THE NEW ZEALAND JOURNAL OF MEDICAL LABORATORY TECHNOLOGY

THE OFFICIAL PUBLICATION OF THE NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INCORPORATED.

VOLUME 20. No. 2. JULY, 1966

Directions for Contributors

In the interests of uniformity, the following directions should be followed by all contributors to the Journal.

Manuscripts should be typewritten on one side only, of good quality quarto sized paper, be double spaced and with a 1½in margin. They should bear the author's name (male authors give initials, female authors one given name), address, and (if this is different), the address of the laboratory where the work was carried out. The manuscript should take the following form: Introduction; materials and methods; results; discussion and conclusion; summary; acknowledgments; references. Carbon copies are not acceptable. Nothing should be underlined unless it is necessary that it be printed in italics.

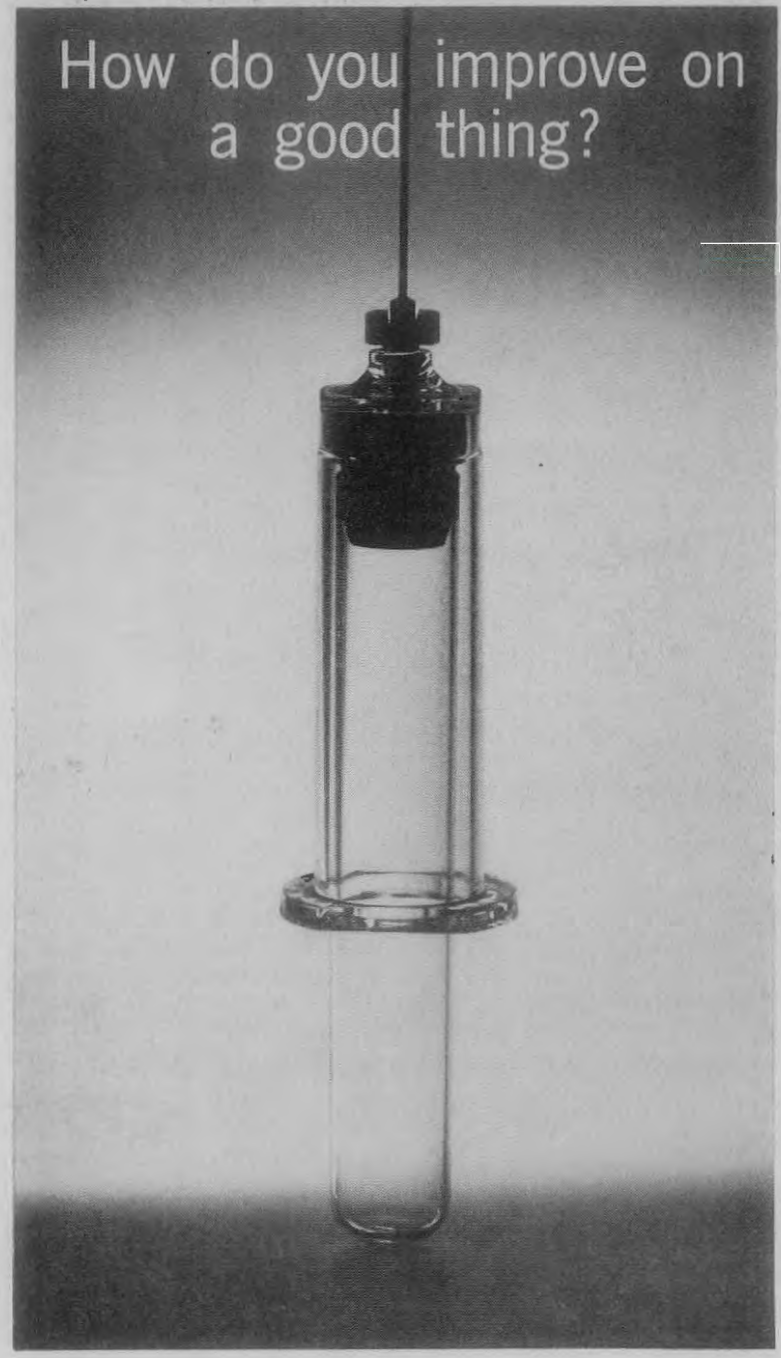
ILLUSTRATIONS. Graphs and diagrams are termed 'figures' and should be numbered in the order of their appearance in the text. Figures should be drawn in Indian ink on stout white paper larger than required for the text. Legends to the figures should be typed separately and attached. Illustrations, particularly half tone blocks, should be sparingly used. Half tone blocks are referred to as 'plates' and these again are numbered in sequence and the captions are typed and attached. Elaborate tables should be kept to a minimum but any necessary tables should be typed on separate sheets of paper and numbered in roman numerals.

NOMENCLATURE. Scientific names of micro-organisms should conform with the system adopted in the latest edition of *Bergey's Manual of Determinative Bacteriology* and underlined to indicate that they are to be printed in italics. Collective names for groups of bacteria such as staphylococci, salmonellae, etc., should not be underlined. Abbreviations such as C.S.F. for cerebro-spinal fluid, are only permissible if their meaning is clearly indicated when first introduced. Conventional abbreviations such as ml. for millilitre and cmm. for cubic millimetre are acceptable without explanation. Names of chemical substances should conform to current chemical practice and care should be taken to see that chemical formulae are correct.

REFERENCES: Only papers closely related to the author's work should be quoted. Contributors should study this issue of the Journal for examples of the preferred method of making reference. All references are brought together at the end in alphabetical order and numbered. In the list, references should include (1) Surname followed by the initials of the author(s), (2) Year of publication in brackets (3) Abbreviated title of the periodical according to *World List of Scientific Periodicals* or to *World Medical Periodicals* (underlined), (4) Volume, (5) Page numbers. If there are three or more authors the words *et al* may be added to the name of the first author in the text, but the names of all co-authors must be given in the list. References to books should include (1) Author(s) or Editor(s), (2) Year of publication in brackets, (3) Title (underlined), (4) Edition, (5) Page number referred to, (6) Name of Publisher and Place of Publication.

REPRINTS. Authors may receive a minimum of 50 reprints at cost price. These should be ordered when returning corrected galley proofs.

PROOFS. Whenever time permits, authors will have the opportunity to correct galley proofs before publication. No major alterations will be permitted unless the author is prepared to stand the cost, and proofs must be returned within three days of receipt.


How do you improve on
a good thing?

- for prothrombin-time testing of patient plasmas over four hours old
- for prothrombin-proconvertin testing without preparation of prothrombin-free plasma

Simplastin®-A

lyophilized thromboplastin - calcium extract with Factor V and fibrinogen added.

Simplastin-A is freeze-dried thromboplastin-calcium containing optimum amounts of Factor V and fibrinogen. It is designed for one-stage prothrombin-time testing of plasmas *over four hours old* and for the P & P test. It is controlled against normal human whole and dilute plasma and against plasma from patients on anticoagulant therapy—both fresh plasmas and plasmas that have been allowed to age for 72 hours at room temperature. Simplastin-A is stable after reconstitution for 1 working day.

Prepare Simplastin-A for use by addition of chemically pure distilled or deionized water with a pH not lower than 6.0 at a temperature not over 37°C.

Use Simplastin-A for control of anticnagulant therapy in modifications of these procedures: Quick one-stage assay for prothrombin • Owren prothrombin-proconvertin test • Prothrombin time test (Link-Shapiro modification of the Quick procedure)* • Ware and Stragnell modification of the prothrombin-proconvertin test.

Simplastin-A is designed for control of anticoagulant therapy. Because Factor V and fibrinogen are added, it MUST NOT BE USED in screening tests for coagulation defects. There are only two exceptions to this rule: Simplastin-A may be used in the prothrombin consumption test. Simplastin-A may be used in a suspected deficiency of Factor V, run in comparison with test results with Simplastin.

Simplastin-A is the thromboplastin of choice for prothrombin times on patient plasmas over four hours old because:

It is reproducible in both the normal and the therapeutic range—from vial to vial, from lot to lot.

It is precontrolled. Simplastin-A is made to exacting specifications for tissue source and conditions of extraction; for particle size and number; for ionic strength and pH; for optimum concentrations of Factor V and fibrinogen.

It is standardized for physical appearance, pH, moisture content, cake weight, heat stability, sodium and calcium content, Factor V and fibrinogen levels. After reconstitution it is stable, if refrigerated, for 1 working day.

It is convenient and economical. Simplastin-A permits the laboratory to hold samples arriving during off hours so all prothrombin time tests can be run at the same time, by the same technologist, under the same conditions. In the pro-thrombin-proconvertin test the availability of Simplastin-A eliminates the need for special preparation of prothrombin-free plasma.

Simplastin-A is available in boxes of 10 vials, 20 determinations.

**Factor V and fibrinogen are added to Simplastin-A specifically for the prothrombin time testing of patient plasmas over four hours old. For plasmas less than four hours old, Simplastin, the standard thromboplastin-calcium, is recommended.*

William R. WARNER and Co. Ltd.
AUCKLAND

THE NEW ZEALAND JOURNAL OF MEDICAL LABORATORY TECHNOLOGY

VOLUME 20. No. 1. MARCH, 1966.

The Journal is published thrice yearly (in March, July and November) and is distributed without charge to all financial members of the N.Z.I.M.L.T. (Inc.). Subscription to the Journal for non-members is ten shillings per year or four shillings per single issue postage paid.

Communications primarily concerning the Institute should be addressed to the Secretary.

Intending contributors to the Journal should address their communications to the Editor at the Department of Pathology, Medical School, Dunedin. Copy must be in the hands of the Journal Committee by not later than the first of the month preceding the month of publication.

Inquiries regarding advertising rates should be addressed to the Advertising Manager at the Microbiology Department, Medical School, Dunedin.

Contributions to the Journal do not necessarily reflect the views of the Editor, nor the policy of the Council of the Institute.

Looking to the Future

With a sub-committee of the Medical Laboratory Technologists Board presently studying the form which the certification of medical laboratory technologists should take in the future, every qualified technologist in New Zealand should be giving some thought to the problem on his own behalf.

The findings of an Advisory Working Group appointed to examine the subject in Great Britain, published in summary elsewhere in this issue of the *Journal,* may provide some food for thought in this direction. Conditions in Britain are not necessarily applicable here in New Zealand—indeed, the findings of the Advisory Working Group are not binding upon the way things will progress in Britain; but after such a careful consideration of the many aspects of the problem by such a formidable assembly of experts, an examination of this report by our own Medical Laboratory Technologists Board would seem to be desirable.

The burden of the Group's conclusions is that it would be beneficial to initiate a national certificate in medical laboratory subjects, similar to those available for workers in other fields of science, and the Institute of Medical Laboratory Technology bas taken a decision to make a formal approach to the Department of Education and Science for such a national certificate to be made available. It would thus seem that all thoughts of raising medical laboratory technology to the status of a degree or diploma course have been abandoned, and doubtless for some good and sufficient reason.

The nearest approach we have here in New Zealand to the system of national certificates in Great Britain is the scheme available through the Technicians Certification Authority, and although this was explored tentatively in 1964 no action was taken. Limited facilities available at the technical colleges and real or imagined jeopardy to the status of the medical laboratory technologist were among the reasons for the failure of the Council to pursue the matter further, but it must be obvious, even to the most conservative of us, that the training of the technologist today requires that he should be taught subjects which it is quite outside the capacity of the vast majority of us to teach. To attempt to bring the trainee to a high standard of technical competence without laying down an appropriate background of scientific and general education is like building an edifice of glass, concrete and steel without adequate foundations, and the very first fact that is going to have to be faced before the proposed new system of training and examination is formulated is that nothing that ignores the assistance available through the existing technical educational establishments is ever likely to be satisfactory.

J.C.

Allescheria boydii (Monosporium apiospermum) Associated with Cases of Otomycosis in New Zealand

F. M. RUSH-MUNRO, A.N.Z.I.M.L.T.
Medical Laboratory, 127 Grafton Road, Auckland.

(A paper read at the 1965 Conference of the N.Z.I.M.L.T.)

Monosporium apiospermum, the imperfect stage of *Allescheria boydii*, was first reported in association with otomycosis by Belding and Umanzio[4] in 1935 in the United States. A second report came from Blank and Stuart[6] in 1955 in Canada.

Since 1957 eleven cases of chronic otomycosis have given characteristic cultures of *M. apiospermum* in this laboratory. One isolate developed the perfect stage, *A. boydii*.

Apart from the interest of these isolations to ear specialists and mycologists, the existence of this fungus in New Zealand suggests the possibility of its occurrence in other infections in man or animals.

A. boydii was first cultured by Boyd and Crutchfield[7] 1921 from a case of maduromycosis and studied by Shear[19] 1921 who named it *A. boydii*, a member of the Ascomycetes. One of the few perfect fungi capable of causing disease in man, *A. boydii* was demonstrated by Emmons[13] in 1944 to be the perfect stage of the more widely known *M. apiospermum*. *A. boydii* produces perithecia (or more accurately cleistothecia) containing ascospores (sexual spores) in addition to the conidia seen in *M. apiospermum*.

As the majority of isolates do not produce the perfect stage in culture, *M. apiospermum* has been most often reported as the causative organism of "madura foot." This condition, first described from Madura in India by Gill in 1842, was found by Vandyke Carter in 1874 to show fungal elements in the grains from sinuses in the affected areas. The term, maduromycosis, is used to describe the infection and, though a number of fungi have been implicated as aetiologic agents of the disease, *M. apiospermum* is the most important agent in the United States and Europe.

It is of considerable interest, that, in recent years, this fungus has been reported as the cause of infections other than mycetoma.

First Zaffiro[22] 1938 reported it from a case of septicaemia. Then Benham and Georg[5] 1948 reported it as the causative agent of a case of meningitis. Baker[3] 1956, Tong *et al.*[21] 1958, Schary *et al.*[15] 1960 and Creitz and Harris[10] 1955 all reported

it from pulmonary disease. The fungus has been isolated from corneal ulcers, (Pautler *et al.*[16] 1955, Gordon *et al.*[14] 1959). Pezenberg[17] 1958 gives a comprehensive report on the isolation of *A. boydii* from an eczematous skin lesion in a dog in Berlin.

In 1961 Meyer and Herrold[15] described the isolation of the fungus from urine and prostatic secretion in a case of chronic prostatitis, initially due to an enterococcus, and treated with achromycin and erythromycin. In the United States *A. boydii* has been cultured from soil and sewage (Ajello 1956, Cooke 1955)[1, 9] and is considered a common saprophyte in the environment (Ajello *et al.*)[2] 1963. Taylor *et al.*[20] 1964, in a survey of 539 soils from Egypt, the Sudan and Ethiopia isolated *M. apiospermum* 17 times. In New Zealand Margaret Di Menna[11] 1955 reported 2 isolations of a Monosporium from 2,244 isolations in a quantitative study of airborne spores in Dunedin. Dye and Vernon[12] in a similar New Zealand wide survey in 1952 did not report any.

The first isolation in our laboratory was Case 1 1957. (Table I.) Earlier swabs were reported to have grown coliform bacilli and staphylococci. An examination of the Gram-stained film by Miss Marie Lindsey showed some unusual large, ovoid, Gram negative spores. (Fig. 1.) This led to close inspection of the

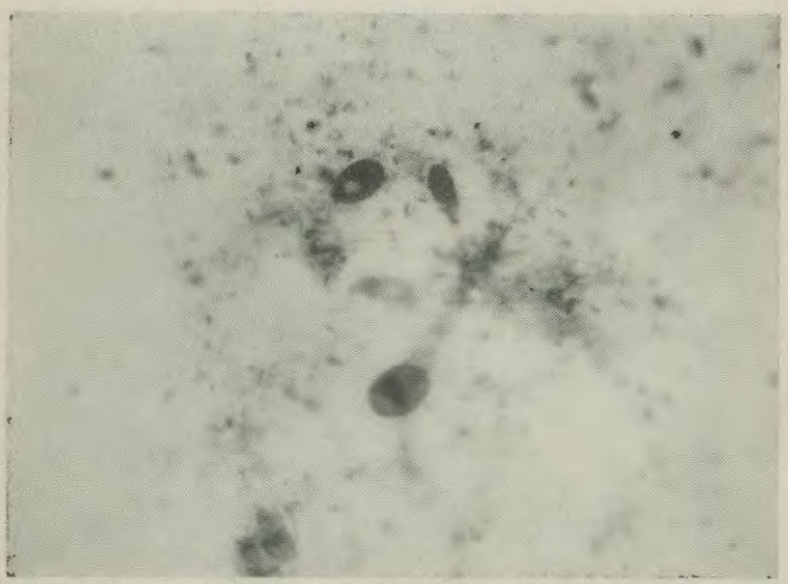


Fig. 1. Spores of *Monosporium apiospermum* in Gram-stained film from ear swab (x 1,000).

debris on the swab and, mounted in potassium hydroxide, abundant spores, mycelium and occasional yellowish coraemia bearing clusters of spores were found. This all suggested an unusual fungal infection, and the swab and the debris were accordingly cultured on Sabouraud dextrose agar and actidione-aureomycin agar.

Bacterial cultures on blood agar and MacConkey agar again gave heavy growths of coliform bacilli and staphylococci and, although these cultures were incubated subsequently at 27°C for 7 days, the fungus did not grow. The Sabouraud cultures both produced rapidly growing fluffy white colonies, later tinged with grey (Fig. 2) and darker grey on the reverse. On blood

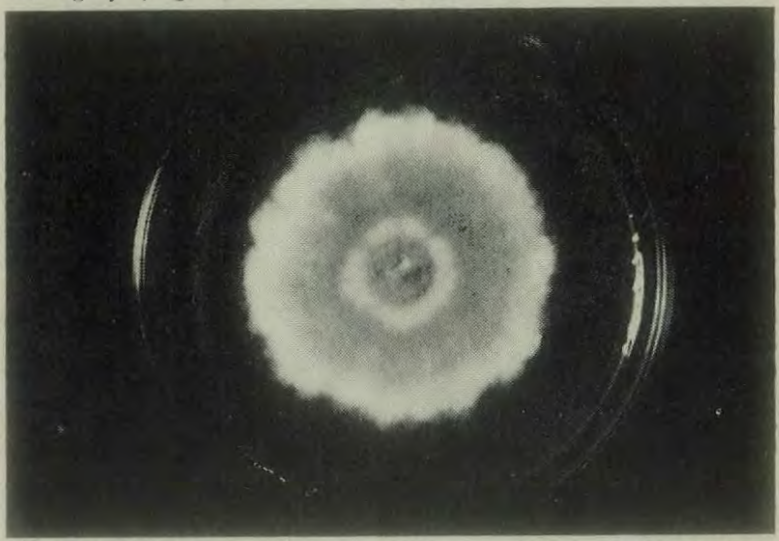


Fig. 2. *Monosporium apiospermum* colony on Sabouraud dextrose agar (14 days).

agar at 37°C subcultures grew well and the colony, 27 mm. in diameter after 6 days, produced a marked zone of haemolysis.

Microscopically a needle mount, and later a slide culture, in lactophenol cotton blue (Fig. 3) showed abundant oval to pear-shaped conidia about 6 x 9 μ, borne singly at their narrower ends on short conidiophores.

From these findings the fungus was identified as *Monosporium apiospermum*[8] and a subculture was sent to Dr Jacqueline Walker of the Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, who kindly verified the identity. Cleistothecia were not found in these cultures.

The history of this case suggested the possibility of the infection having been acquired in the Middle East and the iso-

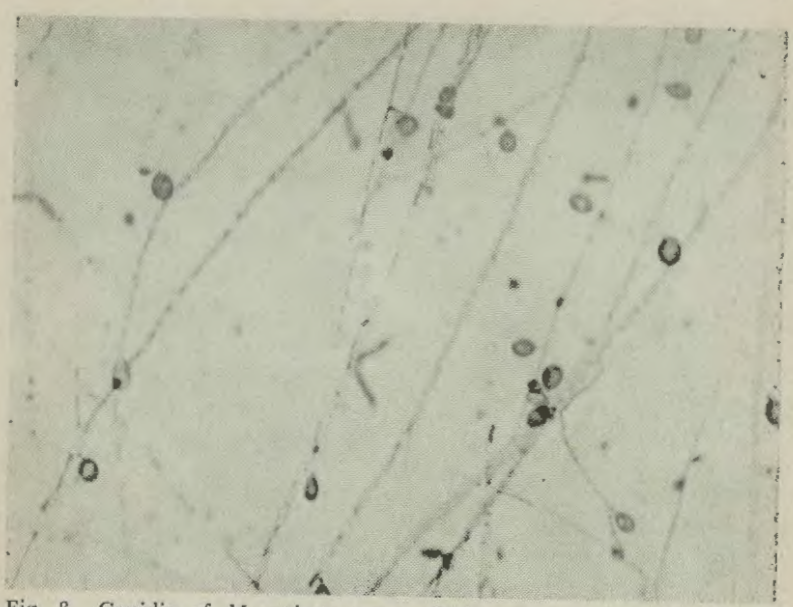


Fig. 3. Conidia of *M. apiospermum.* Slide culture, mounted in lacto-phenol cotton blue (x 400).

lation was regarded as an exotic curiosity. Ten months later Case 2 was recorded and again, although the patient had not been out of New Zealand, there had been contact with personnel from the Middle East.

The third case occurred over 2 years later. This time the patient had not been out of New Zealand and had no reported overseas contacts. As a pig-farmer, he had observed an apparently similar condition in his pigs but Dr E. H. Shortbridge, Veterinary Research Officer, Ruakura Animal Research Station, had not identified the infection in the few specimens examined from pigs, the usual organisms being staphylococci, streptococci and *Corynebacterium pyogenes.*

Further isolations, Cases 4, 5 and 6, occurred during the next 12 months but these did not provide adequate data to establish the significance of the fungus in the infection.

The occurrence of *M. apiospermum* in 1962 as a contaminant in a culture from a leg scraping, and a further isolation from an ear swab in 1963, indicated that the fungus was a consistent member of the saprophytic flora in New Zealand.

In 1964 Case 8 yielded a culture which on prolonged incubation (3½ months) produced cleistothecia (Fig. 4) identifying the isolate as *Allescheria boydii.* This case had had antibiotic therapy.

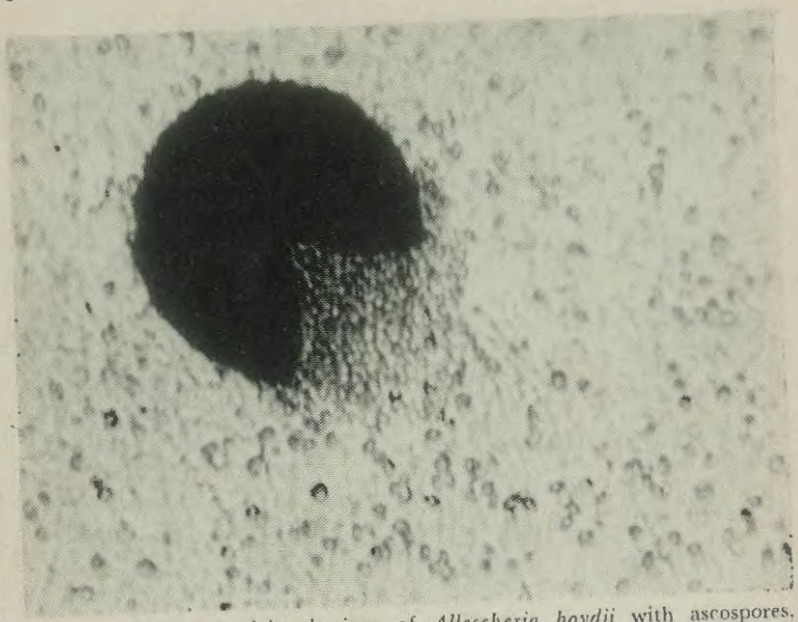


Fig. 4. Ruptured cleistothecium of *Allescheria boydii* with ascospores, mounted in Amann's balsam (x 400).

Three further cases have served to establish the following facts:

1. *M. apiospermum* is a regular fungal invader in chronic ear infections in New Zealand.
2. It is usually associated with heavy growths of bacteria, particularly Gram-negative bacilli,
3. Clinically the discharge has been recognised as thick, buttery to slimy.
4. The fungus has not been isolated from routine bacteriological media due to the heavy growths of bacteria. This emphasizes the importance of careful examination of Gram-stained films from ear swabs, together with potassium hydroxide films of any fragments of debris, to direct appropriate fungal cultures.
5. In view of the increase of fungal infections following hormone or antibiotic therapy, an awareness of the presence of this saprophyte and potential pathogen is to be recommended.
6. Research to determine the extent of its occurrence in soils in New Zealand may be indicated.

Summary

Over a period of eight years in a series of 11 cases *M. apiospermum*—*A. boydii* has been isolated from chronic otomycoses. First suspected to be an exotic importation from the

Middle East it now appears to be part of the saprophytic flora in New Zealand. Provided appropriate cultures are prepared the fungus is easily cultured and recognised, at least in its imperfect form.

Acknowledgments

I wish to thank the following for their notes on the cases, and opinions over the years:—

Dr P. Eisdell Moore, Dr W. McKechnie, Dr J. A. Coombes, Dr C. B. Cornish, Dr L. C. Stewart, Dr S. Brown and Dr H. Black.

I am indebted to Dr Jacqueline Walker for her verification of the first culture; to Mr A. Fraser, Medical Photographic Department, Auckland Hospital, for the photographs; and to Miss Marie Lindsey, whose curiosity led to the first isolation.

REFERENCES:

1. Ajello, L. (1956), *Science,* **123,** 876.
2. Ajello, L., Georg, L. K., Kaplan, W. and Kaufman, L. (1963), *Laboratory Manual for Medical Mycology,* U.S. Department of Health Communicable Diseases Center, Atlanta.
3. Baker, R. D. (1956), *Amer. J. Path.,* **32,** 287.
4. Belding, D. L. and Umanzio, C. B. (1935), *Ibid,* **11,** 856.
5. Benham, R. W. and Georg, L. K. (1948), *J. invest. Derm.,* **10,** 99.
6. Blank, F. and Stuart, E. A. (1955), *Canad. med. Ass. J.,* **72,** 601.
7. Boyd, M. F. and Crutchfield, E. D. (1921), *Amer. J. trop. Med.,* **1,** 215.
8. Conant, N. F., Smith, D. T., Baker, R. D. and Callaway, J. L. (1954), *Manual of Clinical Mycology,* 2nd Edition, Saunders, Philadelphia.
9. Cooke, W. B. and Kabler, P. (1955), *Publ. Hlth Rep., Wash.,* **70,** 689.
10. Creitz, J. and Harris, H. W. (1955), *Amer. Rev. Tuberc.,* **71,** 126.
11. Di Menna, M. E. (1955), *Transac. Brit. mycol. Soc.,* **38** *(2),* 119.
12. Dye, M. and Vernon, T. R. (1952), *N.Z. J. Sci. Technol.,* 118.
13. Emmons, C. W. (1944), *Mycologia,* **36,** 188.
14. Gordon, M. A., Vallotton, W. W. and Croffead, G. S. (1959), *Arch. Ophth.,* **62,** 758.
15. Meyer, E. and Herrold, R. D. (1961), *J. clin. Path.,* **35,** 155.
16. Pautler, E. E., Roberts, R. W. and Beamer, P. R. (1955), *Arch. Opth.,* **53,** 385.
17. Pezenburg, Von E. (1958), *Mykosen,* **1,** 172.
18. Schary, M., Levene, N. and Gordon, H. (1960), *J. infect. Dis.,* **106,** 141.
19. Shear, C. L. (1922), *Mycologia,* **14,** 239.
20. Taylor, W. J. Jnr, Radcliffe, F. and Van Pelman, P. F. D. (1964), *Sabouraudia,* **3,** 235.
21. Tong, J. L., Valentine, E. H., Durrance, J. R., Wilson, G. M. and Fischer, D. A. (1958), *Amer. Rev. Tuberc. pulm. Dis.,* **78,** 604.
22. Zaffiro, A. (1938), *G. Med. milit.,* **86,** 636.

A Review of the Pelger-Huet Anomaly, and Presentation of Three Unrelated Cases

B. A. RAE
Pathology Department, Christchurch Hospital.

A paper read at the 20th Annual Conference of the N.Z.I.M.L.T., June, 1964.

This anomaly belongs to a group of hereditary familial anomalies of blood cells, including hypersegmentation of neutrophils and eosinophils, and Alder's granulation anomaly. These are all primary structural peculiarities which lead to characteristic morphological changes in the blood cells. The vast majority of Pelger-Huet manifestations are heterozygous genetically, and are characterised by the typical bilobed ("spectacle") form of neutrophil polymorph nuclei.

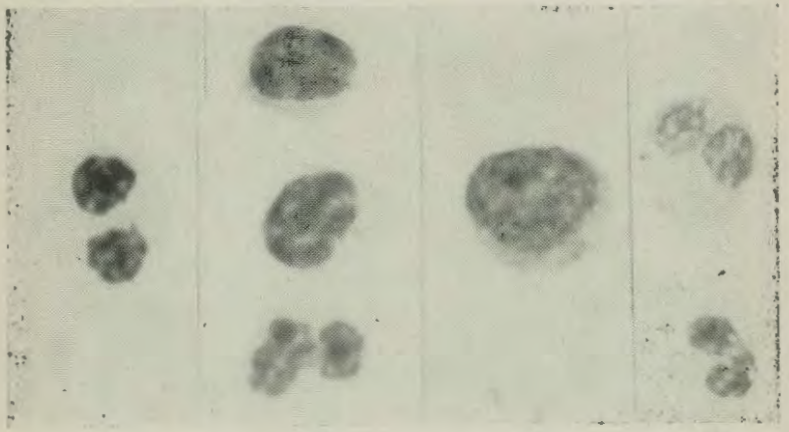


Plate 1. Typical Pelger-Huet leucocytes.
(a) A neutrophil with "spectacle" bilobed nucleus.
(b) Two lymphocytes and a "band" neutrophil.
(c) A monocyte.
(d) An eosinophil with bilobed nucleus and a "Band" neutrophil.
Note the dense aggregated chromatin in all cells.

History

In 1928, a Dutch tuberculosis specialist, K. Pelger, observed a peculiarity of the leucocyte nuclei in one of his patients. These nuclei persisted, unsegmented or bisegmented, when mature. Seldom he saw trilobed nuclei, and never any multisegmented forms. Also, the nuclear chromatin was abnormally aggregated into coarse irregular clumps, and stained intensely.

In 1931 Pelger discovered a similar case, also a tuberculous patient. Pelger associated this "shift to the left" with tuberculosis, and regarded it as of unfavourable prognosis.

Later, in 1931, a Dutch paediatrician, G. J. Huet, examined a ten-year-old girl suspected of having tuberculosis.

He noted a similar anomaly, and on carefully taking the family history he discovered that the girl was a niece of Pelger's first case. Huet traced this anomaly back for three generations and found other members of the family, in good health, possessing the anomaly.

Huet described three families possessing this anomaly in 1931-32, and concluded that there were no pathological implications attributable to the anomaly. Thus, it was later regarded as a harmless blood variant with presumably no clinical importance. Huet was the first correctly to evaluate the anomaly, and postulated that it was a dominant non-sex linked, non-autosomal Mendelian characteristic. During the following years the term Pelger (or Pelger-Huet) anomaly was adopted. The investigations of this anomaly entered a new phase when in 1938 a Swiss haematologist, Undritz, discovered a similar phenomenon in the rabbit, an animal eminently suitable for genetical experiments. The buck rabbit possessing this anomaly produced the expected 1:1 ratio, affecting both sexes of its progeny.

Nachtsheim[7] performed further investigations on these Pelger-Huet rabbits over the next eight years. He confirmed the heterozygote ratio and penetrance, and detected no clinical symptoms or prenatal mortality. However, on mating these heterozygotes he got an unexpected result. Instead of the 3:1 ratio, the ratio of Pelgers to non-Pelgers was 2:1. Also, all progeny examined were heterozygotes, suggesting that in double dose the Pelger gene was lethal, and homozygotes perish as foetuses.

Fortunately this lethality was not absolute. Some homozygotes, on further breeding, lived until parturition or even longer. The two exceptional homozygotes which lived to matnrity were invaluable for study. One, a buck, could be used for breeding and its homozygosity for the Pelger gene proved in this way. The homozygote blood picture was of special interest; all leucocyte nuclei were completely round, with no stretching, or even slight segmentation. The chromatin was markedly coarse and pyknotic. This leucocyte appearance had never before been observed in mammals.

The lethality was obvious; homozygous Pelger-Huet rabbits had marked skeletal abnormalities, including gross shortening and curving of long bones. The animals moved with difficulty, in a "paddling" motion. The thoracic cage was fixed, causing asphyxia and emphysema, and this was the main cause of pre-

natal death. Those surviving parturition presented further symptoms, including a muzzle scurf, hypersalivation, and extreme emaciation. Nachtsheim had little doubt that the rare homozygous human occurrence would also be lethal.

About the underlying mechanism of the anomaly little is known. Undritz postulated that physical and/or chemical factors produced an abnormal colloidal dispersion of chromatin, resulting in the coherent nuclear material resisting segmentation.

Stahel thought that a predisposition to a specific bone marrow was inherited[4].

The anomaly is confined to cell nuclei and manifests late in morphogenesis. Dorr and Moloney (1959)[3] suggest that the defect was apparently due to an arrest or dysplasia of nuclear chromatin synthesis.

Shanbrom *et al.* (1960) theorized an enzymatic derangement of nucleic acid metabolism.

The bilobed Pelger-Huet polymorphonuclears differ from the norm in several respects. The "spectacle" form is characteristic, with individual lobes that are usually (but variably) round, in comparison to the oval or irregular lobes of normal nuclei. Chromatin is conspicuously more condensed into aggregates interspersed with clear nuclear sap. Cell size, cytoplasm, and granularity are usually normal. Other characteristic obser-

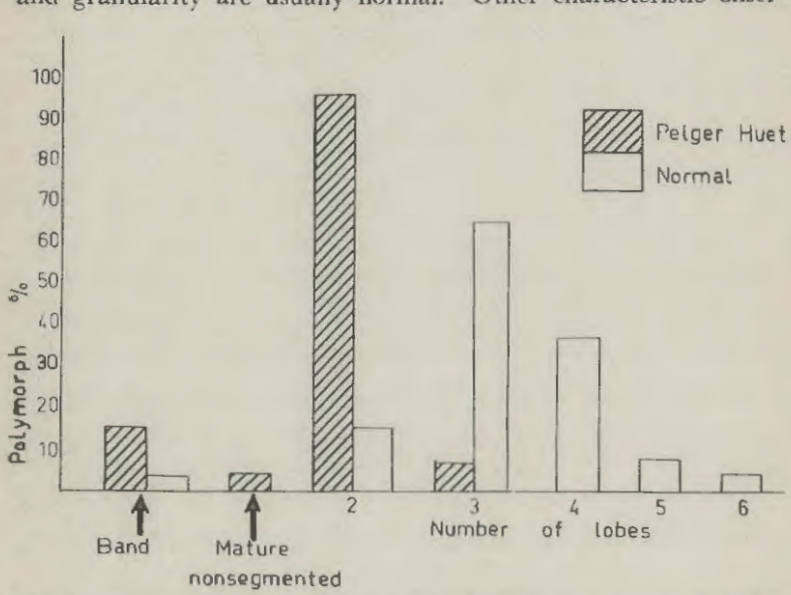


Fig. 1. Representing the results of Arneth lobe counts on normal and Pelger-Huet polymorphonuclears. The apparent hiatus is due to round Pelger nuclei being regarded as mature.

vations are round or slightly indented nuclei, and a typical band forms. See Fig. 1.

It is stressed that these are mature cells; they are not the equivalent of a myelocyte of metamyelocyte. Pelger cells can be differentiated from the latter by the relatively small nucleus and dense basophilic chromatin content. Occasional trilobed polymorph nuclei are seen but never any multiple segmented nuclei.

Harm (Ludden, Harvey)[5] proposed a classification schema, *viz:*

A : normal polymorphs.
B : intermediate polymorphs. } Found in normal blood.
C : true Pelger-Huet polymorphs.

These types are further qualified by number of lobes present.

Partial carriers of this anomaly manifest all three types of polymorphs. There is no satisfactory explanation of these partial carriers; it may well be a separate entity, as cases are rarely found in classical heterozygous families. This suggests that the Pelger gene probably does not possess varying expressibility.

It was noted that female Pelger-Huets had no "drumstick" manifestation of their sex chromosome[10].

However, Luers and Pretzel (1958)[6] have published a paper, relating sex diagnosis with Pelger-Huet cell nuclei morphology. The anomaly typically affects all blood cells. Basophils show a decrease in segmentation, while eosinophils generally have a particularly compact nucleus, and it is not unusual to find mature, but round, nuclei. Lymphocytes and monocytes present the typical Pelger chromatin appearance.

The human homozygous appearance remained unknown until 1952, when Begeman and Campagne[1] described a case in Berlin. The blood picture was very similar to the rabbit appearance, with only species difference present. (In this case, some nuclei were slightly indented—but humans are normally slightly "shifted to the right" when compared to rabbit polymorphonuclears, and thus it was accepted that human "double dose" Pelgerization is not absolute.) This case was fully investigated.

Peroxidase and motility were normal, and marrow had normal cellularity and normal erythroid/myeloid ratio.

It was noted in the marrow that myeloid chromatin commenced the Pelger condensation during promyelocyte morphogenesis, with "stab" forms almost completely absent. A similar chromatin appearance began in the erythroid series at basophil normoblast stage, progressing to frankly pyknotic nuclei. Many megakaryocyte nuclei were round. This appearance of all precursors is also characteristic of heterozygous Pelger marrow. Surprisingly, in this case, and two other cases discovered in later years[2] there were no skeletal, or allied, symptoms that

typified rabbit homozygotes, and it appears that in man the homozygous appearance is not lethal.

It is important to differentiate a true, and presumably benign Pelger-Huet anomaly from pseudo-Pelger-Huet cells, which are often seen in acute chronic myelogenous leukaemia.

Pseudo-Pelger cells are occasionally seen in panmyelopathies, viral diseases, malaria and mongolism.

A summary of differential criteria can be made.

A typical Pelger-Huet heterozygote has 69-93% bilobed polymorph nuclei, atypical band forms, and all leucocytes have clumped, but mature chromatin. Phagocytic activity, neutrophil alkaline phosphatase, white count and differential absolute values are generally normal. Confirmatory demonstration of heredity can, in most cases be performed. (Although spontaneous mutations are known.) In infections with a subsequent leucocytosis the "shift to the left" may resemble a Pelger-Huet manifestation. However, as well as bilobed nuclei there are immature (band) forms and multisegmented nuclei present. Polymorph lobes are elliptic and unequal, with a fine chromatin content. There is usually a raised neutrophil alkaline phosphatase activity. Leukaemic pseudo-Pelger-Huet cells have received special attention.

Dorr and Moloney (1959)[3] described thirteen anomalous cases among various myelopathies, including acute and chronic myelogenous leukaemias, and myeloid metaplasia. The pseudo-Pelger cells appeared late in the course of chronic myelogenous leukaemia and myeloid metaplasia, and followed prolonged exposure to myelotoxic therapeutic agents. In all acute cases, the anomaly was noted prior to institution of therapy.

Shanbrom et al. (1960)[9] conducted a similar survey, and concluded that anomalous cells usually existed prior to therapy, increasing in the terminal phase. They proposed that the pseudo-Pelger cells occurred regardless of therapeutics, and suggested that these cells, as well as other leukaemic aberrations (Turk cells, micromyeloblasts, etc.) represent a asynchronous maturation between nucleus and cytoplasm.

The obvious morphology of Pelger-Huet cells has been used as a tagging device to estimate the survival period of transfused leucocytes. (Roose and Gurney, 1952[8])

Case Reports

The "H" Family (Fig. 2)

This family was detected in 1959 at Christchurch Hospital, and was investigated by Dr F. W. Gunz.

Notable is the almost exclusive male domination of both the genealogy and the anomaly. This is probably a coincidental finding as the anomaly normally affects male and female in equal ratio. This family was checked for any relation between blood

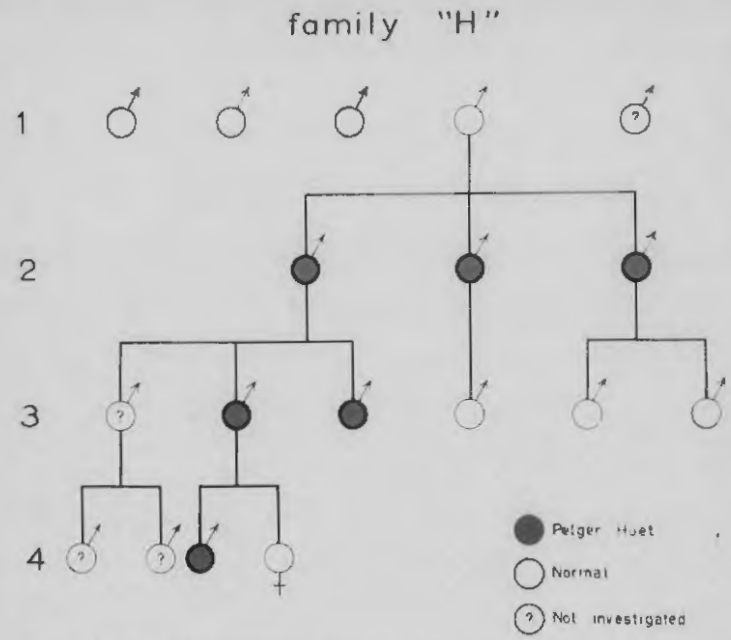


Fig. 2. The "H" Family showing the anomaly present in three generations.

groups and the Pelger anomaly. The results of this, and other authors' work, suggests no genetic link.

The "M" Family (Fig. 3)

The propositus (a 26-year-old woman, for removal of a simple serous ovarian cyst) was detected in September, at Princess Margaret Hospital.

The genealogy is a typical heterozygous picture.

On members of this family a small experiment was conducted. Considering the possibility of extra-haematopoietic cells being "Pelgerized" buccal epithelial smears were obtained using a standardised schema of fixing (Papanicolau) and staining (modified Leishman) for both normal, and Pelger-Huet sources.

Comparing nuclear chromatin did not reveal any obvious difference. A carefully standardised Feulgen desoxyribonucleic acid estimation might have been more conclusive.

The "D" Family (Fig. 4)

The propositus (a 33-year-old woman, for lobectomy) was detected at Princess Margaret Hospital in February 1964. Mrs D. has no relatives in New Zealand, but her children's possession of the anomaly confirms a Pelger-Huet anomaly.

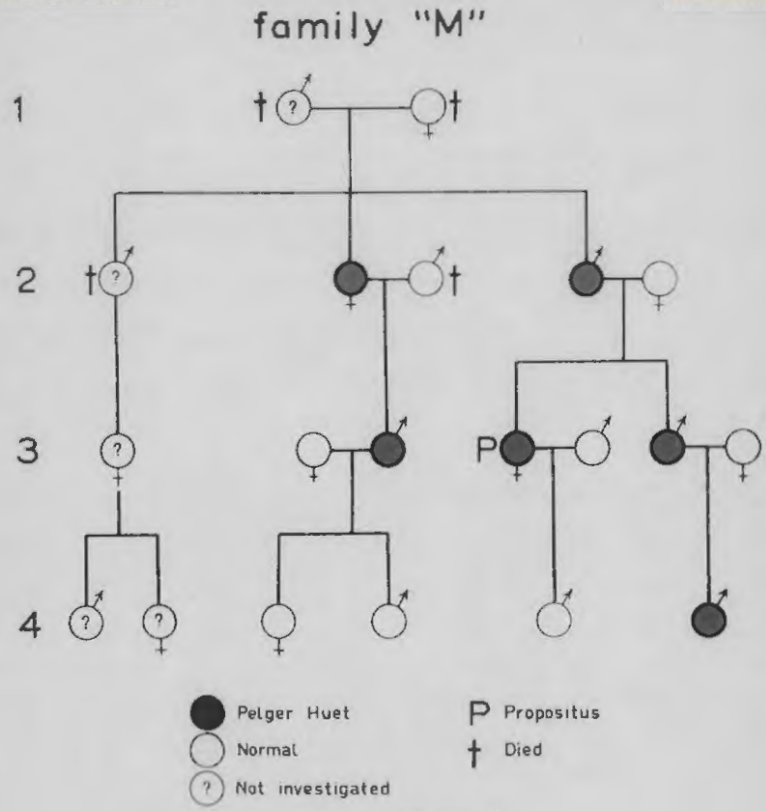


Fig. 3. The "M" Family.

Members of both maternal and paternal families all live in Scotland, and are under investigation.

Conclusion

Although it is a benign condition recognition of the anomaly has some practical significance. Patients may be exposed to unnecessary expense and inconvenience of numerous diagnostic studies. This situation has been known to cause iatrogenic symptoms (generated by auto-suggestion resulting from physician's talk or manner)[4]. Noted also is at least one case where a person possessing the anomaly had been under medical care for a "blood condition" for many years. An unrecognized anomaly can also lead to erroneous clinical diagnosis when the person becomes ill. Certainly the members of a Pelger-Huet family should be given an explanation of their "blood thing," and a reassurance of its non-pathological nature.

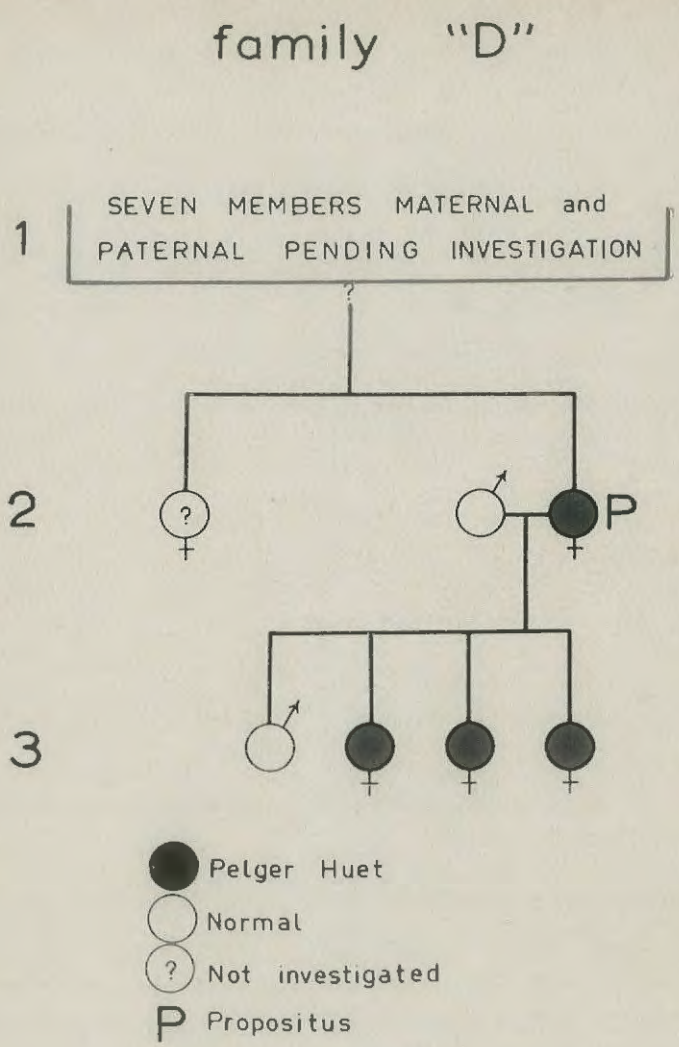


Fig. 4. The "D" Family.

Finally, this anomaly probably only exists when those responsible for screening blood films are aware of it. The incidence has been surveyed several times, and the figures suggest it is relatively common. European and American clinics have noted that the anomaly is probably frequently overlooked. To quote a personal example, the propositus of family "D" had a history of numerous blood tests on previous hospital admissions, and on

this particular admission had had three blood screens before the anomaly was detected.

I gratefully acknowledge the help of Dr F. W. Gunz, Miss M. Eales and Mr T. Tanner in preparing this review.

REFERENCES:

1. Begemann, N. H. and Campagne, V. L. (1952), *Acta Haemat.*, **7**, 295.
2. Ciplea, A. G. and Ciorapciu (1959), *Presse med.*, **15**, 554.
3. Dorr, A. D. and Moloney, W. C. (1959), *New Eng. J. Med.* **261**, 742.
4. Klein, A., Hussar, A. E. and Bornstein, S. (1955), *Ibid.*, **253**, 1057.
5. Ludden, T. E. and Harvey, M. (1962), *Amer. J. clin. Path.*, **37**, 302.
6. Luers, T. and Pretzel, G. (1959), *Blut*, **4**, 185.
7. Nachtsheim, H. (1950), *J. Hered.*, **41**, 131.
8. Roose, W. F. and Gurney, C. W. (1959), *Blood*, **14**, 170.
9. Shanbrom, E., Collins, Z. and Miller, S. (1960), *Amer. J. med. Sci.*, **240**, 732.
10. Skendzel, L. P., Hoffmann, G. L. (1962), *Amer. J. clin. Path.*, **37**, 294.

The History of Blood Transfusion

D. B. SNOOK
Waikato Hospital, Hamilton.

(Winner in the Essay Section of the Junior Essay Competition, 1965.)

Between the highest mountain and the deepest part of the sea, as the ball of the earth moves around the sun, are all the living things we know. Amongst all the living creatures, man takes his place; man the conqueror, inventor, designer and creator. Man, a complex mass of tissue, fighting in a mad race for survival. There are numerous things that keep us surviving, but possibly the most important of our vital assets is blood—blood, the river of life.

From the very dawn of human history, blood has been regarded as the most important ingredient of the animal economy. It had long been realized that loss of blood was inevitably followed by loss of life. In classical times blood was considered to contain mystic properties, and it was commonly thought that the weak might remedy their illnesses by bathing in and drinking the blood of the strong. It is not surprising, therefore, that the life blood of slain gladiators tended to be a popular beverage.

"All this is a far cry from blood transfusion" you may say. This is true, but although it is little more than forty years since blood transfusion became known and accepted as the commonplace practice it is today, it has been in the minds of men for centuries. Let us retrace its history, and see why its evolution was so slow.

The early classical references are all based upon the mystic properties of blood, and the history of blood transfusion for therapeutic purposes does not really begin until the seventeenth century. William Harvey released to the world, in 1628, his conception of the circulation of blood, and allowing thirty years for his conception to sink in there then began the scramble for priority as to "who was first." Many men put forth claims at having made direct animal to animal transfusions, but their experiments were all based on very slender foundations and can be discounted, as most of them were pitifuly unsuccessful, even in striking the animal's vein with their clumsy technique and apparatus.

We can safely give the first real credit to the ingenious mind of a young English doctor, who was later to become known as Sir Christopher Wren. It is interesting to pause here, and observe that a certain Dr Sprat, in learning about Wren's experiments, made a startling prophecy to the Royal Society, that this was "the beginning of something that will ultimately end in extraordinary success." Indeed, many others soon had

their feet firmly planted on the supposedly right path, and on May 31, 1665, the first direct transfusion of blood was attempted in accordance with Wren's basic principles. The donor and recipient were dogs and a system of brass pipes and syphons connected circulatory systems of the two hapless beasts. Unfortunately this proved a failure, although the doctors concerned were sure it would have worked, "had not the syphon broken."

Richard Lower, an Oxford doctor, is to be credited with the first success, once again with two dogs; but he was surprised to find that the blood clotted unless he was quick in connecting the tubes.

Let us turn now to France, where similar success was being enjoyed by a French professor, Jean Denys. In 1667, Denys claimed to have cured a man suffering from an "inveterate frenzy" by transfusing him with a considerable amount of blood from a calf. Although the poor wretch developed pain in the arm, sweating, diarrhoea, vomiting and later passed black urine —all the signs of receiving incompatible blood—he later improved. Indeed, he was lucky to escape with his life, but the medical profession regarded this success with immense satisfaction. The fame of Dr Denys was short lived, lasting one year only, because of the death of one of his patients, whose widow successfully litigated against him.

Disaster followed disaster in France, and in referring back to England we suspect the same thing happening, even though a peep in Samuel Pepys' diary reports earlier success.

The lamb-dog-and-calf-tied-to-the-stake method was on the way out and it is not surprising, that with our present knowledge of the dangers associated with the administration of incompatible blood, the operation should fall into disrepute.

Continuing on, we find ourselves coming to the eighteenth century with virtually nothing to report. In fact it is not until the nineteenth century that we find the idea of blood transfusion being revived. This is the critical point in the history we are tracing, and was the time when the first transfusion in the modern sense was performed. James Blundell, a noted physician of the time, with the help of a colleague, Dr Leacock of Barbados, demonstrated the fact that different species of blood do not mix, thus forming the now accepted doctrine of the incompatibility of the bloods of different species. Their work was crowned with success on the twenty-second of December, 1818, a historic date in medical history. On this day the first transfusion of human blood was given. A man received twelve to fourteen ounces of blood from several donors by means of a brass syringe and cannula arrangement. We can excuse his dying, however, as he had been suffering from an incurable

disease and was not expected to live anyway. The fact that the operation had been tried is the significant fact in the advancement of our story.

Blundell performed ten transfusions in all, two on patients who were already dead before he began. Of the remaining eight, four were successful. He formulated many fundamental points which became the focus of intense interest, and many medical men took up his work. Here there is a lag in the advancement, because the Royal Society was beginning to take notice and was extremely disturbed at the number of severe reactions and deaths still occurring for no apparent reason. It was the cause of much puzzlement amongst the profession, and so they ordered that transfusion only be used in extreme emergency. Modifications to Blundell's syringe and funnel apparatus, the trial of sodium phosphate as an anticoagulant, and even the elimination of air bubbles encountered in direct transfusion, did not appear to decrease the percentage of mishaps. Indeed, at this stage in the history of blood transfusion, it once again appeared to be perilously close to abandonment. All through the remaining part of the nineteenth century we find that all doctors became very disheartened at their inability to perfect the practice of transfusion. Finally, in 1901, a major step was made when Landsteiner established, and relayed to the medical world, the presence of agglutinins and iso-agglutinins in the blood. Landsteiner himself, and later Jansky and Moss, slowly realized the significance of the experimental findings, and in 1907 Landsteiner produced his report on the ABO blood group system.

The discovery of the blood groups was an advance of fundamental importance, and to we who are following this history, the greatest accomplishment of all. It was now possible to eliminate most of the fatalities due to incompatible blood. For the first time men were able to predict compatibility between donor and recipient directly and indirectly, by a method known to us today as the haemagglutination reaction, relying on the presence of agglntinins in the serum and the corresponding agglutinogens in the cells.

Along with the new discovery came changes in technique, and at this stage we will take a closer look at them. Anxious to improve technique as well as theory, doctors, encountering the many problems concerned with direct transfusion, now began to focus their attention on possible methods of indirect transfusion of whole blood. Several methods were devised, and one, which depended on the use of paraffin wax as a coating for the blood container to delay clotting, was to be used with considerable success in the First World War. However, the most significant advance in actual transfusion technique appears to be the development of methods involving anticoagulants.

Sodium phosphate mentioned earlier in our history was once again tried, along with hirudin, peptone, and sodium citrate but all of these unfortunately became rejected because of suspected toxicity. Once again brains were puzzled for some years and it was not until 1914, when a man named Agote successfully performed a transfusion using 0.2% citrated blood and proved that citrate with glucose additive is harmless.

The citrate method now became slowly accepted. The word "slowly" must be emphasized because prejudice really died hard in this case and for many years the cause of post-transfusion reaction was attributed to the use of citrate.

Apart from inuprovements in technique and greater understanding of the blood groups, there is little of historic importance until 1940. It was this year that brought about the amazing discovery of the Rhesus factor. Weiner and Peters demonstrated that a human corpuscular antigen, similar to one found in rhesus monkeys, was capable of stimulating certain dangerous agglutinins. "A wonderful thing, the Rh," some people have said, "But it is a pity it ever found its way out of the laboratory." Nevertheless, understanding and application of the Rhesus factor now eliminated the infrequent transfusion reactions and removed for ever the fallacy of the Universal Donor.

At this stage of the history, it is difficult to decide what is history and what is not. However, the discovery of this Rh factor ultimately led to the opening up of the whole new field of Immuno-haematology and the discovery of such things as genotypes, rare agglutinins and minor antigenic factors. It is impossible to enter into an account of blood group genetics in an essay such as this, but it is with this knowledge that the improvement in techniques, the methods of blood storage, the extraction and use of plasma as side issues, and increased wisdom all end with the success that we are experiencing today in the realm of blood transfusion.

To review it all we could say that blood transfusion today is used to replace the volume of blood through loss, and to contribute any deficient element. Its success demands proper administration of the correct body fluid in the correct amount at optimum speed according to the requirements of the recipient. The "extraordinary success" prophesied by Dr Sprat 1657 has now been achieved, but only after an unfortunate time-lag of nearly 300 years. It is the refinement of knowledge and the perfection of practice that are the most difficult to achieve, but it is the first struggles that appeal most strongly to our sense of history.

Laboratory Notes: Microbiology

Isolation of *Nocardia asteroides* from Two Sputum Specimens

GILLIAN R. BOTT
Pathology Department, Green Lane Hospitol, Auckland.

(Received for publication November, 1965)

Introduction:

Nocardia asteroides is characterised by slender, branching, Gram positive filaments which readily break up into coccoid and bacillary forms in culture. It is weakly acid-fast and grows aerobically. It can be cultured easily on ordinary media and on 10% human blood agar forms dry, white, nodular colonies with irregular edges, which may develop yellow-orange pigment after a prolonged period. The colonies may also have a fuzzy appearance due to fine aerial hyphae.

Nocardia asteroides is usually saprophytic, but is able to cause pulmonary disease resembling tuberculosis, which can become systemic and result in death unless recognized and treated.

This paper describes the cultural characteristics of two organisms isolated from sputa sent to the laboratory for TB culture. The isolations were made on Lowenstein-Jensen medium after the sputa had been treated with 23% tri-sodium phosphate overnight at 37°C.

One patient was a New Hebrides man with tuberculosis, the other a New Zealand girl with bronchiectasis. *Nocardia asteroides* was not thought to play a pathogenic role in either patient.

Characteristics of the Organisms:

Both organisms resembled members of the Anonymous Mycobacteria when first isolated, and were consequently stained by the Ziehl-Neelsen method using 20% sulphuric acid as a decolourizing agent. In both cases partially acid-fast branching filaments and many coccal and bacillary forms were observed.

The colonies were then subcultured on blood agar at 37°C, on Lowenstein-Jensen medium at room temperature, 37°C and 45°C; and Sab-dex slide cultures were set up. Inoculations were also made in Kirchner's medium and gelatin.

GRAM STAIN:

Gram positive branching filaments with coccal and bacillary forms were observed.

GROWTH ON BLOOD AGAR:

After five days colonies were white, feathery and irregular with fine aerial hyphae. One culture grew flat colonies, the other grew larger, heaped-up colonies. Both cultures had an earthy smell, and the colonies adhered firmly to the medium.

GROWTH ON LOWENSTEIN-JENSEN MEDIUM:

Growth appeared at all temperatures in three days. An orange-pink pigment developed more slowly over the wrinkled, dry growth and a fine white aerial mycelium developed also.

SAB-DEX SLIDE CULTURE:

Both cultures grew in a definite branching mycelium seen after four days at room temperature.

GELATIN LIQUEFACTION:

Negative after three months.

LIQUID KIRCHNER'S MEDIUM:

Growth occurred as a pellicle in 4-5 days.

Discussion:

This laboratory has recently been paying particular attention to any growth on Lowenstein-Jensen which is in any way not typical of *Mycobacterium tuberculosis*. Both isolates of *Nocardia asteroides* were at first thought to belong to the Anonymous Mycobacteria group, but the aerial hyphae and the unusual appearance in the stained films eliminated this possibility. Rapid aerobic growth, pellicle formation in Kirchner's medium, and slender branching mycelium caused us to suspect the cultures to belong to the *Nocardia* genus. This was confirmed, and the cultures were forwarded to the Communicable Diseases Centre, Atlanta, U.S.A., where they were both identified as *Nocardia asteroides*.

Further tests were performed on the cultures, as outlined by Georg, Ajello, McDurmont and Hosty,[2] to differentiate between *N. asteroides* and *N. brasiliensis*. The results led to the conclusion that the organisms were *N. asteroides*.

Cases of Nocardiosis have been diagnosed in Australia. It would be interesting to know how frequently *Nocardia asteroides* has been isolated from sputum in New Zealand, and if the isolates have been associated with pulmonary disease. Both isolates in our laboratory were similar in all respects.

Summary

The cultural characteristics of two organisms isolated from sputum samples and identified as *Nocardia asteroides* are described.

REFERENCES:

(1) Bojalil, L. F. and Cerbon, J. (1959), *J. Bact.* **78**, 852-7.

(2) Georg, L. K., Ajello, L., McDurmont, C. and Hosty, T. S. (1961), *Amer. Rev. resp. Dis.* **84**, *337*.

(3) Murray, J. F., Finegold, S.M., Froman, S. and Will, D. W. (1961), *Ibid.*, **83**, 315-30.

Selected Abstracts

Contributors to this issue: R. D. Allan, J. Case, B. Glynn-Jones, J. Hannan, Rosemary Rusbatch and D. Tingle.

The abstracting service of this journal is capable of improvement, if readers having access to current periodicals would care to volunteer their services in preparing brief and concise abstracts of articles likely to be of interest to medical laboratory technologists. Interested readers are invited to write to the Editor for suggestions regarding the mode of presentation.

BLOOD BANKING

Complement Fixing Antibodies in Relation to Hemolytic Disease of the Newborn. Stratton, F., Gunson, H. H. and Rawlinson, Violet I. (1965), *Transfusion (Philad.)*, **5**, 216.

Two cases of haemolytic disease of the newborn are described, based on clinical, haematological and serological findings. In both cases the maternal serum contained complement fixing gamma$_2$ globulin antibody, and in both cases the direct Coombs' test was positive on the cord cells. The antibodies were anti-Kell in the case in which exchange transfusion was necessary, and anti-Jk^a in the second case, which required no treatment.

Hemolytic Transfusion Reaction Associated with Poorly Detectable Anti-Jk^a. Degnan, T. J. and Rosenfield, R. E. (1965), *Transfusion (Philad.)*, **5**, 245.

A haemolytic transfusion reaction probably attributable to anti-Jk^a occurred in a patient whose serum, before transfusion, reacted so weakly with Jk^a positive cells that the incompatibility was missed on the crossmatch.

A Simple Manifold Washing Process for the Preparation of Erythrocytes for the Antiglobulin Test. Gibbs, Mary B. and Camp, F. R. Jnr. (1965), *Transfusion (Philad.)*, **5**, 286.

This paper describes a simple manifold washing process for use in carrying out direct and indirect antiglobulin tests by the tube method. Three washes can be accomplished in six minutes without removing the tubes from the centrifuge head, and evidence is brought to support the conclusion that the device is more efficient in removing all traces of human globulin than the manual method.

A New Antibody; Anti-Rh [27] in the Rh Blood Group System. Keith, Priscilla; Corcoran, Patricia A.; Casperson, Kari and Allen, F. H. Jnr. (1965), *Vox Sang. (Basel)*, **10**, 528.

This paper illustrates the fact that rhesus antibodies may not always be what they seem on simple testing against panel cells.

The serum of the patient was found to contain anti-S and anti-E. The anti-S was readily removed by absorption, the anti-E less readily. After nine absorptions with CDE/cde cells, the anti-E was completely removed, but remaining after 21 absorptions was an antibody which, although no longer capable of agglutinating CDE/cde cells, still agglutinated cells representing the products of cE. This antibody, called anti-Rh [27] in accordance with the system adopted by Allen, behaves like anti-E (anti-Rh [3]) except for its inactivity against cells representing CE.

An Unusual Anti-Cellano (Anti-k) Antibody. Keller, Dorothy H. and Peterman, Patricia A. (1965), *Amer. J. med. Technol.*, **31**, 346.

An example of the rare antibody, anti-Cellano, is described which reacts by a saline technique but fails to react by the indirect antiglobulin technique. The patient had a history of thirteen pregnancies, three by her first husband and ten by her second husband. She also had transfusions following the birth of her third child. Her obstetric history included two miscarriages, but as she gave birth to a normal infant between them and five normal infants following the second, the

antibody was not considered to have been implicated. It is postulated that the antibody may have been a naturally occurring agglutinin, of large molecular size and incapable of crossing the placental barrier.

The Control of Enzyme Solutions Used in Serological Techniques. Nichols, M. E. and Marsh, W. L. (1965), *J. med. Lab. Technol.*, **22**, 206.

A rapid method for checking the activity of papain, ficin and bromelin solutions is described. Milk proteins are used as a substrate at pH 6.2, the flocculation times of the protein being proportional to enzyme activity. The test is sensitive and reproducible and the substrate keeps for several months at −20°C.

Hemolytic Disease of the Newborn Due to Anti-Kidd (Jk^b). Zodin, V. and Anderson, R. E. (1965). *Pediatrics (Springfield)*, **36**, 420.

An antibody, identified as anti-Jk^b, was found in the serum of a woman admitted to hospital in the second stage of labour. The antibody was detected by the antiglobulin technique when it became necessary to match blood following a post-partum haemorrhage. Subsequent testing of the infant's blood revealed that the direct antiglobulin test was positive, and that the bilirubin level at 24 hours was 7.6 mg. per 100 ml. This reached a peak of 8.4 mg. per 100 ml. 36 hours after delivery, and the icterus faded rapidly without treatment.

The authors review the literature relating to this rare antibody and conclude that there are grounds for optimistic prognosis in cases of sensitisation to the Jk^b antigen.

Anti-Kidd (Jk^b): A New Case Report. Jamieson, Ann L. (1965), *Amer. J. med. Technol.* **31**, 397.

The antibody anti-Jk^b was found in the serum of a patient who had received a total of seven units of blood during the preceding week. It is suggested that the initial sensitisation may have resulted from a previous transfusion, nine years earlier, or from one or more of the patient's pregnancies. Although incompatible blood was almost certainly given before the antibody became detectable, the patient suffered no obvious haemolytic reaction. The only clinical evidence of increased cell destruction was a serum bilirubin of 2.3 mg. per 100 ml. and failure to accomplish a significant rise in the haematocrit level. The antibody was not detectable by the saline and albumin techniques, but had a titre of 128 by the indirect antiglobulin technique.

Hemagglutination Detection: Evaluation of Simplified Enzyme Techniques. Henry, J. B., Thalblum, H. and Griset, T. A. (1965), *Amer. J. med. Technol.*, **31**, 433.

After comparing the sensitivity and selectivity of cells treated with a range of proteolytic enzymes against a variety of blood group antibodies, these authors have concluded that the indirect antiglobulin technique is the most sensitive technique available for the detection of atypical isoantibodies.

A Bromelin Slide Test for Antibody Detection. Ehrlich, A. and Castro, A. (1965), *Amer. J. med. Technol.*, **31**, 457.

A simple slide test has been developed for the detection of atypical antibodies using the enzyme bromelin. The advantages of a slide technique are that it is simply performed and that it eliminates the necessity for numbering, centrifuging and washing glass test tubes. On comparing the sensitivity of the technique with the routine indirect antiglobulin screening technique, the authors found that it was no less sensitive and that, indeed, it was more sensitive in detecting cold type antibodies. The method is not claimed to be capable of demonstrating the presence of antibodies which are noted for poor reactivity by enzyme techniques, and it is suggested for use to supplement the indirect antiglobulin test.

On the Incidence of Second Antibody Populations in the Sera of Women Who Have Developed Anti-Rh Antibodies. Issitt, P. D. (1965), *Transfusion, (Philad.)*, 5, 355.

It is generally agreed that one of the factors governing the production of immune isoantibodies is the susceptibility of the subject to antigenic

stimulation. Thus, in people who have produced anti-Rh, one would expect to find a higher incidence of other immune antibodies than in people who have been subject to similar exposure to antigens but have not produced anti-Rh.

In a survey of 2,851 antenatal sera, 13.9% of women who had formed anti-Rh had also produced a non-Rh-system immune antibody. In women with no anti-Rh, the incidence of antibodies was only 0.1%.

The Antiglobulin Reaction on Albumin Enriched Cell Suspensions. Clayton, E. M., Brown, R. B. and Bove, J. R. (1965), *Transfusion (Philad.)*, **5**, 344.

The strength of the indirect antiglobulin reaction with cells incubated in saline was compared with a similar reaction when albumin was added before and after incubation. The results suggest that the sensitivity of the test is enhanced when incubation takes place in the presence of albumin.

Incidence of Irregular Antibodies Occurring in Healthy Donor Sera. Myhre, B. A., Greenwalt, T. J. and Gajewski, M. (1965), *Transfusion (Philad.)*, **5**, 350.

After a four-year survey of the incidence of isoimmune antibodies in the sera of blood donors at a large blood bank, it has been found that a yearly average of 0.34% of all units of blood contained isoimmune antibodies. The incidence in new donors was found to be 0.56%.

Presence of Three Antibodies in an Expectant Woman. Hayeur, Josee H. and Gohier, Micheline (1965), *Canad. J. med. Technol.*, **27**, 221.

This paper describes the discovery of three distinct antibodies in the serum of a woman pregnant for the ninth time, and proceeds to outline the methods by which the identity of the antibodies was established.

The patient's obstetric history included four abortions and four live births, at one of which the infant developed neonatal jaundice. There was also a history of two separate episodes of blood transfusion, with mild clinical signs of a reaction on each occasion.

The results of testing the patient's serum with a panel showed that there were three antibodies present. These were anti-E, anti-Fy^a and an antibody which was never satisfactorily identified. The circumstances are extraordinary in that the patient was Rh negative and her husband Rh positive (cDE/cde). It is unusual under these conditions for anti-E to develop without anti-D as well, and although the authors postulate that the husband's D antigen may have been a modified one, they were unable to establish this fact and the experimental immunisation of two rabbits with the husband's red cells yielded no useful information.

The baby, on delivery, was suffering from haemolytic disease, and anti-E and anti-Fy^a were eluted successfully from the cells. No treatment was necessary.

A fact which seems to have gone unnoticed is that the rhesus genotypings of the family do not make sense unless there were two examples of "crossing over," unless the paternal D antigen was in some way out of the ordinary, or unless there was some technical error in the testing.

CHEMICAL PATHOLOGY

Association of Intravenous Albumin with Alkaline Phosphatase Activity. Rigg, B. M. and Baird, C. W. (1965), *J. clin. Path.*, **18**, 441.

Transfusion of human albumin has been shown to produce considerably elevated levels of alkaline phosphatase in the serum of the recipient.

A More Specific Method for Detecting and Quantitating Rheumatoid Factors Using the R.A. Test. Watson, R. G. (1965), *Amer. J. clin. Path.*, **43**, 152.

Sera is inactivated at 56°C. for 30 minutes before performing the Hyland R.A. Test. Heat labile antiglobulins are removed. R.D.A.

Laboratory Tests for the Diagnosis of Macroglubulinaemia. Coles, M. E. (1965), *Proc. Aust. Assoc. clin. Biochem.*, **1**, 112.

A series of methods is described. Of these, two are particularly useful. After serum electrophoresis on cellulose acetate, the strip is washed in buffer for 30 minutes. This removes all proteins except macroglobulins which resist washing for two hours. A Sephadex column can be used to fractionate proteins so that density readings give characteristic scans differentiating macroglubulins from other proteins. R.D.A.

Laboratory Reports and Records for Chemical Analysis. Whitby, L. G. and Owen, J. A. (1965), *J. clin. Path.*, **18**, 668.

Cumulative Reporting of Chemical Pathology. Flynn, F. V. and Vernon, J. (1965), *J. clin. Path.*, **18**, 678.

Both these articles deal with the need for more comprehensive and critical reviews of reports. The main feature is a cumulative master copy of all previous reports on individual patients. This information is provided with the current report. Xerox copying on hired machines is employed. Copies 2½d each. Provision for maintenance of the machine is necessary. Although in once case 300,000 tests performed annually (1964), electronic computing has not yet been embarked on. R.D.A.

One-Day Renal Function Tests. Edwards, K. D. G., Ashley, B. C. E. and White, H. M. (1965), *Proc. Aust. Assoc. clin. Biochem.* **1**, 101.

Patients who show evidence of renal disease are intensively examined in a 9-hour out-patient visit. A general medical examination is given and a series of comprehensive laboratory tests. Blood is taken for urea and electrolytes, calcium, alkaline phosphatase and creatinine. Three-hour urines are collected after administration of pitressin, ammonium-chloride and phenolsulphonphthalein. Tests are performed for Pitressin concentration, (Osmometer) acid loading, (total and titratable acidity, ammonium and CO_2) dye excretion and creatinine clearance. A large number of "renal medullary syndrome," and other conditions have been diagnosed. R.D.A.

Determination of 3 Methoxy-4-Hydroxymadelic acid (VMA) in Urine by Thin-Layer Chromatography. Annino, J. S., Lipson, M. and Williams, L. A. (1965), *Clin. Chem.*, **11**, 905.

Screening techniques lack specificity and this method provides a quantitative result. The urine is treated with Florison and heat to remove interfering chromogens then extracted with ethyl acetate. Thin-layer chromatography performed on silica gel with butanol-acetic-water.

The spot is located with fast red G.C. and alkali, and after elution is read colorimetrically at 510mμ. R.D.A.

Fluorometric Measurement of Creatine Kinase Activity. Sax, S. M. and Moore, J. J. (1965), *Clin. Chem.*, **11**, 951.

The liberated creatine can be measured by forming a ninhydrin fluophor in strongly alkaline solution. Primary filter 405mμ secondary 485mμ.

The reaction is less sensitive to sulphydryl interference than the V.P. colour. R.D.A.

Sephadex G200 Gel Immunofiltration for Protein Separation. Grant, G. H. and Everall, P. H. (1965), *J. clin. Path.*, **18**, 654.

The gel is spread on glass as for thin-layer chromatography. The serum is applied horizontally while the strip dips into a full trough at one end and an almost empty trough at the other end. In this article final identification is by precipitation reaction. R.D.A.

The Estimation of S.G.O.T. and S.G.P.T. in Stored Blood. Elliot, W. B. and Rosamilia, H. (1965), *Clin. Chem.*, **11**, 29.

The tests can be performed on serum kept over the clot for periods up to 48 hours, provided that there is no haemolysis. Raised values do occur due to the production of keto-acids but a specimen blank corrects this. R.D.A.

HAEMATOLOGY

Partial Thromboplastin Time Test with Kaolin. Normal Range and Modifications for the Diagnosis of Haemophilia and Christmas Disease. Matchett, Myrtle O. and Ingram, G. I. C. (1965), *J. clin. Path.*, **18**, 465.

Performing the partial thromboplastin time after preincubating the plasma with kaolin provides a convenient and sensitive screening test for deficiencies of the thromboplastic factors.

This paper cites clinical examples and provides guidance on interpretation of results.

Error in Hematocrit Value Produced by Excessive EDTA. Lampasso, J. A. (1965), *Amer. J. clin. Path.*, **44**, 109.

Microhaematocrit determinations become unreliable when the concentration of EDTA anticoagulant exceeds 2 mg. per ml. of whole blood, and in situations where, for example, 0.5 ml. of blood is added to an EDTA tube meant to take 7 ml. of blood, the error is as great as 17% of the true haematocrit.

A Rapid Qualitative Method for Fibrinolysis. Kelly, Linda V. (1965), *Amer. J. med. Technol.*, **31**, 331.

Using blood obtained from dogs injected with a substance capable of producing fibrinolysis, this simple method was compared with a quantitative analysis of fibrinolysis. The test consists of two tubes, each containing blood, thrombin and calcium chloride. After fifteen minutes, one tube is placed in the refrigerator to act as a control, while the other is incubated at 37°C. The clots are observed for lysis over a period of four hours, after which time they are tipped on filter paper and examined closely. When fibrinolysis has occurred, the red cells are released from the clot and produce a halo effect on the filter paper. Fibrinolysis is readily distinguished from afibrinogenaemia because in the latter case, both the incubated and refrigerated clots fall apart.

Break-off Capillary Tube Method for Blood Counts. Lewis, S. M. and Benjamin, H. (1965), *J. clin. Path.*, **18**, 689.

The preparation of dilutions of blood from capillary samples for performing blood counts can be rendered less time-consuming by the use of capillary tubing of uniform bore, cut off so as to contain the correct volume of blood when completely filled. The dilution is achieved by dropping the filled capillary into the appropriate volume of diluent.

Automated Staining of Blood Films. Prichard, R. W., Elworth, E. L. and Hammett, J. W. (1965), *Amer. J. clin. Path.*, **44**, 353.

Blood films can be successfully stained by an automated technique. Using the May Grunwald-Giemsa staining procedure and aeration in the buffer stage there is no precipitation of stain, and staining quality is good.

Iron Deficiency Anaemia in Adults: Prevalence and Prevention. Jacobs, A., Kilpatrick, G. S. and Withey, J. L. (1965), *Post-grad. med. J.*, **41**, 418.

Reduction of serum iron levels and a low saturation of the iron-binding protein may be found before the haemoglobin level has fallen below accepted normal limits and reduced marrow haemosiderin may also be a feature of pre-anaemic iron deficiency. It has been suggested that this sideropenic state may, itself, give rise to symptoms which can be corrected by the administration of iron.

The authors conclude that the minimum evidence on which to base the diagnosis of iron deficiency anaemia includes either a typical blood film or a low MCHC. J.H.

Iron-Deficiency Anemia in Infants and Children. Chandra, R. K. (1965), *Indian J. Pediat.*, **32**, 20.

In addition to the better-known blood film findings, many target cells and a few RBC's exhibiting basophil stippling may be encountered.

It is now being recognised that iron-deficiency even without the presence of anaemia may produce a variety of symptoms. J.H.

Antiplatelet Antibodies in Thromboelastographic Studies. Walewska, Irena and Zywicka-Lopaciuk, Halina. (1965), *Archwm Immun. Ther. Exp.*, **8**, 142.

The degree to which human sera containing thromboagglutinins exert an influence on the haemostatic activity of platelets, determined by means of thromboelastography (TEG), was studied. Only antithrombocytic antibodies with lytic activity in the presence of complement diminished the maximal amplitude in the TEG tracings. J.H.

A Simple Micromethod for Chromosomal Analysis from Capillary Blood. Macek, M. (1965), *Folia Biol., Praha*, **11**, 299.

Experiences with a new, simple variant of the micromethod of chromosomal analysis from capillary blood are submitted. The blood samples are cultivated whole, without separating leucocytes and erythrocytes, in medium without human serum and heparin. A modification of the cytogenetic treatment of the cultures by drying and a fractionated colcemide block of mitosis are described. This micromethod was also used successfully in delayed cultivation ("chromosomal investigation by post").
[Author's Abstract]. J.H.

HISTOPATHOLOGY

The Explosive Properties of Ammoniacal-Silver Solutions. Wallington, E. A. (1965), *J. med. Lab. Tech.*, **22**, 220-223.

Accounts are given of several explosions of ammoniacal-silver solutions. Long-term storage and exposure to sunlight of such solutions are not recommended. D.T.

Screening for Amyloid with the Thioflavine T Fluorescent Method. Rogers, D. R. (1965), *Amer. J. clin. Path.*, **44**, 59-61.

A fluorescent technique for demonstrating amyloid was evaluated. False positives are common but few are of practical significance. The technique should be regarded as a supplement to the usual amyloid stains. The method is excellent for rapid screening of tissues for amyloidosis but the presence of amyloid must be confirmed by other methods. D.T.

Aldehyde-Fuchsin Staining Applied to Frozen Sections for Demonstrating Pituitary and Pancreatic Beta Cells. Jennings, Barbara M. (1965), *J. Histochem. Cytochem.* **13**, 328-333.

Fresh frozen (cryostat), prefixed frozen and freeze-dried tissues were used, sections were post-fixed in a variety of fixatives, including formalin and glutaraldehyde. A standard method was evolved whereby sections were oxidised in acidified potassium permanganate and bleached in oxalic acid prior to staining in aldehyde-fuchsin. A rapid method is also given for surgical specimens. D.T.

Juxtaglomerula Apparatus Staining with Thioflavine T. Lehner, T. (1965), *Nature*, **206**, 738.

Positive thioflavine T fluorescence, around the glomerula of mouse kidneys, was at first thought to be due to amyloid, but subsequently shown to demonstrate the cells of the Juxtaglomerula apparatus. Other histological components, in particular the "muciphages" in rectal mucosa, and mast cells, can also cause confusion. B.G-J.

One-hour Processing of Tissue. Robinson, M. D. and Fayen, A. W. (1965), *Amer. J. clin. Path.*, **43**, 91.

The method described uses conventional processing materials, time being gained mainly by the use of a mechanical shaker. Most routine laboratories could adopt the process for the occasional urgent specimen not suitable for frozen section techniques. B.G-J.

Non-specificity of Thioflavine T as an Amyloid Stain. McKinney, B. and Grubb, C. (1965), *Nature*, **205**, 1023.

Hyaline material was found to give false positive results with thio-

flavine and weakly positive staining with Congo red and methyl violet. Some Congo red and methyl violet positive material did not stain with thioflavine. B.G-J.

MICROBIOLOGY

***Haemophilus Influenzae* Antigen-Antibody Reactions.** May, J. R. (1965), *J. Path. Bact.*, **90**, 379.

One is well aware of the need for a method of typing non-capsulated *H. influenzae* to aid the investigation of the epidemiology of respiratory infections caused by the above organism. In this paper the author sets forth a hypothesis that postulates the existence of 3 antigenic and colonial forms of *H. influenzae*—Mucoid (M), Smooth (S) and Rough (R). It is postulated that *S* strains are non-encapsulated, type specific and pathogenic, that *R* strains are non-encapsulated, species specific, and non-pathogenic and that *M* strains are encapsulated, type specific and pathogenic, and may possibly be rare mutants of S strains. R.R.

The Role of Phage in the Transduction of the Toxinogenic Factor in *Corynebacterium Diphtheriae*. Rajadhyaksha, A. B. and Srinivasa Rao, S. (1965), *J. gen. Microbiol.*, **40**, 421.

The bacteriophage of the diptheria bacillus plays a vital role in the conversion of non-toxinogenic strains to toxinogenic strains. However, it now appears that the toxin-inducing ability of the phage is not its inherent property, but that it acts as a transducing agent, carrying factor T+ which is a cytoplasmic, toxinogenic factor. It is possible to remove the phage from the lysogenic strains without affecting the T+ factor by treatment with small amounts of acriflavine. R.R.

Origin of Transferable Drug-resistance Factors in the Enterobacteriaceae. E. S. Anderson (1965), *Brit. med. J.*, **ii**, 1289.

This article introduces a new field of thought concerning drug-resistance. It has been demonstrated that transferable drug-resistance factors in the Enterobacteriaceae are formed by combination between two initially independent elements—transfer factors and resistance determinants. The drug resistance factors then spread both in the drug resistant strains which initially received the transfer factors, and also into the strains from which the transfer factors originally came. The process is probably speeded up by the use of specific antibiotic drugs. R.R.

Fluorescent Antibody Studies with *Nocardia Asteroides*. Al-Doory, Y. (1965), *Sabouraudia*, **4**, 135.

A method for the differentiation of *Nocardia asteroides* from members of the same group has been demonstrated using a fluorescent antibody reagent made of antiglobulin from which cross reacting factors are easily absorbed by using a special antigen powder. R.R.

Bacteriology of Chronic Suppurative Otitis Media. Lakshmipathi, G. and Bhaskaran, C. S. (1965), *J. Indian med. Ass.*, **45**, 436.

This study of 118 patients consisted of examination of direct smears stained by Gram's method and culture for the isolation of bacteria and fungi. The investigation revealed a mixed bacterial flora made up of Gram-negative bacilli and Gram-positive bacilli and cocci. The important bacterial pathogens were coliforms, *Pseudomonas*, *Proteus* and coagulase positive staphylococci. J.H.

***Staphylococcus albus* in Wound Infection and in Septicemia.** Wilson, T. S. and Stuart, R. D. (1965), *Canad. med. Ass. J.*, **93**, 8.

Coagulase negative *Staphylococcus albus* was considered to be the casual agent in 53 (4.4%) of 1,200 wound infections investigated in a large general hospital over the eight year period 1957-1964. Of much greater importance was the finding of this organism in blood cultures on repeated occasions. Twelve patients were so affected, of whom six died. Such data emphasise the tragic mistake of dismissing the report of *S. albus* in a blood culture as "only a contaminant." J.H.

Book Reviews

Mechanising Laboratories by E. A. Smith, B.Sc., M.B.I.M. Iliffe Books, London, 1965. 204 pages, 84 illustrations. Price in U.K. 63s 0d.

This book deals with the introduction of automation into the laboratory, with the object of sparing the wastage of time by highly qualified scientists on routine tasks. The laboratory fields covered are all-emoracing, but some of the advances treated are applicable in the medical laboratory and it may well be that ideas in other fields will be adaptable to application in the hospital laboratory.

Records and filing, mechanical data processing, spectrophotometry, autoanalysis and particle counting are among subjects covered, and although the main application of most of the developments mentioned will be in the industrial laboratory, inspiration towards time and labour-saving is present for every laboratory worker. The only drawback is that for so small a book the price is rather out of proportion. J.C.

Methods in Zone Electrophoresis by J. R. Sargent, B.Sc., Ph.D. British Drug Houses Ltd., Poole. 1965. 107 pages.

This excellent little book has an introductory chapter outlining concisely the theory of electrophoresis. This is followed by chapters dealing with low voltage electrophoresis on paper, high voltage electrophoresis on paper, electrophoresis on cellulose acetate, starch gel electrophoresis, agar gel electrophoresis, polyachrimide gel electrophoresis and block electrophoresis. In each of these chapters an introductory paragraph is followed by descriptions of apparatus, very precise and comprehensive directions for the performance of separations, detection reagents and techniques, applications and, finally, an excellent collection of appropriate references. The short final paragraph discusses the choice of media.

This is essentially a book for the bench technologist in which the various techniques and media commonly used in zone electrophoresis are described in a simple and straightforward manner. Besides being useful to the more experienced technologist, it will encourage the less experienced and provide a set of working directions which will allow successful separations to be achieved.

Some separations of clinical importance (of phenolic acids, for example) are not mentioned. Indexing also could be more complete. However, these minor criticisms do not detract from the general excellence of this most timely work. J.V.D.

Seiverd's Chemistry for Medical Technologists, by Wilma L. White, B.A. and Sam Frankel, Ph.D. C. V. Mosby Company, St. Louis, 1965. Obtainable from N. M. Peryer Ltd., P.O. Box 833, Christchurch, at 86s 0d.

The title of this book is somewhat misleading and it covers a good deal more than this title would lead one to expect. It is essentially a primer of clinical chemistry technique for student technologists in which no detail is considered too insignificant to describe and the instructions are supplemented by numerous illustrations.

New Zealand trainees with a background of U.E. Science subjects might well feel that the authors were writing down to the prospective reader. The first part comprising one-fifth of the book, covers basic chemistry, laboratory manipulations and equipment; including the balance and colorimeters. The treatment is rather brief and elementary. The balance is not taken to the point of describing constant load models, although weighing by the method of swings is described. In a teaching treatise the visual colorimeter might well be mentioned in a historical context but in this electronic age hardly merits the full treatment. However various colorimeters are also described and a useful run-down on flame photometer given later.

The remainder of the book deals with routine clinical chemistry tests. The general plan is to outline a number of tests and then describe some of them in detail. The choice appears to be somewhat arbitrary and no critical comparisons or evaluations are attempted.

To give two examples, the venerable icterus index and Malloy-Evelyn bilirubin method are simply described without comment. Chemical and flame photometric techniques for sodium and potassium are similarly expounded with the brief comment that reasonable correlation is obtained.

The old method of gastric analysis is given. Neither augmented histamine tests or the current approach of direct pH measurement and the expression of acid content in milli-equivalents received a mention. There is a very full chapter on urine tests which covers qualitative tests for porphyrins and some poisons but does not describe steroid estimation.

A number of pregnancy tests are described including all the old favourites, A.Z., Friedman and frog tests. A rather lengthy gel-diffusion immunological reaction is described but not the popular tanned red cell or latex particle techniques.

The chapter on special tests includes a good exposition of the theory and application of osmometry with reference to urine and serum.

There are appendices for review questions and answers and a True or False quiz.

This book is the work of a group of people including a reviewing panel and includes several supervising and teaching technologists.

The preface states that they are all deeply involved with automation but felt that it was beyond the scope of this book. This is debatable in that training must surely bear on the work to be performed. Now-a-days automatic processes pervade all aspects of the laboratory and although we cannot expect a primer for tomorrow we can expect a primer for today.

I also feel that one cannot start too soon to compare and evaluate methods and a more critical and selective treatment of available methods would be valuable. With these reservations one can say that here is a good introduction to the techniques of clinical chemistry written in a straight-forward and lucid fashion. R.D.A.

What's New

A NEW, RAPID SLIDE TEST FOR INFECTIOUS MONONUCLEOSIS

A new, rapidly-performed slide test for infectious mononucleosis has been developed by The Denver Chemical Manufacturing Company Limited, of Stamford, Connecticut.

Called *Denco-I.M. Test*, the new test is reported to be reliable and specific for infectious mononucleosis, and capable of being performed in two minutes. According to a report in the *Journal of the American Medical Association*, the test is capable of detecting the disease during the incubation period, and during a study involving 1,544 patients suspected to be suffering from infectious mononucleosis, it was shown to be 99.3% accurate.

Denco-I.M. Test is available in New Zealand at £4 4s 0d for a kit containing sufficient reagent to perform 10 tests.

The Health Department Examinations

INTERMEDIATE — NOVEMBER/DECEMBER, 1965

Microbiology

Time allowed: Three hours *Answer all questions*

1. Describe the method used in your laboratory for the isolation of *Mycobacterium tuberculosis* from sputum and gastric lavage specimens. Discuss briefly (a) The function of reagents used; (b) Staining method used; (c) Precautions taken in handling tuberculous specimens. (20 Marks)
2. With a binocular microscope and a high intensity light source describe how you would get the best illumination from this apparatus. (15 Marks)
3. Give the distinctive ingredients, the reason for their inclusion and the method of sterilisation of the following media.
   (1) Thioglycollate medium; (2) Selenite F. medium; (3) Urea medium; (4) MacConkey's Bile Salt Agar; (5) Dorset's Egg Medium. (20 Marks)
4. Write *short* notes on five (5) of the following.
   (1) Coagulase test; (2) Oxidase test; (3) Indole reaction; (4) Preparation of films or smears for staining; (5) "Negative" or Background Staining; (6) Definition as related to an objective or lens system. (15 Marks)
5. Discuss sterilisation by filtration, giving the types of filters available and the technique of filtration. (15 Marks)
6. Define the following.
   (1) Chlamydospore; (2) Antigen; (3) Exotoxin; (4) Thermal Death Point; (5) Bacteriostatic. (15 Marks)

Chemical Pathology

Time allowed: Three hours *Answer all questions*

1. (1) What extra steps would you take to obtain a correct result if you were asked to perform a blood urea nitrogen or non-protein nitrogen estimation on a sample of blood collected into a bottle containing, as anticoagulant, a mixture of potassium and ammonium oxalate ?
   (2) If Beer's and Lambert's Laws hold good for a colorimetric procedure for the estimation of glucose, and a specimen of blood containing 100 mg. per 100 ml. of glucose gave an optical density of 0.16, what optical densities would be obtained for specimens containing 150 mg. per 100 ml. and 250 mg. per 100 ml. of glucose respectively ?
   (3) Outline three methods of detecting excess protein in urine, and one method of detecting Bence-Jones protein in urine. *Very brief outlines only are required.*
   (4) How would you check distilled water for purity ? Give possible differences between distilled water and de-ionized water.
   (5) Name some indicators used in acid-base titrations, and give a reason why some are used for one purpose and some for another. (25 marks)
2. (1) List the main differences between soda glass and Pyrex-type glass.
   (2) List the main factors influencing the gravitational field of a centrifuge.
   (3) State the colour of filters passing light mainly of the following wavelengths: 650 mμ, 530 mμ, 420 mμ.
   (4) Why is concentrated acetic acid safer to handle than concentrated hydrochloric acid ?

(5) Define a buffer solution and give an example of a buffer substance.
(6) List three ways in which unwanted haemolysis of a specimen of blood may be caused.
(7) Why should coloured solutions be checked for cloudiness and clarity before reading their optical densities in a photo-electric colorimeter ?
(8) Outline very briefly three ways of distinguishing between glucose and lactose in a urine specimen.
(9) Give the normal range of values for the following constituents of cerebro-spinal fluid: Protein, Glucose (fasting), and Chlorides (as NaCl in mg. per 100 ml. or as Cl^- in milliequivalents per litre).
(10) Give the normal range of values of the following constituents of serum: Chorides, total protein, fasting glucose (state method), N.P.N., Urea or Urea nitrogen.

(30 marks)

3. Describe in detail a method of estimating serum chlorides, giving the calculations involved and noting any precautions necessary in the collection of the specimen. (20 marks)
4. Describe in detail your method of estimating blood glucose. Show the calculations involved in obtaining the result, giving imaginary figures to illustrate this. Indicate the chemical reactions involved and the reasons for each step of the procedure. (25 marks)

Haematology and Blood Group Serology

Time allowed: Three hours. *Answer all questions*

1. Write an account of the ABO blood groups. (20 marks)
2. (a) What is the principle of the direct antiglobulin test and what are its applications ? (10 marks)
   (b) Describe in detail the technique of the direct antiglobulin test. Indicate any special precautions which are necessary in the performance of the test. (10 marks)
3. Write notes of not more than half a page on each of the following topics:
   (a) Mean cell Haemoglobin Concentration; (b) Staining of reticulocytes; (c) Diluting fluid for white blood cell counts; (d) Aplastic anaemia; (e) Romanowsky stains. (20 marks)
4. (a) Write a brief account of the composition and metabolism of haemoglobin. (10 marks)
   (b) Describe in detail one technique for the estimation of haemoglobin. Indicate possible sources of error. (10 marks)
5. Write notes of not more than half a page on each of the following topics:
   (a) The bleeding time; (b) Clot retraction; (c) One-stage prothrombin time; (d) The origin and function of the thrombocytes; (e) Storage of whole blood for transfusion. (20 marks)

Successful Candidates

Auckland
Aldworth, J. M.
Archdall, J. R.
Balgarnie, J. A.
Bond, D.
Carter, C. V.
Collier, D. J.
Cornere, B. M.
Dickey, W. G.
Duncan, S. J.
Frieberg, E. M.
Glover, G. C.
Hamilton, T.
Hammond, D. M.
Higgett, M. C.
Hrstich, S. M.
Hume, C. A.
Irivine, S. P. H.
Kettle, K. A.
Low, W. S. Y.
Morton, I. M.
Nicholson, C. G.
Postles, M. P.
Reed, M. F.
Whitehead, J.
Yeates, N. J.
Yeoman, D. McA.

Christchurch
Cattermole, M.
MacDonald, C.
McLauchland, M.
Skidmore, P.
Titheridge, A.

Dunedin
Edgar, J. M.
Fagg, F.
Forrester, E.
Matheson, L.
Gisborne
Paine, N. C.
Greymouth
Masters, P.
Hamilton
Christie, J. D.
Dold, G. E.
Harger, K. P.
Lawton, J. D.
McIntosh, J. T.
Nicholls, J. M.
Oliver, L. E.
Snook, D. B.
Turner, A. S.
Invercargill
Hockey, C.
Masterton
Jackson, D.
New Plymouth
Dingle, C.
Irvine, D.
Oamaru
McLaren, G.
Ramsay, A.
Palmerston North
Simms, R.
Van den Bemd, E.
Tauranga
Garnett, D. M.
Tanner, K. M.
Wellington/Hutt
Anesi, L.
Cameron, C.
Fisher, M.
Gibson, J.
Girling-Butcher, S. J.
Robinson, I. A.
Smith, D. I. A.
Toplis, B. R.

SPECIAL CERTIFICATE OF PROFICIENCY — NOVEMBER/DECEMBER, 1965

Microbiology (Written)
Time allowed: Three hours.
Instructions: Questions 1 and 2 must be undertaken and two of the remaining three questions.
All questions carry equal marks.

1. What are the special properties and reasons for use of the following media:—
   1. Heated blood agar; 2. Tellurite medium; 3. Bordet-Gengou medium; 4. Desoxycholate citrate agar; 5. Urea medium; 6 Citrate medium; 7. Glucose-phosphate medium; 8. Ellner's medium; 9. Nutrient gelatine; 10. Cornmeal agar.
2. What is meant by the following:
   1. Negative staining; 2. Heterotrophic bacteria; 3. Babes-Ernst granules; 4. Pleomorphic involution forms; 5. Peritrichous flagella; 6. Fimbriae; 7. Facultative anaerobe; 8. Lyophilisation; 9. Endospore; 10. Exotoxins; 11. Toxoid; 12. Passive immunity; 13. Agglutination; 14. Autogenous vaccine; 15. Casoni's Test; 16. Bacteriostatic; 17. Lancefield grouping; 18. Oxidase reaction of micro-organisms; 19. Inspissation; 20. Weil's disease.
3. Describe the methods for the bacteriological examination of urine comparing the relative merits of qualitative and quantitative investigations with one example of each.
   Describe in detail the methods for the identification of organisms likely to be encountered.
4. A specimen of faeces has been received from a one-year-old child suffering from acute diarrhoea.
   Describe in detail your methods for the examination of the specimen for pathogens including the methods for their identification.
5. You have a tryptose-phosphate broth culture growing a small gram-negative cocco-bacillus from a patient with a clinical history suggestive of undulant fever.
   Describe in detail your methods for the identification and differentiation of this organism.

Microbiology (Practical)
Time allowed: Three hours on first day; one hour on second day.
Instructions: All questions must be undertaken.
Questions 1-5 carry equal marks.
Question 6: 15 marks.
Question 7: 20 marks.

1. You are provided with an anaerobic culture A of an organism isolated from a deep wound swab. The following information has been determined:

Glucose	Lactose	Sucrose	Salicin	Indole	Milk	Motility
A	A	A	—	—	AC+G	—

Gelatin liquefaction	Serum digestion	Nitrate reduction	Meat digestion
+	—	+	—

Examine the culture recording your observations and carry out any other tests that can be looked at the following morning to assist the identification and write down any other tests that could be done to verify your identification.
2. You are provided with 4 Corynebacteria B, C, D, E, isolated from throat swabs. Differentiate them by the use of Hoyle's Tellurite Medium.
3. Identify F, a pure culture of an organism isolated from the C.S.F. of a case of meningitis.
4. Culture G is from a pus swab. Identify as far as possible in the time available and test for antibiotic sensitivity. What further tests could be done.
5. Identify culture H.
6. Identify the Salmonella culture I. You are provided with an agar slope and broth cultures in the specific and non-specific phases. The H factors should be identified by tube agglutination.
7. Report on the ten spots:—

J Urethral smear	O Wet film of wall of hepatic cyst
K Oral swab	P Film from concentrate from faeces
L Nigrosin smear of C.S.F.	Q Film from concentrate from faeces
M Culture and stained film	R Film from anal skin scrapings
N Culture and stained film	S Film from scalp infection.

Haematology and Blood Group Serology (Written Paper)

Time allowed: Three hours

ALL questions to be answered; they carry equal marks.

1. Write a short account of each of the following:
(a) The value of the leucocyte alkaline phosphatase stain; (b) The laboratory techniques available for the investigation of chronic myeloid leukaemia; (c) Techniques for enumeration of eosinophils.
2. Write a short account of each of the following:
(a) A simple test suitable for use in an emergency to indicate the presence of a fibrinolysin; (b) Assessment of platelet function; (c) The thromboplastin generation test; (d) The method of distinguishing between a factor V and a factor VII deficiency.
3. (a) Outline a scheme for the laboratory studies necessary in the care of the antenatal patient. Indicate clearly the stage in pregnancy when these studies are best done giving reasons.
(b) A baby is suspected to be suffering from haemolytic disease of the newborn. How would you proceed if no laboratory antenatal investigations had been carried out on the mother? Any biochemical procedures referred to need not be described in detail.
4. Write a short account of each of the following:
(a) Rhesus phenotyping controls; (b) The prozone phenomenon in blood group serology; (c) Naturally occurring Anti-A antibodies; (d) Immune Anti-A antibodies.
5. (a) Describe briefly the laboratory procedures used to establish a diagnosis of megaloblastic anaemia.
(b) What tests are likely to be helpful in determining the response to therapy in megaloblastic anaemia.

6. (a) How would you proceed to provide compatible blood for exchange transfusion to a baby with haemolytic disease of the newborn.
   (b) Discuss red cell survival under the following headings: (Only a general outline of methods need be given).
   (i) Normal circulating life of red cells and methods of measuring this; (ii) Survival of transfused cells and methods of determining this.

Haematology and Blood Group Serology (Practical Paper)

Answer all questions.
They are of equal value.
Record your results clearly, tabulating where possible.
Answer each question on a separate sheet.
All working sheets to be left at your bench along with your answers.

1. Examine the stained blood films A, B, C, D, E, F, G, H, and report on each one.
   Do differential white counts if you consider them necessary.
2. Using the cell panel provided, identify the antibody present in serum X as far as possible. Determine the titre of the antibody by the use of saline, enzyme treated cells and the Indirect Coombs technique. (Details of the cell panel will be provided on a separate sheet).
3. The serum W is from a patient requiring transfusion. Cell suspensions 1, 2, 3 and 4 are from donors. Perform crossmatches using saline, albumin and indirect antiglobulin techniques.
   Report fully on your findings.

Successful Candidates

Adams, Mrs L. J.	Gisborne	Turner, Miss P. A.	Dunedin
Collins, Mrs F.	Dunedin	Watt, G. W.	Auckland
Dodd, Miss E. D.	Christchurch	Wilding, K. C.	Auckland
MacGibbon, N. A.	Wellington	Wood, R. L.	Wanganui
Tucker, R. H.	Masterton		

The Junior Essay Competition, 1966

In accordance with Rule 27, the Council invites entries for the 1966 Junior Essay Competition.

A £5 5s 0d prize will be awarded for the best entry in each of the two sections of the Competition:—

TECHNICAL SECTION: consisting of descriptions of methods or technical procedures, presented in the manner laid down in the "Directions for Contributors" appearing in each issue of the *Journal.*

ESSAY SECTION: consisting of essays on historical, general or particular aspects of medical laboratory technology, presented in the style of an essay.

A cyclostyled sheet of instructions for intending entrants is available on request, either from the Secretary of the Institute or from the Editor of the *Journal.*

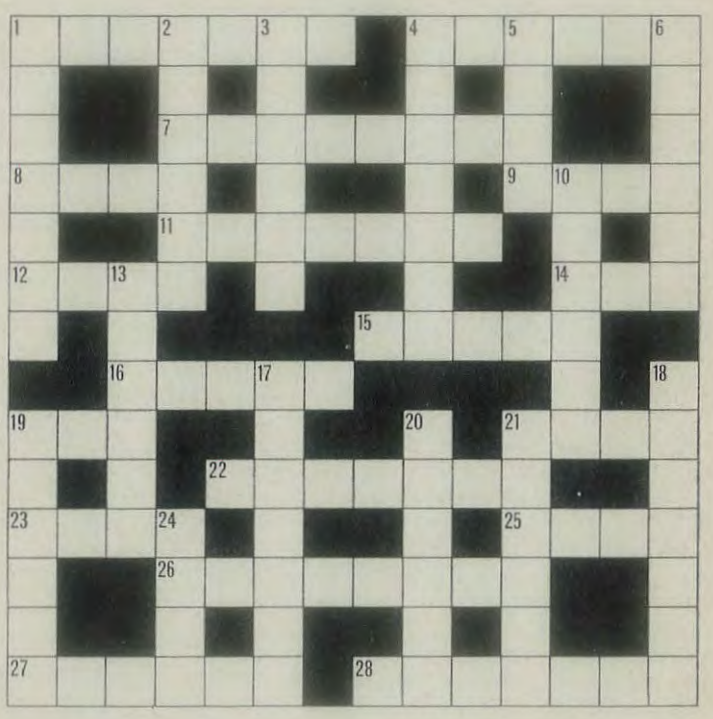
Entrants must be financial members of the Institute and must not have passed the Certificate of Proficiency examination before the closing date, nor be otherwise eligible for Associate membership.

Essays should be submitted to the Journal Editor.

THE CLOSING DATE FOR THE COMPETITION is JULY 1, 1966, and entrants should note that their essays should be posted in sufficient time to ensure that they are received in Dunedin before that date. Entries received after the closing date will be disqualified.

Laboratory Crossword (No. 3)

Compiled by D.S.F.



Clues Across

1. Sweet courses !
4. Common site of streptococci.
7. Shigellae often cause this.
8. These carry a type of 27 across.
9. Biochemical ruler !
11. Three less than usual, and it could be explosive.
12. Resistance to Cockney housing estates !
14. Sudan III will find it, though it may be at the back.
15. Scabies.
16. Blood cell pipette.
19. Almst oval objects seen in wet preparations.
21. A small moat whose weight is important.
22. Liebig could make this, but the Customs may not be pleased.
23. May transmit Ringworm.
25. Schlesinger's Test will find these pigments.
26. 17 Down is caused by this.
27. It should be easy to measure this worm.
28. 11 Across is one, but it may be almost opposite.

Clues Down

1. Sign of illness.
2. Rushes around to find an antibody.
3. Body fluid, clear in health.
4. Must our mixture cause such abnormal growth ?
5. Would hold test tubes at a stretch !
6. You score if you find these blood cells.
10. Mjero methods may be used for tests on this.
13. Caused by genetical interference.
17. A bad song can cause fever !
18. Often found in dysentery.
19. Do spiritualists have this type of blood ?
20. Streptococcal formation.
21. He finds the granules.
24. Centrifuge.

Solution on Page 48.

Possible Changes in the Qualifying System for Medical Laboratory Technologists in Britain

Summary of the Conclusions of an Advisory Working Group

The Advisory Working Group was appointed to inquire into the feasibility of national certificate arrangements for medical laboratory technicians, and to discuss in detail the contents of the ordinary National Certificate in Sciences appropriate to medical laboratory technology and the scope of a Higher National Certificate in medical laboratory subjects. The Group consisted of representatives of the Institute of Medical Laboratory Technology, the College of Pathologists, the Joint Committee for O.N.C. in Sciences, the Department of Education and Science and the Scottish Education Department, and it is perhaps significant that the report was unanimous in spite of the widely differing interests of the participants.

O.N.C. in Sciences for Medical Laboratory Technicians

The content of the chemistry, physics and mathematics specified for the O.N.C. in Sciences for intending biologists was considered desirable and satisfactory, but it was recommended that certain specific technical aspects of basic physics and chemistry and of additional chemistry should receive emphasis. The O.N.C. course referred to normally occupies a minimum of 480 hours, of which 240 hours are devoted to physics, chemistry and mathematics. It was considered that the other half of the course should contain a minimum of 120 hours devoted to basic biology with developed emphasis in certain specific directions, and a minimum of 120 hours elective medical laboratory sciences, forming an introduction to the technique subjects of the present I.M.L.T. scheme.

A review of the position and significance of specific technical training currently undertaken in the college course was recommended. It was felt that while a high standard of technical precision and versatility is required of the medical laboratory technician, a great deal of his training is best undertaken in the environment of the pathology laboratory under the guidance of qualified staff who are acquainted with the latest techniques and have the facilities for their performance. The college course should be complementary to this process and should serve to introduce and rationalise the primary scientific basis of the techniques.

It was recommended that the present I.M.L.T. technique-subject syllabus should be subdivided into primary or basic techniques which might be taught as part of the O.N.C. in Sciences, and specialised or secondary techniques to be taught during laboratory training.

Form of Courses

Block release or sandwich courses were thought to represent the best formulation of the courses, during which the complementary association of college education and laboratory training should be developed.

Examinations

A scheme of examinations similar to the O.N.C. in Sciences was recommended, consisting of:—

Assessed examinations in physics and mathematics as half subjects.

Assessed examinations in chemistry, basic biology and elective laboratory sciences.

It was considered that assessed examinations in practical elective medical laboratory sciences, of a minimum of four hours duration, would be essential. These might possibly be similar to the present practical subject examinations.

H.N.C. in Medical Laboratory Subjects

The objectives of a possible H.N.C. in medical laboratory subjects were understood to be the maintenance and possible extension of the present technical content of the existing A.I.M.L.T. qualification as a basis for State Registration, and the development of appropriate scientific and general education courses in order to provide the appropriate background.

On the basis of the H.N.C. course containing 240 hours of scientific study in each year, it was considered that one half of this content should be given over to study in the technical subject.

The basic structure suggested for the course, covering two years with a minimum of 160 hours per subject was:—

Subject 1. A general scientific subject—in all instances biochemical (or chemical).

Subject 2 a. (80 hours) The general scientific content of the underlying basis of the technical subject.
b. (80 hours) Specific theoretical instruction related directly to the technical subject.

Subject 3. Specific theoretical and practical instruction on the technical subject.

Subject 4. General study subjects.

General study was thought to provide an opening for studies in mathematics, statistics, English and report writing, and serious consideration of a syllabus was recommended.

It was suggested that the course should be arranged so that subjects 1 and 2a could be taught by the college and subjects 2b and 3 could be taught by medical technology staff in appropriately equipped laboratories.

Close co-operation between the colleges and hospitals would be necessary to achieve the most efficient use of staff experience and facilities.

Course Content:

Suggested assemblies of subjects were as follows:—

Course	Subject 1	Subjects 2 (a & b)	Subject 3
A	Biochemistry	Physiology	Haemotology and Blood Transfusion
B	Biochemistry	Physiology	Histopathology
C	Biochemistry	Microbiology	Bacteriology and Virology
D	Physical and Organic Chemistry	Biochemical Physiology	Chemical Pathology

Examinations:

These should follow the pattern established for Higher National Certificates, namely,

a) *Theoretical examinations:* Three 3-hour papers in each of the three subjects 1, 2 (a & b) and 3.

b) *Practical examinations:* It was considered essential to examine searchingly the practical content of subjects 2b and 3 in a minimum of six hours of practical examinations.

The report of the Advisory Working Party concluded with four appendices indicating the scope of suggested syllabuses.

Council Notes

A Council meeting was held at Wellington Hospital on Saturday, November 13, 1965. Present were Mr H. G. Bloore (in the Chair), Miss J. Mattingley and Messrs C. W. Cameron, J. Case, M. McL. Donnell, F. M. Hilder, R. T. Kennedy, J. D. R. Morgan and D. J. Philip. An apology was received from Mr H. E. Hutchings.

Investment of Institute Funds

The Treasurer reported that his inquiries had revealed that the Bank of New Zealand would pay interest at 4% on funds deposited in an investment account for each full year and that 3% per annum would be payable on funds withdrawn in a lesser period. It was agreed that a portion of the Institute's capital should be transferred to an investment account, the actual sum being left at the discretion of the Treasurer.

Microbiology Award

The Secretary reported that Messrs George W. Wilton & Co. Ltd. had undertaken to sponsor an award for the best candidate in each year's specialist examination in Microbiology, to match the award for Chemical Pathology already promised by Watson Victor Ltd. Sponsorship for a Haematology award is still being sought.

Discount on Books for Training Purposes

A letter from Mr E. K. Fletcher was discussed in which the question of the advantages of a discount for the purchase of books by Hospital Boards was raised. Council members reported that many Boards are already receiving such a discount and that there seemed to be no reason why any person buying books in bulk for the use of trainees should not avail themselves of the privilege.

Salary Advisory Committee Submissions

In order to ensure that this year's submissions should be adequately prepared, a sub-committee was appointed to prepare the arguments. To assist in this preparation, the Secretary was instructed to distribute a questionnaire to all qualified members, calling for confidential details regarding their salaries and their obligations in regard to on-call arrangements at their hospitals. A Council meeting is to be held during April to consider and approve the recommendations of the sub-committee.

The Rules of The Institute in Relation to Proxy Voting

An instruction from the 1961 Annual General Meeting regarding the application of proxy votes is held to be invalid as an amendment to the Rules. The correct course woold have been to embody the instruction in the Rules by giving the necessary notice of motion and having the change approved at the next A.G.M. The Secretary was instructed to take legal advice on the proper procedure whereby the Rules might be changed to embody the intention of the resolution of the 1961 A.G.M.

Insurance for Medical Laboratory Technologists

A letter from the underwriters of the American Medical Technologists' Insurance liability programme was read and discussed by the Council. It appears that it would be possible for individual technologists to obtain insurance cover against the consequences of civil litigation connected with their work, presumably through the Institute in a scheme similar to that operated by the A.M.T. It was decided that the scheme should be the subject of further investigation.

Medical Laboratory Technologists Board

The President reported that the Board will recommend the deletion of the restriction of fees for lecturing trainees outside working hours, and will urge increased fees for examiners.

The Board had considered the approval of training laboratories and was investigating the best ratio of tutors to trainees. It would urge the provision of tutorial space in the future hospital building programmes.

The first tutorial workshop meeting will take place during May.

There is to be one further "old-style" Certificate of Proficiency Examination in December, 1966, but future candidates will sit under the new specialist system. Candidates sitting their first subject in February will have the option to sit either in a second subject at Ordinary Level or in their first subject at Advanced Level.

A Sub-committee of the Board has been appointed to look into the title and style of the new certificate to replace the present Certificate of Proficiency. The certificate will have to be redesigned to include provision for the inclusion of details of the subjects passed, but it may be that the final design will be left until the Board's plans for changes in the examination system have been crystallised.

Programmes of Future Annual Conferences

Discussion centred on the over-running of time schedules at past Conferences which often resulted in members being unable to present papers they had prepared. It was suggested that a solution to the problem might be the holding of concurrent forums, enabling more time to be allotted to each discipline. It was also considered desirable that members reading papers should be instructed to omit irrelevant material and, particularly, detailed references. A further suggestion was that the Conference Secretary should invite papers on specific subjects from particular people, thereby avoiding the haphazard distribution of subject material.

Careers Brochure

The Secretary and Editor were instructed to obtain quotes for printing 5,000 and 10,000 copies of the proposed brochure and to proceed with the final arrangements. It was considered not unreasonable that the Department of Health might be invited to subscribe to the cost.

Applications and Resignations

New members elected:

Associate

Scott, A. Dunedin

Members

Aldred, B. J.	Nelson	Hallett, Miss E. J.	Hastings
Bly, Miss D. E.	Wellington	Morton, Miss E. M.	Dargaville
Davidson, Miss P. J.	Auckland	Phillips, Miss L. A.	Lower Hutt
Dixon, A. P.	Wellington	Sharp, Miss J. A.	Dunedin
Foy, J. J.	Dargaville	Wardlaw, D. A.	Auckland

Members reinstated:

Associates

Douglas, R.	Auckland	McBride, Miss R.	Auckland
Grattan, M.	Christchurch		

Members

McDuff, D. A.	Dunedin	Watts, K. A. G.	Takapuna

Application approved:

Associate

Clarkson, K. G. Lower Hutt

The Rex Aitken Memorial Prize

Members are reminded that this award of £25 is made through the generosity of Biological Laboratories Ltd., of Auckland.

Competition for the Prize is open to all members of the Institute who have published an article of technical or practical character, in any periodical, during the year 1965.

Intending entrants should submit *three* copies or reprints of their work to the Editor of this journal, to reach him not later than May 31, 1966.

Who's Who in the Institute

In order to acquaint members, in particular those who have never had the good fortune to attend an annual conference, with prominent figures in Institute affairs, the JOURNAL will present, in each issue, a short biographical sketch of one of the Institute's office-bearers.

Hugh Grosvenor Bloore

H. G. Bloore was born at Gisborne in 1918. Educated at Gisborne High School and later at the Wellington Technical College and Victoria University, he began his career as a medical laboratory technologist at Wellington Hospital in 1936.

After obtaining his Certificate of Proficiency in 1943 and a B.Sc. degree later in the same year, he went to Blenheim to open a laboratory at the Wairau Hospital where he has been ever since.

A competent cabinetmaker in his spare time, Mr Bloore has spent much of his leisure in pursuing this his main hobby, and built himself a stereogram to assist his enjoyment of what he describes as his principal vice: recorded music. Tramping and photography, too, have been activities occupying his time after laboratory hours, although in recent years there has been an ever decreasing amount of spare time for this man who has always been interested in Institute affairs and willing to play an active part in them.

Elected to the Council in 1955, Mr Bloore has held office ever since. He became a vice-president in 1958 and succeeded Mr H. T. G. Olive as President in 1963. A representative of the Institute on the Medical Laboratory Technologists Board, an Institute nominee on the Salary Advisory Committee and, during the last year, the Institute's representative on the combined committee which is negotiating the establishment of a Hospital Service Tribunal, he has done a great deal of travelling on Institute business. His duties as a member of these committees have involved him in more than merely travelling, however. Besides running a small but busy laboratory in between his many trips to Wellington, he is never without the paperwork that accompanies his many responsibilities.

Editing a revised version of the examination syllabus was one of the many jobs that fell to him and, currently, the preparation of submissions to the Salary Advisory Committee is another which he would sooner be without. On the expiry of his three year term of office as President, after this year's Conference, Mr Bloore looks forward to being able to retire from active participation in laboratory politics. His undiminished interest will, we can be sure, keep him on the side-line, applauding and encouraging the activities of his successors.

Post-Graduate Refresher Course at the Auckland Hospital Board's School of Medical Laboratory Technology

The third post-graduate refresher course was held between October 13 and October 15 in the Stevenson Laboratory. Senior technologists from Tauranga, Thames, Opotiki, Whakatane, Gisborne, Rotorua, Hamilton, Wairoa, Whangarei and from the Mater Misericordiae Hospital, Auckland, made up the course, with senior staffs from the Auckland Hospital Board's laboratories taking in as many papers as convenience permitted.

The evening of the 13th was devoted to a conversazione at the Green Lane laboratory, where visiting technologists had the opportunity to view items of equipment in operation, and to question local senior staff. On the following evening, the participants were entertained by Biological Laboratories Ltd., of Auckland.

The course included lectures on all aspects of medical laboratory technology including automation, recent developments and technical training, as well as discussions and a series of papers presented by visiting senior technologists.

Following the course, most visitors found it convenient to remain in Auckland to attend the one-day seminar organised by the local N.Z.I.M.L.T. Branch.

I.C.K.

Auckland Refresher Course

A Visitor's Impression

The preliminary notifications concerning this Course indicated the extent of the planning necessary in connection with programme, accommodation and many other essential details.

The programme reveals the valuable information imparted by speakers who are specialists in their fields. Such knowledge represents the results of much experience, the benefit of this being given as a condensed conclusion, allowing participants to implement current trends directly to routine work without the need for lengthy trials and experiments.

Discussion time following each paper was fully utilised and opinions were freely exchanged. The views of attending delegates contributed useful information. A great deal of informal discussion occurred outside the formal programme and this was amplified in the first evening by a pleasant social gathering at the Green Lane laboratory, where much discussion ensued. There was also an opportunity to inspect the laboratory, where special equipment of interest was demonstrated.

It is perhaps significant that a great deal of discussion centred around matters of administration and policy, which revealed that the many problems which we may think are our particular burden are shared by all, and for which nobody has any magical solution. It is of considerable comfort to those in the more isolated laboratories to find that their approach to these is no less effective than those at the more erudite centres.

The second evening was spent in very pleasant gastronomical exercise, thanks to the hospitality of Biological Laboratories Ltd.

After a concentrated programme of four days, members felt they had achieved some hard work and all agreed that such a course was of considerable value and should be continued on a regular basis at suitable intervals in the future.

G.R.G.

The Library

List of Current Acquisitions

Librarian: D. S. FORD,
Pathology Department, Medical School, Dunedin.

Amer. J. med. Technol. Volume 31, No. 5. September-October, 1965.

Contents: The Application of Programmed Learning to Medical Technology Education: A Rapid Quantitative Method for Fibrinolysis: An Evaluation of the Urograph Method for the Determination of Blood Urea Nitrogen: Professionalism: An Unusual Anti-Cellano (Anti-k) Antibody: Effect of Serum Handling on Electrophoretic Patterns: Paper Strip and Moving Boundary Analysis: An Ultramicro Method for the Determination of Blood Urea: Micro Enzymatic Uric Acid Method: Improving the Accuracy of a Rapid Technique of Plasma Hemoglobin Measurement: Interfering Substances of Menopausal Urine for Red Cells Coated with Human Chorionic Gonadotrophic Hormone: Advances in Clinical Chemistry Instrumentation: The Three M's of Medical Technology.

Volume 31, No. 6. November-December, 1965.

Contents: Experimental Comparison of Intradermal and Subcutaneous Vaccination with Influenza Vaccine: Anti-Kidd (Jk^b)—A New Case Report and Review of Literature: Use of Protein Solubilizing Detergent for Rapid Serum Iron and Iron Binding Capacity Assays: Artifacts Simulating Calcification Associated with Improper Buffering of Formalin Fixative: Longevity of Serum Lipase Values in Pancreatitis—Medical Myth or Reality? Lysine Decarboxylase Studies with Herellea: Sources of Error in Arterial Oxygen Tension Measurement: Hemagglutination Detection—Evaluation of Simplified Enzyme Techniques: Albumin in Urine: The Use of Triphenyltetrazolium in Clinical Microbiology: The Incidence of Enteropathogenic *Escherichia coli* in the Urine and Faeces of Children with Urinary Tract Infections: A Bromelin Slide Test for Antibody Detection: a Differential Staining Method for Intestinal Ova and Larva: Successive Cresylviolet and Hematoxylin Staining.

Ann. Med. exp. Biol. Fenn. Volume 43, No. 2. 1965.

Volume 43, Suppl. 1, 2, 3 & 4, 1965.

Aust. J. biol. Sci. Volume 18, No. 5. October, 1965.

Canad. J. med. Technol. Volume 27, No. 4. August, 1965.

Contents: An Evaluation of the One-Stage Factor VIII Assay: Two Neurological Staining Techniques Utilizing the Dye Luxol Fast Blue: Bases Elementaires en Fluorescence: A Practical Evaluation of Plastic Blood Transfusion Equipment: An Example of a Pure Anti-Le^bL.

Volume 27, No. 5. October, 1965.

The Recovery of Red Cells from Blood Samples Stored in Liquid Nitrogen: Staphylococcus Bacteriophage Patterns: Bases Elementaires en Fluorescence: Evaluation of a Screening Method for Serum Glutamic Oxalacetic Transaminase.

Volume 27, No. 6. December, 1965.

Contents: The Recovery of Red Cells from Blood Samples Stored in Liquid Nitrogen: A Method of Estimating Esterified Cholesterol in Serum: Presence de Trois Anticorps chez une Femme Enceinte.

Filter Volume 37, No. 3. September, 1965.

Contents: Professional Interests of Medical Laboratory Technologists: Review of Dr Ralph Lane's Topic "The Modern World of Work": Some Workaday Problems of Medical Technologists: The Hospital as a Work Setting: Electrocardiography Primer.

J. med. Lab. Technol. Volume 22, No. 4. October, 1965.

Contents: Pitfalls and Trends in Steroid Analyses: A Reliable Technique for Achieving Well-spread Chromosome Plates: The Control of

Enzyme Solutions Used in Serological Techniques; Sterilization and Disinfection Techniques and Equipment; Pyelonephritis—The Identification and Incidence of Micro-organisms Associated with Pyelonephritis; The Explosive Properties of Ammoniacal Silver Solutions; A Stain for Myelin Using Solochrome Cyanin; A Shielded Container for Carrying and Dispensing Doses of Radioisotopes for Intravenous Use; Permanent Standard for Oxyhaemoglobin Determination.

Lab. Dig. Volume 29, No. 2. September/October, 1965.

Contents: Reviews including Fundamentals of Immunogenetics, with Special Reference to Human Blood Groups; Gel Diffusion for Detection of Staphylococcal Antibodies; Gas Chromatography; Complement Fixation Test for Rubella; Human Isospirosis; Evaluation of a Bedside Method for Blood Glucose Estimation; New Transport Medium; Routine Examination of Synovial Fluid; Selective Medium for Isolation of Mima (?) and Herellea(?); Isolation of Salmonella from Egg Products; Serum Lipase Determination Utilizing Brief Hydrolysis; One Hour Method of Processing Tissue. Question and Answer: Clumping of Erythrocytes in Crossmatching.

Volume 29, No. 3. November-December, 1965.

Contents: Landsteiner and Wiener's Discovery of the Rh Factor; Shaken, Not Beaten—Response to Disaster; Abstracts.

Lab. Management. Volume 3, No. 7. October, 1965.

Contents: Automated Experiment Systems—A Practical Guide; Experienced Panelists Provide Practical Answers; The Laboratory Manager's Adaptation to the Product Life Cycle; Thermoanalysis.

Volume 3, No. 8. November, 1965.

Contents: Equipment Data; Micricalories are in Your Future; You May be an Accredited Chemist; Know Your Organizational System; Case History of an Automated Experiment; Halt Contamination Traffic.

Volume 3, No. 9. December, 1965.

Contents: Protect or Pay; Your Laboratory's Profile; Affluence-Recognition-Satisfaction; High Precision C.H.N. by Automated Instrument; Utilities in the Penthouse of a One-storey Building.

Lab. World. Volume 16, Nos. 9, 10, 11, 12. September to December, 1965.

Med. Surg. (Baroda). Volume 5, Nos. 6, 7, 8. June, July, August, 1965.

Med. Technol. Aust. Volume 7, No. 4. October, 1965.

Contents: A Laboratory Investigation into the Use of Transport Media and Methods for Dysentery Exudates; Acidosis & Baseosis.

Volume 8, No. 1. January, 1966.

Contents: Investigation of Male Infertility; The Preparation of Multicoloured Corrosion Casts of Vascular and Duct Systems.

Microbiologia (Buc.) Volume 10, No. 4. July-August, 1965.

Contents: Genetical Conceptions on the Formation of Antibodies; Studies on the Infectivity of Viral Nucleic Acids; Syncital Respiratory Virus; Studies on the Relationship between the Fermentative Properties of the Staphlococci and their Pathogenicity*; The Frequency of *B. cereus* in Minced Meat and Sausages*; Observations on Present Aspects in the Infections with *Pseudomonas aeruginosa**; The Incidence of Antibodies against Parainfluenza Viruses in Roumania*; Contributions to the Study of the Incidence of Ornithosis in Roumania*; The Study of Urinary Mucoproteins—"The Donaggio Test"—in the Course of Acute Viral Hepatitis*; Semiautomatic Distributor of Antibiotic Powders and Tablets Necessary for Antibiograms.

[*Summary in English]

Volume 10, No. 5. September-October, 1965.

Contents: Report of the National Congress of Medical Microbiology, held at Bucharest, 15-18 September, 1965.

N.Z. Hospital. Volume 18, Nos. 1, 2. September, November, 1965.
Offic. J. Amer. med. Technol. Volume 27, No. 4. July-August, 1965.
Contents: The T-3 (T.B.I.) Test: Cultural Characteristics of Seven Common Dermatophytes: The PKU Test in the Clinical Laboratory; Evaluation of a Modification of the Mather Method for Determination of Serum Bilirubin; Urinalysis as a Diagnostic Tool.
Volume 27, No. 5. September-October, 1965.
Contents: Diagnostic Medical Mycology; Medical Frontier; Xylose in Serum and Urine; Recovery of Pin Worm Ova.
Rev. viernes Med. Volume 16, No. 2. May-August, 1965.
S. Afr. J. med. Lab. Technol. Volume 11, No. 3. September, 1965.
Contents: The Estimation of Serum Bilirubin in the Newborn; A Case of Hereditary Ovalocytosis.
Tonic. Volume 2, Nos. 3 and 4, 1965.

Auckland Branch One-Day Seminar

Another highly successful one-day seminar was held on October 16, 1965. The attendance was in the region of 110-120, with a large number of technologists coming from outside the area served by the Branch.

Members were welcomed to the Seminar by Dr A. Warren, Medical Superintendent of The National Women's Hospital; and the Seminar was formally opened by Mr D. Whillans.

The following papers were presented during the day:—
The Red Blood Cell—An Historical Introduction. Mr R. T. Kennedy.
Physiology of the Red Cell. Dr D. Taylor.
The Red Blood Cell in Anaemias other than Haemolytic Anaemia. Dr G. Hitchcock.
Metabolic Activities of the Human Red Blood Cell. Mr A. Nixon.
The Red Blood Cell in Haemolytic Anaemia. Miss J. Grey.
Dynamics of Red Blood Cell Production. Mr B. White.
The Red Blood Cell Count. Dr J. Buchanan.
Red Blood Cell Storage and Survival in Transfusion. Miss K. Schollum.
A Case of Circulating Anticoagulant. Mr O. Phillips.
Blood Groups in Disputed Paternity. Mr R. Douglas.
Serum Electrophoresis on a Polyester Film. Mr W. Wiggle.
A Discussion on Pregnancy Testing. Mr J. Sloan.
Inhibiting the Spread of B. proteus. *A Discussion of Techniques.* Mr T. Miller.
Volemetron Blood Volume Machine: A Demonstration. Mr B. White.
The Serology of Trichinosis. Mr A. Fischman.

At the conclusion of the technical programme, a well-attended buffet tea-cocktail party enabled visiting and local technologists to get together for an enjoyable few hours of informal discussion. I.C.K.

CROSSWORD SOLUTION

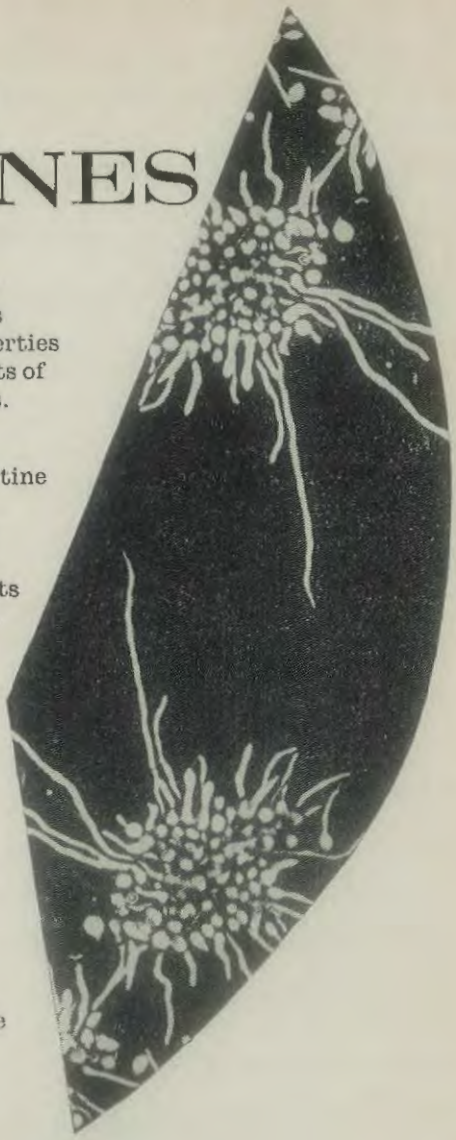
Across

1 Sucrose. 4 Throat. 7 Epidemic. 8 Pigs. 9 King. 11 Uranium. 12 Ohms. 14 Fat. 15 Psora. 16 Thoma. 19 Ova. 21 Atom. 22 Alcohol. 23 Cats. 25 Bile. 26 Parasite. 27 Taenia. 28 Isotope.

Down

1 Symptom. 2 Rhesus. 3 Spinal. 4 Tumours. 5 Rack. 6 Target. 10 Infant. 13 Mutant. 17 Malaria. 18 Amoebae. 19 Occult. 20 Chains 21 Albert. 24 Spin.

OXOID PEPTONES



The Oxoid Laboratories have developed a range of peptones differing widely in their properties so as to meet the requirements of workers in many varied fields.

OXOID PEPTONE L37
is used extensively for all routine purposes in laboratories throughout the world. It is a high-quality peptone which gives consistently good results with standard culture media.

OXOID PROTEOSE PEPTONE L46,
a more specialized peptone, is prepared by the papain digestion of selected fresh meat, for use in media for the production of bacterial toxins.

OTHER OXOID PEPTONES AND HYDROLYSATES:
Peptone L6, Tryptose, Soya Peptone, Mycological Peptone, Tryptone, Tryptone "T," Casein Hydrolysate (Acid), Peptone "P," Liver Digest Peptonized Milk.

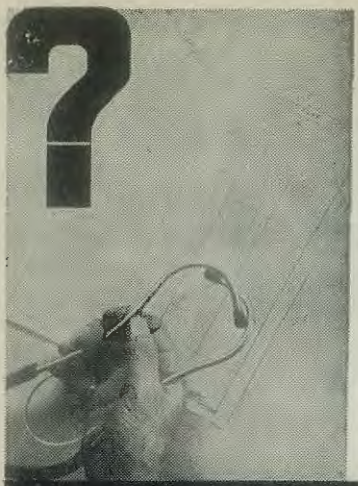
For progressive 'aboratories . . . OXOID **culture media**

MANUFACTURED BY OXO LTD., LONDON

Sole New Zealand Agent Edwin A. Piper Ltd., 4 Rata Road, Cheltenham, Auckland, N.1.
Telephone 70-040. **Telegraphic address:** "Eapagent" Auckland.

Index to Advertisers

Please mention the JOURNAL when corresponding with advertisers.



what he doesn't know can hurt

Are you testing **gram-negative organisms** routinely for sensitivity to

GRAM-NEGATIVE SPECIFIC ANTIBIOTIC

COLY-MYCIN INJECTABLE

colistimethate sodium

for urinary, respiratory, surgical, wound, burn and blood stream infections

- primarily bactericidal against most gram-negative pathogens — especially Pseudomonas and E. **coli** (not recommended for Proteus)
- exceptionally safe when used as recommended (exercise caution in presence of renal impairment)
- rarely induces bacterial resistance
- therapeutic blood and urine levels rapidly attained

Please remember: Since Coly-Mycin (colistin) is a polypeptide antibiotic, a clear zone of inhibition, regardless of size, indicates sensitivity — usually high sensitivity.

Sensitivity discs are available from your regular suppliers, from this office—free of charge, or your Warner-Chilcott representative. Also, have you seen the 4½ minute bacteriology film on Coly-Mycin (colistin)? Ask your Warner-Chilcott representative about it the next time he calls.

Side Effects: Occasional reactions such as circumoral paresthesias, nausea, dermatitis, drug fever, transient vertigo, and dizziness have been reported and usually disappear upon discontinuance of drug or reduction of dosage.

Precautions: Exercise caution in renal impairment. Transient elevations of BUN have been reported. As a routine precaution blood studies should be made during prolonged therapy.

William R. WARNER and Co. Ltd
AUCKLAND

OMNIS ORBIS
WARNER

to detect bleeders before surgery

a new tool for new dependability

Platelin™

standardized platelet factor reagent

Newer tests have been devised tc replace the Lee-White Clotting Time, which is known to miss nearly 50% of proven hemophilia cases.(1). These tests are far more dependable indicators of potential bleeders than the routine bleeding and clotting times. They are relatively rapid and simple. But they require a rigidly standardized platelet factor reagent. Until now, no such reagent has been readily available.

PLATELIN is platelet factor reagent, rigidly standardized against normal plasma, against DIAGNOSTIC PLASMA Warner-Chilcott and against plasmas deficient in stage one clotting factors.

Using PLATELIN, any worker skilled in the technique of the Quick One-stage Prothrombin Time can rapidly perform either of two new and sensitive coagulation screening tests:

The Hicks-Pitney Test(2)—a rapid, simplified screening version of the Thromboplastin Generation Test, especially adapted for routine use, which duplicates the extreme sensitivity of the TGT. The only commercial reagents needed are PLATELIN and DIAGNOSTIC PLASMA Warner-Chilcott.*

The Partial Thromboplastin Time Test(3) — similar in procedure to the One-stage Prothrombin Time, and approximately equal to the Prothrombin Consumption Test in detecting bleeders. Only one commercial reagent is required: PLATELIN.

Complete directions for performing and interpreting both the Hicks-Pitney and the Partial Thromboplastin Time tests are included with each package of PLATELIN.

Take advantage of this new advance in coagulation research. Order a supply of PLATELIN today.

Each vial of PLATELIN is sufficient for 12 Hicks-Pitney or 25 Partial Thromboplastin Time tests.

Boxes of 10 vials, 2.5 ml. size, 60/-.

References: 1. Wilkinson, J. F.; Nour-Eldin, F.; Israels, M. C. G., and Barrett, K. E.: Lancet 2:947 (Oct. 28) 1961.
2. Hicks, N. D., and Pitney, W. R.: Brit. J. Haem. 3:277, 1957.
3. Langdell, R. D.; Wagner, R. H., and Brinkhouse, K. M.: J. Lab. & Clin. Med. 41:637, 1953.

* In addition to its use as a reagent in the Hicks-Pitney test, DIAGNOSTIC PLASMA Warner-Chilcott remains the **normal plasma of choice for quality control** of the one-stage prothrombin time and other coagulation tests. Make sure your supply of DIAGNOSTIC PLASMA Warner-Chilcott is adequate.

William R. WARNER and Co. Ltd.
P.O. Box 430, Auckland

OMNIS OPP
WARNER

Five years ago most labs in U.S.A. were still using other thromboplastins.

Today more than 80% have changed to Simplastin. *Why?*

Such changes are not made lightly. Each laboratory had its reasons:

Dependability Simplastin's reproducibility from vial to vial and lot to lot is *guaranteed.* We make sure of reproducibility by rigidly controlling such factors as particle size and number, pH, ionic strength, moisture content, temperature stability. We standardize Simplastin against normal and dicumarolized plasmas, against whole and dilute Diagnostic Plasma Warner-Chilcott and against other lots of Simplastin. For accuracy in prothrombintime determinations, the thromboplastin *must* give reproducible results. Simplastin always does.

Purity To laboratories that used to use *liquid* commercial thromboplastin preparations, this has been a significant consideration. (To stabilize thromboplastin in suspension, the manufacturer must use a preservative. Preservatives commonly used for this purpose are phenol (carbolic acid) and formaldehyde—both enzyme poisons that can make prothrombin times less reliable, especially with patients on anticoagulants.)

Convenience For laboratories that once made their own thromboplastin or extracted it from dried brain preparations, this has proved to be an important advantage. Adding water to Simplastin takes a lot less time and trouble than the do-it-yourself procedures — and you couldn't make a finer thromboplastin by any means.

Economy Thanks to the no-waste vials (6 and 20-determination size, to match your laboratory load), the skilled time saved by simple reconstitution, and the less frequent calls for "repeats", many laboratories find that their cost per test is lower with Simplastin.

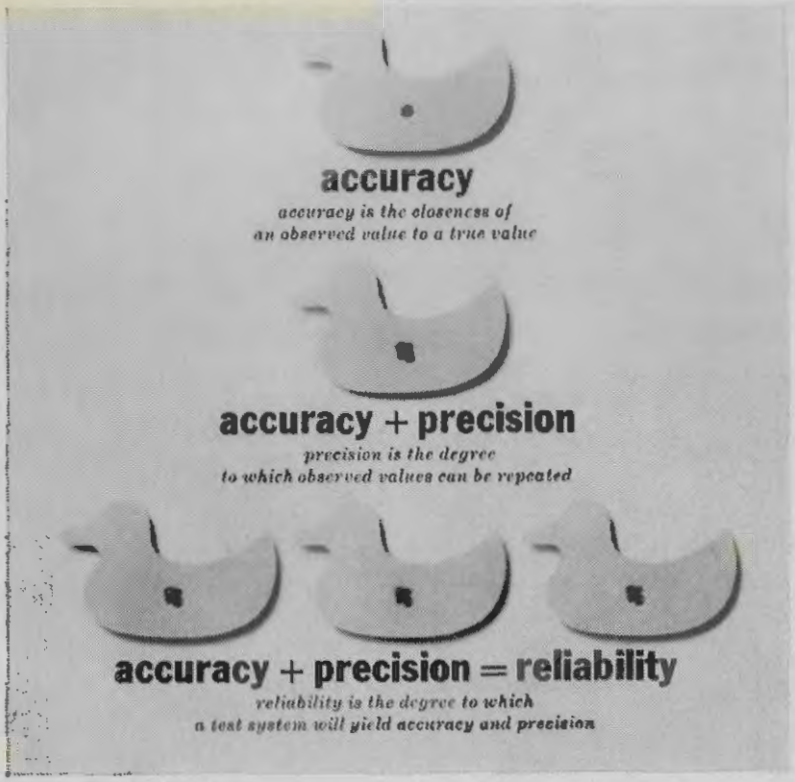
"It's the standard" Simplastin has become the standard thromboplastin in most coagulation research laboratories, and wherever results must be readily comparable to those obtained in other laboratories.

These are typical reasons why so many laboratories have changed to Simplastin. And why very, very few have changed again.

Like the finest product in any field, Simplastin is flattered by many imitators. They come and go. Even more gratifying is that year after year more and more laboratories, and more and more patients, benefit from our continuing efforts to make Simplastin the finest thromboplastin available.

William R. WARNER and Co. Ltd.
AUCKLAND

OMNIS ORBIS
WARNER



Quality control with Versatol® standards in serum lets you know your test system is giving you all three

Versatol • Versatol-A • Versatol-A Alternate
Versatol Pediatric • Serachol • Versatol-E-N • Versatol-E

With the Versatol system of standards in serum you can standardize and control: bilirubin • calcium • chloride • cholesterol, free • cholesterol, total • creatinine • glucose • non-protein nitrogen • phosphorus, inorganic • potassium • protein bound iodine • sodium • total nitrogen • total protein • urea nitrogen • uric acid • alkaline phosphatase • acid phosphatase (prostatic) • amylase • lactic dehydrogenase • lipase • transaminase (GOT)

William R. WARNER and Co. Ltd.
AUCKLAND

OMNIS ORBIS
WARNER

Contents

PRINTED BY THE EVENING STAR CO. LTD.,