ASSOCIATION OF CLINICAL PATHOLOGISTS:
52nd GENERAL MEETING

The fifty-second general meeting of the Association of Clinical Pathologists was held at Harrogate from April 8 to 10, 1954.

For the first session the chairman was Dr. J. V. Wilson.

Myelofibrotic Anaemia in Hodgkin's Disease

J. M. Fullerton said that, although anaemia had been recognized as a constant feature in Hodgkin's disease, only one recorded case of an aplastic or myelofibrotic type is recorded in the literature.

A male patient was seen showing the features of anaemia, loss of weight, a palpable spleen, and a few enlarged peripheral lymph nodes. Five marrow punctures, including a trephine, suggested the diagnosis of myelofibrotic anaemia or aplastic anaemia. A lymph node biopsy six weeks before death suggested the possibility of a diagnosis of Hodgkin's disease.

Post-mortem findings showed a typical Hodgkin's picture of microscopical involvement of bone marrow of ribs, vertebrae, sternum, iliac crest, and long bones.

The Saline Fragility of Leucocytes

H. G. H. and D. L. Richards (Winchester) described a technique for measuring the saline fragility of leucocytes.

The results are plotted on a graph in the form of two curves, one representing the total cell bodies per c.mm. of blood added to each tube, and the other a curve representing the number of cells still remaining refractile in the solution.

The median leucocyte fragility for 50 normal bloods and a large number of abnormal bloods has been determined. Eighty-four per cent. of normal bloods have median leucocyte fragility between 0.300% and 0.350%. The extreme limits of normal are 0.250% to 0.385%.

The Deficiency Theory of Blast Cell Leukaemias

E. K. Blackburn (Sheffield) and L. G. Laitha (Oxford) presented evidence against the theory that acute blast cell leukaemia is a deficiency disease.

In more than 60% of over 200 normal bone marrows, cultures an absolute increase in the number of polymorphonuclear leucocytes was found during the first 24 hours of the culture. Not infrequently, cultures from cases of chronic myelocytic leukaemia showed a similar increase in the number of polymorphs. On the other hand, no rise in the number of polymorphonuclear leucocytes was observed in 24 series of cultures from 15 patients with acute myeloblastic, paramyeloblastic, or monoblastic leukaemia. Features of non-specific differentiation from blast cells could not be identified with normal maturation. No difference could be detected between blast cells cultured in normal as opposed to acute leukaemic sera.

Study of daily blood counts before and after 52 transfusions in 39 patients with blast cell leukaemia revealed definite improvement in three cases, dubious improvement in seven cases, rapid deterioration in five cases, and probable deterioration in four cases. In the remainder, 33 out of 52 transfusions, there was no significant change.

Frequent or serial fresh plasma transfusions in two cases of acute leukaemia failed to induce significant clinical or laboratory improvement.

For the second session on the opening day Dr. W. H. McMenemey was in the chair.

The Serum Antithrombin Test in Fibrocystic Disease of the Pancreas

J. C. W. MacFarlane said that the use of the antithrombin content of plasma as an aid to laboratory confirmation of the clinical diagnosis of fibro-cystic disease of the pancreas was originally suggested by Innerfield, Angrist, and Benjamin (1951). With a slightly modified technique and using serum in place of plasma, this test has been used at The Hospital for Sick Children, Great Ormond Street, since December, 1951. The technique employed has not altered from that published by MacFarlane (1952).
The test has been used in 102 cases of fibrocystic disease of the pancreas, confirmed by examination of the duodenal juice, and in 92 of them, or 90%, the serum antithrombin content has been found to be considerably lower than that found in normal serum. The results have ranged from 18% to 68% of normal. Some 750 "normal" sera have been examined, the cases being of the same age group, including 114 cases of recurrent chest infections, 36 cases of coeliac disease, 45 cases of "failure to thrive," 27 cases of fatty diarrhoea, and 73 relatives of 22 proven cases. There have been six "false positive" results; one a case of eczema, one of advanced miliary tuberculosis, and four showing chronic respiratory infections.

No rationale for the test can be offered, but it is thought to offer a simple and reliable, if empirical, aid to diagnosis.

REFERENCES

Risks from Chronic Irradiation and their Haematological Control

R. H. Mole said that in human cases of serious anaemia due to radiation little if any warning was given by the white cell count preceding the illness. He discussed the evidence, both clinical and experimental, and it was concluded that it was not likely that changes in the blood count would be observed unless exposure to radiation was many times the maximum permissible. Damage to the gonads occurred with smaller dose rates of radiation. Physical measures of control were considered preferable to haematological methods.

[We hope to publish this paper in full in a future issue of the journal.—Ed.]

Observations on Temperature Levels in Hot Air Ovens

R. Barrington Brock and E. M. Darmady (Portsmouth) described how multipoint thermocouples were used to test ovens loaded with syringes. Observations were made on two gas, three electric, and two electric ovens with fans. The experiment showed the variations over 40° C.-50° C. in the gas oven and that in many sites the temperature was considerably lower than that of the thermometer reading. In the electric oven the final variation of temperature varied from 28° C. to 12° C., and the take-up of heat was slow and variable. In the electric ovens fitted with fans the final variation of temperature was less than 10° C., and the take-up of heat was immediate and reliable. Tightly packing the syringes prevented the absorption of heat in whatever oven was used. The loading of syringes when the oven was hot made no difference to the amount of heat absorbed provided the temperature was allowed to regain the selected degree. In the ovens fitted with fans heat was probably taken up more quickly and more evenly. It was suggested that heat treatment in these ovens need not be so long as in the electric oven but that the gas oven could not be regarded as reliable. A plea was made for the description of ovens when loaded rather than the normal practice of describing when empty, since, apart from one gas and one electric, all the ovens investigated showed variation when empty of less than ±3° C. The tight packing of syringes was condemned. Preliminary experiments with autoclaves showed similar discrepancies.

On April 9 the chairman at the first session was Professor R. A. Willis and at the second Dr. R. W. Fairbrother.

In the afternoon Professor C. H. Gray took the chair.

During the afternoon on April 9 demonstrations were shown at the Royal Bath Hospital, Harrogate.

Pneumocystis Carinii in Interstitial Plasmacellular Pneumonia

H. S. Baar described the first case of interstitial plasmacellular pneumonia outside the European continent. The finding of characteristic honeycombed masses in air-spaces, which were identified by Vanék and Jirovec as the protozoon Pneumocystis carinii, was confirmed. Histochemical reactions of the honeycombed masses were reported. The case was associated with cystemalic inclusions of salivary glands and the significance of this association was discussed.

Nephrocalcinosis and Hypercalcaemia in an Infant

I. M. P. Dawson and W. S. Craig (Leeds) described a boy aged 5 months who presented with anorexia, vomiting, constipation, and hypotonia, persisting, with periods of irregular fever, till death at 11 months. Investigations showed raised serum calcium, blood cholesterol, and urea nitrogen levels. Other biochemical findings, including plasma bicarbonate, alkaline phosphatase and chlorides, were normal. Pus cells were found in the urine which was acid. Radiographs showed increased density of the skull and long bones. Necropsy revealed bronchopneumonia, without parathyroid hyperplasia or gross changes in other organs.

Microscopically, the lungs showed unresolved pneumonia. In the kidneys there was patchy hyaline change in some glomeruli, and both calcium-containing and eosinophilic casts in distal and collecting tubules, with some calcium deposition in surrounding tissue. The proximal tubules showed vacuolation and degeneration with calcium deposits in degenerate areas. The case was considered similar to those described by Lightwood (1952) as idiopathic hypercalcaemia. The pathological changes were those of a nephron nephrosis of unknown aetiology, and the biochemical disturbances probably secondary to primary renal damage.

REFERENCE
The Pathology of Ulcerative Colitis

Cuthbert E. Dukes said that the modern surgical treatment of ulcerative colitis by colectomy had provided a new opportunity for the study of the lesions in severe cases. These always include widespread inflammation of the mucosa, often accompanied by extensive superficial ulceration, congestion of the submucosa, the presence of inflammatory polyps and strictures.

A patient with severe ulcerative colitis is threatened with many dangers such as haemorrhage, toxæmia, and perforation. There is also a less obvious yet persistent menace increasing with time, namely, cancer. When cancer follows chronic ulcerative colitis the malignant tumours are frequently multiple and atypical in appearance, grow rapidly and metastasize early.

Almost all who during recent years have enquired into the relationship between ulcerative colitis and carcinoma have reached the conclusion that colitis predisposes to cancer and that the extent of this predisposition has been underestimated in the past because of difficulties in diagnosis, both clinical and pathological.

Dr. Dukes explained that his experience was based chiefly on the examination of colons removed by colectomy from severe cases of ulcerative colitis. In a consecutive series of 120 cases of severe colitis carcinoma was found seven times, an incidence of 5.8%. The average age of these patients was 42 years. The average duration of symptoms of ulcerative colitis before the onset of cancer in this series of cases was 15 years.

If the question is asked, “How often does cancer follow ulcerative colitis?”, the answer must obviously depend on the severity of the disease and on the duration of symptoms of the cases being considered. Such a question can only be answered in general terms by saying that any patient in whom severe ulcerative colitis has lasted more than 10 to 15 years has entered a phase of life when intestinal cancer has become a serious risk.

Some Observations on the Pathology of Sjögren’s Syndrome

B. S. Cardell reported the necropsy findings in three cases of Sjögren’s syndrome and discussed them in relation to four cases recorded in the literature. There appeared to be two main components, (1) atrophy of certain glands and dryness of their associated mucosae and (2) rheumatoid arthritis. In the first component the essential lesion was in the conjunctival, lacrimal, and salivary glands and the submucous glands of the respiratory and upper alimentary tract. The distribution of the glandular lesion in the seven necropsy cases was lacrimal and salivary, seven, conjunctivae, six, mouth, tongue, and larynx, five, oesophagus, four, nose and trachea, three, and bronchi, two. In the earlier stage there was a predominantly lymphocytic cellular infiltration producing glandular enlargement and parenchymal atrophy which resulted in impaired function. Eventually both parenchyma and the cellular infiltrate disappeared and were replaced by fibro-adipose tissue. Dryness of the associated mucosae was a result of the glandular atrophy.

The nature of the underlying pathological process remained obscure. It was possible that the glandular atrophy and the rheumatoid arthritis were both manifestations of collagen disease. This theory received some support from the observation that cortisone produced symptomatic improvement in these cases and from the occurrence of polyarteritis nodosa in two of the seven necropsy cases.

An Incidence of Miliary Tubercles in Bone Marrow Related to Diagnostic Needle Biopsy

J. L. Emery and N. M. Gibbs (Sheffield) said that the clinical diagnosis of miliary tuberculosis using the present methods of radiological appearance of the lungs and examination of the eye for choroidal tubercles was known to reveal the disease in a little less than half of the cases.

A systematic study of 0.1 ml. of bone marrow from 44 children who had died with generalized miliary tuberculosis revealed miliary tubercles in 13 cases.

In these 44 children a clinical diagnosis of miliary tuberculosis had been made by radiography of the chest in 13 and examination of the eye in 14 cases. These two methods in conjunction produced the diagnosis in 18 cases. Marrow biopsy would theoretically have enabled the clinical diagnosis to be made in a further five cases.

It was suggested that bone marrow aspiration biopsy had a place in the diagnosis of generalized miliary tuberculosis.

Cristobalite Granuloma

T. C. Morton said that cristobalite was a rare crystalline form of silica occurring in nature. Quartz and amorphous silica are converted into cristobalite by heating them above 800°C.

The case reported was that of a single woman of 44 who had a simple appendicectomy carried out in 1940. Thirteen years later a lumbar sympathectomy was carried out retroperitoneally on the right side and a small lymph gland found incidentally was sent down for biopsy. This was at first suspected to be the site of a hyperplastic tubercular lymphadenitis. Owing to the success of the operation a left lumbar sympathectomy was carried out through an abdominal incision and a chain of grossly enlarged para-aortic lymph glands was found on the left side. There were no peritoneal adhesions or the usual tale granulomatous plaques or nodules. The lymph glands were removed and showed a marked foreign body reaction with numerous inclusion bodies visible in ordinary stained sections, especially very prominently under Nicoll’s prisms. A re-examination of the original biopsy from the right side under Nicoll’s prisms showed identically similar particles. Professor King and Dr. Nagelschmidt showed that these inclusion bodies were cristobalite in addition to talc.

It is known that the talc dusting powder in use in 1940 was of inferior quality and it is surmised that quartz was present as a contaminant together with cristobalite. The interesting feature was the wide dispersion from the site of the operation and the fact...
that the proliferative foreign body reaction was confined solely to the lymph glands.

M. J. H. Smith and M. E. H. Pessell reported experiments and results of "The Estimation of Serum Acid and Alkaline Phosphatase Activity with 4-Aminoantipyrine." This paper will be published in the August issue of the journal.

A Calcium Tolerance Test

B. E. C. Nordin (Postgraduate Medical School of London) described an intravenous calcium tolerance test which might assist in the diagnosis of certain types of metabolic bone disease. Calcium gluconate (15 mg. calcium per kg. body weight) was given intravenously in normal saline over a four-hour period after the subject had been on a low calcium diet (100 mg.) for three days. In nine normal subjects the mean urinary calcium excretion during the 12 hours following the start of the infusion was 50.7% of the administered dose; two standard deviations either side of the mean gave a normal range of 38 to 62%. In seven cases of proven osteomalacia the excretion was always less than 25%. In nine cases of osteoporosis the excretion was well above the normal range in three (all young adults) but within the normal range in six (all post-menopausal osteoporosis). An interesting aspect of the test was the fall in urinary phosphate clearance which followed the infusion and which was most marked in the osteomalacic group. It seemed possible that this was due to suppression of activity in the parathyroid gland.

Paper Chromatography of Urinary 17-Ketosteroids

Sheila McDonough and Arthur Jordan said that a considerable number of neutral 17-ketosteroids had been found in urine, but the methods hitherto employed for their separation had not been suitable for routine use. Chromatography using impregnated filter paper can give excellent results but in our hands proved to be very uncertain, but satisfactory separations using a cyclonexane when a 20% (v/v) methanol system on Whatman No. 31 paper and working at a temperature of 34.8° C. had been found satisfactory. The amount of 17-ketosteroid on the paper must not exceed 400 µg. From this amount, an extract from a normal male gives five or six spots. Work is in progress to identify these spots. The least mobile spot is not yet identified. The next appears to be aetiocholan-3α:11β-diol-17 one, the next aetiocholan-3α-ol-11:17-dione. The fourth spot is not yet identified, it may be androstan-3α:11β-diol-17-one; the fifth spot is not always present, it consists of androst-5-en-3β-ol-17 one. The sixth, and most mobile, spot contains three components: androsterone (androstan-3α-ol-17-one), aetiocholan-3α-ol-17-one, and 3βchloro-androst-5-en-17-one.

Haemoglobin S and Haemoglobin C—A Case with Sickle Cell Haemoglobin C Disease

H. Lehmann and G. M. Edington said that six human haemoglobins were now known of which five seemed to be alleles genetically: adult (A), sickle cell (S), C, D, and E. Foetal haemoglobin (D) is not usually found after the first year of life, except in thalassaemia and in sickle cell anaemia and in some other anaemias, particularly those which started before the physiological haemoglobin F formation in the infant came to an end. Haemoglobin F is characterized by its resistance to alkali. A, S, and C haemoglobins differ in their behaviour on paper electrophoresis, and, in addition, a feature of S is its tendency to gel at reduced O2 tension. At pH 8.6 A migrates fastest, S less so, and C is slower than both A and S. Various chemical differences have been alleged to exist between A and S: the number of SH groups, or the number of "active" SH groups, or the number of valine molecules are said to be different. The only definite chemical differentiation is shown by electrophoresis at pH 11 and 4 (Scheinberg). As the two haemoglobins migrate differently at pH 11, the difference cannot be due to the NH4 groups which are inactive at this pH. They do, however, migrate at equal speeds at pH 4, suggesting that the different migrating rates at the other pH ranges are due to carbonyl groups. D has the same electrophoretic properties as S but does not gel at reduced O2 tension. E migrates at alkaline pH at the same rate as A but differs from A at acid pH. D and E have so far been found in one family each, but S and C seem to be widely distributed and their incidence pattern is of anthropological interest. Much work has been done on S in that respect but little so far on C. The present case is the first to be reported from outside the U.S.A. A survey recently carried out jointly with Dr. D. F. Roberts in Southern Sudanese Niotes, including 75 unrelated Dinkas, failed to show C in that group, a population which also does not have the S haemoglobin. A systematic survey of C incidence in West Africa is now in progress and plans are made to extend this to other parts of Africa.

S can give rise to sickle cell anaemia and it is important to differentiate between the haemolytic anaemia and the sickle cell disease, the condition in which crises may lead to death. The anaemia is similar to that of acholuric jaundice and to the newly discovered "target cell anaemia" associated with C, and to thalassaemia. Similarly as in acholuric jaundice, but to a lesser extent, it is now believed that the abnormally shaped cells are eliminated by the reticuloendothelial system. The crisis is peculiar to the S-carrying red cell and it is due to sickling of cells in vivo. A most important factor in their causation are infections.

The therapy of the homozygous, giving rise to sickle cell anaemia, and the heterozygous, giving rise to harmless sickle cell trait, will have to be modified, and while it will always be true that a very severe case of sickle cell anaemia will be a homozygote and a perfectly healthy S individual a heterozygote, there is a wide scale between the two. Sickle cell trait is not always harmless and in the U.S.A. a disease involving haematuria is now found more and more exclusively in S heterozygotes. There must be factors (modifiers) of which we know as yet little which determine the percentage of haemoglobin
from each gene. In A–S heterozygotes A has up to now always been found to be >S: among S–C heterozygotes none has been so far found in whom the relationship was not C<S.

One difficulty is the discrepancy between observed incidence of sickle cell anaemia and the calculated incidence of S homozygotes. Evidence has recently been brought forward to suggest the protection of S homozygotes against malaria, and the question arises whether malaria protects homozygotes from sickle cell crises. If this could be proven it would go far in helping us to understand the increased finding of sickle cell anaemia in areas where malaria is being eradicated (U.S.A., Greece, certain parts of Africa). Better diagnostic facilities and more intensive search for the condition will not serve as a complete explanation. Some relationship between malaria and sickle cell anaemia would serve as an additional explanation of the survival at high frequency of the sickling gene in areas where malaria is endemic. Sickle cell crises have a sufficiently serious prognosis to justify an examination of the possible therapeutic value of malaria.

Protein and Protein-bound Polysaccharide Abnormalities in the Diagnosis of Amyloid and Allied Disorders by Paper Electrophoresis

I. C. Gilliland and E. Stanton said that diabetic nephropathy described by Kimmelstiel and Wilson (1936) shows deposits of hyaline-like material in the arterioles and in the glomerulus. MacManus (1950), by periodic-acid-Schiff staining, showed it to be a polysaccharide-containing protein. He suggested that they might be deposited from the blood.

Diabetic retinopathy shows similar changes of polysaccharides in the hyaline arterioles and microaneurysms. Duguid and Anderson (1952) suggested that these also are deposited from the blood.

Initial observations required elaborate chemical estimations (Gilliland, Hanno, and Strudwick, 1954), but it was now proposed to show that the same information could be obtained by a simple method suitable for routine use.

Total proteins and total polysaccharides were measured in the serum and further characterized by electrophoresis on paper. Duplicate papers were run for each sample. Naphthalene black stain demonstrated the proteins and periodic-acid-Schiff stain demonstrated the polysaccharides. The colour density was read with the recording densitometer of Laurence (1954), the Gaussian curves completed, and the relative areas measured by planimetry.

No evidence of abnormal polysaccharide was found in a series of cases of diabetes, but a progressive rise in the total protein-bound polysaccharides occurred as the complications of diabetes increased. The major component affected was the a2 globulin. The albumin fell as a2 rose, so that four groups could be well differentiated by comparing the albumin a2 ratio without the need for chemical estimation of the total. As the polysaccharides are protein-bound an indication can be derived from examination of the protein pattern alone. These protein changes are consistent and of diagnostic value in diabetes with Kimmelstiel-Wilson complications.

A useful index of complications could be obtained from simple electrophoresis on paper of proteins and estimation on the albumin/a2 ratio so derived. This index was tested in a new series of diabetic patients suffering from three grades of diabetic retinopathy and the index correlated with the severity of the complications.

It had been shown by many people (Gutman, 1948; Marrack and Hoch, 1949; Lever, 1951) that a rise in protein-bound polysaccharides in the serum is not specific for diabetes but occurs in a wide variety of conditions. Acute rises in protein-bound polysaccharides occur after many feverish or traumatizing episodes, but return to normal. This has been studied particularly in rheumatic fever. Chronic rises more comparable to diabetes occur in rheumatoid arthritis and in untreated tuberculosis amongst other conditions.

If the lesions of the diabetic complications occur as a result of the deposition of these protein-bound polysaccharide materials in the vessel walls and in the kidneys, then similar changes should occur in these other conditions. Both rheumatoid arthritis and tuberculosis may terminate in amyloid disease and the kidney stained by periodic-acid-Schiff stain shows a remarkable similarity to Kimmelstiel-Wilson lesions. The serum of patients with proven amyloid disease examined by the same electrophoretic technique was also similar to those of the diabetics with Kimmelstiel-Wilson lesions.

Estimations of the albumin/a2 ratio in the serum of patients with uncomplicated rheumatoid arthritis of varying durations showed a steady fall with duration. The albumin/a2 ratio below 3 was of diagnostic help in amyloid disease.

Seibert et al. (1947) showed that the total serum protein-bound polysaccharides are cumulative and that the presence of two diseases such as tuberculosis and diabetes leads to a greater amount being present. The albumin/a2 ratio in a few patients with tuberculosis and rheumatoid arthritis showed albumin/a2 ratios diagnostic of amyloid disease which had developed in a period very notably shorter than in the cases with uncomplicated rheumatoid arthritis. In each of these cases the amyloid disease was proved by biopsy.

The albumin/a2 ratio in several cases of osteoarthritis showed no change.

Sera were examined from four cases of amyloid disease occurring as a result of long-standing tuberculosis and in these the albumin/a2 ratio was again below 3.

A number of cases of uncomplicated sarcoidosis proved by biopsy were also examined. The albumin/a2 ratio was lowest in four cases characterized by gross enlargement of liver and spleen. One was shown to have characteristic changes of para-amyloid disease at necropsy.
Our observations in rheumatic fever confirm the rise in protein-bound polysaccharides initially, returning to normal. The albumin/A₉ index can be calculated from the figures given by Jackson et al. (1953) on 303 children with rheumatic fever using the Tiselius method. These show a progressive rise in the albumin/A₉ index as the disease progresses.

Thus the albumin/A₉ index gives useful information of prognostic and diagnostic value in a wide variety of disorders.

References


Laurence, D. J. R. (1954). In the press.


The meeting ended on April 10, when the chairman at the first session was Dr. H. R. R. Mavor and at the second Dr. A. G. Signy.

The Isolation of Pasteurella septica from the Sputum in Bronchietasis

J. M. Talbot said that Past. septica (syn. multocida) had now been described on numerous occasions as having been isolated from pathological conditions in man. The majority of examples were from wounds inflicted by animals, but there were a number of cases, most of which were reported from the U.S.A., in which no direct animal contact was known. Prominent in this latter group are those cases in which the organism seems to live as a symbiont in the respiratory tract of those patients with disease of the bronchi, lungs, or nasal sinuses, especially those with bronchiectasis. The persistent occurrence of this organism in the sputum of a patient with bronchiectasis has not previously been reported in this country, but such a case was here described in which the organism was satisfactorily identified by biochemical and pathogenicity tests. There is a strong possibility that more examples of this condition may be forthcoming if a careful watch is kept for them.

The Bacteriology and Pathogenesis of Brain Abscess

L. Parker reviewed 70 cases of brain abscess investigated at the Manchester Royal Infirmary since January, 1948.

A comprehensive technique was used for the isolation of the organisms. Blood agar plates were incubated aerobically, microaerophilically, and anaerobically. Strict anaerobes were found on 12 occasions and many facultative anaerobes grew better on anaerobic or microaerophilic culture than on aerobic culture when first isolated. Chloral hydrate-blood agar was used when the presence of Proteus vulgaris was suspected. Liquid media, particularly a modification of Brewer's thiglycollate medium, were valuable when only a small number of organisms were present.

The organisms most frequently isolated were:

- Proteus vulgaris: 15
- Staph. aureus: 13
- Non-haemolytic streptococci: 11
- Bacteroides group: 5
- Anaerobic streptococci: 5

No pneumococci or fungi were isolated.

In 15 cases all cultures were sterile.

The bacterial flora of an abscess was related to the primary focus.

In many of the abscesses due to direct spread of infection the route of spread was easily traced; in some cases there was a bone defect, and in others thrombosed blood vessels were seen.

In abscesses caused by blood-borne infection the route of spread was less obvious. In a few cases there was clinical evidence of bacteraemia before the presence of the abscess was recognized; but the relative importance of bacteraemia and septic embolism (by the systemic arteries or the vertebral veins) in the pathogenesis of haematogenous brain abscesses is difficult to assess.

The Epidemiology of Proteus vulgaris Infections

A. C. Cunliffe said that within recent years the importance in surgical infections of Gram-negative bacteria, such as Pseudomonas pyocyanae and Proteus vulgaris, which are relatively insensitive to penicillin and the majority of the new antibiotics, had increased. It is generally recognized that a large number of Ps. pyocyanae infections are the result of cross-infection in hospital. There is much less knowledge about the epidemiology of P. vulgaris.

In the work described the serological classification of P. vulgaris had been developed to provide an accurate method of subdividing the species and by this means the epidemiology of Proteus infections in a number of populations had been elucidated. The typing of strains isolated at a general hospital and from patients in a burns unit provided evidence suggesting that infection with Proteus vulgaris occurs in two ways; (a) as the result of self-infection from the gut, and (b) by cross-infection.

Evidence for cross-infection was suggested by the finding of the same type of P. vulgaris in seven of nine infected burns in one ward of the burns unit. The distribution of types in this and other wards suggested that infection took place in the ward rather than during dressings at the common dressing station. In the general hospital no evidence of cross-infection was found; self-infection was suggested by the fact that in the majority of patients the somatic and flagellar antigens of the strain isolated from the faeces were identical with those of the strain isolated from the site of infection.
A Seasonal Incidence of Toxoplasma Infection?

J. K. A. Beverley and C. P. Beattie said that the birth dates of patients born with severe manifestations of congenital toxoplasmosis (hydrocephalus, intracerebral calcification, and chorio-retinitis) showed a peak from April to July; of those born with minor manifestations only, a peak from October to March. If the birth dates of those born with severe manifestations are antedated three months and a histogram made by months from them it will be found to coincide with a histogram made of the birth dates of cases born with minor manifestations. This is in keeping with the supposition that children born of mothers infected during the middle of their pregnancy may show major manifestations and those born of a mother infected late in pregnancy minor manifestations. It also suggests a seasonal incidence of infection in autumn and winter.

Carrier Medium in Pertussis Diagnosis

D. B. W. Lacey described his carrier medium for isolation of B. pertussis and showed the greater ease of isolation using his selection medium.