973).

One thousand consecutive adults, 590 men and 410 women, coming to necropsy in Newcastle General Hospital in 1974 were specially examined for lymphocytic infiltration of the thyroid and for thyroid antibodies in postmortem blood. A preliminary study had shown that antibodies could be demonstrated *post mortem* and this was confirmed during the survey. The lymphocytic infiltration has been graded similarly to that of Williams and Doniach (1962). Minor degrees of infiltration with only occasional small foci were seen in 10.8% of men and 19.5% of women, with more severe grades in 2.7% of men and 14.8% of women. A close correlation was demonstrated between the degree of infiltration and the presence of antibodies. Of the men 2.7% and of women 13.4% had antibodies but only seven patients of 144 with minor infiltration had antibodies, while 62 out of 85 with more severe infiltration had antibodies.

These results help to confirm the suggested association between lymphocytic infiltration of the thyroid, usually demonstrated at necropsy, and the presence of thyroid antibodies, usually demonstrated in different groups of living patients.

References

- Evered, D. C., Ormston, B. J., Smith, P., Hall, R., and Bird, T. (1973). Grades of hypothyroidism. *Brit. med. J.*, **1**, 657.
- Williams, E. D. and Doniach, I. (1962). Postmor-

tem incidence of focal thyroiditis. *J. Path. Bact.*, **85**, 255.

Karyotypic transformation of chronic granulocytic leukaemia

J. C. SHARP (*Department of Haematology, The Children's Hospital, Sheffield*) Karyotypic abnormalities, additional to the Ph¹, have been identified by banding in 16 consecutive cases of chronic granulocytic leukaemia (CGL) at transformation. Non-random changes—trisomy 8, abnormalities of a chromosome 17 and a second Ph¹—found either in association or singly occurred in 11 cases (approximately 70%). Four different abnormalities of chromosome 17 were found, namely, an isochromosome long arm 17, i (17q), in five cases and in one case each, a translocation product of long arm 17 and an 18, trisomy 17 and deletion of short arm 17, 17p-. A factor or factors operating at the centromere of a 17 may produce a break and isochromosome formation, translocation or deletion or instability and subsequent non-disjunction. In the remaining five cases, the abnormalities were non-recurring and considered random.

In 11 cases, acute transformation of the disease was recognized from standard haematological parameters at the same time as the additional chromosome abnormalities were found. In four the chromosome abnormalities preceded transformation by from one week to three months. One of these, characterized clinically only by busulphan resistance, had a karyotype of 59 chromosomes.

In two cases of focal transformation, both with parapareses caused by extradural deposits, the demonstration of additional chromosome abnormalities in the bone marrow and the blood suggested a systemic transformation: in neither case was there haematological evidence of this.

The finding of karyotypic abnormalities additional to the Ph¹ in a significant proportion of cells suggests that transformation is occurring. In some cases this may permit early recognition of the metamorphosis of the disease.

A laboratory study of the haemolysis caused by different blood pumps

O. H. B. GYDE AND B. R. HARRIS (*Department of Haematology, East Birmingham Hospital, Birmingham*) Peristaltic pumps cause little overt haemolysis when used to maintain patients on haemodialysis. Nonetheless the performance of some of the designs has been questioned together with