Vol. 38 No. 4 November 1984

ISSN.0028-8349

NEW ZEALAND JOURNAL OF

MEDICAL LABORATORY TECHNOLOGY

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

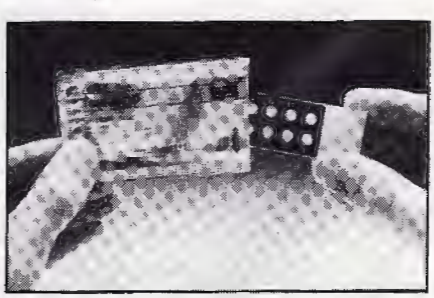
You can put Toxoplasma gondii in the spotlight!

(Treponema pallidum, too!)

We just did!

Bio Merieux is a range of antigen prepared slides for a series of parasitic organisms notably as far as New Zealanders are concerned TOXO -SPOT IF (Toxoplasma Gondii) and Trepo - SPOT IF (Treponema pallidum for diagnosis and prevention of syphilis.

SPOT IF slides give you results in 1½ hours and are stored in airtight



sachets for storage at 4°c with the number of organisms, their morphology and reactivity, standardised.

SPOT IF -Immunofluorescence for Toxoplasma Gondii and Treponema Pallidum.

Just What You'd Expect from Bio Merieux available from K.M.S.

bioMérieux
Laboratory reagents and products

KMS

Kempthorne Medical Supplies Ltd. P.O. Box 1234. 79 Carlton Gore Rd. Auckland, New Zealand. Ph. 775-289. TX: KMS NZ 2958.

circle 77 on the readers reply card

A new cost-effective immunoassay system for every laboratory

ORTHO* Microwell Test System

ORTHO Microwell Test System is a complete testing system which meets the needs of today's cost-conscious laboratories. The system enhances productivity and conserves valuable personnel time with rapid, accurate test throughput, smaller specimen requirements and dependable instrumentation.

With the ORTHO Microwell Test System we offer:

- A line of Ortho's ELISA Test Kits of proven specificity and sensitivity
- ORTHO Microwell Reader designed to meet future laboratory immunoassay needs for efficiency and economy
- A commitment to aggressive, ongoing development of significant diagnostic tests in important areas of laboratory medicine
- Assay specificities for sexually transmitted diseases and immune status monitoring

New kit specificities:

- ORTHO HSV Antigen ELISA Test System
- ORTHO Rubella IgG Antibody ELISA Test System
- ORTHO Serum ELISA Test System for Circulating Immune Complexes (C1q–IgG)

A complete test system for enzyme-linked immunosorbent assay

Ortho Diagnostic Systems is committed to offering a testing system which meets today's laboratory needs in the new health care environment.

- Accuracy: the most diagnostically significant tests—those that lead directly to concise diagnosis
- Timeliness: a system to answer test requests as rapidly as possible for optimum patient management
- Efficiency: a user-friendly system with minimal tech-time demands for optimal use of technologists and technicians
- Performance: convenient microwell format enhances productivity by combining small specimen requirements with rapid test throughout

ORTHO Microwell Reader

- Fully computerized—data reduction cartridge
- Flexibility to read one well or entire plate in minutes
- Positive well locator
- Clock/calendar
- QC data printout

Ortho Diagnostic Systems Inc.
Raritan, New Jersey 08869

Ortho Diagnostic Systems: at the leading edge in immunoassay

circle 76 on the readers reply card

QUANTUM® II
MICROBIOLOGY SYSTEM

FOR THE IDENTIFICATION OF ENTEROBACTERIACEAE, NON-ENTERICS AND YEASTS.

The Bacterial Identification

Like no other instrumentation, the Quantum II Microbiology System is able to provide a rapid, semi-automated identification of gram negative bacteria. Results list the identification by genus and species plus all biochemical reactions, so there is no need to refer to external charts or code books.

The procedure is extremely fast and simple, using a specially designed cartridge with 20 lyophilized conventional biochemical substrates. Colorimetric analysis is completely automated in order to reduce the chance of interpretation or transcription error.

The speed of results provides same-day answers for faster report turnaround, thus increasing laboratory efficiency and productivity.

The Yeast Identification

The Quantum II Microbiology System provides a rapid, 24 hour method for identifying medically important yeasts based on nineteen biochemical reactions and a conventional germ tube test. This represents a significant savings in time when compared to manual methods taking from three to fourteen days for completion.

Procedurally, Yeast Identification is simple to perform, using a single cartridge with lyophilized biochemical substrates plus a negative control. Complete test interpretation and printout of results eliminate many variables common in manual procedures, thereby reducing chance error.

ABBOTT LABORATORIES
Diagnostics Division

Auckland 63 Marsden Ave Mt Eden Ph: 694-425
Wellington Astral Towers Main Street Upper Hutt Ph: 285-073

circle 78 on the readers reply card

THE NEW ZEALAND JOURNAL OF
MEDICAL LABORATORY TECHNOLOGY

Vol. 38 No. 4 November 1984 ISSN 0028-8349

TABLE OF CONTENTS

SUBSCRIPTIONS

Subscriptions to the Journal for non-members requiring delivery in New Zealand is $NZ18.00 for 1 year surface mail paid. Single issues are $NZ5.00 surface mail paid.

Subscription to the Journal for non-members requiring delivery overseas is $NZ18.00 for 1 year plus $NZ4.20 surface mail paid. All subscriptions except for single issues are due in February.

DIRECTIONS FOR CONTRIBUTORS

From Vol. 36 No. 1 all papers published will be in the form known as "Vancouver Style" or Uniform Requirements for Manuscripts submitted to Biomedical Journals. Full details may be found in the New Zealand Journal of Medical Laboratory Technology, Vol. 36, No. 4, page 90 to 109 or from the Editor.

Intending contributors should submit their material to the Editor, D. Dixon-McIver, Biochemistry Laboratory, National Women's Hospital, Auckland, New Zealand, or The Editor, P.O. Box 35-276, Auckland 10, New Zealand. Acceptance is at the discretion of the Editor, and no undertaking is given that any article will be published in a particular issue. The copy deadline for each issue is the first of the month prior to the month of publication.

ADVERTISER INQUIRIES

Inquiries regarding advertising rates and copy or blocks for advertising should be addressed to the Advertising Manager, Trish Reilly, 48 Towai St, St Heliers, Auckland 5, Phone 555-057.

DATES OF PUBLICATION

The months of publication for 1984 are March, May, August and November.

This Journal is abstracted by: Biological Abstracts, Chemical Abstracts, Cumulative Index Nursing and Allied Health Literature, Current Clinical Chemistry, Hospital Abstracts, Institut nautchnoi informatsii.

PUT IT TO ANY TEST.

Now, there are more TDM assays than ever. And for every new assay, you've got to be ready with the right control: the new LYPHOCHEK® TDM Control.

This tri-level control contains twenty-five constituents to cover today's most popular assays. Plus eight for those that are just around the corner. For every testing method and just about every manufacturer.

Reconstitute LYPHOCHEK TDM Control and it's stable for 30 days. What's more, our Q.C. program delivers interlaboratory values from sign-up to expiration date.

LYPHOCHEK TDM Control. For today's TDM assays, and tomorrow's, you're covered.

BIO-RAD

ECS Division

For more information contact

Scientific Products Division — Smith Biolab Ltd.

AUCKLAND: Phone 483-039. Private Bag, Northcote
WELLINGTON: Phone 697-099 P.O. Box 31-044
CHRISTCHURCH: Phone 63-661 P.O. Box 1813

Oops. We almost forgot Vancomycin.

circle 79 on the readers reply card

LYPHOCHEK® is a registered trademark of Bio-Rad Laboratories

Presidential Address

By Mr A.F. Harper, President N.Z.I.M.L.T.

Given to the 40th Annual Scientific Meeting at Dunedin, 16th August, 1984

Ladies and Gentlemen, when I assumed office three years ago there was a major goal I had hoped we would achieve; that was a degree course in medical laboratory technology. This is something I have felt very strongly about for many years. In my view it is essential if we are to progress as a profession.

You will now know from the last MLTB newsletter that because of the gloomy prognosis following the Hospital Board Association's rejection of the course, the facilities in the new block at Massey have been directed to other purposes, and the staff expected to be involved in teaching parts of the degree are being utilised in new courses.

We had a golden opportunity to achieve something which had been talked about and for which a need has been recognised since at least the mid 1960s. That opportunity has been lost. It is disappointing to me personally, to other members of Council and no doubt it will also be a disappointment to the majority of Institute members who recognised the benefits and supported the course.

What is important now is for us to decide where we go from here. The path will not be easy. Experience has shown that in establishing a degree course for example, the following organisations are involved; firstly the NZIMLT, then not necessarily in sequence the MLTB, Society of Pathologists, the University Administration, SCORITE, University Grants Committee, HBA, Health Department, Education Department and finally Government, and there could be others as yet unknown. These are all cogs in the wheel and opposition by any one of these organisations can block or at least delay the establishment of a new course. I think it was unfortunate that our opportunity with Massey came at a bad time economically. If it had come for example in the early 1970's, I believe we would have succeeded.

The possibilities which Council can now pursue would appear to be to continue exploring a degree course through other universities as well as Massey. It is possible we could be pressured in to resurrecting the old diploma proposal. You will recall this was abandoned because it was recognised that this course would achieve a level of education only slightly higher than our NZCS. To achieve a level comparable with our current registerable qualification, a post diploma, diploma would have been necessary. Bearing in mind the Health Department's stated wish to phase out the MLTB examinations, the formal education input for the second diploma would necessitate trainees attending block courses at a technical institute. Such a course would be very similar to the Massey course which has been rejected, in relation to the time staff would be required to be absent form the laboratory and expense to hospital boards. The end result would be a less satisfactory qualification.

In my view future councils will need to be vigilant and not move away from our current education, imperfect as it is, until it can be replaced by something which really serves our needs.

Before leaving the topic of education I would like to refer briefly to the Christchurch Hospital's decision to use exclusively the graduate route to registration. This may or may not be seen by other laboratories as a means of obtaining staff with a broader scientific background than supplied by the NZCS. The Christchurch experiment however, in the absence of a degree course in MLT, may well have a considerable influence on the direction our future education takes. I am sure it will generate both interest and debate.

I would now like to devote some time to a topic which I know is causing concern to technologists not only in New Zealand but also in a number of countries overseas — the performance of laboratory investigations outside the laboratory by non-laboratory staff, a practice which has increased in recent years. The range of equipment being marketed for this purpose has also increased and no doubt will continue to do so. It is an international trend which is motivated mainly by economics and includes a desire to reduce the cost of after hours laboratory services. In some areas convenience is an additional factor.

As technologists we are aware of the dangers which are inherent in this situation. The apparent simplicity of these tests is deceptive. To obtain reliable results certain conditions must be met. These include adequate staff training and a knowledge of the principle of the metholodology used, the opportunity to maintain expertise by the regular performance of the test, proper maintenance of equipment, the correct storage of reagents, adequate quality control, and the presence of a suitably qualified person with the authority to see that these requirements are carried out.

I question that these criteria are being met. It is difficult to see how they can be when these tests are being performed by staff whose training is related to other areas of health care and the performance of these investigations is merely an appendange to their normal duties.

The question is what action should the NZIMLT take? We have two reasons for concern.

(1). As a professional body dedicated to improving laboratory standards and patient care.

(2). The industrial aspects.

At the NZIMLT Special General Meeting in Christchurch in 1982 a resolution was passed "that Council draw the attention of the Medical Laboratory Technologists Board to the widespread contravention of Section 32 of the Medical and Dental Auxilliaries Act and request that steps be taken to ensure its enforcement". We have recently received a ruling from the legal section of the Health Department which states that while it is illegal for persons other than registered technologists or those exempt under Section 12 of the regulations, to perform medical laboratory technology in a medical laboratory, this however does not apply if these investigations are carried out in some other area. It is clear from this ruling that the present act gives no protection to either patient or laboratory staff where investigations are performed in a non-medical laboratory situation.

You will be aware that the current act is to be replaced by an umbrella one designed to cover a number of health related professions. Representatives of Council have had discussions on the draft bill with a sub-committee of the MLTB. The Institute will have an opportunity to make submissions when the Health Professions Registration Bill goes before a select committee in 1985. The new act will give the Institute the opportunity to correct the shortcomings which exist at the moment.

Some of the possibilities are that we could attempt to have included in the Act a ban on laboratory investigations being carried out by non registered or non exempt persons regardless of where they are performed. This I believe would be unacceptable because the ban would have to apply to the traditional routine testing of urine by nursing staff.

We could try to limit the types of tests carried out by non-laboratory staff. Here there may be machinery difficulties regarding legislation when new tests became available. I am sure however that the act and regulations could be drafted in such a way as to overcome these problems.

As a third option we could protect the interests of the patient by using the act to ensure that the supervision of these investigations, performed outside the laboratory is carried out by laboratory personnel. This would include advice on the purchase of equipment and the monitoring of staff training, equipment maintenance and quality control. It is likely that to correct the present potentially dangerous situation we will need to convince the decision makers that it is unwise to substitute economy for expertise.

The issue I have been discussing is an important one. I hope Institute Members will make their views known to Council.

Ladies and Gentlemen, this is the end of my term in office as President and unlike recent events in the national political arena, the transfer of leadership to Colvin will be effected in an amicable manner. The other difference from the national scene of course is that all existing members of council have been re-elected. I am sure that this reflects a recognition of the talents which exist within Council and appreciation of the amount of work which has been done on your behalf.

with normal operating procedures. When the centrifuge had reached a speed of approximately 2500-3000 rpm it broke down with a dramatically loud bang and clatter. It was immediately switched off by the attendant who promptly evacuated the room.

The centrifuge was inspected immediately it was ascertained that it had in fact stopped. Damage which was immediately apparent included the following:

(1) deformation of the rotor yokes so that two opposite cup positions became narrowed and two widened;
(2) the presence of score marks at the tops of the receiving slots on each side of two cups and small metal fractures again at the tops of the lug receiving slots on the opposite sides; large fractures and/or deformities were present on several of the cups;
(3) displacement of the centrifuge shaft from a vertical position;
(4) fracture of the top of the die cast moulding which surrounds the centrifuge driveshaft; the fracture extended around one half of the circumference only and it is assumed to show the extent of shaft movement after the shaft had bent;
(5) deformation of the centrifuge chamber wall with several discrete score and imprint marks present;
(6) small score marks were evident on the centrifuge lid;
(7) other fittings within the chamber were severely damaged;
(8) fracture of several metal spacers located beneath the centrifuge chamber;
(9) all the centrifuge buckets were fractured;
(10) the blood packs had been torn open.

From the above observations it was concluded that a centrifuge bucket was probably forced out from between the rotor support lugs. The cup then collided with the centrifuge wall producing one set of score and imprint marks and distorting the centrifuge chamber. Absence of one cup produced a gross imbalance of the rotor which led to bending of the driveshaft and collision of the diametrically opposite cup with the chamber wall. This collision dragged the cup from its lugs and the remaining two cups were also released from the lugs through bending of the rotor arms, possibly as a consequence of the large deceleration forces. The rotor appears to have come to rest within a half rotation.

The service agent took delivery of the machine to attempt to assess the cause for failure.

Discussion

In recent times there have been two failures of this machine. Originally, an out of balance situation resulted in damage to the upper shaft. The motor was not displaced, the motor mounting was intact and appeared to be in good condition. This fault was repaired by the replacement of the shaft. The second catastrophic event occurred a few days later. There is no reason to suspect that the second failure is consequential to the first event. The evidence suggests that the first fault was repaired properly and that the equipment, with one exception, was working in accordance with its specifications when it was returned for our use.

On the fatal run, the machine started and accelerated normally. Immediately prior to the failure the operator noticed that the machine had reached approximately 2300 rpm. At that point in time the operation was considered to be normal in every respect. The first sign of a failure was a loud bang and clattering noise. The failure resulted in the sudden and violent bending of the upper shaft. The bending shaft broke the cast metal cone where the shaft passes from the motor compartment to the centrifuge bowl and lodged into the cone. The shaft stopped (instantly) within one half of a revolution.

There was no reason to suspect that the correct loading procedures were not followed by the operator. The operators concerned with both the events were interviewed. They were both aware of the thorough operating procedures followed as a routine practice.

Further assessment of the rotor and centrifuge cups in use at the time of the second accident has shown clearly that the cups were not of a type listed by the manufacturer for use with this rotor. The cups (IEC) which were being used, permit to and fro (circumferential on the rotor) movement of the cup on the support lugs, more than would normally be expected or allowable. It was also noted that one of the rotor support lugs had been assembled by the manufacturer in a reversed position and would provide a shortened length of supporting surface for a centrifuge cup due to a chamfered end. The combination of these two events could have led to the final event of a cup becoming displaced centrifugally from the lug supports. Examination of the end face of the lug which was located in a reversed position showed a linear streaking pattern which has been suggested may be due to an aluminium cup being forced past its vertical surface by centrifugal action. There is one other lug which shows a similar appearance and this is located diametrically opposite the reversed lug.

Review of operating practices, both present and past, shows that the 276 rotor which was not currently used, appeared to have been used extensively for blood product manufacture only in the mid/late 1970's, when it appears that the same type of cups as were in use at the time of the accident Cat. No. 408, may have been in use. The Hospital Board does have one set of cups which are appropriate for this rotor — Cat. No. 353, but have only been used in the PR2 centrifuge which became obsolete in the mid/late 1970's. Checks on dates of purchase of rotors and cups have helped to clarify this point. If these points are correct as outlined, then the accident occurred after a long period of prior use of the same equipment combination.

It has been established that the wrong cups were in the rotor. A type 276 rotor was fitted to the machine with type 408 cups. Only type 353 cups should be fitted to the type 276 rotor. There is a significant difference in the size of the cups. In comparison with the 353 cup the 408 cup is smaller in diameter (4mm) and has a larger mounting slot (3mm, ⅛").

There have been many theories developed on the reason for the failure. However taking all factors into consideration the most likely explanation is that one cup came out of its mounting. The resultant reaction forces caused the shaft to bend.

The major issue was to review operating practices and supervision in order to prevent recurrence of a centrifuge accident.

(i) The operating requirement in the local Blood Transfusion Service is for several thousand centrifuge runs to be performed annually by a range of laboratory assistants and technologists so that appropriate blood products can be prepared.
(ii) The brand and type of centrifuge in use is considered to be appropriate for the task but some changes in equipment must be considered. It would be desirable to standardise the rotors and cups used, so that variation in practices for use of the centrifuges are minimised. Two types of rotor are in current use on the DPR 6000 centrifuges. At present a four place, type 977, windshield rotor with type 400 cups is in use as a first line backup rotor for the two six place, type 981, windshield rotors with type 408 cups. The type 400 cups are more difficult to load than the type 408 cups and have been the subject of criticism from local Hospital Board engineers.
(iii) If, in normal laboratory use, vibration is noted as a constant factor of poor operation, this vibration may be directly traceable to the load in the rotor. The operator should ensure that the rotor is loaded symmetrically, and that the shields are all of the same gram weight. It is also wise to check each shield for proper cushions to make sure that some shields do not contain extra cushions.

It is essential that only the correct rotors, shields and components be used on this centrifuge.

Accessory balance is also an important factor in prolonging the bearing and armature life.

To obtain a good dynamic the opposite loads must, in addition to being equal in mass, have the same centre of gravity. Care should be taken to select tubes and bottles in pairs that are alike in shape, thickness and distribution of glass or plastic. The larger the container, the more critical the selection should be.

Note:

All centrifuges have so-called "criticals". As the speed increases the centrifuge vibrates for a short time. Left alone, the machine will normalize as more speed is applied.

(iv) Equipment surveillance: The centrifuge rotors, windshields and cups will continue to be visually inspected each week by one designated staff member for evidence of wear and damage.

Application of molybdenum disulphide lubricant to the lug receiving slots on the centrifuge cups will be performed monthly instead of six monthly as suggested by the manufacturer.

The current checks on centrifuge speed calibration which are performed every six months will be continued.

(v) All centrifuges should be checked by a trained engineer nominated by the Board's engineering services after any repair has been performed, and befora the laboratory takes delivery of a repaired machine.

The failure of the PR6000 must be viewed as an overall event with several contributory factors.

Because a positive approach has been adopted by all involved we have been able to benefit from this costly accident.

Conclusion

Obviously a piece of equipment is introduced to fulfil certain purposes, hence we must be certain that:

(a) These purposes have been thoroughly defined.
(b) The equipment selected is correct for the purposes defined.
(c) Preferably, that it will not become rapidly obsolete. At the same time, it is to your credit if the equipment is capable of additional functions.

Equipment standards therefore are predetermined and dictate the acceptability, or otherwise, of what is available on the market. Great care must be taken to set these standards in the first place, as all the quality control under the sun will not compensate for the wrong equipment.

A number of centrifuges have been produced to handle the most demanding applications in laboratory centrifugation especially in the blood component processing and plasmapheresis areas of the modern blood bank. They have been designed to advance the standards of durability, reliability, simplicity of operation and operator safety. The following factors would need to be given careful consideration before purchasing a new centrifuge.

(1) Features: rotor capacity, rotor acceleration and deceleration, low noise of operation and temperature protection.
(2) Reliability: High standards of reliability need to be maintained, especially the circuitry for the refrigeration and speed control.
(3) Convenience and simplicity of operation,
(4) Versatility,
(5) Minimal routine maintenance,
(6) Safety: Safety such as:
    (i) electrical interlock system to prevent rotor from spinning when the chamber door is open and vice versa,
    (ii) rotor imbalance detection,
    (iii) temperature controls,
    (iv) comprehensive operator instruction manual,
    (v) heavy duty inside steel guard to contain rotor and buckets if an accident should occur.

If all the above facts are carefully considered and operators use the machines within their set operational limits, it would then be hoped that every centrifuge run would have a happy ending.

Alpha-1-Antitrypsin: Review

M.A. Lorier, M.Sc.

Department of Clinical Biochemistry, Christchurch Hospital, Christchurch

Historical Perspectives

The ability of plasma to inhibit proteases was first described by Camus and Gley in 1897. Nearly sixty years later, Jacobsson[1] localized the antitrypsin activity at the alpha-1 region on standard serum protein electrophoresis. Eight years later, Schultze et al.[2] isolated the inhibitor and named the protein alpha-1-antitrypsin (α_1AT), after recognizing the functional significance, as a protease inhibitor, of a protein they had first described and named as alpha-1-3-glycoprotein[3]. The inhibitor had also been named and described by others; alpha-1-antiplasmin by Norman and Hill[4], alpha-1-globulin B by Poulik and Smithies[5] and alpha-1-trypsin inhibitor by Bundy and Mehl[6], but its significance as the major protease inhibitor found in plasma was not recognized.

Tha association of genetic α_1AT deficiency with pulmonary emphysema was first reported by Laurell and Eriksson[7]. They noted the absence of the alpha-1 band on agarose gel electrophoresis (Fig. 1) and noted that it was often associated with severe early onset emphysema. Later, in 1969, Sharp et al.[8] noted that α_1AT deficiency was associated with liver cirrhosis in childhood. A large study by Sveger[9] found that approximately 50% of the children with α_1AT deficiency showed some sign of liver disease in the first months of life, and confirmed the association between deficiency of the protein and liver disease.

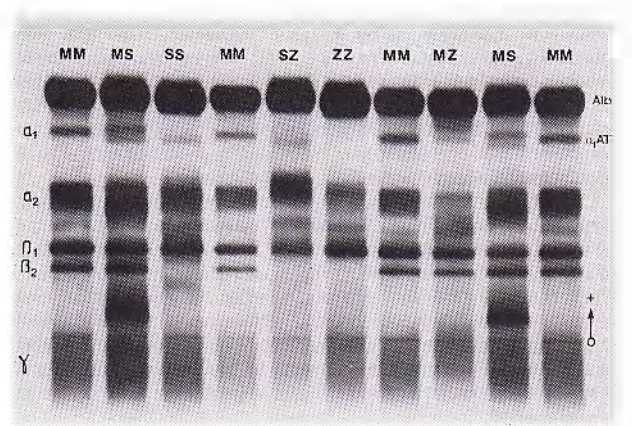


Fig. 1 Serum protein electrophoresis (pH 8.8) on agarose gel showing α_1AT phenotypes. Note the decreased concentration of the slow S band on the PiMS sample and that the PiZZ sample has no visible α_1 band.

Function

Of all the protease inhibitors found in plasma, α_1AT has the highest molar concentration (40-100 μmol/l). It is an acute phase protein. This implies that the inhibitor is a defence protein which has a protective role, increasing in concentration in response to infection or inflammatory conditions[10]. The normal mean concentration of α_1AT (in healthy males) is 1.3 g/l and increases rapidly up to 4 times its normal level when stimulated by inflammation. The α_1AT level will also increase in response to oestrogens[11].

There is considerable evidence to suggest that α_1AT acts as a tissue scavenger for leukocyte elastase. The strongest evidence for this function comes from clinical studies and the specificity of α_1AT. Individuals with a severe inherited deficiency of α_1AT (PiZZ) have circulating levels only 10-15% of normal[12] and are predisposed to severe early onset emphysema, characterized by damage to the elastin tissue of the lung. This is thought to be the result of the inability to restrict elastase which is released by the

phagocytic cells in the normal removal of damaged tissue at an injury site[13]. The specificity of α_1AT for leukocyte elastase is very high. Beatty et al.,[14] studied the association rates of α_1AT for a range of serine proteases and found that α_1AT inactivates leukocyte elastase more rapidly than any other inhibitor found in plasma. This strongly suggests that the most important function of α_1AT is the inhibition of elastase released by the laukocytes. The ability of α_1AT to inhibit pancreatic trypsin and chymotrypsin as well as the serine proteases of the clotting and fibrinolytic system, in vitro, suggests that it may have some function as an inhibitor for these proteases, but the relatively slow half time of association between α_1AT and these proteases indicates that it has very little influence on these proteases in vivo[15].

Complexed α_1AT (α_1AT-protease) is catabolised directly in the reticuloendothelial system. It has been suggested that it may be recycled by passing on the protease to α_2 macroglobulin, which acts as a comprehensive antiprotease[16], but this is unlikely as the dissociation constant between α_1AT and elastase is very low.

Structure

Alpha-1-antitrypsin is a small hydrophilic glycoprotein with an isoelectric point between 4.3-4.8 and consists of a single polypeptide chain of 394 amino acid residues and 3 carbohydrate sidechains, giving a molecular weight of 51 000[17]. The molecule has a single reactive site centred on methionine at position 358, 37 residues from the C terminus[18]. Inhibition of a protease is accomplished by the formation of a 1:1 complex between the α_1AT and the protease (similar to the complex formed between an enzyme and substrate), which blocks the protease.

The position of methionine at the active site of α_1AT is puzzling as methionine is susceptible to oxidation and inactivation. Elastase preferentially cleaves proteins at small hydrophobic residues such as valine or alanine; consequently, the presence of these two residues at the active centre of the inhibitor would give a more specific inhibitor. Also, these two residues would not be as susceptible to oxidation and inactivation as methionine.

The inactivation of α_1AT, however, may provide a self regulatory contribution to the inflammatory process at an inflammatory focus. During inflammation, leukocytes aggregate at the inflammatory site and release bactericidal oxygen free radicals and protaases, including elastase and cathepsin G. These proteases break down adjacent connective tissue to give an area of liquefaction which isolates the foreign body in readiness for ejection. The spread of this liquefaction process, by diffusion of the enzymes, will be constrained by tissue proteinase inhibitors, α_1AT and $\alpha_1$antichymotrypsin. This limits tissue breakdown at the periphery of the inflammation, but allows it to occur at the focus where the α_1AT is itself inactivated by the oxidation of the methionine[17].

Alpha-1-antitrypsin Microheterogeneity

Alpha-1-antitrpysin is a glycoprotein which is synthezised in the liver and secreted into the blood in three forms[19]. These three microheterogeneic forms are the result of variations in three oligosaccharide sidechains linked to asparagine residues at positions 46, 83, and 247 of the α_1AT molecule[20,21]. The oligosaccharide sidechains consist of a core sequence of 5 sugar residues, and an antenna sequence of 3 sugars ending in a charged sialic acid residue (Fig. 2). The number of antennae attached to a core can vary, forming a complex with either two or three antennae[19]. This affects the total charge on the protein and results in a set of stained bands on isoelectric focusing, differing by one charge unit. These different forms are called isoforms (Fig. 3). Isoform I (band 6, the most cathodal of the major bands of α_1AT on isoelectric focusing) contains three biantennary structures. Isoform II (band 4) contains two biantennary structures, together with a tri-antennary structure, while isoform III (band 2) corresponds to a single bi-antennary structure and two tri-antennary structures[19].

In addition to the isoform structure, there are post-secretional modifications. All three isoforms appear to have an N-terminal modification resulting in a loss of two positive charge groups. This could occur if either the terminal 5 or 13 amino acids were cleaved off. The modified protein is visible on isoelectric focusing as bands 8, 7 and 5, and represents about 5-10% of the corresponding major bands 6, 4 and 2 (Isoforms I,II and III) (Fig. 3). The isoforms do not separate on standard serum protein electrophoresis, in barbitone buffer, at pH 8.6.

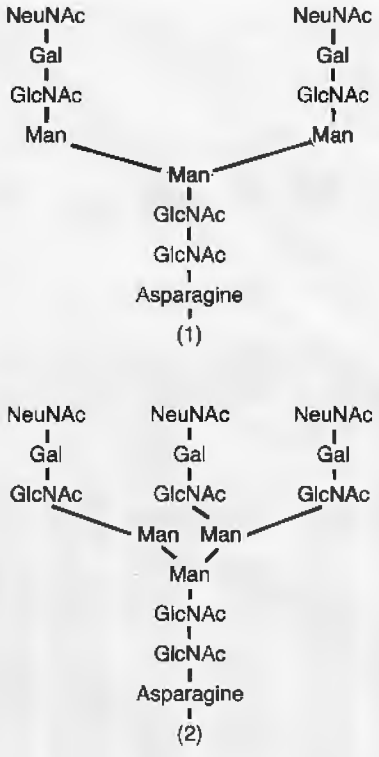


Fig 2. N-linked complex oligosaccharide structures found on α_1AT. (1) Bi-antennary, (2) Tri-antennary. GlcNAc, N-Acetylglucosamine; Man, Mannose; Gal, Galactose; NeuNAc, N-Acetylneuraminic acid (Sialic acid).

Table 1. Frequency and concentration of the major α_1AT deficiency phenotypes[35].

PHENOTYPE	FREQUENCY %	CONC. (% NORMAL)
MM	87.9	100
MS	6.9	80
SS	0.23	60
MZ	3.91	58
SZ	0.31	38
ZZ	0.08	15

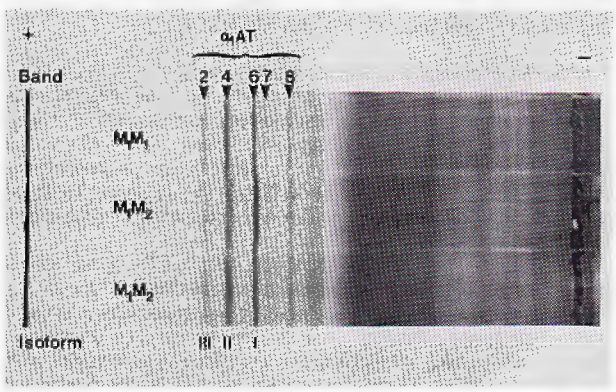


Fig. 3. Isoelectric focused gel (pH 4-5) of PiMM phenotype plasmas.

Alpha-1-antitrypsin Phenotyping

Simple high resolution SPE and isoelectric focusing are the methods of choice for detecting and phenotyping α_1AT variants. The resolution of the SPE must be able to detect the PiMS and

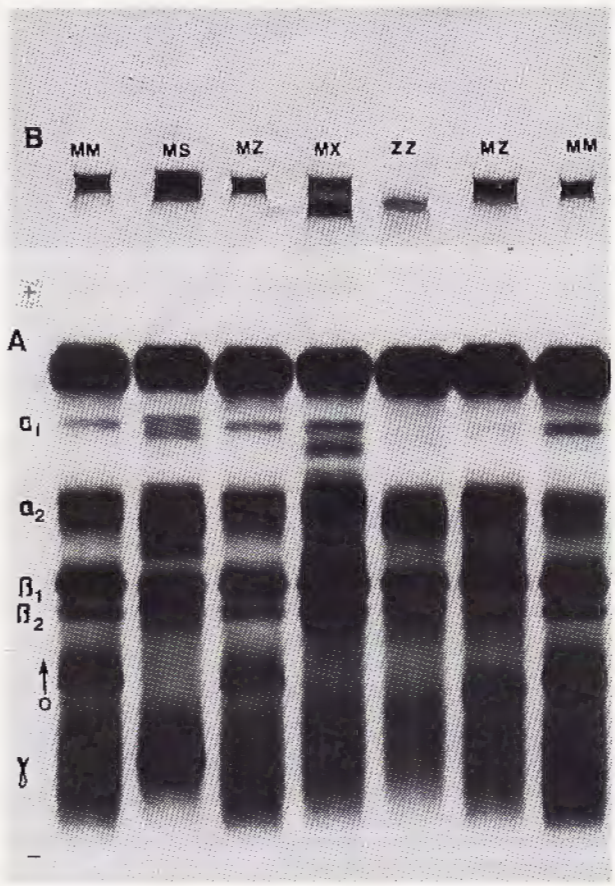


Fig. 4. Protein electrophoresis (pH 8.8) of plasma samples. (A) stained with Coomassie Blue and (B) immunofixed using anti-α_1AT antisera, to demonstrate different Pi phenotypes.

PISS (Fig. 4) variants, as these individuals may be at risk if they smoke or live in an unfavourable environment. Isoelectric focusing differs from most electrophoresis techniques in that separation is achieved with a pH gradient, obtained by using amphoteric 'Ampholines', instead of a simple constant pH buffer system. The advantage of this system is that the proteins are focused or concentrated at their pI position, giving very high resolution. The interpretation of the pattern of bands formed on isoelectric focusing are used to obtain the phenotype (Fig. 5).

The Genetic Variants of Alpha-1-antitrypsin

The genetic polymorphism of α_1AT ws unravelled by the combined efforts of Fagerhol, Gedde-Dahl, and Laurell[22,23]. Using an acid starch gel technique, Fagerhol showed that α_1AT formed a set of 8 'prealbumin' bands, and by studying the pattern formed by these bands, was able to show that α_1AT is coded for in an autosomal co-dominant fashion (i.e. coded for on two independent alleles at a single locus).

The major physiological function of α_1AT is to inhibit granulocyte elastase; its function as an inhibitor of trypsin is relatively unimportant. For this reason it would be correct to call it Alpha-1-protease inhibitor[24], but the International Pi Committee has recommended standardization on Alpha-1-antitrypsin, with the abbreviation α_1AT for the inhibitor and Pi for the system of alleles[25]. As many as forty variants have been recognized[26]. These variants are classified by the Pi system of nomenclature in terms of their mobilities at pH 4.95 by a letter of the alphabet[25]. As a result, on isoelectric focusing, PIA is the most anodal and PiZ is the most cathodal variant. PiMM represents the most common genotype. An additional Pi- with no demonstrable α_1AT in plasma has been described[27]. Two of the variants have been characterized so far, and show a single amino acid substitution. The PiS variant is the result of a point mutation at amino acid residue 264 glutamic acid to valine, and the PiZ the result of a change at residue 342 glutamic acid to lysine[28,29].

The common PiM phenotype can be further subdivided into three subtypes, M_1, M_2 and M_3. All three subtypes produce similar concentrations of inhibitor in plasma[30].

Deficiency Variants

Most of the Pi alleles result in the synthesis of α_1AT concentrations similar to that of the common PiM allele. However, some alleles such as Pi-, PiZ, PiS, PiW, PiMDuarte, and PiP give decreased levels in plasma. The reason for this is not clear. The low level of α_1AT associated with the PiZ variant appears to be due to a failure to secrete α_1AT from the liver, rather than a decrease in synthesis or an increase in catabolism. The characteristic feature of the PiZ allele is the accumulation of the Z protein at the site of synthesis within the liver cell[31]. The PiS allele appears to have a lower synthesis rate[32]. There is no increase in catabolism, nor is there accumulation of α_1AT in the liver cell of the PiS individual[31]. The other deficient variants occur infrequently in the European population.

Clinical Significance

Deficiency of α_1AT is a genetically controlled condition. A number of alleles result in a reduced concentration of inhibitor. The frequency and concentration of the common deficiency phenotypes are shown in table 1. The homozygous PiZZ and heterozygous PiSZ phenotypes, resulting in plasma concentrations of only 15% and 38% of a normal pool, are especially significant because of their relatively high frequencies in the European population, their characteristically low concentrations of α_1AT, and the association of the Z allele with liver cirrhosis[31]. The deficiency of α_1AT is associated with two distinct pathophysiological processes. One process is directly related to the inability of α_1AT to provide adequate protection against released proteases, with resulting damage to susceptible lung tissue. The other involves the accumulation in the liver of abnormal Z α_1AT, resulting in liver cirrhosis.

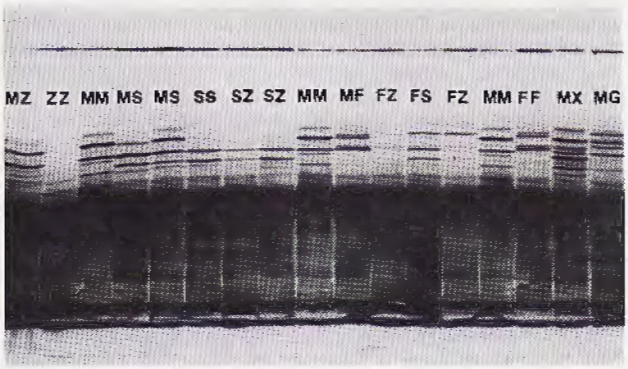


Fig. 5. Isoelectric focused gel (pH 4-5) of serum samples of different phenotypes.

Liver Cirrhosis

Sharp et al.[6] first recognized the association between severe α_1AT deficiency and juvenile cirrhosis. The later demonstrated that the presence of inclusion bodies in the liver cells of PIZ subjects represented an accumulation of α_1AT. The α_1AT accumulates in the rough and smooth endoplasmic reticulum and is found in all carriers of the Z gene, although it is much more pronounced in the homozygote. Approximately 10-20% of PIZZ infants develop neonatal hepatitis, which progresses in a proportion of these fatal juvenile cirrhosis. Although childhood cirrhosis is the most obvious form of liver disease, there is substantial risk of affected adults developing cirrhosis[34].

The reason for the failure in secretion of the Z protein from the liver is not known. One suggestion is that the new Lys-Lys sequence (the result of a point mutation, at residue 342) is misread as a processing signal, stopping the processing of the oligosaccharide structures.

Pulmonary Emphysema.

The lungs are elastic organs which expand and contract with the

movement of the chest. They have a large connective tissue component, consisting mainly of collagen mixed with elastic tissue, which predominates in the alveoli. Damage to the elastic tissue results in permanent distension and destruction of the alveoli and forms the basis of the disease known as emphysema.

Phagocytic cells, particularly granulocytes present in the lungs release collagenase and elastase. While these cells are present in small numbers in normal lungs, they accumulate rapidly at sites of inflammation in diseased lungs. If there is a deficiency of inhibitor, the release of proteases can overwhelm the local defence mechanisms and cause destruction of the elastic tissue, resulting in pulmonary emphysema[33]

The methionine at the active site of α_1AT has the disadvantage of being prone to oxidation and, consequently, α_1AT is readily inactivated by oxidizing agents such as oxygen free radicals released by phagocytes and also by cigarette smoke.

The effect of cigarette smoking is three-fold. Smoking causes an increase in the number of neutrophils present in the lungs[13] and these neutrophils, when stimulated by smoke, release oxidants which can inactivate the α_1AT. The smoke condensate is also thought to contain oxidants that oxidize the methionine at the active site of α_1AT, further reducing the protective effect of α_1AT[33].

The severity of the emphysema is related to the loss of active inhibitor. Non-smokers with PiMZ, PiMS, or PiSS phenotypes are usually unaffected by the partial loss of α_1AT. However, if individuals with these phenotypes smoke or live in a dusty environment, early onset emphysema may result[17].

The early onset pulmonary emphysema caused by α_1AT deficiency is only one of a number of causes of emphysema. It is significant, however, because if the deficiency is detected and precautions are taken not to abuse the lungs by smoking, the onset of emphysema can be delayed. This is evident from a comprehensive study done by Larsson[34], who studied the life expectancy of 246 PiZ individuals from the age of 20 years. He found that the median age of onset of dyspnoea in the PiZZ individuals was 40 years for smokers compared with 53 years for non-smokers, and that PiZZ individuals who smoked had a significantly lower life expectancy than PiZZ non-smokers.

Conclusion

The medical significance of α_1AT is emphasized by the occurrence of an inherited deficiency disease which predisposes affected individuals to liver cirrhosis in childhood and/or early onset emphysema in adulthood. The pathogenesis of the latter has been shown to be due to the lack of adequate inhibitor to elastase, an enzyme secreted by activated neutrophils. The added abuse of cigarette smoking which activates neutrophils to secrete more elastase, and oxidizes α_1AT, the inhibitor, increases the severity of the emphysema.

From the phenotype frequencies given in table 1., it can be shown that there are an estimated 2 400 homozygous PiZZ and 10 000 heterozygous PiSZ individuals in New Zealand Clearly, every effort should be made to detect these individuals, because of the serious risk they incur by smoking.

References

1. Jacobsson, K. Studies on the trypsin and plasmin inhibitors in human blood serum. *Scand. J. clin. Lab. Invest.* 1955; **29 (suppl. 14):** 55-102.
2. Schultze, H.E., Heide, K., & Haupt, H. α_1-Antitrypsin aus humanserum. *Klin Wochschr.* 1962; **40:** 427-429
3. Schutlze, H., Golliner, I., Heide, K., Schonenberger, M., & Schwick, G. Zur kenntnis der α-globuline des menschlichen Normalsenims. *Z. Naturforschung.* 1955; **106:** 463-473.
4. Norman, P.S., & Hill, B.M. Studies of the Plasmin System. *J. Exp. Med.* 1958; **108:** 639-649.
5. Poulik, M D., & Smithies, O Comparison and Combination of the Starch Gel and Filter-paper Electrophoretic Methods Applied to Human Sera. *Biochem J* 1958; **68:** 636-643.
6. Bundy, H.. & Mehl, J. Trypsin inhibitors of human serum. *J. Biol. Chem.* 1959; **234:** 1124-1128.
7. Laurell, C.-B., & Ericksson, S. The electrophoretic $\alpha_1$globulin pattern of serum in $\alpha_1$antitrypsin deficiency. *Scand. J. clin. Lab. Invest.* 1963; **15:** 132-140.
8. Sharp, H., Bridges, R., Krivit, W.. & Freier, E. Cirrhosis associated with $\alpha_1$antitrypsin deficiency: a previously unrecognized inherited disorder. *J. Lab. Clin. Med.* 1969; **73:** 934-939.
9. Sveger, T. Liver disease in $\alpha_1$antitrypsin deficiency detected by screening 200 000 infants. *N. Eng. J. Med.* 1976; **294:** 1316.
10. Ganrot, K. The plasma protein patterns in acute infectious disease. *Scand. J. clin. Lab. Invest.* 1974; **34:** 175-81.
11. Ganrot, P. Variations of the concentration of some plasma proteins in normal adults, in pregnant women and in newborns. *Scand. J. clin. Lab. Invest.* 1972; **29 (suppl. 124):** 73-83.
12. Fagerhol, M.K. The genetics of $\alpha_1$antitrypsin and its implications. *Postgrad. Med. J.* 1976; **52 (suppl. 2):** 73-83.
13. Gadek, J.G., Fells, G. A., & Crystal, R.A. Cigarette smoking induces functional antiprotease deficiency in lower respiratory tract of humans. *Science.* 1979; **206:** 1315-1316.
14. Beatty, K., Bieth, J., & Travis, J. Kinetics of association of serine proteinases with native end oxidized $\alpha_1$proteinase inhibitor and $\alpha_1$antichymotrypsin. *J. Biol. Chem.* 1980; **255:** 3931-3934.
15. Travis, J., & Salvensen. J. Human Plasma Proteinase Inhibitors. *Ann. Rev. Biochem.* 1983; **52:** 655-709.
16. Ohlsson, K., & Laurell, C.-B. The disappearance of enzyme-inhibitor complexes from the circulation of man. *Clin. Sci. Mol. Med.* 1976; **51:** 87-92.
17. Carrell, R., Jeppsson, J-O., Laurell, C-B., Brennan, S., Owen, M., Vaughan, L., & Boswell, D. Structure and variation of human $\alpha_1$antitrypsin. *Nature.* 1982; **298:** 329-334.
18. Boswell, D., Owen, M., Brennan, S., Carrell, R., & MacLachlan, A. Protides of the Biological Fluids:. *Brussells 27th Colloqu.* 1980; **28:** 129-132.
19. Lorier, M.A. Alpha-1-antitrypsin Isoforms in Health and Stress. MSc Thesis. University of Otago. 1983.
20. Carrell R.W., Jeppsson, J-O., Vaughan, L., Brennan, S., Owen, M., & Boswell, D. Human $\alpha_1$antitrypsin: carbohydrate attachment and sequence homology. *FEBS Lett.* 1981; **135:** 301-303.
21. Vaughan, L., Lorier, M., & Carrell, R. α_1Antitrypsin microheterogeneity: Isolation and physical significance of isoforms., *Biochim. Biophys. Acta.* 1982; **701:** 339-345.
22. Fagerhol, M.K., & Gedde-Dahl, T.Jr. Genetics of the Pi serum types. Family studies of the inherited variants of serum $\alpha_1$antitrypsin. *Hum. Hered.* 1969; **19:** 354-359.
23. Fagerhol, M.K., & Laurell, C.-B. The polymorphism of prealbumins and $\alpha_1$antitrypsin in human sera. *Clin. Chim Acta.* 1969; **16:** 199-203.
24. Mega, T., Lujan, E., & Yoshida, A. Studies on the oligosaccharide chains of human $\alpha_1$protease inhibitor. I. Isolation of glycopeptides. *J Biol. Chem.* 1980; **225:** 4057-4061.
25. Cox, D., Johnson, M., & Fagerhol, M. Report on nomenclature meeting for $\alpha_1$antitrypsin. *Hum. Genet.* 1980; **53:** 429-433.
26. Jeppsson, J.-O. & Boel, F Typing of genetic variants of $\alpha_1$antitrypsin by electrofucusing. *Clin. Chem.* 1982; **28/1:** 219-225.
27. Talamo, R., Langley, C.E., Reed, C.E., & Makino, S. Alpha-1-antitrypsin deficiency: A variant with no detectable $\alpha_1$antitrypsin. *Science.* 1973; **181:**70-71.
28. Owen, M., Carrell, R., & Brennan, S. The abnormality of the S variant of human $\alpha_1$antitrypsin. *Biochim. Biophys Acta.* 1976; **453:** 275-261.
29. Jeppsson, J.-O. Amino acid substitution Gly-Lys in $\alpha_1$antitrypsin PiZ. *FEBS Lett.* 1976; **65:** 195-197.
30. Frants, R.R., & Eriksson, A.W. $\alpha_1$antitrypsin: Common subtypes of Pi M *Hum. Genet.* 1976; **26:** 435.
31. Eriksson, S., & Larsson, C. Purification and partial characterization of PAS positive bodies from the liver in $\alpha_1$antitrypsin deficiency. *N. Engl. J. Med.* 1975; **292:** 176-180.
32. Carrell, R., & Owen, M. α_1Antitrypsin. structure variation and disease. *Essays Med. Biochem.* 1979; **4:** 83-119.
33. Janoff, A. Human Neutrophil Elastase and the Protease Pathogenesis Model of Pulmonary Emphysema. Molecular Basis of Biological Degradative Process. Academic Press, N.Y. 1978; 225-259.
34. Larsson, C. Natural history and life expectancy in severe alpha-1- antitrypsin deficiency. *Acta Med. Scand.* 1978; **204:** 345.

35. Janus, E., Joyce, P., Sheat, J., & Carrell, R. Alpha-1-Antitrypsin variants in New Zealand. *NZ Med. J.* 1975; **82**:289-291.

Culture Proven Legionella Pneumophila Pneumonia

Janice Garner and Susan Parry M.B., Ch.B.

Department of Microbiology, Auckland Hospital

Abstract

Legionella pneumophila is now firmly established as a major cause of pneumonia both nosocomial and community acquired[1]. Until recently diagnosis was usually retrospective and dependent on demonstration of specific antibody. We report here what we believe is the first isolation in New Zealand of *L. pneumophila* from clinical material. With the availability of selective culture media, routine isolation of *L. pneumophila* from sputum is now a reality.

Introduction

It is recognised that Legionnaires' disease occurs world-wide and there have been several well documented, immunologically proven cases reported in New Zealand[2,3,4]. *L. pneumophila* is a hardy bacterium, widespread in the environment and can be cultured from many potable water sources. Despite this it has proved fastidious and slow-growing when cultured in the laboratory.

Since 1977 the original charcoal yeast extract agar (CYE)[5] first described for *L. pneumophila* has been improved[6] and made semi-selective[7], allowing isolation of the organism from contaminated respiratory secretions. We report a case of *L. pneumophila* pneumonia in which the organism was grown from sputum and detail laboratory methods and materials.

Case History

Mr M., a previously wall 69 year old man, presented with a three week history of lethargy, night sweats, shortness of breath on exertion, diarrhoea and abdominal pain. He had a moderately heavy alcohol intaka and had been a heevy smoker.

At edmission he was in no distress. He had a temperture of 39.0°C and a respiratory rate of 25/minute. He had oral candidiasis and chest auscultation reveeled late inspiratory crepitations. The chest X-ray showed a widespread interstitial and alveolar pattern.

Results on Admission

The white blood count was 10.3 x 10^9/l with 9.27 x 10^9/l segmented neutrophils. The ESR was 89mm/hr. The erterial blood gases while breathing air were PO_2 55mm Hg and PCO_2 25mm Hg. The serum albumin was 29 g/l, serum alkaline phosphatase 210 I.U./l, serum gamma glutamyl trensferase 165 I.U./l and serum aspartate amino transferase 45 I.U./l. The serum bilirubin was normal. The serum sodium was 134 mmol/l with normal serum urea and creatinine. Blood and urine cultures were negative. Mycoplasma titres were <1:16. He had little sputum and an adequate specimen was not obtained until the third day of admission. This showed 1+ pus cells, and routine culture grew commensal flora and a heavy growth of *Candida albicans.* Legionella culture was also requested, and *L. pneumophila* isolated.

He was treated with oxygen by mask, oral erythromycin and intravenous cloxacillin. His clinical condition improved rapidly.

Microbiological Methods

These are as described in Legionnaires' Disease Laboratory Manual[8]. Working in a biohazard cabinet, sputum was teased out with two applicator sticks and areas most likely to be actual sputum (bloody or milky in appearance) were chosen, and diluted 1 in 10 in trypticase soy broth. Sterile glass beads were added and the mixture vortexed until homogenous. Plates were inoculated as follows:

Blood agar plate (BAP)	1 drop (0.3ml)
McConkey agar (MAC)	1 drop (0.3ml)
Buffered charcoal yeast extract + ∝ ketoglutarate (BCYE ∝)	3 drops (0.1ml)
BCYE ∝ + cefamandole, polymyxin, anisomycin (BMPA ∝)	3 drops (0.1ml)

BCYE ∝, BMPA ∝ and MAC plates were incubated in humidified air at 35°C. Plates were examined daily under a dissecting microscope and a careful note made of each colony type as it appeared. *L. pneumophila* takes on average 3 to 5 days to grow on culture media. New colonies appearing at this time are easily noticed if an accurate record has been kept.

Table I

Gram stain	Filamentous gram negetive becillus
BAP	No growth 5 days
BCYE ∝ minus L-cysteine	No growth 5 days
Oxidase	Positive
Cetelese	Positive
Gelatinase	Positive
T-BYE	Green fluorescence Brown soluble pigment
*D.F.A. *L. pneumophila* Serogroup I	positive

*Performed by N.H.I., Wellington.

Results

After overnight incubation all plates except BMPA ∝ showed a heavy growth of *Candida albicans.*

The BMPA ∝ showed no growth until dey 3 of incubation. Representatives of all colony types were picked to BAP and BCYE ∝ and any that grew on both media disregarded. The *L. pneumophila* colony appeared at Day 4, end was intensely blue with a ground glass appearance. After 72 hours this isolate grew well on BCYE ∝ but not BAP and Gram stain showed a filamentous Gram negative bacillus. These results are consistent with presumptive *L. pneumophila.* Table I shows confirmatory tests.

The identity was confirmed as *L.pneumophila* serogroup I by

N.H.I., Wellington and Wadsworth Legionnaires' Disease Laboratory, Los Angeles, U.S.A.

No acute phase serum was taken but sample taken 6 weeks later gave an indirect immunofluorescent antibody titre of 1:128.

Discussion

Until recently, cultura for *L. pneumophila* was limited to normally sterile or only marginally contaminated specimens, e.g. lung biopsy, pleural fluid, trans-tracheal aspirates. These were often not available and diagnosis rested on demonstration of sero-conversion (a 4-fold rise in antibody ≥ 1:512) or demonstration of the organism in tissue by direct immunofluorescence (DFA) or other special staining techniques. Diagnosis of infectious disease by serological tests is seldom ideal. 4% of a healthy New Zealand population has an antibody level to *L. pneumophila* of ≥ 1:128[9] and reports for other healthy populations are as high as 30%[8]. Patients infected by *L. pneumophila* show a slow sero-conversion. In one study[10] 18% of patients sero-converted by 2 weeks, 64% by 3 weeks, 82% by 4 weeks and 100% by 6 weeks. Serum samples taken during the acute phase of the illness may be normal and it is often difficult to obtain a paired sample 3 or 4 weeks later.

The development of a semi-selective media enabling isolation of *L. pneumophila* from contaminated respiratory specimens is a major advance in the laboratory diagnosis of Legionnaires' disease. Sputum is a very good sample for culture and is preferable to bronchial washings which may be contaminated with local anaesthetics or normal saline both of which are inhibitory to *Legionella*[8]. Sputum collection is non-invasive and this is an important advantage over methods such as open lung biopsy and transtracheal aspiration, both of which yield excellent material of culture.

The patient reported here had oral candidiasis and the sputum was heavily contaminated with *C. albicans.* The yeast was completely inhibited by anisomycin in the BMPA ∝ plate. Nevertheless, this media does not suppress all organisms likely to be colonisers of the oropharynx.[7]

There is little known about the true spectrum of Legionella pneumonia.[11] In one hospital[12] *L. pneumophila* was the commonest cause of pneumonia attributable to a single organism (22.5%) and accounted for 29% of all nosocomial pneumonias. In another hospital[13] where Legionnaires' disease had never been documented, *L. pneumophila* accounted for 9.5% of all pneumonias during a three month study period when optimal laboratory diagnostic tests were employed.

Early descriptions of Legionnaires' disease suggested a typical clinical picture[10] but a recent prospective case control pneumonia study by Ye et al[12] found that Legionnaires' disease could not easily be distinguished from pneumonia of any other etiology on clinical grounds. However of the laboratory parameters, hyponatremia occurred significantly more frequently in Legionnaires' disease.

Culture of sputum for *L. pneumophila* should now be considered a routine part of the diagnosis of Legionnaires' disease. The organism has never been cultured from respiratory specimens in the absence of disease.[13] Culture media is commercially available, sputum is relatively easily obtained and remains positive for at least 4 days after the commencement of specific antimicrobial therapy.

Until Legionnaires' disease is considered in the diagnosis of all pneumonias and until optimum laboratory tests are employed, it is not possible to judge how widespread the disease is in New Zealand.

Acknowledgements

The authors wish to thank N.H.I., Wellington and Legionnaires' Disease Laboratory, Division V.A. Medical Centre, Los Angeles for confirming the identity of the isolate.

References

1. Editorial. The Lancet 1983. January 15th.
2. Holst PE, Bilous AM, Frater WJ, Metcalfe RV, Bettelheim KA. Legionnaires' disease in Wellington. *NZ Med J* 1980; **91**: 339-42.
3. McDonald KS, Faoagali JL, Tait GBW, Moller PW. Legionnaires' disease in a patient with polymyositis. *NZ Med J* 1980; **91**: 451-2.
4. Wallace M, and MacDonald D. Legionnaires' disease: report of a sporadic case. *NZ Med J* 1980; **91**: 453-4.
5. Feeley JC, Gibson RJ, Gorman GW et al. Charcoal-Yeast Extract Agar: Primary isolation medium for *Legionella pneumophila*. *J Clin Microbiol* 1979; **10**; 437-441.
6. Pasculle AW, Feeley JC, Gibson RJ et al. Pittsburg Pneumonia Agent: Direct isolation from human lung tissue. *J Infect Dis* 1980; **141**: 727-732.
7. Edelstein PH. Improved semiselective medium for isolation of *Legionella pneumophila* from contaminated clinical and environmental specimens. *J Clin Microbiol* 1981; **14**: 298-303.
8. Edelstein PH. Legionnaires Disease Laboratory Manual 1983.
9. Bettelheim KA, Metcalfe RV and Sillars H. Levels of antibody against *Legionella pneumophila* serotype 1 in healthy populations in five areas in New Zealand. *J Clin Microbiol* 1982; **16**: 555-557.
10. Kirby BD, Snyder KM, Meyer RD, Finegold SM. Legionnaires' Disease. *Ann Intern Med* 1978; **89**: 297-309.
11. Editorial *JAMA* 1983; **249**: 3214-15.
12. Yu VL, Kroboth FJ, Shonnard J, Brown A, McDearman S, Magnussen M. Legionnaires' Disease: new clinical perspective from a prospective pneumonia study. *Am J Med* 1982; **73**: 357-61.
13. Muder RR, Yu VL, McClure JK, Kroboth FJ, Kominos SD, Lumish RM. Nosocomial Legionnaires' Disease uncovered in a prospective pneumonia study. *JAMA* 1983; **249**; 3184-3188.

TECHNICAL COMMUNICATION

The Detection of Cryptosporidium Oocysts in Faecal Samples

M.J. Carter, ANZIMLT

Microbiology Department, Taranaki Base Hospital, New Plymouth

Introduction

The coccidial protozoan parasite *Cryptosporidium* belongs to the phylum Apicomplexa, order Eucoccidiorida, suborder Eimeriorina. Other members of this suborder include *Toxoplasma* and *Isospora*. The parasite was first discovered in mice by Tyzzer in 1907[1], and subsequently was shown to cause enteritis in a wide variety of mammals, reptiles and birds. Human infections were first reported in 1976[2,3], with a further twelve cases reported during the next five years. *Cryptosporidium* was thus thought to be a rare cause of infection in humans. With the emergence of the acquired immune deficiency syndrome (AIDS) this situation has rapidly changed, and the organism has now been shown to be a significant cause of gastro-intestinal disease in both immunocompetent and immunodeficient individuals[4-6]. Infection is acquired by the ingestion of the oocyst.

In February 1984, a New Zealander, diagnosed in Australia as having AIDS complicated by *Cryptosporidium* infection, was transferred from St Vincent's Hospital, Sydney to Taranaki Base Hospital, New Plymouth. His gastrointestinal systems were unaltered since initial diagnosis, and on admission to this hospital he had pale watery diarrhoea with up to 10 bowel actions per day. Work was therefore carried out in this laboratory to confirm the continuing presence of *Cryptosporidium* oocysts in his faecal samples, and to evaluate some of the methods used to detect this parasite.

Methods

A large number of methods are available for the laboratory detection of *Cryptosporidium* oocysts in faecel samples, including direct microscopy of unstained faeces, and methods using staining procedures such as Iodine, Giemsa, Safranin, fluorescent dyes and variations of the acid-fast technique. Many of the reported techniques have not given consistent results in the hands of other investigators[7,8], and it is possible for a laboratory, using an already reported technique, not to detect the parasite in specimens from patients infected with *Cryptosporidium*.

The following methods were attempted: Iodine wet mount, Sheather's sugar flotation, Ziehl-Neelsen acid-fast (cold), Modified acid-fast (Hot), Safranin (Hot), Methylene blue (Hot)[4,5,7,8]. Although *Cryptosporidium* oocysts were demonstrated using all the above techniques, the cold acid-fast stain proposed by Ma & Soave[5], but modified by the use of Ziehl-Neelsen carbol fuschin, was found to give the most consistent, reliable and superior results with all faecal samples from the patient. The cold acid-fast stain has the advantages, over the hot method, of being more rapid, technically less demanding, and gave clear cut staining reactions. Excellent differentiation of the oocysts from other faecal material and yeasts were achieved. The *Cryptosporidia* are 4-6 μm in diameter, and typically have a thick outer wall and variable internal structures including an eccentric dot (Fig 1). However, it is important to note that the staining intensity of the oocysts may vary from deep red to a very pale pink. The slide preparation used was that described by Garcia et al[7].

Recommended Method

SLIDE PREPARATION

1. Soon after passage of faeces mix approximately 2g with 6ml 5% buffered formalin in a screw capped container.
2. Place formalin treated sample in a plastic centrifuge tube with lid and centrifuge at 300 x g for 2 minutes.
3. Remove and discard supernatant and to the sediment add 20 drops 10% KOH.
4. Place capped tube inside a plastic bag and vortex until the sediment is homogeneous.
5. Add 4-5ml 5% buffered formalin.
6. Mix tube and spin at 300 x g for 2 minutes.

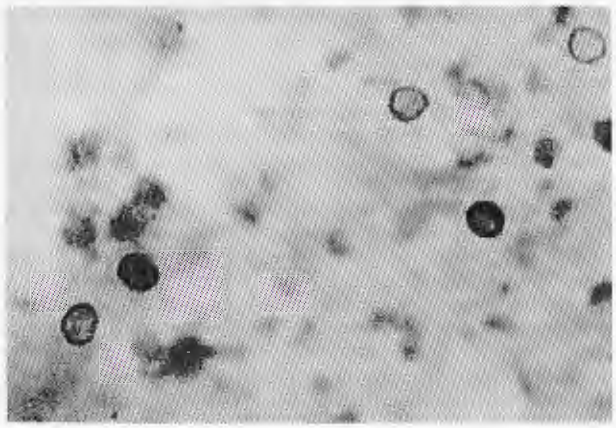


Fig 1: *Cryptosporidium* oocysts in faecal sample. Modified acid-fast stain (x 400).

7. Carefully remove most of the supernatant.
8. Using a disposable Pasteur pipette spread (thin layer) a small portion of the upper layer of sedimented material on microscope slide.
9. Dry on slide warmer for 10 minutes.

STAINING

1. Fix smear in methanol for 1 minute.
2. Dry slide in air.
3. Flood slide with ZN carbol-fuchsin. Stain 1 minute without heating.
4. Rinse slide with tap water.
5. Decolourize with 10% sulphuric acid (until no additional red colour rinses off). This usually takes approximately 5-20 seconds.
6. Rinse slide with tap water.
7. Counterstain with either light green (2% light green in 2% acetic acid) for 20 seconds or Loeffler's methylene blue for 1 minute.
8. Wash with tap water and air dry.

Acknowledgement

I would like to thank Dr Ira G.T. Hettiaratchy for her advice in the preparation of this paper.

Addendum

Since the preparation of this paper a further 4 patients with *Cryptosporidium* enteritis have been detected by this laboratory using the described concentration and staining method on faecal samples. There was no difficulty in making the diagnoses and excellent staining reactions were achieved in each case, thus demonstrating the value of the technique.

References

1. Tyzzer, E.E. A sporozoan found in the peptic glands of the common mouse. *Proc Soc Exp Biol Med* 1907; **5:** 12-13.
2. Nime, E.A., Burek, J.D., Page, D.L. et al. Acute enterocolitis in a human being infected with the protozoan *Cryptosporidium*. *Gastroenterology* 1976; **70:** 592-98.
3. Meisel, J.L., Perera,. D.R., Meligro, C., Rubin, C.E. Overwhelming watery diarrhoea associated with a *Cryptosporidium* in an immunosuppressed patient.

Gastroenterology 1976; **70:** 1156-60.
4. Current, W.L., Reese, N.C., Ernst, J.V., et al. Human cryptosporidiosis in immunocompetent and immunodeficient persons. *N Engl J Med* 1983; **308:** 1252-57.
5. Ma, P., Soave, R. Three step stool examination for cryptosporidiosis in ten homosexual men with protracted watery diarrhoea. *J Infect Dis* 1983; **147:** 824-28.
6. Jokipii, L., Pohjola, S., Jokipii, A.M.M. *Cryptosporidium:* a frequent finding in patients with gastrointestinal symptoms. *Lancet* 1983; ii: 358-61.
7. Garcia, L.S., Bruckner, D.A., Brewer, T.C., Shimizee, R.N., Techniques for the recovery and identification of *Cryptosporidium* oocysts from stool specimens. *J Clin Microbiol* 1983; **18:** 185-90.
8. Baxby, D., Blundell, N. Sensitive, rapid, simple methods for detecting *Cryptosporidium* in faeces. *Lancet* 1983; ii; 1149.

CONTINUING EDUCATION

A Voice from the Wilderness

Mary Sorenson

National Womens Hospital, Auckland.

In 1902 Gustav Mann, one of the developers of biological stains and dyes, wrote — "It is not sufficient to content ourselves with using acid and basic dyes and speculating on the basic and acid nature of the tissues, or to apply colour radicals with oxidizing and reducing properties; but we must endeavour to find staining reactions which will indicate not only the presence of certain elements such as iron, or phosphorus but the presence of organic complexes such as the carbohydrate group, the nucleins, protamins and others." I wonder if he envisaged it ever being possible to demonstrate the things we can today by means of the immunoperoxidase staining techniques available to Histotechnologists. With the advent of these new antigen-antibody techniques it becomes more important for the person involved in their performance to have broader based skills than those applied to Histology only.

In the late 1950's Histology was removed from the Technologists' Syllabus and was considered unnecessary for attaining the Certificate of Proficiency in Medical Laboratory Technology. Although at this stage most students were still exposed to some of the techniques during the course of their training, Histology quickly became one of the "minor" disciplines. Departments came to be staffed by anyone who could, or would, do the job. Technical assistants became the normal means of achieving the routine work and they do an excellent job. However, the Pathologist who relies on his technical staff to produce quality work may find when faced with a problem with his Perioxidase — anti Peroxidase staining that his assistant may not have recourse to the solution without the basic knowledge gleaned in the Technologist course on antigen-antibody reactions.

To those who study the examination figures published each year it would appear we train a number of people to a stage where they can pass a Certificate or even Specialist level examination. However, too often these people are using Histology as an "easy" means to a final certificate examination for Registration or are forced into it post C.O.P. because unless they undertake Histology there will be no Staff Technologist position for them. The situation will be appreciated by those who have advertised recently within New Zealand for Technologists in Histology and had no applicants for, often graded, positions. Several recent or pending appointments of staff from England and Ireland show that senior staff is required throughout the country.

So, in speaking of Continuing Education in relation to Histology maybe we should be talking just "Education" as a whole. The exercise of employing as assistants those who have the educational prerequisites to attain N.Z.C.S. in chemistry or biology and then go on to limited registration is a means of partly allaying the situation. However, the overall basics of Medical Laboratory Technology are still lost to these people. As modern techniques become more widespread there appears to me to be more application of the principles learnt in other departments.

The solution lies with finding some means of attracting trainees to continue their post N.Z.C.S. education in Histology as well as the "major" disciplines and to assure them that Histology has as good, if not better, prospects for promotion.

While researchers are finding more and more means of taking the human factor away from biochemical and other tests they have not yet designed a processing machine that will change it's own solutions, an embedding machine to orientate tissue in paraffin, or other media, or a microtome that can tell when it has cut an adequate section. To those who feel that Histology has stagnated over the years the obvious answer from the "old hands" is that Histologists did it right in the first place and therefore didn't require changes.

For those who have never been exposed to even the most elementary Histology, here is a very superficial look at the workings of the department. Tissues from patients are firstly fixed, normally in formalin. Fixing in the Histological sense means preservation not making better, ready to be replaced, as a new office staff person in this lab was heard to enquire. The pathologist then selects representative material for processing (dehydration in alcohols, cleaning in xylene and impregnation by paraffin wax is the normal procedure) after which the tissue is embedded in paraffin blocks and sections cut in a microtome. Wax is then removed, sections stained (routinely Haematoxylin and Eosin but with ever increasing numbers of specialist stains) and mounted in a permanent media ready for the Pathologist's diagnosis. To those involved already in Histology apologies for the over-simplification of our vocation.

Changes, albeit slow, are taking place in the Histology world and those of us involved in high quality patient care must be adequately prepared to change as well. To this end I trust this will be a start to those involved in Histology coming forward with suggestions and articles for this column and win back for their discipline the respect it deserves.

To illustrate this situation I enclose some questions for those of you who are or could become involved in the art to show, hopefully, how diverse Histology can be.

These questions are multiple choice and **caution:** there may be

more than one correct answer. **(Answers are on page 152)**

(1) Which of the following are coloured blue with nile blue sulphate?
   a) Phospholipids
   b) Fatty acids
   c) Glycolipids
   d) Cholesterol
   e) Triglycerides

(2) The granules of eosinophils are
   a) seen in a haematoxylin and eosin stained slide
   b) stained with 1:10,000 eosin
   c) stained metachromatically
   d) contain tryptophan
   e) three to four millimicrons (3-4mm) in diameter

(3) During anaphase
   a) chromosomes migrate to opposite poles of the cell
   b) chromosomes align along the centre plate
   c) the spindle is formed
   d) the cytoplasm divides
   e) chromatin clumping occurs

(4) Which of the following statements are true:
   a) Osteoclasts deposit bone
   b) Acidophils of the pituitary produce growth hormone
   c) Leydig cells produce sperm
   d) B cells of the pancreas produce insulin
   e) Collagen is produced by fibroblasts

(5) Malignant cells may show
   a) increased RNA content
   b) changed nuclear cytoplasmic ratio
   c) loss of cell identity
   d) hypochromasia of the nucleus
   e) prominent nucleoli

(6) Which of the following are Gram positive?
   a) Clostridium welchii
   b) Fibrin
   c) Keratin
   d) Mycobacterium tuberculosis
   e) Amyloid

(7) Which of the cells **must** be present in a true specimen of sputum?
   a) Squamous cells
   b) Columnar cells
   c) Lymphocytes
   d) Carbon-laden histiocytes
   e) Macrophages

(8) Of the following fungal pathogens which may be found in tissue which exhibit both rounded bodies and hyphae?
   a) Aspergillus fumigatus
   b) Candida albicans
   c) Actinomyces bovis
   d) Trichophyton rubrum
   e) Cryptococcus neoformans

(9) Which of the following dyes are metachromatic?
   a) Azure A
   b) Neutral red
   c) Bismark brown
   d) Light green
   e) Methyl blue

(10) Kohler illumination is
   a) when the image of the light source is in the same plane as the specimen
   b) when the image of the iris diaphragm of the condenser is in the same plane as the specimen
   c) when the image of the field iris diaphragm is in the same plane as the specimen
   d) of limited value for photomicrography
   e) the best light source for examining histological sections.

Revision Series in Biochemical Calculations

Section III: pH Calculations Part A — Strong Acids and Bases

Trevor A. Walmsley

Dept. of Clinical Biochemistry, Christchurch Hospital, Christchurch.

The pH Scale

The concentration of hydrogen ion is an important property governing the physicochemical behaviour of a solution. The symbol for hydrogen ion concentration is $[H^+]$. For convenience the hydrogen ion concentration is expressed as pH where:-

$$pH = -\log [H^+] \text{ (or by taking antilogs } [H^+]=10^{-pH})$$

Therefore an increase in pH of 1 unit represents a 10 fold decrease in hydrogen ion concentration and a decrease in pH of 2 units represents a 100 fold increase in hydrogen ion concentration etc.

Hydroxyl ion concentration is expressed as pOH where:-

$$pOH = -\log [OH^-]$$

The relationship between pH and pOH is:-

$$pH + pOH = 14$$

Therefore in a solution of say pH 1.0, pOH *must be* 13.0.

At neutrality the concentration of hydrogen ions and hydroxyl ions is equal, therefore pH = 7 and pOH = 7.

Table of hydrogen ion concentration, pH, pOH and hydroxyl ion concentration.

$[H^+]$	pH	pOH	$[OH^-]$
10^{0} mol/l	0	14	10^{-14} mol/l
10^{-1} mol/l	1	13	10^{-13} mol/l
10^{-2} mol/l	2	12	10^{-12} mol/l
10^{-3} mol/l	3	11	10^{-11} mol/l
10^{-4} mol/l	4	10	10^{-10} mol/l
10^{-5} mol/l	5	9	10^{-9} mol/l
10^{-6} mol/l	6	8	10^{-8} mol/l
10^{-7} mol/l	7	7	10^{-7} mol/l
10^{-8} mol/l	8	6	10^{-6} mol/l

pH of Strong Acids and Bases

Solutions of strong acids are completely dissociated in aqueous solution. For example HCl, HNO_3 and $HClO_4$ are all completely dissociated in aqueous solution and are therefore strong acids.

Weak acids (see Section IV) are only partially dissociated in aqueous solution. For example H_2SO_4, HCN, H_2CO_3, H_2S, H_2SO_3, H_3PO_4 and all organic acids are only partially dissociated in aqueous solution.

On comparing the pH of 0.1 M HCl and 0.1 M H_2SO_4:-

HCl is completely dissociated in aqueous solution:-

$HCl \text{------} > H^+ + Cl^-$

Therefore the concentration of hydrogen ions in solution is 0.1 mol/l and the pH is 1.0.

If complete dissociation of 0.1 M H_2SO_4 would be equal to the pH of 0.2 M/l HCl.

However although the first hydrogen ion completely dissociates in aqueous solution:-

$H_2SO_4 \text{----} > H^+ + HSO_4^-$

The second hydrogen ion only partially dissociates:-

$HSO_4^- \text{-----} > H^+ + SO_4^{--}$

Since the equilibrium of this reaction lies to the left (see Section IV) the pH of 0.1 M H_2SO_4 must be closer to the pH of 0.1 M HCl than 0.2 M HCl (as it would be if complete dissociation occurred).

Examples:-

a) Calculate the pH of 0.05 M HCl

HCl is a strong acid and is completely dissociated in solution:-

$HCl \text{ ----- } > H^+ + Cl^-$

Therefore 0.05 mol/l HCl contains 0.05 mol/l H^+

$pH = -\log [H^+]$

$= -\log (0.05)$ (use your calculator to evaluate)

$= 1.30$ (never express pH to more than 2 decimal places)

b) Calculate the pH of 0.02M NaOH

NaOH is a strong base and is completely dissociated in solution:-

$NaOH \text{ ----- } > Na^+ + OH^-$

Therefore 0.02 mol/l NaOH contains 0.02 mol/l OH^-

$pOH = -\log [OH^-]$

$= -\log (0.02)$

$= pOH$

$pH = 14 - pOH$

$pH = 14 - 1.70$

$= 12.30$

c) Calculate the pH of 0.02 M $Ba(OH)_2$

$Ba(OH)_2$ is a strong base and is completely dissociated in solution:-

$Ba(OH)_2 \text{ ----- } > Ba^{--} + 2\,OH^-$

Therefore 0.02 mol/l $Ba(OH)_2$ conteins 0.04 mol/l OH^-

$pOH = -\log [OH^-]$

$= -\log (0.04)$

$= 1.40$

$pH = 14 - 1.40$

$= 12.6$

d) pH in nanomoles/litre

At physiological pH hydrogen ion concentration is expressed in nanomoles per litre (nmol/l) where 1 nmol = 1×10^{-9} mol.

To calculate the hydrogen ion concentration at pH 7.40

Use your calculator to evaluate:-

$[H^+] = 10^{-7.40}$

$= 3.98 \times 10^{-8}$ mol/l

$= 39.8 \times 10^{-9}$ mol/l

$= 39.8$ nmol/l

e) Calculate the pH of a solution prepared by mixing 10.0 ml of 1.0 M HCl with 20.0 ml 0.2 M NaOH and diluting the mixture to 100 ml.

$$\text{No moles HCl} = \frac{10.0 \times 1.0}{1000} = 0.01 \text{ moles}$$

$$\text{No moles NaOH} = \frac{20.0 \times 0.2}{1000} = 0.004 \text{ moles}$$

Reaction between HCl and NaOH is:-

$HCl + NaOH \text{------} > NaCl + H_2O$

Therefore 0.004 mole NaOH reacts with 0.004 mole HCl to produce 0.004 mole NaCl and 0.004 mole H_2O leaving 0.006 mole HCl in 100 ml.

Concentration HCl = 0.006 mol/100 ml

$$= \frac{0.006 \times 1000 \text{ mol/l}}{100}$$

$= 0.06$ M

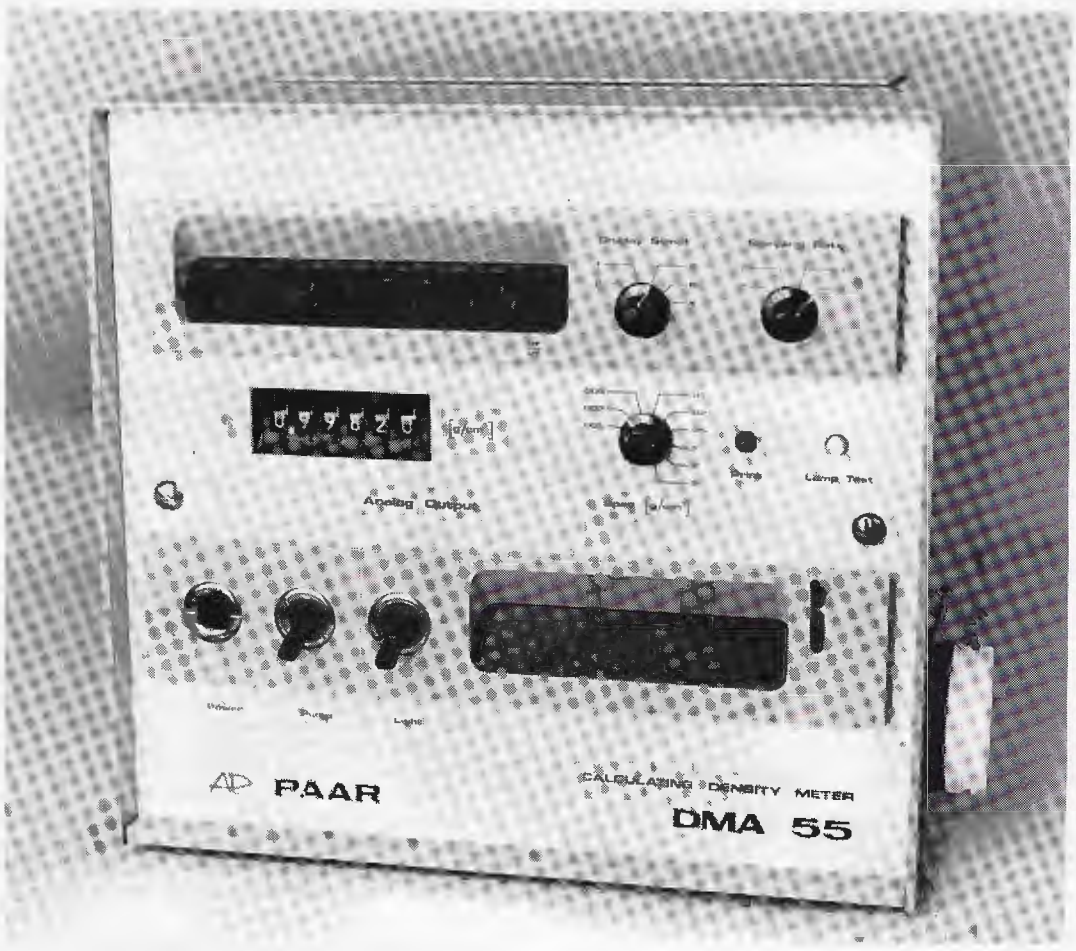
Therefore pH = - log (0.06) = 1.22

Section III — Problems (Answers on Page 152)

1. Calculate the pH of 10^{-3} M HCl.
2. Calculate the pH of 10^{-5} M HCl.
3. Calculate the pH of 10^{-9} M HCl. (? trick question — hint first calculate the hydrogen ion concentration of water at pH 7 before and after the addition of HCl).
4. Calculate the pOH of 10^{-2} M NaOH.
5. Calculate the pH and pOH of 0.025 M NaOH.
6. Calculate the pH and pOH of 1.5 mM HCl.
7. Convert the following hydrogen ion concentrations to pH (note that the hydrogen ion concentration is progressively reduced by 1/10 therefore the pH should correspondingly increase by 1.00).
   a) 210 nmol/l
   b) 21 nmol/l
   c) 2.1 nmol/l
8. Calculate the hydrogen ion and hydroxyl ion concentration in the following solutions, express the answer between 1 and 999 in either mmol/l, μmol/l, nmol/l or pmol/l etc.
   a) 1.50
   b) 4.50 — you should be able to predict this from (a)
   c) 7.25
   d) 8.80
   e) 11.90
9. Convert the blood pH reference range of 7.35 to 7.45 to hydrogen ion concentration in nmol/l.
10. Calculate the pH of a solution whose hydrogen ion concentration is one quarter that of a solution of pH 4.00.
11. Calculate the pH of a solution whose hydroxyl ion concentration is five times that of a solution of pH 8.00.
12. 100ml of 0.1 M HCl is mixed with 50 ml of 0.1 M NaOH, calculate the pH of the final solution.
13. 10 ml of 0.1 M HCl is mixed with 22 ml of 0.1 M NaOH, calculate the pH of the final solution.
14. Calculate the pH of a solution prepared by dissolving 5.0 g NaOH in 500 ml water and diluting with water to 1 litre.
15. Calculate the pH of a solution prepared by dissolving 4.0 g KOH in 500 ml 0.2 M HCl and diluting to 1 litre with water.

DETERMINING DENSITIES OF PHYSIOLOGICAL FLUIDS.

Anton Paar Digital Density Meters are used in Brix, Plato, Balling, API (etc) measurements for the studies of enzymes, proteins, polymerizations and macromolecules.



These Meters provide a fast, accurate means of measuring densities or specific gravities of liquids and gases, as well as concentration of solutions. Highly accurate results are obtained in seconds without the need for skilled technicians. And without time consuming procedures such as pycnometer filling, waiting for temperature equilibrium, weighing. There's no need to determine weight, volume or temperature of samples — thereby eliminating inherent sources of error.

A unique measuring method.
The heart of each Density Meter is a U-shaped, oscillating sample tube. In operation, this tube is completely filled with 0.7 ml of sample substance by injection with a hypodermic syringe, with a pump, with vacuum suction or by continuous flow. The sample tube is electromagnetically excited. Density, specific gravity, or concentration of the sample is determined precisely by the measurement of the period of oscillation of the sample tube. Accuracy is not affected by the liquid's viscosity, volatility and surface tension. As long as the sample is liquid or pasty enough to be injected and withdrawn, it can be measured.
This measuring method is most accurate and its versatility allows the study of many samples which cannot be measured precisely any other way.

WATSON VICTOR LIMITED

P.O. BOX 1180 PHONE: 857-699 WELLINGTON

BRANCHES AT —	AUCKLAND	CHRISTCHURCH	DUNEDIN
	P.O. BOX 1216	P.O. BOX 706	P.O. BOX 921
	PHONE: 593-039	PHONE: 69-282	PHONE: 777-291

circle 80 on the readers reply card

EDITORIAL

E.L.T.

The most serious problem facing our profession today is that of Extra-Laboratory Testing (E.L.T.). It has far reaching ramifications for us. The Institute has to determine what stance to adopt with regard to this problem before making submissions to the Parliamentary Select Committee which will consider the Health Professions Registration Bill. In coming to any decision, the Institute must take into account any effects that decision will have not only on the profession but also, and most importantly, on the patient.

Many will consider E.L.T. to be a problem facing those working in Hospital Laboratories only. This is not the case. There are many doctor's surgeries where nurses perform pregnancy tests and glucoses. How long before more laboratory tests are added to their repertoire? With the advent of dipsticks, filmstrips and other technologies which on the surface seem 'foolproof', this possibility is becoming more and more a probability whilst the Medical and Laboratory supply companies continue their drive to sell this technology to the G.P. Already in many practices, the practice nurse, who is 100% funded by the State, has taken over many of the duties which the G.P. previously performed. Is it not possible then that the practice nurse could also perform an increasing range of laboratory tests?

Amongst some of the proposals put forward so far as solutions to the problem are the supervision and control of E.L.T., the limiting of the number of tests that can be done by E.L.T., and the total banning of E.L.T. except for the traditional ward urine testing. Each has its advantages; each has its disadvantages.

The supervision and control of E.L.T. proposal acknowledges that E.L.T. is going to continue. The main thrust of the proposal is that the Technologist must be given the power to control the training of non-laboratory personnel in the correct practices and techniques, and also make the decision as to what is the most appropriate equipment. It therefore is designed to control the situation not correct it; that is the disadvantage. Most Technologists would prefer spending their time teaching laboratory trainees the correct practices than teaching non-laboratory personnel over whom they ultimately have no control.

The proposal of limitetions being placed on what tests can be done by E.L.T., without any other measures, has the serious weakness of there being no continuing input from the laboratory. There is no control over who does the test, how they do it, where they do it, and on what instrument it is done. It also suffers from the fact that there will be a need for revisions of the approved list from time to time as more tests become suitable for E.L.T. To improve this proposal, it might be necessary to combine it with the first proposal; the combined proposals will still have that same weakness of failing to correct the situation.

The proposal to ban E.L.T. (except the traditional ward urine testing) has an advantage over the other two, that of attempting to correct the situation. A ban on E.L.T. would not prevent suitably motivated patients from performing their own self-monitoring as any individual has the right to do. The ban could be achieved if alterations are made to the list of those that are currently exempt, and medical laboratories and pathology tests are carefully defined. The only people exempted should be medical practitioners who are specialising or practicising in pathology. It seems foolish to have all medical practitioners exempt. Only those who are working in the medical laboratory have any understanding of the pitfalls of laboratory tests, have any knowledge or understanding of quality control, or realise that the figures given out at the end may not necessarily be correct. If you require a plumber you don't call in a pharmacist instead; if you require a dentist you don't go to a cobbler; if you require a brain specialist you don't go to a foot specialist; so if you are a patient requiring laboratory tests, why have them done by a House Surgeon, Registrar or nurse when there are personnel qualified in the required discipline available? Surely, the patient deserves better than that?

It will be necessary to define a medical laboratory such that it is the only place where pathology tests can be carried out (excepting ward urine testing). This would take the 'E' out of E.L.T. and place pathology tests back in their righful place. The main disadvantage is that this proposal will require strict policing if it is to be successful but by so doing, it will give the patients the protection that they

deserve.

Whatever ones feelings are on the subject of E.L.T., it must be remembered that if the laboratory is unable or unwilling to provide the service that is required, some-one else will.

---

re: **National Immunohaematology Proficiency Survey (NIPS)**
Dear Sir,

We wish to teke this opportunity to reply to the letter from John Case published in the NZIMLT Journal August 1984[1].

We willingly accept that having re-examined the report quoted[2], the "suggestion that it be considered that C^w be added to the antigens required" was taken as a recommendation and falsely reported as such in our article.

However, the comments regarding the "poor performance of enzyme techniques"[1] we feel are still valid in spite of Mr Case's comments. The issue being, not whether enzyme techniques are useful or not — (they are a "recommended additional test" by The New Zealand Transfusion Advisory Committee[3]) but that if any technique is used then it must be used properly. The point being that in the summary of results reported[4] a number of laboratories failed to detect an anti-D (serum 082) an anti-c (086) and an anti C^w (090) by a technique that is shown by their peers (other participant laboratories) as being able to detect these antibodies.
Yours sincerely

R.J. Austin
Technologist in Charge Immunohaematology
Taranaki Base Hospital.

A.E. Knight
Technologist in Charge Immunohaematology
Dunedin Public Hospital

References:

1. Case, J., letter to the Editor; *N.Z.J. Med Lab. Tech* 1984; **38**, 104.
2. Garrahy, G., The role of compatability tests; *Transfusion* 1982; **22:** 169-172.
3. Blood Transfusion Procedures in New Zealand Part I 3rd Edition Section 6:8.
4. Austin, R.J., Knight, A.E., National Immunohaematology Proficiency Survey (NIPS): A summary of results; *N.Z.J. Med Lab Tech* 1983; **37,** 117.

re: **Historical Instruments**
Dear Sir,

For nearly nine years members of this Joint Working Party have been collecting, conserving and cataloguing pieces of old, obsolete and sometimes rare medical laboratory equipment in the hope of their being preserved for posterity in permanent store so that they are available for research purposes and display for interested sections of the public.

A large part of the collection has now been accepted by the Curator of the Wellcome Museum of the History of Medicine in the Science Museum, South Kendington, London and it is hoped that the collection will be on display and ready for scientific purposes in early 1985.

Inevitably, duplicates of some items have been collected and these are surplus to the Wellcome Museum's requirements. In view of the difficulties of prolonged storage in unsuitable places and uncertainty of curatorship, the Working Party has decided to offer duplicates to any bona fide collections or museums. If you have such a collection and are interested I would be pleased to hear from you. A list of the apparatus available is available from B.T. Edwards, Haematology Dept, Christchurch Hospital, Christchurch.

It is not intended to make any charge for any instrument or equipment, but in view of the careful nature of the packing of scientific apparatus and the heavy cost of overseas freight charges, the cost of postage and packing would have to be recovered from you.

It may be possible to give an approximate estimate of these costs before despatch of any items. I hope this offer may be of service to you and look forward to hearing from you.
Yours very truly,

Guy C. Pascoe,
Secretary to the Joint Working Party on Historical Instruments, IMLS.

re: **Extra Laboratory Testing**
Dear Sir,

The concern of W. Hodgson and R.S. McKenzie was voiced at the 16th Congress of I.A.M.L.T. There was a special session on the "Extra Laboratory Test" and three papers were given.

In the discussion that followed, several examples of disastrous results produced by inexperienced staff were produced and with the most probable increase of the "Extra Laboratory Test", it was strongly felt that the laboratory should be taking the responsibility of these tests in the following way:-

1. **Training**
   Full training of the technique, safety and instrumentation (my own opinion is that some form of accreditation be given to properly trained operators).
2. **Quality Control**
   The importance of recording of quality control, taught together with some degree of policing.
3. **Reporting**
   It is important that a work book be used to keep records of Q.C. and work records. Hard copy reports should be produced (some results have been jotted down on pieces of paper or even in the lab reports) and placed in patient's notes.

I feel that there is going to be a proliferation of this type of testing and we should, in a united, standardized manner, interest ourselves in the "Extra Laboratory Test".
Yours sincerely,

David Dohrman
Waikato Hospital

re: **Technologist Training Schemes**
Dear Sir,

Concern has been expressed by members at the Annual General Meeting of the Christchurch Branch of the N.Z.I.M.L.T., and subsequently echoed at the N.Z.I.M.L.T. South Island Seminar about impending changes to the Christchurch Technologist Training Scheme.

In compliance with the motion passed by branch members at the Christchurch AGM, I enclose for the purpose of publication in the forum section of the journal a brief summary of the scheme compiled from correspondence with the Administrative Office, Pathology Department, Christchurch Hospital.
Yours faithfully,

M. Mumane
Secretary
Christchurch Branch N.Z.I.M.L.T.

Christchurch Branch N.Z.I.M.L.T. Annual General Meeting 1984

Education was one of the subjects announced for discussion prior to the A.G.M.

Eighteen members were present; thirteen voted for the following motion, three against. There was one abstention.

It was moved that, "This branch inform Council of the proposed changes in the Christchurch Training Scheme and that details be promulgated nationally through the Journal for discussion."

In compliance with this motion, we submit a summary of the proposed scheme compiled from correspondence with the administrative officer, Pathology Department, Christchurch Hospital.

The following proposals have the support of the Laboratory Committee (composed of Charge Technologists) and the Pathology Services Committee (composed of Pathologists).

1. It is proposed to phase out the NZCS trainee option.
2. The NZCS-based scheme is to be replaced by a graduate training scheme. B.Sc. graduates will be employed and trained for three years for limited registration only. The proposal is to employ only graduates in the trainee establishment from 1985 onwards.

3. Over a period of five years the trainee establishment will be reduced from 42 to 17. Trainee positions lost will be replaced by:-
   17.5 Lab Assistants
   2 Staff Technologists
   2 Staff Technologist positions created from existing senior laboratory assistant positions.
4. This means that about six people per year will be qualifying once the new scheme is fully operational, instead of an average of about 8 under the present scheme.
5. By creating the new Staff Technologist positions we are also creating more job opportunities for newly qualified staff.

A discussion paper circulated prior to the adoption of these proposals summarised the "Advantages and Disadvantages" of the above-outlined scheme.

Advantages:

1. The economics of employing NZCS trainees for a period of five years to registration does not compare favourably with employing trainees with a Science Degree for a period of three years training to registration (NZCS trainee five years salary $55,922; B.Sc. graduate trainee three years salary $42,019). This shorter lead time to registration allows for more effective staff planning and management.
2. More permanent qualified staff (trainee lab assistants and qualified technologists) and consequently less trainees, less staff rotation and less input for training.
3. The trainee with a degree entrance qualification has greater maturity and more background to further learning and each degree will be accepted according to the discipline in which the trainee will be working.
4. A Registered Technologist with a Science Degree will be better prepared to develop and integrate new techniques into the routine work.
5. With rapid advances in technology the degree-based Registered Technologist will be better qualified to cope with future technological changes.

Disadvantages:

1. Retention of qualified Registered Staff may be poorer due to their ability to apply for a greater variety of positions.
2. Specialised training only in one discipline would still require some combined general lectures in the first year of training to enable trainees to become familiar with basic information related to the other disciplines.
3. School leavers will not have the opportunity to follow an apprentice-type training to gain a professional qualification. This will be offset to some degree by being able to offer school leavers positions as junior laboratory assistants who will get the opportunity to aim for a QTA.

The other side of the Street:

Dear Sir,

I recently took the opportunity to re-read previous issues of the Institute Journal, from February 1982 through to the most recent August 1984 issue noting, in particular, membership statistics published in each issue and Paul McLeod's Editorial in August 1982.

Like many members of the Insitute, I am concerned at the apparent unwillingness of many eligible laboratory workers, particularly amongst the laboratory assistants group, to join the Institute. From a high of 1578 members in the past three years, we have observed a gradual decline in numbers to 1342 members in May 1984, a fall of 236 members or 15% of the eligible membership in public and private laboratories. The annual report this year outlined Council's efforts to recruit those "wayward souls" and return them to the fold; how successful the campaign will be, only time will tell.

What is clear, however, is that a disproportionately (and unacceptably) high number of laboratory assistants either choose, or are not encouraged, to become members. The Annual Staffing Survey, published in the December 1983 issue, showed that, in April 1983, there were 954 laboratory assistants employed in Medical Laboratories throughout the country. However, only 35% or 334 of these people were members of the Institute (this percentage is based on an approximation as reported in the 1983 Annual Report). Six hundred and twenty potential members who, for one reason or another, choose not to be so. The question is WHY?

As a further, sobering thought, based on these two reports, 41 per cent of the total laboratory workforce eligible for membership choose not to become members. Again, one may ask, why is this?

Psychologists, psychiatrists and others of similar ilk, tell us that there are three ways of viewing ourselves; how we see ourselves, as we would like others to see ourselves, and how others see us. I invite you to read, or re-read, Paul McLeod's editorial from 1982. Although this is a personal view of NZIMLT membership this article, coming from a current council member, is probably a reflection of how Council see the role of the Institute; how we would like others to see ourselves.

But how do others see us? Contrast, if you will the points raised in Paul McLeod's editorial regarding the value of Annual Conference with those of D.R. Romain, in a letter to the Editor in December 1983. "Inadequate chairing of sessions ... beer and leer image ... scarcity of scientific papers ..." Janet Marsland has described us as a "bunch of jellies". Is **this** how others see us?

Examining how others see us, and how we see ourselves, perhaps gives us insight as to why so many of our members, or potential members are leaving, or failing to join the Institute.

A further point raised in D.R. Romain's letter may well get to the crux of the problem. "Do Charge Technologists see conference just as a meeting for themselves, or do they encourage all members to attend ...?" I echo this statement but, additionally, go further and ask, do Technologists see the Institute as an organisation for themselves only, or for all members? No! ... rubbish! ... damn nonsense, I hear you all say. Don't we run the Laboratory Assistant's examination, negotiate their rates of pay and conditions of employment, publish their articles in the Journal etc., etc. Yes we do, but do we represent them, do we encourage them to participate in Institute affairs? Has a laboratory assistant ever been a representative on Council or encouraged to run for Council (and as you technologists dive for the "Rules of the NZIMLT", yes Rule 13 (b) states that "an ordinary, voting member may be nominated for election as an ordinary member of Council") or do we see membership of Council as the exclusive domain of Associates and Fellows? Recently, at the Annual Conference in Dunedin, several remits relating to conditions of employment for Laboratory Assistants were defeated, whilst a remit requesting Council to investigate the possibility of designing a suitable badge for Associates and Fellows was passed. To the two hundred or so Technologists present at that Conference, the democratic process a la NZIMLT was seen to work. To the handful of laboratory assistants who may have been present and, perhaps more importantly, those 620 non-members who were not, the failure of those remits was a further body-blow to a group already believing that the NZIMLT is for technologists. Is this encouragement or discouragement?

Paul McLeod warned of the dangers of a drop in membership to the extent that other self interest groups or unions could make us "good picking". If the current membership defections continue, that day may be not too far away. We must recognise the needs of the laboratory assistants for an equal slice of the cake. We cannot continue to ignore their requests for a defined career structure and improved conditions of employment because "it may mean they get paid more than I do" as one senior technologist was purported to have said.

I conclude with a general warning. If we continue to look upon the Laboratory Assistants as second class members, as "pairs of hands" with no requirement for a career structure, then we shall lose these people from our organisation and, once lost, we will NEVER get them back.

Howard C. Potter, FNZIMLT
Biochemistry Dept, Christchurch Women's Hospital,
Christchurch.

BOOK REVIEW

Volume II of a **Medical Laboratory Manual for Tropical Countries** by Monica Cheesbrough FIMLS has now been published. It contains bacteriology, virology and mycology.

Special features of the new volume include:

Emphasis on the major communicable diseases.

Well illustrated with more than 50 Colour Plates showing

microscopical and cultural features of pathogens that cause:

Campylobacter enteritis — Salmonella and Shigella infections — cholera — amoebic dysentery — meningitis — tuberculosis — leprosy — gonorrhoea — pneumonia — staphylococcal and Group A Steptococcal infections — donovanosis — diphtheria — clostridial infections — anthrax — trachoma — relapsing fever.

Safety in the microbiology laboratory.

Free kit with each manual to make condenser stops to examine specimens by dark-field microscopy, e.g. chancre fluid for spirochaetes.

Subsidized low price to developing countries.

Availability: From Tropical Health Technology, 14 Bevills Close, Doddington, March, UK, PE15 OTT.

Developing country price - £4.90 **(Other countries** - £8.20)
Please add: £1.50 for surface mail postage, i.e. total - £6.40
OR £7.20 airmail i.e. total - £12.10
NOTE: Cost for 2 books surface mail - £12.57, 3 books - £18.51, 4 books - £24.59, 5 books - £30.32.

Payment: By sterling cheque drawn on a UK bank, by international money order or postal order, by Eurocheque made out in sterling, by US dollar cheque drawn on a US bank, or by UNESCO coupons.

Microbiological Methods
C.H. Collins & Patricia M. Lyne

'Microbiological Methods' describes the procedures used in routine medical, public health and food control laboratories. This covers the apparatus, materials, foods, food poisoning and identification of the main groups of micro-organisms.

The author's aims (more clearly stated in earlier editions) are, with two exceptions, fully achieved. Designed as a practical 'in use', 'bench book', supplementary to more academic books, it is aimed at the student working in a routine laboratory and those involved in teaching at the bench.

This book gets top marks for presentation of material. The text is concise, accurate, and clearly arranged with an abundant use of sub-titles, headings, and where appropriate lists, tables, line diagrams and cross-reference to other sections.

A large portion of the book is devoted to laboratory basics; safety, equipment, culture media techniques, staining and identification procedures. These subjects are covered with a safety conscious and often cost conscious overtone. Use of commercial apparatus and media is acknowledged and presented with the same detail as adjacent manual techniques — often presenting the alternatives for large and small workload laboratories.

A significant portion of the book is on bacterial food poisoning, foods of all categories (meat, dairy products, processed foods etc), waters and even contamination of pharmaceutical products, cosmetics and stock feed.

The mycology and bacteriology sections are adequate for the students though for identification of some fungi in particular, other books would be necessary. There is nothing on parasites which this reviewer feels is better left to specialized texts.

The two areas in which I feel this book has failed are Antibiotic Testing and Serology.

Antibiotic Testing is presented with a complete bias to diffusion techniques which are excellently presented in depth. Semi-automated techniques such as replica plating on agar dilutions are not even mentioned as an alternative. At least under assay of body fluids for antibiotic levels, where again the emphasis is on diffusion techniques, newer mechanized and automated techniques are outlined briefly.

Regarding serology — there is no traditional serology or serological procedures described but present is a misplaced chapter of detailed fluorescent antibody technique with very little on specific application in microbiology.

With the exception of antibiotic testing and serology (for the above reason) I feel this book succeeds in presenting general microbiological methods in an attractive fashion giving not only the facts but just as importantly the information required for good understanding. It is a good laboratory textbook and especially useful for the student.

A. Paterson.

Minutes of the 40th Annual General Meeting of the New Zealand Institute of Medical Laboratory Technology held in Dunedin on 16 August 1984 Commencing at 4 p.m.

Chairman
Mr A. Harper

Apologies
It was resolved that the apologies be accepted from J. Marsland, M. Legge, G.R. Rose, E. Crutch, H. Olive, W. Wilson, A. Johns and K. Boddy.
B. Collins/D. Pees

Proxies
The list of proxy holders was circulated to the meeting

Minutes
It was resolved that the Minutes of the 39th Annual General Meeting as circulated be taken as read and confirmed.
I. Buxton/R. Austin

Annual Report
It was resolved that the Annual Report be received.
B. Edwards/M. McCarthy
Speakers on the Annual Report included K. McLoughlin (Fellowship), J. Elliot (Overseas Aid), D. Reilly (Membership Recruitment), D. Dixon-McIver (Publications), P. McLeod (Management), J. Parker (Awards), B. Edwards (Technical Assistants Examination Committee), M. McCarthy and H. Neal.
It was resolved that the Annual Report be adopted
B. Edwards/B. Main

Financial Report
It was resolved that the Financial Report be received
D. Reilly/C. Campbell
Other speakers on the Financial Report included M. McCarthy, B. Edwards and B. Main
It was resolved that the Financial Report be adopted
D. Reilly/D. Dixon-McIver

Election of Officers
The following members of Council were elected unopposed:

President:	Mr C. Campbell
Vice-Presidents:	Mr K. McLoughlin, Mr W. Wilson
Secretary:	Mr B.T. Edwards
Treasurer:	Mr D. Reilly
Auckland Regional Representative:	Mr D. Pees
Central North Island Regional Representative	Mrs M. Young
Wellington Regional Representative:	Mr J. Elliot
Christchurch Regional Representative:	Mr P. McLeod
Dunedin Regional Representative:	Mrs J. Parker

Presentation of Awards
The following award winners were announced and the awards presented by the President:-

CERTIFICATE EXAMINATION AWARDS

Clinical Biochemistry	Miss C.J. Tollemache
Haematology	Miss M.A. Jenssen
Histology	Mr C.A. Lee
Immunohaematology	Miss M.J. Collier
Immunology	Mr M.W. Crowther
Microbiology	Miss P.J. Cooke
Cytogenetics	Miss D. Meek

SPECIALIST CERTIFICATE EXAMINATION AWARDS

Haematology	Miss L.J. Cape
Clinical Biochemistry	Mrs S.M. Greenwood
Immunology	Mrs G. Lloyd
Cytology	Mr I.H. Barlow
Microbiology	Miss K.A. Milne

QUALIFIED TECHNICAL ASSISTANTS AWARDS

Immunohaematology	Ms K. Scotney
Clinical Biochemistry	Miss J.E. Bolton
Haematology	Mrs G.P. Buckley
Histological Technique	Miss C.A. Goodyer
Medical Cytology	Mrs A.M. Sharp
Medical Microbiology	Miss J.R. Walker

JOURNAL AWARDS
Roche Products Clinical Chemistry Award — Miss A. Buchanan
McGaw Dade Haematology Award — R.M. Holmes and J.E. Lucas
Journal Student Award — S. Sexton and P. McCoomb
Journal Prize — Mr A. Henwood

SPECIAL AWARDS
Eli Lilly Microbilogy Scholarship — Miss E.S. Poole
NZIMLT Scholarship — Miss C. Hickton
Annual Scientific Meeting Best Trade Exhibit Award — Northrop Instruments Ltd

Henoraria
It was resolved that no honoraria be paid
D. Reilly/B. Edwards

Auditor
It was resolved that Deloitte, Hoskins and Sells be eppointed as the Institute's auditors
D. Reilly/J. Elliott

There being no further business the meeting closed at 4.35 p.m.

Minutes of the Special General Meeting of the New Zealand Institute of Medical Laboratory Technology held in Dunedin on the 16 August 1984 Commencing at 4.35 p.m.

Chairman
Mr A. Harper

Minutes
It was resolved that the minutes of the Special General Meeting held on the 18 August 1983 be taken as read and approved.
I. Buxton/D. Dixon-McIver

Business Arising
Mr C. Campbell reported on the items passed at the Special General Meeting which related mainly to negotiations.

Remits
1. It was resolved that effective from and including the year commencing 1 April 1985, the annual subscription for Fellows and Associates be increased from $40.00 to $45.00 reducible by $5.00 if paid by 30 June.
D. Reilly/D. Dixon-McIver
2. It was resolved that Rule 6(c) (i) be amended by replacing 'Medical Technologist's Board' with 'Medical Laboratory Technologists Board' and the 'Certificate of Proficiency' with the 'Diploma in Medical Laboratory Technology'.
B. Edwards/D. Pees
4. It was resolved that Policy decision No. 3 be reaffirmed.
Policy Decision No. 3 (1972/75/78/81): Council will make and administer awards to members of the Institute, the details of each award will be recorded and may be amended from time to time by resolution of Council. The summary of these details shall be published annually in the Newsletter.
J. Parker/J. Elliot
5. It was resolved that Policy Decision No. 5 be reaffirmed.
Policy Decision No. 5 (1978/81): That medical supply companies should not be approached to aid in the finance of

Branch meetings; companies may be invited to Regional Seminars and although donations may be accepted, money is not to be solicited.

M. Young/J. Lucas

6. It was moved D. Pees that Council be requested to formally change the name from New Zealand Institute of Medical Laboratory Technology Inc. to New Zealand Institute of Medical Laboratory Science Inc.
   The motion lapsed through want of a seconder
7. It was moved M. Young seconded R. Austin that the NZIMLT make a recommendation to the Medical Laboratory Technologists Board and the Department of Health that annual licensing be discontinued until such time as a qualified medical laboratory technologist is able to practise in his own right and with that, have access to Social Security funding.
   The motion was declared lost.
8. It was moved K. Ahern seconded M. Murnane that the NZIMLT recognise the career requirements of laboratory assistants by negotiating, at the earliest opportunity, to amend the Laboratory Assistants Scele of DG19 to DG38, Grades 3 to 10, to allow identical opportunities for salary, and career progression.
   After counting of hands and proxies the motion was declared lost 94 (for) to 79 against as it did not reach the required two thirds majority.
9. It was moved M. Murnane seconded K. Ahern that the NZIMLT negotiates a sole charge responsibility allowance for laboratory staff working outside normal hours while in sole charge of the laboratory for emergency and urgent services.
   After counting of hands and proxies the motion was declared lost 89 (for) to 91 (against)
10. It was moved M. Murnane, seconded K. Ahern that Council make a recommendation to the Medical Laboratory Technologists Board that the entry qualification into the Graduate Trainee Scheme be amended from appropriate science degree to appropriate tertiary qualification
    After counting of hands and proxies the motion was declared lost 49 (for) to 80 (against)
11. It was resolved that Council examine the possibility of providing a suitable badge for Associates or Fellows of the Institute.

J. Parker/R. Holmes

12. It was moved G. Mitchell, seconded C. Mackie that the Institute negotiate for the removal of the overtime limits as outlined in DG48 Section 3(5)c.
    The motion was declared lost on voices.

General Business

Miss H. Robertshawe spoke to the meeting expressing her appreciation for the recognition given her during her period as Secretary of the Medical Laboratory Technologists Board.

It was moved B. Mitcherson, seconded B.S. Collins that the meeting record its appreciation of the work done by Helen Robertshawe.

The motion was carried unanimously with acclamation.

There being no further business the meeting closed at 6.47 p.m.

The Pacific Way

Random Thoughts of a recently Returned Technologist

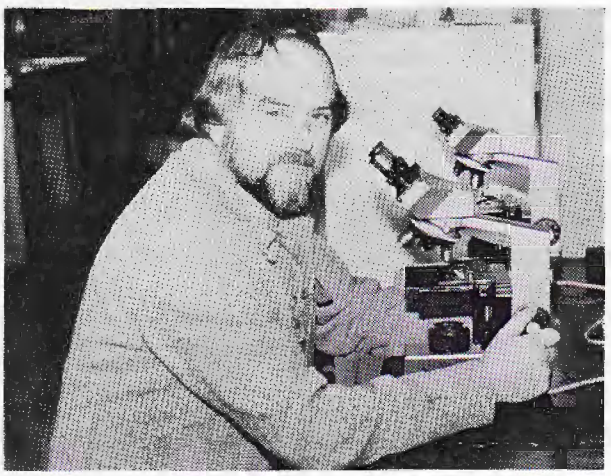
Mike Lynch

On returning to New Zealand after a six month assignment in the Trust Territory of the Pacific Islands (Marshall, Caroline and Mariana Islands) for the World Health Organisation, I find the attention directed towards the Pacific Islands in our Journal to be most gratifying. The various comments by those at present working and those who have worked in the Pacific helps to highlight the areas where New Zealand can give appropriate assistance. Our assistance should be confined to what the island laboratories want and not to what we think they need. This point has been emphasised for me time and time again by the technicians working in Micronesia. Although the PPTC courses are carefully constructed so that the material and information imparted is appropriate to the island needs some training courses in other parts of the world do not always recognise what equipment works well in a tropical climate and what methodologies are suitable for the existing expertise. The development of appropriate courses of training is not easy when one considers that there are health services in the Pacific that have been developed by earlier colonial powers such as Britain, France, United States, New Zealand and Australia. More recently Japan has become involved in the Pacific and has introduced its style of technology, laboratory equipment and supplies. Thus each island has a traditional style from which their medical technology has evolved. It is inappropriate to teach technicians from the American Trust Territories how to perform antibiotic sensitivity tests by the Stokes method when they follow the Bauer-Kirby technique at home. It is very important then, when we in New Zealand are giving assistance, be it equipment or teaching, that we have some knowledge of the type of technology that exists in the recipient country.

The Trust Territory of the Pacific Islands is a grouping of many Micronesian Islands in the western Pacific north of the equator. Originally these islands were grouped into three major divisions known as the Marshalls, Carolines and Mariana Islands, but in 1946 they were grouped together by a United Nations Mandate with the United States of America as the controlling power. In the past few years the islands have made considerable progress towards greater independence and will eventually be known as the Republic of Belau and the Commonwealth of the Northern Marianas. My recent assignment involved me working in six laboratories in the area and this along with a previous assignment in Kiribati (Gilbert Islands) has enabled me to study the laboratory systems in most of Micronesia. My comments in this letter are restricted to the difficulties of providing a laboratory service in the Trust Territories.

1. Staff training

Most of the Chief Technicians were trained quite some years ago at the laboratory training facility at the Fiji Medical School. One laboratory has a Chief Technician who was trained and registered as a laboratory technologist in the United States. The rest of the laboratory staff have been trained either on the bench or at short courses in specific subjects in Hawaii, Guam, New Zealand, Australia or in Micronesia. Thus, the training has been very fragmented and uniform standards and methods do not exist. There are no Pathologists in tha area and the Chief Technician is left to direct the technical and management aspects of his own laboratory. Many of these Chief Technicians are working under difficult conditions and deserve any help and encouragement we in New Zealand can give them. It does appear that with some of the short course training schemes, inappropriate people are selected to attend. I feel that only senior staff who have the authority and the initiative to introduce the new techniques should be sent on these courses. These courses should be on a specific topic and not of a general nature. Even so, the most effective training is achieved when the staff are taught in their own laboratories, on their own equipment, using their own supplies and solving their own particular problems. It is my opinion that expatriates should be sent to the Pacific areas to assist with training. These expatriate trainers need to have special skills and it is for these people that perhaps the PPTC could well organise a special course. Such people must be able to adapt to the island way of life (not always easy), show empathy with the islanders and be able to learn some of their language and respect their customs. It is interesting to note that some of these comments on staff training are in agreement with those of Ruth Reeve and Ted Norman, both of whom have worked in the Pacific and have been reported in recent issues of this Journal.



Mike Lynch,
Maths and Science Department Wellington Polytechnic

2. Equipment

All of the laboratory equipment in these islands is of American manufacture and much of it was supplied as part of American aid packages. Thus, teaching island technicians on courses in New Zealand to use equipment that is not available in their home laboratories is not very helpful. Equipment breakdown along with a shortage of critical supplies are the most common cause of test procedures not being regularly performed. Therefore equipment must be able to stand up to the rigors of a tropical climate. Equipment maintenance is a skill that is lacking in most island laboratories and hospitals and thus the older manual techniques need to be stressed in any training scheme. Ted Norman reported in 1982 that the Coulter Counter in the laboratory in Truk had broken down. This same instrument was still out of action when I arrived at the island in September, 1983. Equipment such as this is not always appropriate to the islands' needs and great care needs to be taken when assessing the type of equipment to be sent as aid. I hope that we in New Zealand keep our feet firmly on the ground (or coral) when we address this problem. The worst example of inappropriate aid that I came across was the promise of an automated chemistry analyser that could cope with one hundred tests an hour to a small island hospital. This laboratory would not have had the refrigerator space to store the reagents needed to operate such a machine.

3. Techniques

The island laboratory personnel are generally eager to learn new techniques and gain new knowledge. Unfortunately this

commendable desire often obstructs any attempt to perfect their present techniques. I can see no sense in learning about and setting up methods for the isolation of campylobacter when their salmonella and vibrio isolation techniques are virtually non-existent. Examples such as this are numerous. Often techniques have to be resorted to that are not ideal but nevertheless fit into the system existing in a laboratory. Separate safe facilities are not always available for mycobacterial work and the technique in use may have to be one that kills the bacteria allowing only smears to be examined. Each area of the Pacific has certain diseases that cause the most problems and the techniques for the identification of these diseases are the first priority. It was distressing to visit one laboratory on an island where diabetes was a major problem to find that they had no way of estimating blood sugar levels. Technologists sent to work in these countries must be sufficiently versatile to cope with almost any situation.

4. Supplies

All of these islands have limited natural resources and are economically dependent on financial aid from other countries. Thus, the money available for the purchase of laboratory supplies must be reserved for those items of highest priority. Often suppliers in the more affluent countries refuse to send supplies to an island customer unless cash is sent with the order. Then once the goods are available for delivery there is a further delay while waiting for cargo space to become available. The frustrations associated with the lack of materials needed to perform your job are considerable and righting this problem is often beyond the scope of the laboratory concerned.

Despite all the problems and frustrations mentioned, working in a developing nation is a most rewarding experience. The people of the Trust Territories are delightful. It was my privilege to know them and to work amongst them.

Mr Satish Sudhaker, President of F.M.L.T.A.

Fiji Medical Laboratory Technologists Association

This new association was formed on the 31st December 1983 at the Hoodless House Lecture Room in Suva. The total financial membership is 35. The Council consists of —

President: Mr Satish Sudhaker
Secretary: Mrs Atalifo (Acting Secretary)
Treasurer: Mrs Saroj Krishne, plus 8 committee members.

The new Council regrets the death of their first Secretary Mr Kurae Teruka who was severely burnt when his house was gutted by fire and later died in hospital.

In December 1984 the A.G.M. will be held, and planning will be started for the first Scientific Meeting.

N.Z.I.M.L.T. LIBRARY

Laboratory Medicine

October 1983
- i) HLA and Disease: An association
- ii) Volume determination in 24 hour urine specimen lithium as exogenous marker
- iii) Antenatal treatment to prevent Rh immunization
- iv) Controls for identification of HSV Types 1 and 2 in tissue section

January 1984
- i) Coagulase negative Staphylococci; significance and identification
- ii) Immunoperoxidase Part II: Practical application
- iii) New staining technique for hepatic tissue.
- iv) Deterioration of Factor VIII:C in stored plasma for use in activity curves
- v) Evaluation of cotton-wool filters for preparing leucocyte-poor blood
- vi) Rapid, inexpensive presumptive identification of common aerobic Gram-negative bacilli

February 1984
- i) Endocrinology of the fetoplacental unit: the role of estrogen assays
- ii) Clinical significance and laboratory identification of yeasts
- iii) Lysis-centrifugation blood culture for recovering fungi from the blood
- iv) Use of calcofluor white in clinical mycology
- v) Immunoperoxidase methods with plastic embedded materials

March 1984
- i) Ion-specific electrodes
- ii) Species identification and clinical significance of *Strept. viridans*
- iii) Low pH acridine orange stain for trichomonads.
- iv) Disc diffusion susceptibility test trouble-shooting guide
- v) Use of preliminary embedding in agar for plastic sectioning
- vi) Advances in laboratory tests in autoantibodies to nuclear antigens in systemic rheumatic diseases
- vii) Three diagnostic test kits for Rubella

April 1984
- i) Bone marrow transplantation
- ii) Transfusion therapy for the oncology patient
- iii) Frequency of antibody to Hepatitis B in a community hospital laboratory
- iv) Bacteriologic plate media: Review of mechanisms of action
- v) Contingency planning for laboratory computer failure

American Journal of Medical Technology

Vol 49.12
- i) Clinical aspects of Haemophilia and von Willebrand's Disease
- ii) Lab. evaluation of Factor VIII and IX
- iii) Red cell distribution width on the Coulter S plus
- iv) Evaluation of API-20E strips for identification of coagulase negative staph. from the urinary tract

---

Journal of Medical Technology

Vol. 1
- I) *Focus on Immunoassays:* Applications; Indirect Immuno-fluorescence; Techniques in microbiology; Haematology; Therapeutic drug monitoring; Haemostasis
- ii) Quality control of lymphocyte counts using the Coulter S — Plus II

Vol 1.2
- i) *Focus on Blood Gases including;* an update on correction factors; Henderson-Hasselbalch equation; computerized interpretive reporting; hemodialysis and peritoneal dialysis
- ii) Evaluation of a commercial ELISA assay for *N. gonorrhoea*

Vol 1.3
- i) *Focus on Haematology* including; Cell histograms; Cellular diagnosis; electron microscopy and ultrastructural cytochemistry

Vol. 1.4
- i) *Focus on Mycology* including; Mycotic disease diagnosis; Nocardiosis; Sputum culture and the evaluation of two test systems for the serodiagnosis for pulmonary aspergillosis and systemic mycoses

---

Australian Journal of Medical Laboratory Science

Vol 5.1
- i) Separation of progressively motile spermatozoa from human spermatozoa
- ii) Enrichment for Methicillin resistant *S. aureus*
- iii) Fluorescent staining method for the localization of Zirconium in expoxy embedded tissues.

FELLOWSHIP REGULATIONS
(Revised 1984)

1. Introduction

1.1 The New Zealand Institute of Medical Laboratory Technology (Incorporated) is the professional organisation which fosters the interests of technologists and complementary medical laboratory staff as distinct from the Medical Laboratory Technologists Board which conducts the qualifying examinations for technologists and is the registration body. Under its rules the NZIMLT offers Fellowship as its highest academic category of membership. It follows, therefore, that resignation from the Institute entails forfeiting Fellowship status and the right to use the letters FNZIMLT.

1.2 Fellowship of the NZIMLT is the highest academic qualification attainable for Institute member technologists trained or practising in New Zealand. It is intended that the level should equate with the highest medical technology qualifications available world-wide.

1.3 Successful candidates will have the attributes required of a specialist technologist able to take charge of a reference laboratory. In addition to utilising a thorough knowledge of established theory and practice they should be able to demonstrate their ability to undertake developmental work beyond the limits of contemporary technology.

1.4 Prospective Fellowship candidates must read carefully all sections of these regulations including the appendices.

2. General

2.1 Fellowship of the NZIMLT may be gained:
(a) by examination, or
(b) by submission of a thesis, or
(c) by exemption

2.2 An applicant for Fellowship must have been registered with the Institute as an Associate for three years.

2.3 Applications must be made on the prescribed application form and must be received by the Convener of the Fellowship Committee:
(a) before the closing date for examination enrolments
(b) in the case of thesis, three months before the commencement of the work.

Applications must be accompanied by the fee set by the Council of the Institute.

2.4 Three copies of prepared work (thesis or treatise) must be submitted; the original and two good quality copies produced by xerographic or comparably permanent process. It is recommended that a fourth copy be retained by the candidate.

2.5 Successful copies of prepared work submitted shall remain the property of the Institute and, at the discretion of the Editorial Board, the whole or any part of the work may be reproduced in the NZIMLT Journal. Permission to publish the work elsewhere must be obtained from the NZIMLT Council.

2.6 The Institute will not accept material that has been submitted or accepted for any other qualification. Such material may be used only as supportive data.

2.7 All income accruing from the commercial use of any original ideas contained in the submitted work shall remain the property of the author.

3. Examination

3.1 Candidates must be practising medical laboratory technologists working under the supervision of either a specialist medical practitioner, a specialist medical laboratory technologist or a senior hospital scientific officer. A report from this supervisor will be required and may be taken into account in overall assessment of the candidate.

3.2 The subjects available for Fellowship examinations shall be those offered by the Medical Laboratory Technologists Board for Specialist Certificate examinations.

3.3 The examination will consist of:
(a) three written papers — Paper 1: 2 hours
Paper 2: 3 hours
Paper 3: 3 hours
(b) a treatise of approximately 3000-5000 words on a medical laboratory scientific subject chosen by the candidate and related to the discipline selected for examination. This must be submitted at the time of application.

The Institute reserves the right to conduct an oral examination whenever considered necessary by the examining panel.

3.4 Marks will be allocated as follows:
Paper 1 — 20
Paper 2 — 30
Paper 3 — 30
Treatise — 20

Candidates must gain an aggregate of 60% to pass.

Marks for the treatise may be carried forward for one year if the examination is to be attempted again.

Candidates who fail only because of their treatise mark will be given the chance to revise and re-submit the treatise before the end of December of their examination year.

3.5 All material in the treatise shall conform to instructions given in "Directions for Contributors" in the latest issue of the NZIMLT Journal.

The treatise shall be typed on only one side of good quality A4 paper and shall be covered in manilla board and bound by a slide binder or similar. The title of the treatise and the candidate's name shall be displayed on the outside cover. Pages shall be numbered at the top outer corner 10mm from the top and flush with the outer margin of the text.

4. Thesis

4.1 The candidate must nominate either a specialist medical practitioner, a specialist medical laboratory technologist or a senior hospital scientific officer to act as supervisor for the work. The Institute reserves the right to appoint an additional or alternative supervisor. The supervisor is required to submit a report which will be taken into account in the overall assessment of the candidate.

4.2 A thesis must be, or must include mostly, original work of the candidate. The extent of work carried out by collaborators must be indicated clearly and acknowledged.

4.3 The NZIMLT Fellowship Committee must be notified of intention to prepare a thesis at least three months prior to the commencement of the work. Three typewritten copies of the title and abstract of the intended work must be submitted at the time of application.

4.4 Normally the thesis should not exceed 20,000 words.

4.5 The thesis must conform to "Recommendations for the Presentation of Theses", British Standards Institution BS 4821 (1972), with the following exceptions:

Spine title: The spine of the work shall bear the thesis title and the surname and initials of the candidate printed along the spine in such a way as to be readable when the volume is lying flat with the front cover uppermost.

Position of page numbers: Page numbers shall be located at the top outer edge of the page, away from the bound edge, approximately 10mm from the top and flush with the outer margin of the text.

Units, symbols, abbreviations and references shall conform to instructions given in "Directions for Contributors" in the latest issue of the NZIMLT Journal.

5. Exemption

5.1 In exceptional circumstances an individual may be awarded Fellowship by exemption. This may be granted at the discretion of the NZIMLT Council in recognition of an approved higher degree from a recognised university, other suitable qualifications and experience, publications or outstanding achievement.

5.2 The Fellowship Committee reserves the right to request a report from the candidate's nominated supervisor.

The following appendices do not constitute part of the NZIMLT Fellowship regulations. They are intended as notes for guidance of intending candidates or others with an interest in Fellowship. Any information contained in these sections may be changed as circumstances dictate but any important changes will be advertised in the NZIMLT Journal.

Appendix I
Examinations

Normally the examinations will be held on the first Tuesday, Wednesday and Thursday of July each year. The closing date for examination enrolments will be the last Friday in February of that year.

As the level of the examination is expected to be high and the subject matter at this level is constantly changing, it is considered not feasible to set any syllabi. As a guide only, candidates should

refer to the Medical Laboratory Technologists Board Specialist Certificate syllabi and bear in mind that the Fellowship examination represents the culmination of three years' additional work experience and academic advancement.

The standard for a Fellowship treatise should be at least equal to that required of an article acceptable for publication in a reputable refereed journal. The treatise is expected to be a methodical discussion or exposition in the candidate's chosen specialist subject. For example, this may take the form of a comprehensive review article with substantiated critical comment or an investigative report containing critical evaluation of methodology. A well-researched original article would be ideal.

It is intended that each paper will allow a choice of questions in the following format:

Paper 1: A choice of 1 question out of a total of 4
Paper 2: A choice of 2 questions out of a total of 5
Paper 3: A choice of 3 questions out of a total of 6

The one answer required in Paper 1 should be of a philosophical nature and display the candidates' ability to express their own opinions based on established data. The second paper requires two answers related to purely theoretical or academic aspects of the discipline while the third will require three answers with a more practical or vocational bias.

The examining panel for each discipline will usually consist of two examiners and a moderator. When possible the examiners will be selected from those who have been involved previously with the Medical Laboratory Technologists Board Specialist Certificate examinations.

Correspondence relating to the examinations must be addressed to the Convener of the NZIMLT Fellowship Committee, not to any examiner.

Appendix II

A Brief Guide to Planning and Writing a Thesis

This is intended to assist with the design of experiments and to provide some general references for use in writing the thesis.

1. Literature Search
   The literature search is vital before a project is started. It provides information on what has been done and whether the proposed work has been done previously. This information is obtainable as reviews, abstracts or current titles which may be obtained from:
   (a) Journals
   (b) Books
   (c) Indexing services, e.g. Index Medicus, Biological Abstract, Bioresearch Index
   (d) Computer information services, eg: MEDLARS or Biosis Previews. These require the searcher to write search programmes and a fee is charged. However, both offer an update facility.
2. The Problem
   The problem, or "what am I going to do", can be broken down into a number of steps:
   (a) What am I going to investigate?
   (b) Has this been done before?
   (c) Is the problem
   (i) open, i.e. will other work continue on it after you have finished; or
   (ii) closed, i.e. finite, all work is finished at the end of the project.
   (d) Restrict the area of search, do not get side-tracked into investigating too many small problems which lead away from the main problem. Good literature searches can help to avoid this.
   (e) Identify all relevant parameters, eg: purity of reagents, availability and suitability of equipment.
3. Initial Exploration
   (a) Write and clearly define the problem.
   (b) Ensure adequate supplies of reagents and spare parts are available.
   (c) Ensure all the techniques work before starting investigations.
4. Standardisation
   (a) Check standards, e.g. purity, supply, etc.
   (b) Examine accuracy and precision.
   (c) Select samples and controls, decide on storage conditions.
   (d) Examine bias.
   (e) Ensure the work is reproducible.
   (f) Check experimental design.
5. Instruments
   (a) Decide what instrumentation is necessary.
   (b) Ensure availability of instruments.
   (c) Ensure stability.
   (d) Keep instrument log books.
6. Safety
   (a) Ensure all safety procedures are adhered to.
   (b) Read chemical labels carefully (some chemicals have toxic vapours or may be absorbed thorugh the skin) and observe appropriate precautions.
   (c) Discuss the project with the departmental safety officer.
7. Records
   (a) **Do not rely on memory.**
   (b) Document all results and comments during tests.
   (c) Organise results after completion of investigation before the final writing up.
   (d) Make conclusions and write them down on the basis of results as the work proceeds.
   (e) Make tables and draw graphs of the experimental information as it is completed. Stick tables and graphs in a notebook next to the relevant steps and data. Use a large (30x20cm) notebook for this.
   (f) Keep a separate book in which to record summaries of results from many experiments, grouped by subject.
   (g) Start writing your thesis when you are approximately two-thirds of the way through it.
   (h) After completion of the first copy, set it aside for two or three weeks then re-read it. This is one of the best ways to identify mistakes.
   (i) Have the draft copy read by another person (besides your supervisor) before producing the final copy for typing. Do they understand what you are attempting to investigate?

References

Anderson, J., Durston, B.H. and Poole, M. Thesis and Assignment Writing. Sydney, John Wiley and Sons Australiasia Pty Ltd, 1970.
Berzun, J. The modern researcher. N.Y. Harcourt, Bruce, 1957.
Booth, V. Writing a scientific paper. The Biochemical Society, P.O. Box 32, Colchester, Essex. CO28HP. U.K. 1977.
British Standards Institution. Recommendations for the presentation of thesis. London, 1972 (B.S. 4821:1972).
Campbell, W.G. Form and Style in thesis writing. Boston, Houghton Mifflin, 1974.
Conference of Biological Editors Committee on Form and Style. Style manual for biological journals. 2nd e. Washington D.C. American Institute of Biological Sciences, 1964.
Cumulative book index. 1938 to date, New York, H.W. Wilson.
Fowler, H.W. A dictionary of modern English usage. 2nd ed. Oxford, Clarendon Press, 1965.
Gowers, Sir E. The complete plain words. London, H.M.S.O. 1954.
Kapp, R.O. The presentation of technical information. New York, MacMillan, 1960.
Mitchell, J.M. Writing for professionally and technical journals. New York, Wiley, 1968.
Parsons, C.J. Thesies and Project Work. London, George Allen and Unwin Ltd, 1976.
Partidge, E. Usage and Abusage: a guide to a good English. 6th ed. London, Hamilton, 1965.
Roget, P.M. Thesaurus of English words and phrases. Rev. ed. London, Longmans, 1962.
Treleure, S.F. How to write scientific and technical papers, 3rd ed. Baltimore, Williams and Wilkins, 1958.
Turbian, K.L. A manual for writers of term papers, these and dissertations. 3rd ed. University of Chicago Press, 1967.
University of Chicago Press. A manmual of style, containing typographical and other rules for authors, printers and publishers, recommended by the University of Chicago Press. 12th ed, Chicago, 1969.
World List of scientific periodicals. 4th ed. London, Butterworths Scientific Publications, 1963-65, 3v.

Fellowship Examination 1984

Haematology

Paper 1

INSTRUCTIONS: Time allowed: Two hours. Ten minutes extra is allowed for reading the paper.
Answer any ONE question
Each question is worth 20 marks

1. "The repertoire of tests of most medical laboratories is determined more by tradition than by their clinical usefulness". Discuss this statement.
2. Discuss the influence of "expert" assessment, peer assessment and self assessment on the maintenance of good laboratory standards.
3. "A profile of coagulation factor assays will replace screening tests (PT,APTT etc) just as a profile of liver enzyme assays has replaced earlier screening tests (thymol turbidity etc)" — Comment on this statement.
4. Give an historical account of the development of any current concept in haematology.

Paper 2

INSTRUCTIONS: Time allowed: Three hours — ten minutes extra is allowed for reading the paper.
Answer TWO questions only
Each question is worth 15 marks.

1. Describe what is known of the control of normal haematopoiesis. Discuss the abnormalities of haematopoiesis which may be found in neutropenia.
2. Critically evaluate the theories proposed to explain the pathogenesis of the haemolytic uraemic syndrome and thrombotic thrombocytopenic purpura.
3. What haematological disorders may be associated with the Epstein-Barr virus and human T cell leukaemia-lymphoma virus (HTLV-1). Discuss in detail the possible pathogenetic mechanisms involved.
4. Describe the red cell membrane defects of sickle cell anaemia and of hereditary spherocytosis.
5. Give a full account of the natural inhibitors of coagulation and fibrinolysis.

Paper 3

INSTRUCTIONS: Time allowed: Three hours. Ten minutes extra is allowed for reading the paper.
Answer THREE questions
Each question is worth 10 marks.

1. Give an account of
   a) the methods for measurement of platelet bound immunoglobulin and
   b) tests required to establish a diagnosis of Glanzmann's thrombasthenia.
2. Discuss techniques available for the isolation and purification of human haematopoietic stem cells for both investigatory and therapeutic purposes.
3. Haematology technologists in both service and research laboratories require many technical skills. Enumerate and if possible classify these and give your views on how and when these skills should be learnt.
4. Critically evaluate
   a) methods of assaying factor VIII clotting activity in plasma, cryoprecipitate and fibrinogen depleted concentrate.
   b) methods of assaying factor VIII related antigen end factor VIII coagulant antigen in plasma.
5. a) A person is found to have a prolonged euglobulin clot lysis time. Describe the methods you would use to investigate this.
   b) List the sources of error which could be common to any in vitro haemostatic test.
6. a) Discuss the automated methods for measuring differential white cell counts.
   b) How can the various red cell and platelet indices available from modern automated cell counters be used for rapid diagnosis.

northrop

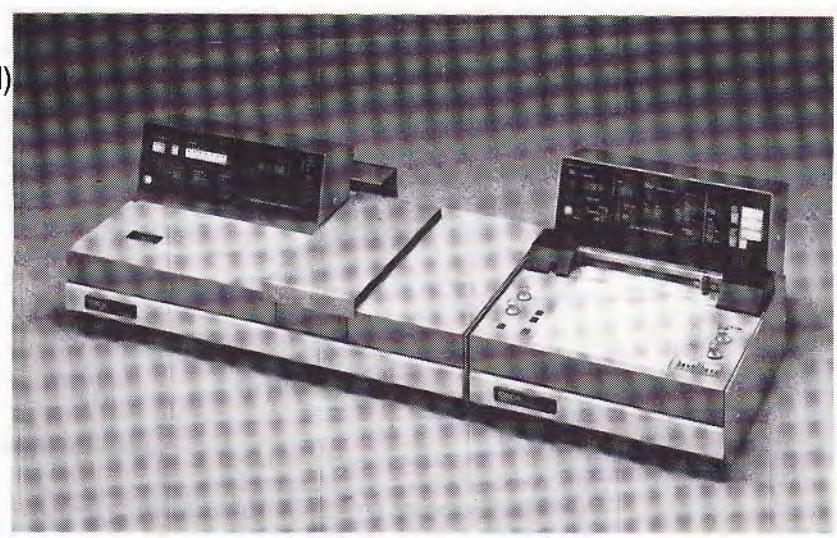
INSTRUMENTS & SYSTEMS LIMITED

WE HAVE THE UV-VIS SPECTROPHOTOMETER FOR YOU

FROM:

CECIL CE243 (not illustrated)
Low cost Grating
Spectrophotometer with:

- single beam optics
- wave length range 325-900nm
- holographic grating
- 10nm bandwidth
- wide range of accessories



THROUGH:

CECIL CE599 Universal
Spectrophotometer with:

- intelligible survey controls
- wave length programming from 190-800nm
- holographic grating
- digital display
- 2nm resolution
- microcomputer automated programs

TO:

HEWLETT PACKARD 8451A
Diode Array Spectrophotometer
with:

- single beam optics
- procures full spectrum (190-820nm) in 0.1 seconds
- incorporates operating system and hardware of H.P.'s famous H.P. 85A microcomputer
- kinetics and tablet dissolution software available
- high speed LC detector capability

WITH A LOT OF MODELS IN BETWEEN

northrop
INSTRUMENTS & SYSTEMS LIMITED
Sturdee House, 85-87 Ghuznee Street, P.O. Box 2406, Wellington New Zealand. **Telephones:** 850-091, 851-480. Telex: NZ3380
Also branches in **Auckland.** Tel: 794-091 and **Christchurch.** Tel: 488-873.

circle 85 on the readers reply card

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY

Annual Staffing Survey

1 APRIL 1984

1983 figures are in parentheses

Please give the number of people employed in your hospital or private laboratory as at 1 April this year. All numbers must be as full time equivalents.

SECTION A. CURRENT STAFF

1. MEDICAL LABORATORY TECHNOLOGISTS *(see Note 1)*

	CURRENT ESTABLISHMENT	CURRENTLY EMPLOYED		CURRENT VACANCIES	
Clinical Biochemistry		174	(175)	9	(6)
Microbiology		164	(155)	1.5	(5)
Haematology		160	(145)	4.5	(4.5)
Immunohaematology		86	(84)	6	(5)
Histology		22	(25)	3	(3)
Medical Cytology		6	(6.5)	0	(0)
Nuclear Medicine		6.2	(4.2)	0	(0)
Immunology		23.	(23)	1	(1)
Cytogenetics		5.5	(10)	0	(1)
Virology		1	(2)	0	(1)
Administration (full time)		37	(30)	0	(1)
On rotation		46	(47)	1	(0)
Other:		4.5	(6)	0	(1)
TOTALS		735.2	(712.7)	26	(28.5)

2. LABORATORY ASSISTANTS (*see Note 2)*

	CURRENT ESTABLISHMENT	CURRENTLY EMPLOYED		CURRENT VACANCIES	
Clinical Biochemistry		188	(188)	5.5	(3.5)
Microbiology		165	(170)	3.9	(2)
Haematology		142	(142)	1.7	(1.5)
Immunohaematology		101	(101)	2.1	(4.2)
Histology		78	(80)	0.5	(0)
Medical Cytology		40	(39)		
Nuclear Medicine		16	(8)		
Immunology		41	(40)		
Cytogenetics		5	(7)		
Virology		5.6	(5.5)		
Blood Collection Service		87	(88)	0	(1.6)
On rotation		56	(59)	2	(0)
Other:		24	(28)		
TOTALS		948.6	(955.5)	15.7	(12.8)

3. TRAINEES (*see Note 3)*

How many people do you have training to be a medical laboratory technologist? 381 (415

How many of these trainees are science graduates? 22 (18)

How many vacancies do you have for trainees? 6 (6)

Please categorise your trainees as follows:

(a) N.Z.C.S. TRAINEES (*see Note 4)*

	CURRENTLY EMPLOYED		CURRENT VACANCIES	
First Year Trainees	50	(67)	6	(2)
Second Year Trainees	65	(61)	0	(0)
Third Year Trainees	70	(91)	0	(0)
TOTAL	185	(219)	6	(2)

(b) CERTIFICATE (PART II) TRAINEES *(see Note 5)*

	CURRENTLY EMPLOYED		CURRENT VACANCIES		NO. TO QUALIFY *(see Note 6)*	
Clinical Biochemistry	45	(33)	0	(0)	16	(5)
Microbiology	41	(50)	0	(0)	19	(19)
Haematology	38	(42)	0	(0)	14	(10)
Immunohaematology	25	(19)	0	(0)	6	(5)
Histology	5	(3)	0	(0)	0	(1)
Medical Cytology	2	(3)	0	(0)	1	(0)
Nuclear Medicine	0	(1)	0	(0)	0	(0)
Immunology	2	(2)	0	(0)	1	(1)
Cytogenetics	2	(3)	0	(0)	1	(1)
Virology	2	(0)	0	(0)	0	(0)
TOTAL	162	(156)	0	(0)	58	(42)

(c) SPECIALIST CERTIFICATE (PART III) TRAINEES *(see Note 5)*

	CURRENTLY EMPLOYED		CURRENT VACANCIES	
Clinical Biochemistry	8	(10)	0	(0)
Microbiology	5	(15)	0	(0)
Haematology	9	(7)	0	(0)
Immunohaematology	3	(4)	0	(0)
Histology	2	(1)	0	(0)
Medical Cytology	1	(0)	0	(0)
Nuclear Medicine	5	(2)	0	(0)
Immunology	0	(0)	0	(0)
Cytogenetics	1	(1)	0	(0)
Virology	0	(0)	0	(0)
TOTAL	34	(40)	0	(0)

SECTION B. FUTURE STAFF

Please estimate what you think your future total requirements will be for Registered Technologists and Laboratory Assistants.

	BY 1986		BY 1989	
	TECH.	L.A.	TECH.	L.A.
Clinical Biochemistry	198	216	218	234
Microbiology	187	192	203	208
Haematology	179	161	186	174
Immunohaematology	103	110	112	116
Histology	30	84	35	92
Medical Cytology	6	42	9	48
Nuclear Medicine	8.5	13	9.5	13
Immunology	31	50	35	54
Cytogenetics	8.5	6	9.5	10
Virology	5	7	7	9
Administration (full time)	37	0	38	1
On rotation	56	68	55	75
Blood Collection Service	1	89	5	105
Other:	17	17	4	17
	867	1055	926	1156

NOTES

1. Include all people who are entitled to registration or limited registration with the Medical Laboratory Technologists Board.

2. All laboratory assistants should be included irrespective of whether or not they have the Certificate of Qualified Technical Assistant.

3. Trainees should include all people who are undergoing a course of training which will result in them being eligible for registration as a Medical Laboratory Technologist. People who have already qualified and training towards another Certificate of Attainment should not be included.

4. Include as 1st year trainees all students who are doing N.Z.C.S. year three and as 2nd year trainees students doing N.Z.C.S. year four etc.. Students who have failed examinations should be counted at the repeat level.

5. Include N.Z.C.S. trainees and science graduates who are planning to undertake these examinations. Do not include people already qualified.

6. Please indicate how many of these trainees will qualify this year as they have already passed another Certificate examination.

INSTITUTE BUSINESS

Office-Bearers of the N.Z.I.M.L.T. 1984-85

President
C. Campbell
Laboratory, Palmerston North Hospital

Past-President
A.F. Harper

Vice-Presidents
K. McLoughlin
W.J. Wilson

Secretary
B.T. Edwards
Haematology, Christchurch Hospital

Treasurer
D.M. Reilly
Diagnostic Laboratory, Auckland

Council
M. Young, D. Pees, J. Elliot, J. Parker, P. McLeod

Editor
D. Dixon-McIver
Biochemistry Dept., National Women's Hospital, Auckland.
or the Editor, P.O. Box 35-276, Auckland, 10.

Membership Secretary
Margaret Young
Laboratory, Waikato Hospital, Hamilton.

Membership Fees and Enquiries

Membership fees for the year beginning April 1, 1984 are:
For Fellows — $40

For Associates — $40

For Members — $30

For Non-practising Members — $20

All membership fees, changes of address or particulars, applications for membership or changes in status should be sent to the Membership Secretary at the address given above.

Members wishing to receive their publications by airmail should contact the Editor to make the necessary arrangement.

Membership Sub-Committee Report August 1984

	August 84	August 83
Membership as at 9.8.84	1378	1383
LESS Resignations 25, G.N.A. Death 1	27	68
	1351	1315
PLUS Membership Applications and lost membership re-enrolled	44	76
TOTAL MEMBERSHIP	1395	1389

Applications for Membership as at August 9th 1984

Miss D.J. Anderson, Hamilton; Ms L.M. Anderson, Wellington; Miss H. Angove, Waipukurau; Miss J.R. Ashby, Palmerston North; Miss N.A. Beamish, New Plymouth; Miss A. Brown, Gisborne; Miss R.L. Corkill, Dargaville; Miss A.J. Courtney, Christchurch; Miss K.J. Denton, Christchurch; Miss L.K. Henderson, Auckland; Mrs J.E. Kenny, Palmerston North; Miss A.J. Letham, Auckland; Ms E. McChlery, Wellington; Miss D.F.Q. Murphy, Christchurch; Mrs P. Oliver, Hamilton. Ms C. Paul, Auckland; Miss J.M. Rathbun, Greymouth; Miss H.C. Pearmain, Hastings; Miss L.E. Roach, Palmerston North; Mr D.R. Schwarzenbach, Hastings; Miss E.K. Turtle, Auckland; Mr K. Wilkinson, Hamilton; Mrs H. Woods, Wellington; Ms N.J. Godby, Invercargill; Miss G.M. Stevenson, Waipukurau; Mrs H.K. Learmonth, Palmerston North; Miss J.E. Oliver, Oamaru; Miss N.L. Allnutt, Oamaru; Miss S. Rich, Oamaru; Mr G.A. Moore, Christchurch; Miss S.M. Weastell, Christchurch; Miss V. Hutchings, Nelson; Miss L. Sherwood, Wellington; Miss R.M. Blyth, Christchurch; Mrs D. Armstrong, Christchurch;

Applications for Associateship

Mrs L.J. Ellwood, Auckland; Mr H.M. Patterson, Auckland; Mr G.O. Warren, Thames; Mrs S.M. Hilbourne, Auckland; Ms M. Love, Lower Hutt; Mrs A. Morpeth, Norfolk Island; Mr J.J. Atkinson, Auckland; Mrs G.E. Evans, Christchurch; Mrs V. Collins, Auckland; Ms C. Van Dam, Auckland; Mr T.A. Perry, Waipukurau; Mr T.A. Walmsley, Christchurch; Miss H. Brady, Wellington; Mrs L. Rimmer, Auckland.

Applications for Fellowship

Mr R. Douglas, Australia.

Resignations as at August 9th 1984

Mr A.J. Beach; Ms C.J. Cruikshank; Mrs J.A. Jackson; Mrs J. Epplett; Miss S.L. Sutton; Mr C.A. Gilmore; Mrs J.M. des Landes; Mrs R.O. Peacock; Mrs S. Gaisford; Mrs B.M. Fromont; Mrs S.A. Spooner; Ms M. Young; Mrs E.M. Thompson; Ms H. Rowe; Mrs J.A. Rodgers; Mrs L.J. Masters; Mr D. Beckingham; Mrs J.M. Bennett; Ms D. Rowsell; Mrs P.C. Stewart; Mrs J.A. Baker; Mrs D.J. Riach; Ms M. Nash; Ms L. Keesing; Ms R.J. Butter;

Mail Returned — no resignation received

Mrs W.E. Crawford.

New Zealand Institute of Medical Laboratory Technology 1984 Technical Assistant's Examination Results.

Q.T.A. in Clinical Biochemistry

ADAIR, Adele Daphne; ANDERSON, Linda; BOLTON, Jane Elizabeth; CAFFERY, Joanne Alice; DEW, Clare Marie; GREIG, Susan Patricia; HARCOMBE, Jacqueline Lillian; HARRISON, Raewyn Louise; JACKSON, Felicity Sue; JOHNSTONE, Robyn Kaye; KNIGHT, Dianne Noelene; MAIN, Janelle Deane; MAYES, Jocelyn; OLDERSHAW, Raewyn Anne; PARTRIDGE, Trudy Marie; PLUNKETT, Jenny Joy; SAINSBURY, Joanne; TOMBS, Adrienne Liane; TREVATHAN, Janice Isabell.

Q.T.A. by General Certificate

SIMPSON, Raewyn.

Q.T.A. in Haematology

AITKEN, Deborah Marie; ANDREW, Jill Mary; BASTIN, Joanne Helen; BENNETT, Andrea; BLUNDELL, Lyn; BUCKLEY, Gabrielle Patricia; BURNS, Catherine Marie; CRAWFORD, Nicola Lucie; CROWE, Judy Kim Ida; CUMMING, Lynda Margaret; DAVY, Helen Wendy; DIXON, Margret Erica; DOUGLAS, Bronwen Pamela; FAMILTON, Karen Joy; KEBBEY, Rowane

N.Z.I.M.L.T. Technical Assistants Examination Committee
1984 Technical Assistants Exam Result Summary

Examination	No Enrol	No Sat	No with each grade A	B	C	D	E	% Pass	AV Mark
Q.T.A. in Clinical Biochemistry	21	19	2	5	12	0	0	100.0	62.4
Q.T.A. by General Certificate	5	5	0	0	1	1	3	20.0	43.9
Q.T.A. in Haematology	25	24	5	10	8	1	0	95.8	66.8
Q.T.A. in Histological Technique	10	10	4	3	3	0	0	100.0	66.5
Q.T.A. in Medical Cytology	13	13	4	5	2	2	0	84.6	67.0
Q.T.A. in Medical Microbiology	14	14	0	2	6	2	4	57.1	51.9
Q.T.A. in Mortuary Hygiene & Technique	3	3	3	0	0	0	0	100.0	81.3
Q.T.A. in Immunology (Immunohaematology).	7	7	1	1	4	0	1	85.7	59.3
Q.T.A. in Immunology (Microbiology).	5	5	1	1	3	0	0	100.0	62.0
Q.T.A. by Special Certificate — Mycology	2	2	0	0	2	0	0	100.0	58.8
Q.T.A. by Special Certificate — Metabolic Biochemistry	1	1	0	1	0	0	0	100.0	72.5
Q.T.A. by Special Certificate — Tissue typing	2	2	1	0	1	0	0	100.0	68.0
Q.T.A. by Special Certificate — Blood Products	4	3	0	2	1	0	0	100.0	66.2
Q.T.A. by Special Certificate — Media Preparation	3	3	1	1	0	0	1	66.7	63.7
TOTAL	115	111	22	31	43	6	9	86.5	62.7

Elizabeth; KNEEBONE, Delwyn Gaye; LIDDLE, Andrea Robyn; McKAY; Alister Duncan; OWEN, Alice Lloyd; PEARCE, Lorraine Alison; STIRLING, Kim Michelle; STROUD, Susan Lynda; WOODS, Vivienne Anna.

Q.T.A. in Histological Technique
BROWN, Victoria Mary; DENT, Helen: EAGAR, Raewyn Lesley; GOODYER, Cheryl Anne; HOLDEN, Linda Karen; McCOOL Bernadette Anne; ROBINSON, Jo-Anne Marie; TOFILAU, Christina Daisy; WOOD, Denise Heather; WOODWARD, Leigh Margaret.

Q.T.A. in Medical Cytology.
BROWNE, Karen Elizabeth; CARTER, Julia Helen; COOPER, Lynette Anne; HEMMING, Margaret Ann; INGLE, Jennifer Anne; MILLER, Gail Lynette; MURRAY, Kimberly Julie; PRICE, Kathleen, Marie; ROY, Jacqueline; SHARP, Ann Marie; STANLEY, Dianne Joan.

Q.T.A. in Medical Microbiology
BEACHAM, Julia Sharon; LITTLE, Bronwyn Jane; McANDREW, Agnieszka; McCABE, Anne Margaret; McLEAN, Christina Anne; TRESIDDER, Megan Joy; TREVATT, Sarah Victoria; WALKER, Jillian Rae.

Q.T.A. in Mortuary Hygiene & Technique
GREEN, Douglas; HUEGE DE SERVILLE, David Mark; WHARTON, Robert John.

Q.T.A. in Immunology (Immunohaematology)
BROWNLIE, Kim, Leanne; HALL, Louise Lyndsey; SCOTNEY, Karen Bigg-Wither; TAEFU, Tavai Uliuli; THOMPSON, Alan Michael; WELMAN, Liberta Patricia.

Q.T.A. in Immunology (Microbiology)
ABBOTT, Josa Marianne; CHRISTOPHER, Patricia; MacKENZIE, Jillian Esme Sommervell; MOYNAN, Julie Karen; O'BRIEN, Sharon Bernadette.

Q.T.A. by Special Certificate — Mycology
BROWN, Christine Dawn; GILBERT, Michelle Ann Reynolds.

Q.T.A. by Special Certificate — Metabolic Biochemistry.
WALSH, Diane Kerry.

Q.T.A. by Special Certificate — Tissue Typing
KRAVCENKO, Susan Marguerite; WHITE, Jackie.

Q.T.A. by Special Certificate — Blood Products
DOCHERTY, Colleen Joy; FLAVELL, Leigh; FOLI, Faye Fane.

Q.T.A. by Special Certificate — Media Preparation
HOPPER, Pamela Kaye; PATERSON, Maree Anne.

N.Z.I.M.L.T. SCHOLARSHIP

The NZIMLT Scholarship was won this year by Christine Hickton of Christchurch Hospital. Below is her successful application form which clearly shows how to set it out.

New Zealand Institute of Medical Laboratory Technology (Inc)
N.Z.I.M.L.T. SCHOLARSHIP
Application Form

Date of Application: 12 March 1984

Full Name, Age and Address: Christine Mary Hickton, Age: 32, c/o 16 Ihie Street, Palmerston North.

Status of NZIMLT membership and date obtained: August 1983 Fellowship

Professional Experience:
August 1969 — December 1972 Trainee Palmerston North Public Hospital
January 1973 — December 1974 Trainee Princess Mary Hospital for Children Auckland: Part II and Part III Haemaology
January 1975 Staff Technologist Coagulation Unit Blood Transfusion Service Auckland
June 1976 — September 1977 Technologist in charge Coagulation Unit Blood Transfusion Service Auckland.
December 1977 — May 1978 Technologist Serology Dapartment Pearsons Laboratory Christchurch
May 1978 — March 1984 Technologist in charge Coagulation Unit Christchurch Hospital
May 1984 — December 1984 Research Fellow. Department of Coagulation Disorders, Allmanna Sjukhuse, Malmo Sweeden.

Papers Published and/or Resume of Participation in Research:
Beard MEJ and Hickton CH
Prekallekrein (Fletcher Factor) Deficiency in Typhoid Fever
Arch Intern Med.

Romeril KR Hickton CM Hamer JW and Heaton DC
Heparin Induced Thrombocrytopenia: Case reports and a Prospective Study NZ. Med J.

Beard MEJ and Hickton CM
Haemostasis in Heat Stroke
Br. J. Haem

Wyld PJ and Hickton CM
Recurrent Deep Veir Thrombosis and an Acquired Abnormality of Fibrinolysis (abstract) NZ Med J. (In Press)

Short discourse of not more than 200 words on the reasons for applying for the Award:

I am going to be working as a Research Fellow at the Coagulation Research Laboratory, University of Lund, Malmo Sweden, for a period of six months. The position is an unpaid one, although accommodation is provided.

I am interested in pursuing two main areas of research while in Malmo. These are the investigation of thrombotic disorders and factor VIII. The Laboratory in Malmo is a world leader in these two areas. I am keen to learn the variety of methods they use to measure functional activity and immunological properties of proteins of the fibrinolytic system as fibrinolyis is an area of haemostasis which has been neglected in this Country. Investigations of the factor VIII protein currently underway in Malmo includes the assay of von Willebrand factor multimes and the use of both chromagenic substrates and monoclonal antibodies in the assay of factor VIII.

I am applying for this award to assist me in accepting this opportunity to gain further knowledge in these two araas and gain the valuable experience of working in a leading laboratory.

NZIMLT Scholarship

Applications are invited for the NZIMLT Scholarship. Details of this scholarship is set out below.

This award, consisting of $500 kindly donated by NZIMLT, is to be used **either** for the purpose of funding a research project which cannot otherwise be undertaken **or** to attend an overseas scientific meeting. The Scholarship is open to all financial members of the NZIMLT. Applications must be made on the official application form available from the Secretary of the NZIMLT.

Acceptance of the Scholarship will require the recipient **either** to prepare an article for publication in the NZIMLT Journal relating to that research **or** prepare a full report on the meeting attended for publication in the NZIMLT journal.

Applications close on 1 **July 1985** with the Secretary, NZIMLT, Haematology Dept, Christchurch Hospital, Christchurch. The successful applicant will be announced at the Annual Scientific Meeting.

ELI LILLY AWARD

The Eli Lilly Microbiology Scholarship was won this year by Elizabeth Poole of Dunedin Hospital. Below is her successful application form which clearly shows how to set it out.

New Zealand Institute of Medical Laboratory Technology (Inc)
Eli Lilly Microbiology Scholarship
Application Form

Date of Application: 22 June 1984

Full Name, Age and Address: Elizabeth Sally Poole, Age 33, Virology Laboratory, Dunedin Public Hospital, Private Bag, Dunedin

Status of NZIMLT membership and date obtained:
Ordinary Member NZIMLT 1975

Professional Experience:
Bachelor of Science (Microbiology) 1974. Since 1974 I have been working in Virology at Dunedin Public Hospital. For the past seven years I have been in charge of this laboratory supervising a staff of four other people.

Papers published and/or resume of participation in research:

PUBLICATIONS

1. Paul, C.E., Poole, E.S. Rubella immunisation history as a guide to immunity. J. of Epidemiology and Community Health 1983; 37:75-77.

2. Paul, C.E., Poole, E.S. Rubella immunisation and immunity in a defined population. NZ Med J 1983; 96:557-60.

CURRENT RESEARCH PROJECTS

a) *Rotavirus detection.* Latex agglutination has been used to detect various microbiological antigens. I have evaluated this methodology as an initial screening test for detecting rotavirus in faeces. The results indicate that this is a rapid, simple, inexpensive test that can be used in nonspecialised laboratories.

I am presenting a paper entitled "Latex agglutination for rapid detection of rotavirus antigen in faeces" at the NZIMLT Conference in August 1984.

b) *Chlamydia trachomatis.* This has become the most dominant sexually transmitted disease. It is likely that chlamydial infection will become a notifiable disease and contact tracing

will apply. This would increase the demand for the exacting chlamydia culture. I am examining:- whether monoclonal antibody will detect chlamydia in direct smears; whether the smears taken are satisfactory for this technique; the relationship of other genital pathogens to chlamydial infection; and the incidence of infection in the Dunedin population.

c) *Coxsackie virus serology.* I am developing an antibody capture enzyme immunoassay for detecting IgM and IgG antibody to coxsackie viruses. Coxsackie viruses are involved in causing pericarditis and myocarditis and may be associated with the myalgic encephalomyelitis syndrome.

Short discourse of not more than 200 words on the reasons for applying for the Award:

Diagnostic Virology is expanding quickly with many new techniques for rapid diagnosis becoming available. I want to meet with other diagnostic virologists to discuss techniques, solve problems and compare standards.

For this reason I am attending the Sixth International Congress of Virology at Sendai, Japan, between 1-7 September 1984. An extensive range of workshops conducted by world experts are being held as well as many scientific symposia. While I am there, I will have the opportunity to join with other virologists forming the Asian Group for Rapid Viral Diagnosis. It is proposed that this Group will disseminate new information on rapid techniques as it becomes available. I expect to be able to expand and improve our diagnostic service as a result of attending this Congress.

The Otago Hospital Board has granted me leave with pay, but I have to raise the majority of the expenses myself and I would therefore appreciate the help of this Scholarship.

Eli Lilly Microbiology Scholarship

Applications are invited for the Eli Lilly Microbiology Scholarship. Details of this scholarship are set out below.

This award, consisting of $500 kindly donated by Lilly Industries (NZ) Ltd, is to be used **either** for the purpose of funding a research project which cannot otherwise be undertaken **or** to attend an overseas scientific meeting. The scholarship is open to all financial members of the NZIMLT currently working in the field of Microbiology. Applicants for the Scholarship must apply on the official application form available from the Secretary of the NZIMLT.

Acceptance of the Scholarship will require the recipient **either** to prepare an article for publication in the NZIMLT journal relating to that research **or** prepare a full report on the meeting attended for publication in the NZIMLT journal.

Applications close on **1 July 1985** with the Secretary, NZIMLT, Haematology Dept, Christchurch Hospital, Christchurch. The successful applicant will be announced at the Annual Scientific Meeting.

The following is a report from M.D. McCarthy, Diagnostic Laboratory — the winner of the 1983 Eli Lilly Award — who attended the Annual Meeting of the American Society for Microbiology in St Louis, U.S.A.

St Louis, Missouri is renowned for many historical features of the American way of life. Principally, it was the "Gateway to the West" as the many pioneers pushed from the east across the Mississippi at St. Louis towards the west, thus creating the famous catchphrase "go west young man".

In March 1984, downtown St Louis looked to the casual visitor as if many millions had indeed "gone west" and left behind a somnolent city with a run-down central commercial area, left behind a magnificent Arch rising some 630 feet above the adjacent Mississippi, and left behind wide streets protected on each side by high drifts of packed snow.

However, appearances were deceptive, as some 10,000 microbiologists assembled in the Cervantes Convention Centre in downtown St. Louis to attend the 84th Annual General Meeting of the American Society for Microbiology.

Registrants to the meeting came from all over the World, several from the U.K., continental Europe, the Arab states, Southern Africa, Japan, Korea and China. Australia was represented by one technologist from Sydney and I was the only person from New Zealand.

All overseas registrants were greeted warmly at the registration area, passed from one area to another until finally, all the formalities were completed in a small area labelled "PROBLEMS". Efficiency was the keynote and the 10,000 registrants were organised through a central area containing some 100 computer terminals and 300 local volunteer staff.

The scientific sessions commenced on Monday 5th March at 8.00 a.m. in 11 concurrent fora, staged in nine different venues spread through downtown St Louis. There was an efficient fare bus service operating through all the accommodating hotels to all the venues, and shuttle buses ran between the Conference venues during the day to transport delegates to the various fora and poster displays.

Walking between venues appealed to me as a means of exercise but once was enough! The distance was not great — some 2 miles — but at 26°F with a 15 m.p.h. wind and a chill factor of 8, the brisk pace did not in any way compensate for the freezing cold.

The Trades Display operated from 9.00 a.m. to 5.00 p.m. Monday to Wednesday and some 1500 displays were open and available for business. The displays were all together in an area of about one acre. Each enquiry to a stand meant that you surrendered your identification label — a credit card piece of plastic — and this was "zip zapped", thus, giving the Company an accurate record of your name, address and interests. There was no wasted time checking spellings, addresses etc., or trying to decipher the "Noo Zilan" accent.

The Program and Abstracts weighed 1.5 kg and consisted of 550 pages listing all the papers presented in each session plus the abstract of each paper. The seminar sessions commenced at 8.30 a.m. and finished at 11.45 a.m. with, usually, 4-6 speakers developing a common theme. The second seminar would commence at 1.30 p.m., concluding at 4.00 p.m. and, on two evenings, there were special shorter seminars from 7.30 p.m. to 9.30 p.m.

From Monday to Friday, there were 250 seminars covering such diverse topics as "Aspects of Supramolecular biology of *Escherichia coli*" through "Characterisation of microbes from extreme environments" to "Status of minority microbiologists, primary concerns" — something for everybody!

80% of the information disseminated at the Conference was available through the Poster Sessions. Up to 250 posters in a session were displayed in a central area and at least one of the authors was in attendance with the poster presented. All sessions had common subjects and it was not uncommon to find posters expressing opposite views on display face to face. This lead to frank, sometimes heated, and always interesting discussion between the authors and the circulating people.

Posters were displayed in sessions at 9.00 a.m., 11.00 a.m., 1.00 p.m. and 3.00 p.m. each day. The session lasted for 90 minutes and on some occasions, you had to move smartly from a seminar session to check a poster session that you were interested in.

There were 100-120 posters displayed per session which meant that a total of some 2,500 posters were on display — an impressive ratio of contributors/attendees.

The subjects covered were particularly diverse and I admit to not spending much time with the authors of "Response of the Heterotrophic Microbial Communities of Lake Hoare, Antarctica, and Mountain Lake, Virginia, to High Dissolved Oxygen". However, a session on Antimicrobial Susceptibility containing some 80 posters made for some rapid reading within a 90 minute time frame.

Wednesday 7th March was designated Student Science Day and some thousand local high school and undergraduate college students were introduced to microbiology, attending sessions on "Applied and Environmental Microbiology", "Veterinary Microbiology" and "Control of Human Diarrhoeal Disease" as well as touring through the scientific and technical exhibits.

19 subjects were offered in workshops on the Saturday/Sunday prior to the meeting by the A.S.M. and for between US$125 — S175 you could attend these workshops ranging from

"Staphylococcal foodborne illness", "Hybridoma technique and application", "Evaluation of patients with A.I.D.S." to "Need assessment and selection of computer systems".

The overall attendance at St. Louis was 10,000 — somewhat down on previous years. Local people attributed this to the Government clamp on medical spending (sound familiar?) but non-locals tended to criticise the location. In 1985 the venue will be Las Vegas and the registration is expected to rise to at least 15,000.

The American Society for Microbiology draws its membership from all fields of microbiological endeavour and to some extent the medical/clinical microbiology section does not rate too highly in the organisations list of priorities. This was illustrated when the first seminar "Bacterial identification Systems — Current Status" was allocated the Mississippi Ballroom in the Clarion Hotel. Seating was organised for 1000 people and 15 minutes prior to the session commencing, all the seats were occupied, as were the aisles and most of the space available along the walls. Meanwhile, next door, in a larger ballroom, the aquatic microbiologists had a session with some 100-150 attendees!

All the Americans I met at the Conference were well informed of New Zealand — mainly that we had more sheep than people and we were close to Australia (they knew of the America's Cup) — expressed a genuine desire to know more about our country, our laboratory technology, equipment availability etc. I found them most hospitable and generous in giving their time to discuss specialist interest items and most enquiries that I left with them have produced prompt, courteous replies.

I would like to acknowledge the assistance of Eli Lilly (N.Z.) Limited in helping me to attend this meeting and to meet with many of the top American microbiologists and manufacturing companies.

Michael D. McCarthy,
Diagnostic Laboratory,
AUCKLAND.

Initial Announcement

South Pacific Congress on Medical Laboratory Science
Sydney, Australia August 18-22, 1986

General Information

Host Bodies

The Australian Institute of Medical Laboratory Scientists is proud to host the joint meeting of the AIMLS and the NZIMLT.

Aims of the Congress

To promote medical laboratory science in the South Pacific.

Congress Venue

Sydney Hilton International.

Congress Secretariat

All enquiries and correspondence should be addressed to:
The Secretariat
South Pacific Congress on Medical Laboratory Science
G.P.O. Box 2609
Sydney, N.S.W.
Australia, 2001
Telephone: (02) 241 1478; (02) 27 6940
Telex: AA74845 CONSEC
Cables: CONVENTION Sydney

Climate

Although August is winter in Sydney, you can expect sunny crisp days and cold nights. The average temperature range between 17°C (63°F) during the day to 9°C (48°F) during the night.

Sydney — The Host City

Sydney, capital of the State of New South Wales, is Australia's oldest and biggest city. From its humble beginnings as a penal settlement in 1788 it has grown into one of the greatest cities in the Southern Hemisphere with a population of over 3.5 million.

Built around one of the most beautiful harbours in the world and along miles of golden beaches, Sydney is the gateway to Australia, a major industrial and business centre and the busiest port in the South Pacific.

Sophisticated, cosmopolitan and vigorous, Sydney is fascinating in its variety and its beauty.

Plan to Attend

Circle 60 on the readers replay card to ensure that you are sent further information about the Congress as it becomes available. This adds your name to our mailing only and does not place you under any obligation.

Programme

Scientific Programme

The scientific programme will consist of plenary sessions, concurrent symposia and poster sessions.

The symposia will allow a concentrated analysis of particular subjects that will be sufficiently broad to interest scientists from varied backgrounds.

Posters will be organised into "synthesis sessions" with a chairman and panel. Presenters of posters will have the opportunity to speak for several minutes to their poster. As such the poster sessions will be a combination of a paper and a poster.

A call for papers to be presented as posters will be distributed with the registration brochure in August/September 1985.

Social Programme

To provide a change of pace from the scientific sessions, delegates and their accompanying guests will have many opportunities to meet socially and to renew and develop friendships.

Sydney is famous for its spectacular Opera House, its magnificent harbour and Harbour Bridge, its excellent seafood and its many golden surfing beaches.

A programme of official and optional social events and excursions will be arranged to take full advantage of these features — harbour cruises, visits to nearby sanctuaries to see our unique animals, tours of Sydney's historic areas, visits to the Opera House, art galleries and restaurants.

Travel information

Planning your Travel

QANTAS, Australia's Airline, has been appointed the official international carrier for the Congress. ANSETT has been appointed the official domestic carrier.

Offices of Qantas and Ansett have been informed regarding arrangements made for the Congress and will be pleased to provide advice regarding your travel plans and to co-operate with your travel agent.

Pre and Post Congress Travel in Australia

There are many exciting places to visit in Australia and tours will be arranged to places such as the Great Barrier Reef and Ayers Rock.

Special note should be taken regarding substantial discounts which are available on airfares in Australia to visitors from overseas. Your travel agent or the offices of Qantas or Ansett will give you valuable advice on "See Australia" airfares.

Various discounted and excursion fares are available to Australian residents and you should ask your local Ansett office of the most convenient and economical fares before you travel.

Exhibition

A comprehensive commercial exhibition will be held in conjunction with the Congress.

The exhibition will be held on Level 9 of the Sydney Hilton Hotel from Wednesday, August 20 to Friday, August 22 inclusive.

For further information, please contact the Secretariat.

SITUATIONS VACANT

MICROBIOLOGY TECHNOLOGIST

A vacancy exists in a Private Medical Laboratory for a qualified Technologist. This is a charge position in a small but busy laboratory.

Applications or further enquiries can be made to: **The Pathologist, Medical Laboratory, 119 Don Street, Invercargill.**

MEDICAL AID ABROAD (Auckland Branch) has available current lists of vacancies overseas for a variety of health workers, both paid and volunteer. Further information will be supplied on receipt of a SAE and a donation of $2.00 to cover copying costs. For further information write to: **The Secretary, Medical Aid Abroad, P.O. Box 3983, Auckland 1.**

LABORATORY TECHNICIAN
SCHOOL OF HEALTH SCIENCES,
CENTRAL INSTITUTE OF TECHNOLOGY

A laboratory technician is required for the School of Health Sciences at the Central Institute of Technology. Duties will be mainly associated with N.Z.C.S. (Medical Science) Courses. The Technician is responsible for the preparation and setting up of the practical work for this course.

Applicants must have experience in the field of Haematology and Microbiology and will preferably hold a N.Z.C.S. (Medical Science) qualification or equivalent. The successful applicant will be required to commence duties on 4th February, 1985. Remuneration will be $14,447 — $16,859 + $417 cost of living allowance, depending on qualifications and experience.

Further enquiries should be addressed to **Marie L. Knight, Head of School of Health Sciences, Central Institute of Technology, Private Bag, Trentham, Phone 288-169, ext. 763,** with whom applications close on 7th December 1984.

WORK WANTED

SITUATION WANTED

BRITISH MEDICAL LABORATORY SCIENTIFIC OFFICER seeks employment of a senior scientific nature in the field of clinical or forensic toxicology in New Zealand. I am a qualified graduate in toxicology with 12 years experience in hospital biochemistry laboratory.

Please contact: **Mr T.P. Cramp, FIMLS, CBiol MIBiol, 9 Reading Street, Broadstairs, Kent, England.**

APPOINTMENT WANTED IN NEW ZEALAND LABORATORY

U.K. State Registered Medical Laboratory Scientist (Clinical Chemistry) with 11 years post-registration experience including the last 4 years as Senior.
M.Sc., F.I.M.L.S., Cert. in Medical Laboratory Management.
Eligible for registration with N.Z.M.L.T. Board.
40 years old.

Replies to: Clifford D. Abiaka, 16 Marsham Close, Acorns, Aylesbury, Bucks. HP21 7XB England. Phone No. (0296) 89488.

Bachelor of Laboratory Technology graduate, seeks appointment as Junior Technician. Will consider any area of medical laboratory science. CV on request.
Please reply to: D. Chiang, 4/F 178 Junction Rd. Kowloon, Hong Kong.

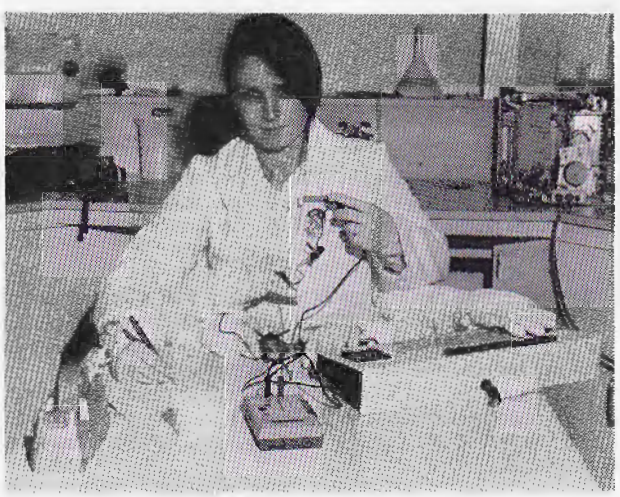
Answers to Histology Continuing Education Questions

1. a,b.
2. a,b,d.
3. a.
4. b,d,e.
5. a,b,c,d,e.
6. a,b,c.
7. d.
8. a,b.
9. a,b,c.
10. c,e.

Answers to Biochemical Calculations
Section III: Molecular Weights

1. 3.00
2. 5.00
3. 7.00
4. 2.00
5. 12.4,1.6
6. 2.8,11.2
7. a) 6.68
   b) 7.68
   c) 8.68
8. a) 32 mmol/l, 316 fmol/l
   b) 32 μmol/l, 316 pmol/l
   c) 56 nmol/l, 178 nmol/l
   d) 1.5 nmol/l, 6.3 umol/l
   e) 1.26 pmol/l, 7.94 mmol/l
9. 35.5 — 44.7 (note reversal)
10. 4.60
11. 8.70
12. 1.48
13. 11.68
14. 13.10
15. 1.54

POETS CORNER



The Latest in Multi-Functional Technologists.

Here I am, you see, looking somewhat like a tree;
But ah! the varied work that I can do!
The lab can leave to me work that would be done by three,
And I'm very good directing traffic, too!

These attributes were planned; they injected insect gland,
(While telling me the stuff would do no harm.)
A finger, then a hand sprouted on my left side, and
The right began to grow a tiny arm.

I watched the new limbs sprout, grow to size, and wave about,
(I tell you, though, the wretched things did itch!)
I had a niggling doubt as the extra arms grew out;
The bosses said, "Don't worry, you'll be rich!"

And when the skin and bone of these extra arms had grown,
I had to learn to operate the things.
At first the muscle tone was bad; they felt like stone,
And I had to wear quadruple folded slings.

My strength then quickly grew with an exercise or two,
And soon my arms were ready, strong, and fit.
I was a sight, that's true, quiet an oddity to view;
The bosses said that mattered not a bit.

However, now I find that I wish I had declined
Their offer of so many extra arms;
My poor befuddled mind is so often left behind
By this large array of fingers, wrists and palms.

And have you ever tried, with three arms on either side,
To co-ordinate the movements of each hand?
It's not good for my pride when my bosses all deride
All my best attempts; they just don't understand!

I'm getting quite distraught, for my daily life is fraught
With problems, such as finding things to wear.
My clothes cannot be bought, and my seamstress must be taught
How to sew my shirts with armholes everywhere

When I think about my plight, then I often think I might
Have the extra arms cut off without delay;
But, it all may come out right, and my future may be bright —
And I certainly can use the extra pay!

Robin Cooper

Student's Slips

1. Charles Darwin was a naturalist who wrote the Organ of the Spices.
2. Three kinds of blood vessels are arteries, veins and caterpillers.
3. The dodo is a bird that is nearly decent now.
4. To remove air from a flask, fill the flask with water, tip the water out and put the cork in quick.
5. A litre is a nest of young baby animals.
6. The process of turning steam into water again is called conversation.
7. A magnet is something you find in a bad apple.
8. The school is ventilated by hot currents.
9. The earth makes a resolution every twenty-four hours.
10. The cuckoo does not lay its own eggs.
11. To collect fumes of sulphur, hold a deacon over a flame in a test tube.
12. Typhoid fever may be prevented by fascination.
13. Parallel lines never meet unless you bend one or both of them.
14. Algebra was the wife of Euclid.
15. Algebraic symbols are used when you do not know what you are talking about.
16. Geometry teaches us to bisex angels.
17. An axiom is a thing that is so visible that it is not necessary to see it.
18. A circle is a line which meels its other end without ending.
19. The moon is a planet just like the earth only deader.
20. The pistol of a flower is its only protection against insects.
21. An example of animal breeding is the farmer who mated a bull that gave a great deal of milk with a bull with good meat.
22. English Sparrows and Starlings eat the farmer's grain and soil his corpse.
23. By self-pollination, a farmer may get a flock of long-haired sheep.
24. If conditions are not favourable, bacteria go into a period of adolescence.
25. Dew is formed on leaves when the sun shines down on them and makes them perspire.
26. Vegetative propagation is the process by which one individual manufactures another individual by accident.
27. Sea water has the formula CH_2O.
28. A super saturated solution is one that holds more than it can hold.
29. A triangle which has an angle of 135° is called an obscene triangle.
30. The hydra gets its food by descending upon its prey and pushing it into its mouth with its testacles.
31. Blood flows down one leg and up the other.
32. The cerebrum is a cavity in the head.
33. A person should take a bath once in tha summer time and not quite as often in the winter.
34. When you haven't got enough iodine in your blood you get a glacier.
35. For fainting: Rub the person's chest, or if a lady, rub her arm above the hand.
36. For fractures: To see if the limb is broken, wiggle it gently back and forth.
37. For dog bite: Put the dog away for several days. If he has not recovered, then kill it.
38. For nose bleed: Put the nose lower than the body.
39. To remove dust from eye: Pull the eye over the nose.
40. For snake bite: Bleed the wound and rape the victim in a blanket for shock.
42. For asphyxiation: Apply artificial respiration until the patient is dead.

NEW PRODUCTS AND SERVICES

UNIQUE VISUAL RECORD MONITORS VACCINE STRENGTH.

A label which indicates temperature variations over an indefinite exposure period has been used by the World Health Organisation (WHO) to assess vaccine potency.

The 3M Brand Monitor Mark time/temperature integrator label releases a blue dye which moves across a time exposure scale when exposed to levels above a pre-set temperature.

WHO found that vaccines for polio, measles and diptheria were often ineffective on arrival at their destination because they had been often exposed to high temperatures during transportation which impaired their potency.

By attaching two 3M Monitor Marks to a card where the date, activation level and location could be recorded, WHO personnel could assess how long the vaccine had been exposed to a higher temperature and the amount of impairment.

3M Monitor Marks can be produced to conform to any temperature level from — 17°C to 48°C over an exposure time of a few minutes to several months as required.

The Monitor Mark can be attached to most surfaces by its pressure sensitive backing and is activated just before a product is stored or transported.

Although until now, the Monitor Mark has been used with vaccines, Mr Denis Crampsie, Marketing Manager of 3M New Zealands Packaging Systems Division, said that it also has wider applications in the frozen food, dairy chemical and pharmaceutical industries where goods have to be maintained at pre-determined temperatures during storage or transportation.

Once the Monitor Mark label is activated, a blue dye moves across five exposure windows reflecting the combined factors of the amount of temperature increase and the period of exposure. A graph assists in interpreting the reading and its effect on the goods being monitored

Using a 3M Monitor Mark establishes better environmental controls over products where temperature changes are critical to product stability and potency. Shipment costs can also be reduced by monitoring weaknesses in the product distribution system which can result in damaged goods.

For further information contact Denis Crampsie 3M NZ Box 33246, Takapuna Auckland 9, or circle 61 on the readers reply card.

FLUORESCENCE MICROSCOPE FOR CHLAMYDIA DIRECT SPECIMEN TEST

Chlamydia trachomatis is a widespread causative agent of sexually transmitted diseases.

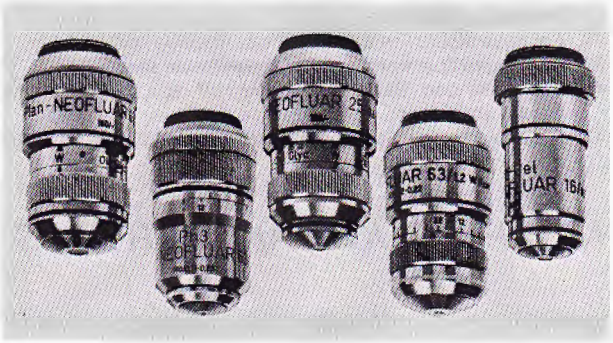
Most staining methods cannot detect elementary bodies and, so far chlamydial diagnosis has been on tissue cultures.

With the introduction of direct specimen tests — e.g. SYVA'S

MICRO TRAK — using specific FITC conjugated monoclonal antibodies, diagnosis is rapid and easy-to-perform.

CARL ZEISS has assembled a specific incident light fluorescence package. Based on the popular Standard 16 Microscope, the IVFL Fluorescence Condenser is equipped with a high performance filterset No 16 peaking at the recommended maximum of 480nm. Chlamydial elementary bodies are typically in the order of 0.2 to 0.4 microns and the special optical equipment includes objectives with extremely high numerical apertures both, for rapid screening and accurate morphological diagnosis.

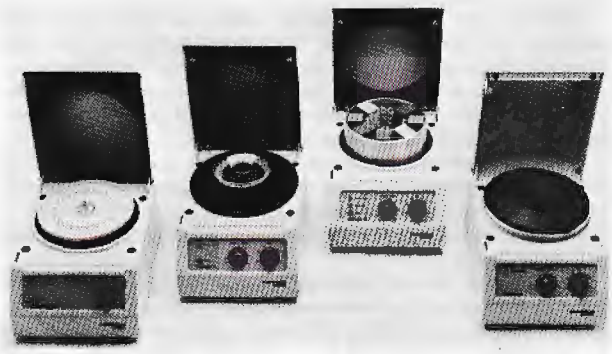
For information please contact: Carl Zeiss Pty. Ltd., 6th Floor, 4 Seasons Plaza, 22 Emily Place, Auckland 1 or **circle 62 on the readers reply card.**



MULTI-IMMERSION MICROSCOPE OBJECTIVES

The Plan-Neofluar multi-immersion objectives are designed primarily with fluorescence microscopy in mind where the examination of weakly fluorescing materials are the subject of critical analysis. Available for brightfield and Nomarski DIC or phase contrast applications, they can, in addition to water and conventional immersion oils, be used with glycerine, paraffin, silicon oils and other immersion media, provided they are chemically inert. Their chromatic correction, high numerical apertures, high transmission and low residual fluorescence make them suitable for fluorescence microscopy. The 25x and 40x objectives incorporate correction collars which can be adjusted for either covered or uncovered specimens with different immersion media, while the 16x objective does not require adjustment.

For information please contact: Carl Zeiss Pty. Ltd., 6th Floor, 4 Seasons Plaza, 22 Emily Place, Auckland 1 or **circle 63 on the readers reply card.**



BENCH TOP CENTRIFUGES

Four bench top centrifuges are available through Smith-Biolab agents for Heraeus-Christ, Osterode.

Haemofuge® A is a centrifuge for the rapid determination of the cell volume of blood, according to the German Standard 58933. It is equipped with a 24-place capillary rotor, which is accelerated to a top speed of 12 000 rpm, equivalent to 14 890 x g. The control panel includes an illuminated push button for mains, a run indicator light, timer for runs up to 15 minutes, and an electro dynamic brake which comes into effect upon expiration of the pre-selected time.

Biofuge® A is a combined microliter/Haematocrit centrifuge. Angle rotors for microtubes of different sizes — up to 40 tubes per run — can be inserted, as well as a 24-place haematocrit rotor for the determination of blood cell volume. With a top speed of 13 000 rpm the Biofuge® A attains the considerable centrifugal force of 17 390 x g.

Biofuge® B has — compared with Biofuge® A — a considerably higher capacity. With a capacity of up to 160 microtubes the model B offers an alternative for laboratories which have to process a large number of samples every day. BIOFUGE® B accommodates a drum rotor for eight interchangeable tube racks for microliter tubes of different sizes, top speed 11 000rpm equivalent to 11 630 x g. In addition, a 24-place capillary rotor for the determination of blood cell volume can be used.

Medifuge® is a small centrifuge for use in the physican's laboratory and in small hospitals, equipped with an angle rotor for accommodation of 12 tubes of 15ml. Vessels of a total length up to 131mm can be used alternatively in a sixplace rotor. A relative centrifugal force of 3030 x g is attained at top speed of 5300 rpm. For further information, contact Smith-Biolab Ltd, Scientific Products Division, Private Bag, Northcote, Auckland or **circle 64 on the readers reply card.**

HELENA ELECTROPHORETIC EQUIPMENT

Before the Medical Technologist Conference in Dunedin, Keith Fairchild from Helena Laboratories held a series of Electrophoresis Workshops throughout the country culminating with the demonstration of Densitometers on the Smith-Biolab stand at the Conference itself.

The instrumentation covered a broad range and price for Densitometers from the Quickscan Jr to the Cliniscan, and were well received by those attending.

Keith also demonstrated the Titan Gel Agarose Kits such as High Resolution Protein and the Silver Stain Kit. The Titan Gel Chamber, Cooling Chamber and power supplies were used to demonstrate these techniques.

All consumerable reagents and instrumentation for Clinical Electrophoretic Techniques may be obtained from Helena Laboratories.

For more details contact: Scientific Products Division Smith-Biolab Limited, Phone: Auckland 483-039, Wellington 697-099 Christchurch 63-661, or **circle 65 on the readers reply card.**

WHITTAKER M.A. BIOPRODUCTS

Whittaker M.A. Bioproducts are now available through the Scientific Products Division of Smith-Biolab Ltd.

This exciting Agency offers a complete range of Viral Reagents for Complement Fixation, a chromogenic test for Limulus Amebocyte Lysate, Elisa Immunosorbent Assay test kits such as Rubelisa, Cytomegelisa, Toxolisa, Chlamydelisea, Herpes, Measles, Mumps, Elisa.

Primary Kidney cells (Monkey and Rabbit) are routinely available with special shipping arrangements.

Components are available for Chlamydia and Herpes Isolation and Fluorescein conjugated antisera to Human Virus such as Adenovirus, Cytomegalovirus and Herpes.

For further information, please contact: Scientific Products Division, Smith-Biolab Limited, Phone: Auckland 483-039, Wellington 697-099, Christchurch 61-661, or **circle 66 on the readers reply card.**

LEADING BENCHTOP CENTRIFUGE OFFERS ADVANCED FEATURES AND SIMPLIFIED CONTROLS

The new Centaur 2 is the latest remarkable advance in bench top centrifuges from MSE. Bringing together the superb advantages of versatility, efficiency and safety which established Centaur 1 as the leading benchtop centrifuge, Centaur 2 really excels itself in terms of ease of operation and accuracy.

Centaur 2 incorporates a host of safety features that have been developed to meet the highest safety standards; including a 5mm thick guard ring, a four-point burst-proof lid fixing, a lid interlock which prevents access to the moving rotor, bolt down security and an out of balance detector.

Centaur 2 is extremely versatile. With a wide accessory range including 2 angle and 3 swing out rotors, Centaur 2 can also accommodate most existing Minor and Minor 'S' rotors. And Centaur 2 is remarkably simple to use. Centaur 2's stop/start switch means that there is no need to reset the speed between runs, the 0 to 30 minute timer enables runs to be accurately

reproduced. Speed setting and reading is also much easier with Centaur 2.

The new digital speed indicator allows the operator to determine the setting far more quickly and accurately than on conventional analogue instruments. A wide removable bowl facilitates both easy access and cleaning.

When MSE first introduced Centaur 1 it was acknowledged as a major advance in centrifuge production. The development of Centaur 2 with even higher standards of accuracy and ease-of-use will further establish the Centaur as one of the worlds leading bench top centrifuges.

For further information contact: Kempthorne Medical Supplies Limited, P.O. Box 1234, Auckland. Phone: 775-289 or **circle 67 on the readers reply card.**

OSTEOPLAN — A NEW IMAGE ANALYSIS PACKAGE FOR BONE HISTOMORPHOMETRY

The need for quantitative analysis of bone samples became apparent soon after techniques were developed for histology diagnosis of metabolic bone diseases. In addition to morphometric and volumetric data the continuous dynamic process of new bone formation is of vital interest. To date, manual methods for quantification of bone sections are tedious and very time consuming.

The Osteoplan combines the advantages of discriminatory input by the investigator with specialised software for fast data processing. Standard microscopic techniques such as phase contrast and fluorescence are utilised to assemble almost 100 different parameters for each analysis. Statistical evaluation is applied to each parameter.

In addition to the special bone histomorphology program, the system is equipped with a comprehensive software package for measurement and evaluation of all types of images by interactive operation.

For details please contact: Carl Zeiss Pty. Ltd., 6th Floor 4 Seasons Plaza, 22 Emily Place, Auckland 1 or **circle 68 on he readers reply card.**

NEW DIALYZER MEMBRANE EQUAL IN PERFORMANCE, LOWER IN COST

The performance of Elkay's new 'H' type dialyzer membrane for use with Technicon SMAC analyzers is directly comparable with the equipment manufacturers product but costs up to 26% less.

In a series of independent comparison evaluations, the new membrane was shown to achieve similar sensitivities to the Technicon 'H' membrane using control samples. At Elkay's suggested list price of $210 per package of 12, with discounts for quantity purchases, the new membrane can significantly reduce operating costs for laboratories using this analyzer.

Following the introduction of the 'H' type membrane, Elkay now provides a single source supply for replacement components for Technicon SMAC analyzers with a full line of pump tubing, sample cups, dialyzer plates and membranes, filter separators, connector assemblies, flowcells and recorder paper.

Technicon & SMAC are registered trademarks of Technicon Instruments.

For further information contact Medic DDS, P.O. Box 205, Wellington or **circle 69 on the readers reply card.**

CHROMOSOME ANALYSIS ON IBAS

Typically, chromosome analysis consists of two steps, i.e. metaphase search and caryotyping. Both steps can be exceptionally lengthy and therefore expensive.

Through a specially developed software package the IBAS analysis system from Zeiss is now capable of relieving the tedium associated with manual techniques and enables automatic and interactive grouping and pairing.

An on-line scanning stage and auto-focus module is used under low power to locate and store metaphase co-ordinates applying complex hand pass filter operations and cluster analysis algorithmus. Following the low magnification scan where metaphases are ranked in order of suitability, detected plates are automatically relocated under high magnification. In this classification mode the number of chromosomes are displayed together with a caryogram proposal. Overlapping or touching chromosomes can be segregated, rotated, re-paired and artefacts can be eliminated interactively. The final machine caryogram can be output using a TV hard copy unit.

For information please contact: Carl Zeiss Pty. Ltd, 114 Pyrmont Bridge Road, Camperdown NSW 2050 or **circle 73 on the readers reply card.**

LAB-LINE® ORBITAL WATER BATH SHAKERS

LAB-LINE INSTRUMENTS, INC. announces two new Orbital Water Bath Shakers to their broad line of orbital shakers. These new Water Bath Shakers have exclusive features not found on any other orbital water bath shaker. For example, you can choose from two models, a microprocessor controlled or a hydraulic thermostat controlled.

The outer body is constructed of molded polyethylene so it will never chip, rust or corrode. The stainless steel water bath chamber is seamless and has no holes or perforations on the bottom of the tank. This eliminates the possibility of leaks and makes cleaning of the chamber interior fast and easy.

The microprocessor controlled model has digital set and L.E.D. readout for temperature and time. Temperature control is ± .1°C. The electronic timer can be set to time in either minutes or hours. Three audible alarms are standard signalling over temperature, low water and end of shaking time.

The hydraulic thermostat model utilizes two thermostats, one primary and one safety. Temperature control is ± .5°C.

Both models can be set to shake continuously and are designed for rugged and continuous use by incorporating a quiet heavy duty lifetime lubricated ball bearing motor.

Both models utilize solid state speed control and a direct reading tachometer to monitor speed from 25 to 400 RPMs continuously.

For further information contact Wiltons, P.O. Box 31-044, Lower Hutt or **circle 74 on the readers reply card.**

BACTERIURIA SCREENING

The identification of urine specimens which indicate the presence of bacterial infection is a significant concern to most hospital clinicians and microbiology laboratories. Manual media culturing techniques are used by most institutions for purposes of identifying bacterial infection in patient urine specimens at the present time. These techniques are both slow, requiring 24 hours or more for results, and labor intensive. In addition, an average of more than 75% of urine specimens cultured in routine testing environments indicate negative test results. Analytical Luminescence Laboratory has developed a Bacteriuria Screening system which enables the clinician to differentiate positive versus negative urine specimens at critical threshold levels of bacterial concentration in 15 minutes. Only those specimens identified as being "positive" need be processed further for bacterial identification and susceptibility testing.

ADVANTAGES OF THE A.L.L. BACTERIURIA SCREENING SYSTEM:

* SPEED — Results in 15 minutes.
* SENSITIVITY — at 10^4 CFU/ml = 91%
  at 5×10^4 CFU/ml = 98%
  at 10^5 CFU/ml = 99%
* STABILITY — A.L.L.'s Luciferin-Luciferase is stable for:
  8 hours at room temperature
  3 days at + 2°C
* VALUE — A.L.L.'s Bacteriuria Kit is designed to generate 200 actual patient tests. Extra reagent is included to allow for Quality Control and normal waste.

  ATP Standard is included in the A.L.L. Bacteriuria Screening Kit.

  For further information contact: Watson-Victor Ltd, Phone: 593-039, Auckland or **circle 75 on the readers reply card.**

NEW ORGANISATION FOR GENZYME/KOCH LIGHT

Genzyme/Koch Light have announced that Genzyma Biochemicals and Koch Light Fine Chemicals, have formed a new organisation dedicated to serving the Chemical and Scientific Products Trade.

Mr Ralph Gibbs has been appointed as manager, Asia and Pacific Region and Labsupply Pierce (NZ) Limited have been appointed their New Zealand Agents.

ELGA
THE PURE WATER PEOPLE

Elga, the established leaders in water purification offer the most comprehensive range available of deionisers and reverse osmosis equipment for the laboratory and industrial user. The Elga product range offers a wide choice of capacities and flow rates, whilst the modular format of the versatile Spectrum units enables the user to choose precisely the degree of purity required.

Your pure water need may be for HPLC or glass rinsing, tissue culture or solution make-up. Whatever the application, Elga – the Pure Water People have the experience to help you.

Contact your local distributor for full information.

WILTON INSTRUMENTS
A division of SMITH BIOLAB LIMITED

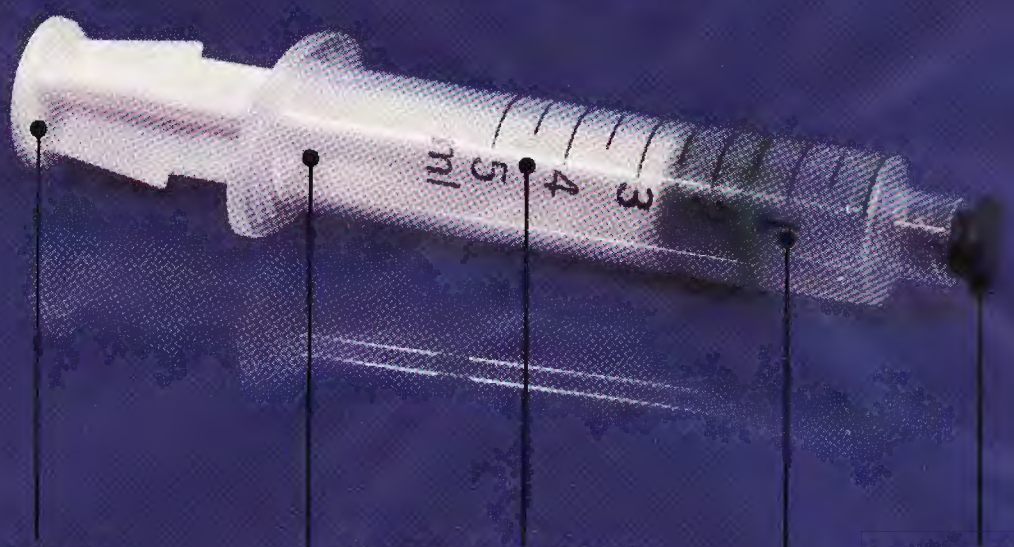
WILTONS
P.O. Box 31-044, Lower Hutt, Phone: 697-099
Private Bag, Auckland 9, Phone: 483-039
P.O. Box 1813, Christchurch, Phone: 63-661

ELGA
The Pure Water People

WN28

circle 87 on the readers reply card

PREZA-PAK®
reflects what you want
simplified arterial blood gas sampling
accurate results



Easy-slide plunger
returns smoothly, easily, automatically under arterial pressure.

Consistent residual heparin amount
The variability is held to a minimum, e.g. 150 micro litre with a 20G needle and 125 micro litre with a 22G needle.

Luer lock fitting
allows direct collection from a stopcock, and is compatible with all standard hypodermic single use luer needles.

Shatterproof plastic barrel
keeps the sample safe even if accidentally dropped, avoids unnecessary repeat collections.

Ready to use
Prefilled heparin sampler. No glass ampoule to break – faster, easier, accurate and safe.

PREZA-PAK® from Terumo is a simplified and more reliable arterial blood gas sampler, ideal for those with their own analytic department. And Terumo's Preza-Pak 'J' Blood Sampling Kit is still available for specific purposes.

If you would like more information on the Preza-Pak range, or if you would like a representative to call, please fill in the coupon and send to:
Terumo, New Zealand Branch, 3 Acorn Street, Royal Oak, Auckland, New Zealand.

TERUMO®

TERUMO CORP. SYDNEY: 54 Buffalo Road, Gladesville, N.S.W. 2111 Tel: (02) 808 2522
TERUMO CORPORATION, Tokyo, Japan
Sales Offices: Brussels/Frankfurt/Los Angeles/Maryland/Montreal/New Jersey/Panama/Paris/Singapore
Manufacturing Plants: Belgium/U.S.A./Australia/Japan

I would like:

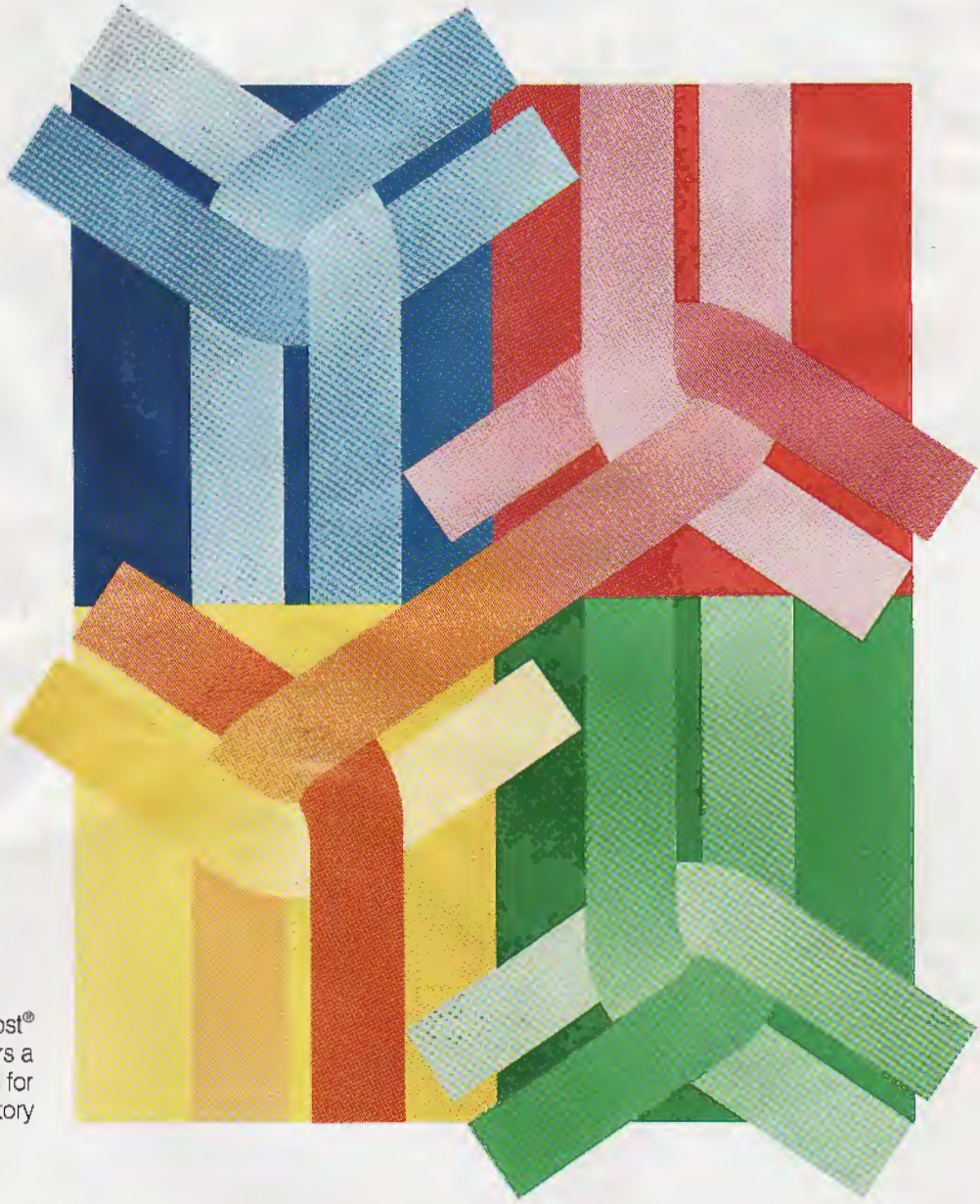
☐ More literature on Preza-Pak range
OR
☐ A representative to call

Name: .....

Address: .....

.....Postcode .....

circle 88 on the readers reply card



Under the label of Enzygnost® Behringwerke Research offers a program of ELISA diagnostics for the Medical Laboratory

Enzygnost®

realizing the full potential of ELISA

LH 00467

Behring Diagnostics
Hoechst New Zealand Limited
C.P.O. Box 67, Auckland
Phone 578-068. Telex 2338

BEHRING

E. v. Behring

circle 89 on the readers reply card