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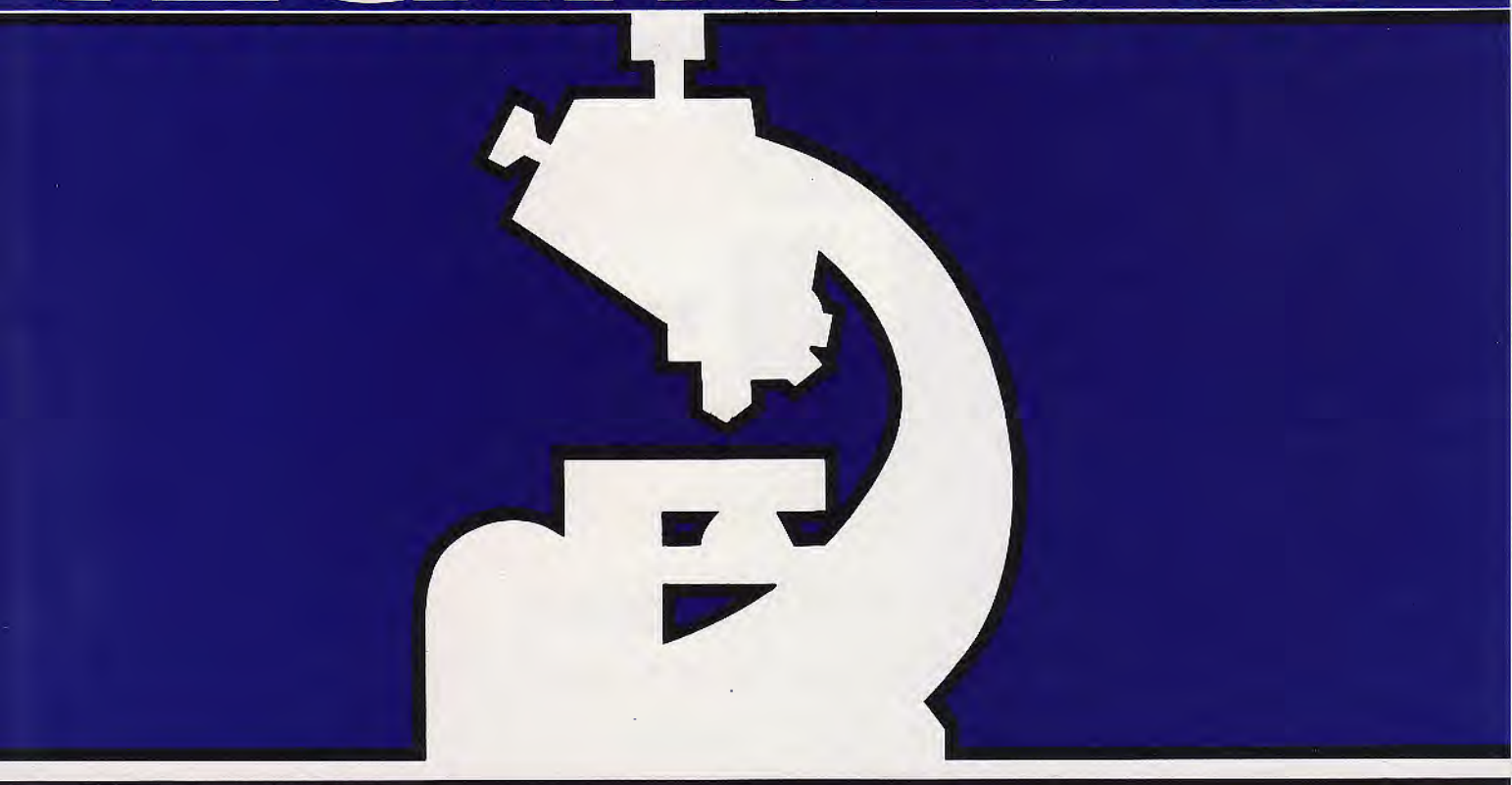
NEW ZEALAND JOURNAL OF

MEDICAL LABORATORY TECHNOLOGY



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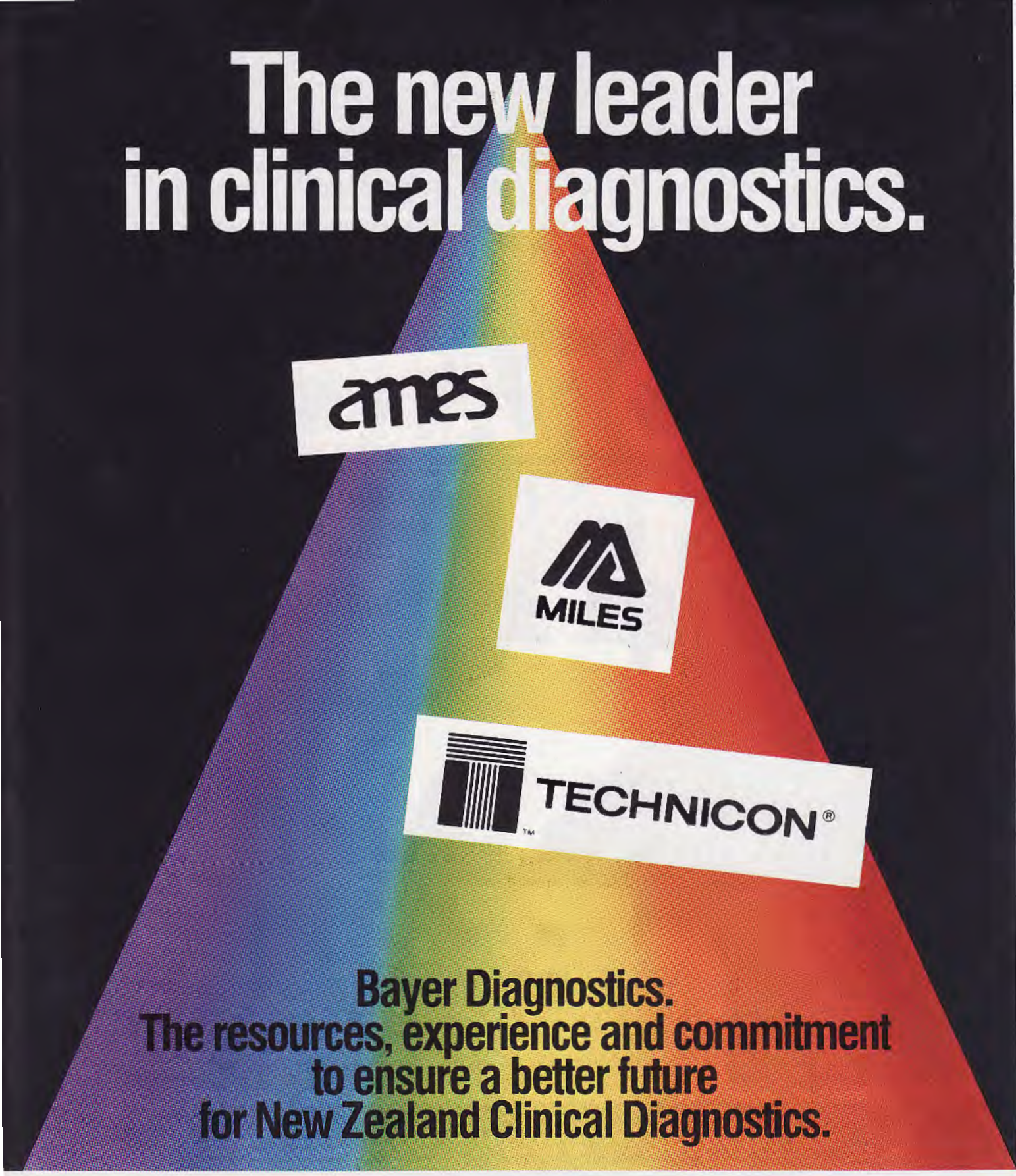

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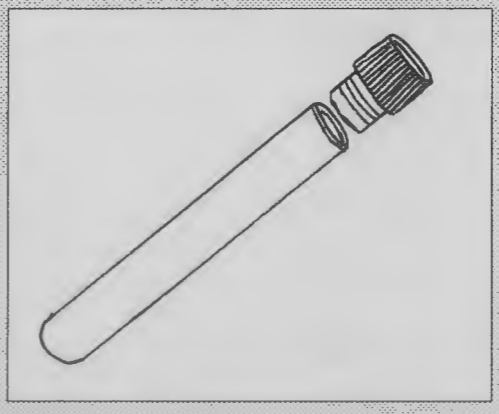

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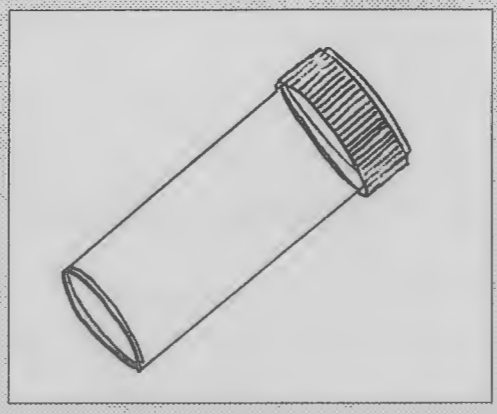

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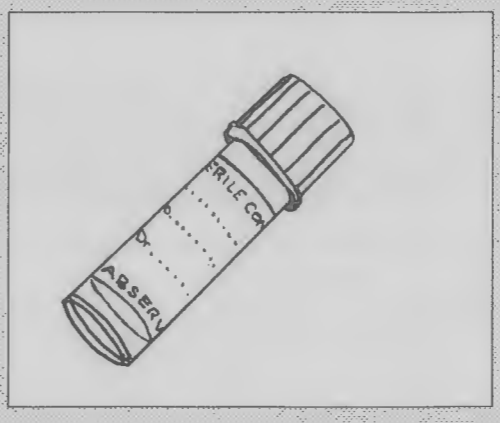

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THE NEW ZEALAND JOURNAL OF
MEDICAL LABORATORY TECHNOLOGY

Vol. 44 No. 2 May 1990 ISSN 0028-8349

TABLE OF CONTENTS

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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. 42 No. 2, page 54 to 60 or from the Editor.

Intending contributors should submit their material to the Editor, M. Gillies, Microbiology Laboratory, Princess Mary Hospital, Auckland, New Zealand, or the Editor, P.O. Box 9095, Newmarket, Auckland, 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.

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

DATES OF PUBLICATION

The months of publication for 1990 are March, May, August and November.

This Journal is abstracted by: Biological Abstracts, Chemical Abstracts, Cumulative Index to Nursing & Allied Health Literature, Current Clinical Chemistry, Hospital Abstracts, Institutnautchnoi informatsii.

CURRENT COMMENT

MEDICAL LABORATORY TECHNOLOGISTS — ACTIVATE

Anne Paterson, Dunedin Hospital

In the normal waxing and waning of fortunes, it is doubtful if many would disagree that our profession's fortune at present appears to be on the wane. Like most, bar management, we're a bit on the back foot.

In the 1970's, perhaps our heyday, we enjoyed an important and well recognised role in the health care system. Using complicated technology, technologists magically produced diagnostic answers. Life was good. We were among the top 10% of paid workers. But technology exists everywhere now. Everyone from the wordprocessing secretary to the supermarket checkout operator, show how simple it is to use.

Increasingly in recent years, it has been the commercial world leading the way and doing the research and development of techniques for us to work with. They look for any opportunity to pick up an idea in order to make their dollar. But their increasingly "easy to use" technology is 'de-skilling' our profession. Technological skills have been de-mystified. Not only are we purchasing machines that simply need, cuvettes filled, buttons pushed and printed results pasted on the correct form; but reliance on things like Quality Control is also shifting to the commercial world. Q.C. Standards and Q.A.P. are purchased.

How much thought do you give to Q.C. unless your results are marked wrong?

I don't think we should allow ourselves to rely on Standards for our profession, being administered from outside our profession.

I'm not saying 'no' to national standards or accreditations. I am saying that we, each member of our profession, and the profession itself, needs to self-impose high principles, particularly in the area of Q.C., so that the external standards are seen to validate our standards, not police them. Council is currently working towards a position statement with regard to optimal standards. We can and all should be doing this by being pro-active, instead of passive or reactive.

For example, as I have gone around recently inviting people to do something — now fairly uncommon — like preparing and presenting a paper for the South Island Seminar or the Conference in Invercargill in August — I have had a few positive replies. Sadly there have been more like these:

"Why? I don't get anything out of it!"

"Give up a Saturday, for no pay!"

"What's the point?"

"No, I'm too busy"

What should one expect to get out of attending or participating in such a function?

Self-education, you may even catch a little enthusiasm!!!

It's an opportunity to share your knowledge, experience and wisdom with others, and gain the benefit of theirs. So your role at such a Scientific Meeting might be that of learning and growing, or if you are more experienced the very important role of Teacher/Leader.

This leadership role is critical to the ongoing growth of the profession on two main counts:

1. To educate and encourage the development in others. Education must not stop with qualification.
2. To lead the probing at the frontiers of our profession, rather than wonder what the commercial companies will come up with next.

Research and/or development doesn't have to be on a large scale, such as commercial companies and not Area Health Boards can afford, but a profession is only going forward if it is involved in Research and Development. The very small amount underway currently is predominantly in the area of pure academia and being directed towards other qualifications instead of our own, of Fellowship.

Staying active in your profession in these ways has the potential of rewarding you with Job Satisfaction. Job satisfaction is personal satisfaction for an individual but it does require and is worthy of 'commitment'.

There is a particular excuse from some cynics that I wish to answer.

"People don't care about professional development, they want financial remuneration"

Yes, money does make the world go round!

But what makes the wages go up? Admittedly not much these days. However, if that is the only end goal some can aim towards, then an obvious means is to demonstrate the 'worth' of the profession. That is of course by maintaining and always looking to improve the principles of our profession.

This may take the form of educating Medical and Nursing staff on the best specimen collection techniques — i.e. looking to attend their meetings and speak as the authority.

It does mean not accepting ever that the calibration is "close enough".

It does mean watching for the interesting case study; the potential research project; the developing trend; and undertaking the personally and professionally rewarding work of collecting, collating and presenting such efforts.

Surely people understand that to make any progress in award negotiations, delegates will more and more need to be representing progressive professionals conducting themselves in an appropriate manner. If we leave all effort and development to the commercial world, our delegates will have nothing other than the cost of living to bargain with!

It's 'Users Pay' these days and 'Lack of Use Under Threat'.

If all managers can see is highly educated Lab. workers performing increasingly automated and routine tasks and demanding more money for it, this will downgrade our image and cost us very, very, dearly.

The manna of the Med. Lab. Tech. is already wilting under the pressure of technological advances. As the years pass, specialist subjects become increasingly more and more specialised. But our work is intertwined so it is more important than ever that we work together, keep communicating with and educating each other. As departments shrink, and the possibility of the current demarcation lines between them being broken down, it can only be to our advantage to be involved and recognised as the authority that should be involved in our re-organisation.

We have two under-utilised tools at our immediate disposal —

Annual Scientific Meeting

Journal of Medical Laboratory Technology

They are designed and provided to be opportunities for YOU to

— self educate

— develop professionally

— assist and encourage others

— record and report the results, issues and concerns of our profession.

We must endeavor to improve our dwindling image of importance in the health system, each playing our own individual parts to enhance the profession of Medical Laboratory Technology and the confidence in it.

It does mean Time; Effort; and Commitment but we can only gain individually and professionally.

Medical Laboratory Technologists — ACTIVATE ! ! !

45th ANNUAL SCIENTIFIC MEETING
N.Z.I.M.L.T.
ASCOT PARK MOTOR HOTEL
INVERCARGILL
THEME — "1990's A NEW ERA"

PROGRAMME

Monday 27 August

WORKSHOP

API ATB Automated Workshop
Full day, wet workshop. Maximum registrants 20.
Sponsored by Med Bio Enterprises.

Tuesday 28 August

WORKSHOPS

1. Mycology "Refresher Course in Medical Mycology"
Full day, wet workshop. Maximum registrants 20.
Speaker Alan Woodger, Mycology Reference Laboratory N.Z.C.D.C.
Sponsored by N.Z.I.M.L.T.

2. Parasitology "Parasitology for the Small Laboratory"
Full day, wet workshop. Maximum registrants 20.
Speaker Mr Graeme Paltridge, Charge Technologist
Microbiology Department, Christchurch Hospital.
Sponsored by N.Z.I.M.L.T.

3. Haematology — Quality Control
Half day, 1300-1600 hrs. Speaker Dr Wilbur Hughes,
Australia, Director Quality Assurance Programme
Haematology R.C.P.A.
Sponsored by Coulter N.Z. Pty Ltd.

4. Drugs of Abuse Testing
Half day, 1300-1600 hrs.
Speaker Mr John Sharman, Charge Toxicology
Department, Christchurch Hospital.
Sponsored by N.Z. Diagnostics Ltd.

5. Immunohaematology "Use of Microplates"
Donor Accreditation, Antibody Screening and Identification.
Half-day, 0900-1200 hrs. Maximum registrants 20.
Speaker Mr David Wilson, Charge Technologist
Immunohaematology Department,
Palmerston North Hospital.

6. Hepatitis C Virus Seminar
1400-1600 hrs.
Sponsored by Abbott Laboratories.

7. Histology — Immunoperoxidase Staining Techniques
Half day, 1300-1600 hrs. Maximum registrants 20.

USER GROUP MEETING
Roche Diagnostics N.Z. Ltd.
Cobas user group meeting. POOL PARTY.
1400 hrs.

Wednesday 29 August

Annual Scientific Meeting Opening Ceremony
T.H. Pullar Address, Jan Parker.

GENERAL FORUMS

Direction of the Health Services in the 1990's —
Speakers: Hon D.F. Quigley, Director Strategos Consulting Ltd. Prof M.H. Cooper, Chairperson Otago Area Health Board. Mr J. Pannett, General Manager, Southland Area Health Board

Discussion Forum
— Mastery Assessment.
— Responses to Laboratory Assistant and Trainee Questionnaires.

45th Annual General Meeting N.Z.I.M.L.T.
Special General meeting N.Z.I.M.L.T.

Thursday 30 August

GENERAL FORUMS

The Ante Natal Patient
"A look to the future"
Speakers: Mr Mike McCarthy, Microbiology, Diagnostic Laboratory, Auckland. Dr Jim Faed, Regional Transfusion Director, Otago B.T.S. Mr Norman MacLean, Obstetrician and Gynaecologist, Southland Hospital.

D.N.A.
What it can currently provide, applications in the 90's, foreseeable developments, equipment and resources required, can we afford it?
Speakers: Dr Charles Beresford, Co-ordinator DNA Diagnostics, Otago Area Health Board. Dr Pauline Hughes, Scientific Officer, Otago Area Health Board. Mr Mike Denton, Research Fellow in Molecular Biology, Biochemistry Department, Otago University.

Front Office in the 90's
Telecommunications systems, laboratory records, computers, patient rights.
Speakers: Telecommunications Representative. Mr Peter Huggard, Principal Technologist, Green Lane Hospital. Mr Alec Anderson, Managing Director, Detente Systems. Mr P. Strettel, Legal Representative to Southland Area Health Board.

CONCURRENT FORUMS IN
Biochemistry, Histology and Immunohaematology.
Forum for Smaller Laboratories.

SEMINAR
Haematology — Special Interest Topic.

WORKSHOP
Microbiology Automation
Sponsored by Roche Diagnostics N.Z. Ltd.

NEW PRODUCTS RELEASES
Roche Diagnostics N.Z. Ltd.
Boeringher Mannheim Ltd.

Friday 31 August

CONCURRENT FORUMS
— Microbiology, Haematology, Biochemistry.
— Discussion Forum Immunohaematology.

GENERAL FORUM
Laboratory Safety Procedures.
Speaker: Mr Norman Kuttner, Scientist, N.Z. Communicable Disease Safety Committee.

CLOSING CEREMONY

45th ANNUAL SCIENTIFIC MEETING
N.Z.I.M.L.T.
REGISTRATION FORM
29th to 31st AUGUST 1990

SURNAME: .....TITLE: Dr/Mr/Mrs/Ms/Miss

PREFERRED FIRST NAME: ..... LABORATORY: .....

MAILING ADDRESS: .....

.....

STATE MEMBERSHIP OF N.Z.I.M.L.T: .....

OTHER (SPECIFY): .....

NAMES OF ACCOMPANYING PERSONS/CHILDREN (INCLUDE AGE OF CHILDREN)

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Accommodation is available at the Ascot Park Motor Hotel (Conference Centre) or alternatively at the Kelvin or Grand Hotels. Fill in the appropriate form and send direct to the Hotel of your choice.

45th ANNUAL SCIENTIFIC MEETING
N.Z.I.M.L.T.
REGISTRATION FORM
19th to 31st AUGUST 1990

Full Conference Registration Fee (includes morning/afternoon tea)	$85.00	.....
One Day Registration Fee	$25.00 Day Attending	.....
Half Day Registration Fee	$12.50 Day Attending	.....
Additional Late Fee	$50.00	.....

** DEADLINE 30th JUNE WILL BE STRICTLY ENFORCED **

Additional Fee for Non-Member N.Z.I.M.L.T.	$50.00	.....

SOCIAL FUNCTIONS

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	☐	Additional tickets $15.00/ticket Number of tickets	.....
Wednesday Evening	☐	Comedian Phil Kingsley Jones entertains in his own inimitable style. $10.00/person Number of tickets	.....
Thursday Evening	☐	Mardi Gras — a street party you will never forget. $36.00/ person (meal included) Number of tickets	.....

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	Wed	Thur	Fri		
Number of Tickets	☐	☐	☐	$10.00/ticket	.....

(No alternative lunch available on site)
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TOTAL PAYMENT . . . . . .

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Laboratory
Southland Hospital, Kew
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WORKSHOPS REGISTRATION FORM 27-28 AUGUST 1990

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PLEASE TICK APPROPRIATE BOX FOR WORKSHOP/S YOU WISH TO ATTEND

Monday 27 August

API ATB AUTOMATED WORKSHOP, Med Bio Enterprises, Full Day
Maximum Registrants 20 ☐ No Charge

Tuesday 28 August

MYCOLOGY "Refresher Course in Medical Mycology", Full Day, $20.00
Maximum Registrants 20 ☐ .....

PARASITOLOGY "Parasitology for the Small Laboratory", Full Day, $20.00
Maximum Registrants 20 ☐ .....

HAEMATOLOGY Q.C., Coulter Pty Ltd, Half Day (pm)Maximum Registrants 20 ☐ No Charge

DRUGS OF ABUSE TESTING, N.Z. Diagnostics, Half Day (pm) ☐ No Charge

IMMUNOHAEMATOLOGY "Use of Microplates", Half Day (am), $20.00
Maximum Registrants 20 ☐ .....

HEPATITIS C VIRUS SEMINAR, Abbott Laboratories, 1400-1600 hrs ☐ No Charge

HISTOLOGY, Immunoperoxidase Staining Techniques, Half Day (pm) $20.00
Maximum Registrants 20 ☐ .....

TOTAL PAYMENT .....

If you are attending a workshop and conference, please make one cheque payable to: N.Z.I.M.L.T. Southland Conference. Return by 30 June 1990.

Post Cheque and Registrations to:

Conference Secretariat
Laboratory
Southland Hospital, Kew
INVERCARGILL

The Organising Committee reserve the right to cancel any workshops due to the lack of registrants.

45th ANNUAL SCIENTIFIC MEETING N.Z.I.M.L.T.

ABSTRACTS FOR 1990 NZIMLT SCIENTIFIC MEETING

You are invited to submit 15-20 minute papers for the above meeting. Abstracts must be typed in single space type in less than 250 words. These must be free of grammatical and typographical errors. The original and two photocopies should be submitted.

ABSTRACTS SHOULD INCLUDE:

Title (In Capital Letters)
Author's Names
Abstract Content

Also include presenting Author's name, address, telephone number and any visual aids required, e.g. 35mm Slide Projector, Overhead Projector.

Abstracts should be submitted before 30 June 1990.

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LABORATORY,
SOUTHLAND HOSPITAL,
KEW,
INVERCARGILL

FAX: 021-82680 TELEPHONE: 021-45764

Poster presentations will also be accepted for the conference.
The submission date is 30 June 1990.

N.Z.I.M.L.T. A.S.M.
27th to 31st August 1990

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Double or Twin	$100.00 per night
Motel Units/23 units	$ 70.00 per night
Third person in room/motel	$15.00 per night

KELVIN HOTEL — REGISTRATION

N.Z.I.M.L.T. A.S.M.
27th to 31st August 1990

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GRAND HOTEL — REGISTRATION

N.Z.I.M.L.T. A.S.M.
27th to 31st August 1990

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ADDRESS: .....
.....
.....

DATE: .....
TITLE: Dr/Mr/Mrs/Ms/Miss
PHONE (STD): .....
NUMBER: .....

PLEASE MAKE A BOOKING FOR:

☐ Adults
☐ Children

DATE OF ARRIVAL: .....
DATE OF DEPARTURE: .....

YOU WISH TO SHARE YOUR ROOM WITH:

NAME: ..... ADDRESS: .....
NAME: ..... ADDRESS: .....

FORWARD THIS REGISTRATION FORM TO:

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Grand Hotel
P.O. Box 89
INVERCARGILL by 30 June 1990

REGISTRATION IS TO BE ACCOMPANIED BY PAYMENT FOR YOUR FIRST NIGHTS ACCOMMODATION — NON REFUNDABLE.

Accommodation — Tariff per night inclusive of G.S.T.

Twin and Double Rooms	$70.00 per night
Single room	$45.00 per night
Third person in room	$15.00 per night

Assessment of Two Blood Glucose Monitors: BM Reflolux II and DIC Glucoscot II.

John M Mellelieu A.N.Z.I.M.L.T, Staff Technologist, Biochemistry Department, Palmerston North Hospital

A description of a laboratory assessment of a new (to the New Zealand Market) glucose monitor : DIC Glucoscot (1) in parallel with the BM Reflolux (2) monitor.

Blood volume is not critical although a larger volume is required for (1).

The time duration for blood incubation and colour development requires greater precision (1) as a rate type reaction is followed.

Correlation coefficients for blood glucose measured against a YSI glucose oxidase analyser were 0.986 (1) and 0.997 (2).

Dependence on ambient operating temperatures is demonstrated by both monitor types and especially at low extremes (1) gave spurious results while (2) only gave error messages.

Monitor (2) strips show sufficient colour stability to allow rechecking days after development.

Key phrases:

Diabetic glucose monitoring, test strips, analytical error, self testing.

Introduction:

The DIC Glucoscot II blood glucose test monitor, manufactured by DIC Kyoto Japan, is relatively new to the New Zealand market. It is available through New Zealand Medical and Scientific Ltd with test strips available on prescription.

Advertised as the smallest, clearest and simplest blood glucose monitor available it would appear to be an ideal choice for the diabetic home user. Little published data is available on the performance of this monitor.

The long term quality of life for the diabetic is largely determined by therapy equated to laboratory results in consultation with the Medical Practitioner, but increasingly, and of greater convenience, is self monitoring.

I have, therefore, undertaken an assessment of the Glucoscot monitor using the Boehringer Mannheim Reflolux II as comparison.

It was considered that the Reflolux was widely accepted for self monitoring of glucose and would be familiar to the reader.

Results were referenced to a Yellow Springs Instrument (YSI) Glucose Analyser (Model 23AM) in the laboratory using the glucose oxidase, electrode reduction principle.

Tests conducted were considered on the basis that the meters are designed for the 'unsophisticated' home user and it is their operating procedure that will affect the performance of the monitor.

Materials and Methods:

Glucose monitors, test strips and laboratory (reference) assay of glucose.

I obtained two of each type of monitor and arbitrarily assigned an identifier A and B.

In all studies, unless intra-meter comparison was performed, monitor A of each type was used.

Three different batch/lot of strips were obtained from suppliers. All work except inter-batch strip variability was performed on the one lot number:-

BM Reflolux 62332
DIC Glucoscot 7078

Manufacturers' instructions were followed exactly for calibration and use of monitors, after thorough familiarization by myself, the only operator in this study.

Results were referenced to our laboratory glucose-oxidase electrode reduction method (YSI), calibrated prior to each set of data assays, using Welcomtrol Normal and Abnormal sera as control material.

In no instance was there a time lapse of greater than one half hour between relevant comparisons of the same blood sample.

Figure 1: *BM Reflolux*

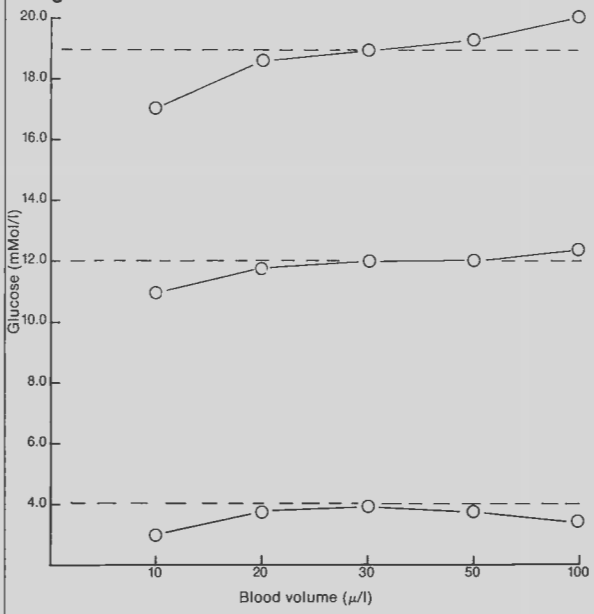


Figure 1: *DIC Glucoscot*

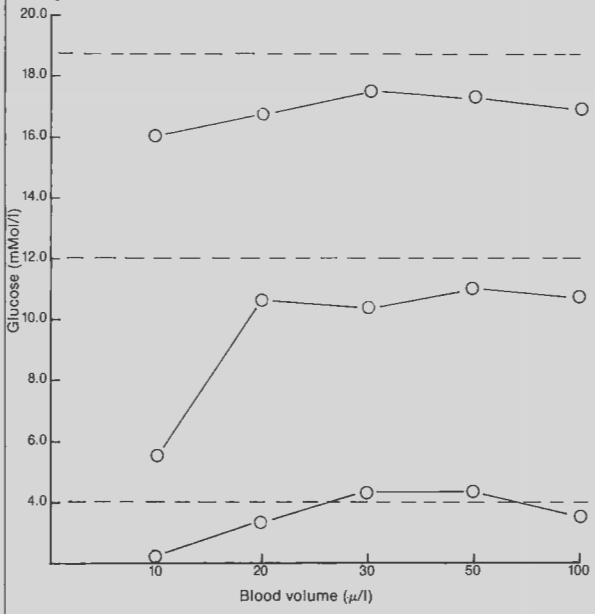


Figure 1: *Effect of blood volume.*
Manufacturers' instructions were followed for each result with blood volume being varied for each monitor at each of three glucose levels. Dotted line denotes reference (YSI) result. Neither manufactuer makes reference to a quantifiable blood volume. The following notes are taken from the operator handbooks:
Reflolux: "...good size drop of blood, large enough to cover both test zones completely."
Glucoscot: "Apply a large drop of whole blood to the entire reagent surface area."

Specimens:

In all cases, heparinized whole blood collected into a B.D. vacutainer tube was used. Previous studies[1] show little or no effect of Na Heparin on strip performance.

Blood was obtained from Diabetic Out-patients coming to our laboratory clinical room for routine Biochemical checks, after explanation and verbal consent for its use. No identification of sample was made.

Statistics:

Statistical methods — Regression analysis, standard deviation, coefficient of variations calculated using standard formulae.[2]

Results:

Variation in size of blood sample applied to the test strip:

The test strip is adequately covered by 20μl for the Reflolux strip but to achieve coverage on the Glucoscot strip a smearing technique is required. This is not recommended and was rejected in favour of a 50μl application. In both cases these volumes were selected as adequate coverage and satisfactory results (Figure 1) were obtained, and are standard Oxford pipetter volumes, eliminating possible minor variations from application.

Variation in incubation time:

Blood is incubated for 30 to 90 seconds before being removed, results obtained at a read time of the recommended 120 seconds. (Figure 2).

Reflolux shows little effect of a variation of ±10 seconds from manufacturer's recommended 60 seconds at levels up to 10mMol/L but higher levels show dependency on the blood incubation time.

Glucoscot shows considerable dependence on incubation time with small time variations at all levels having a marked effect on glucose results.

The tailing effect seen at high levels for both monitors in this experiment is probably due to an inadequate development time after blood removal.

Variation in colour development time:

Blood is incubated on the strip for the manufacturers' recommended 60 seconds prior to removal. Strips subsequently read at 10 second intervals up to and beyond the recommended 120 second read time. (Figure 3).

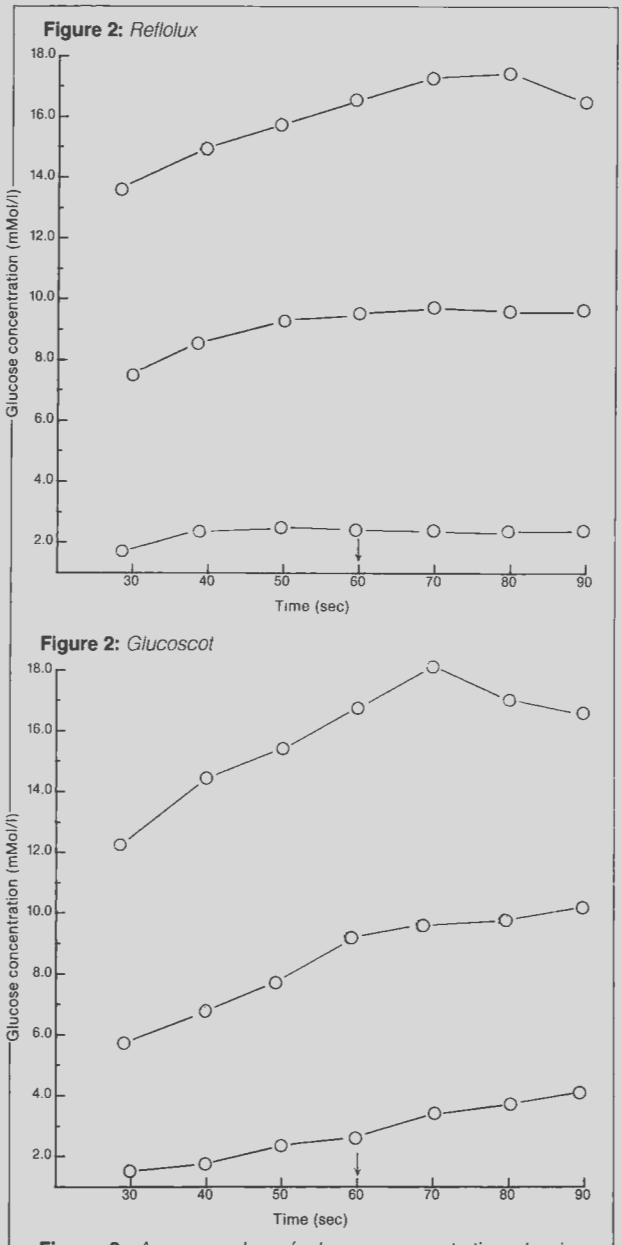


Figure 2: *Average value of glucose concentration showing variation due to blood incubation time on strip, prior to wipe. Arrow denotes manufacturers recommended wipe time. Read time was 120 seconds after blood application.*

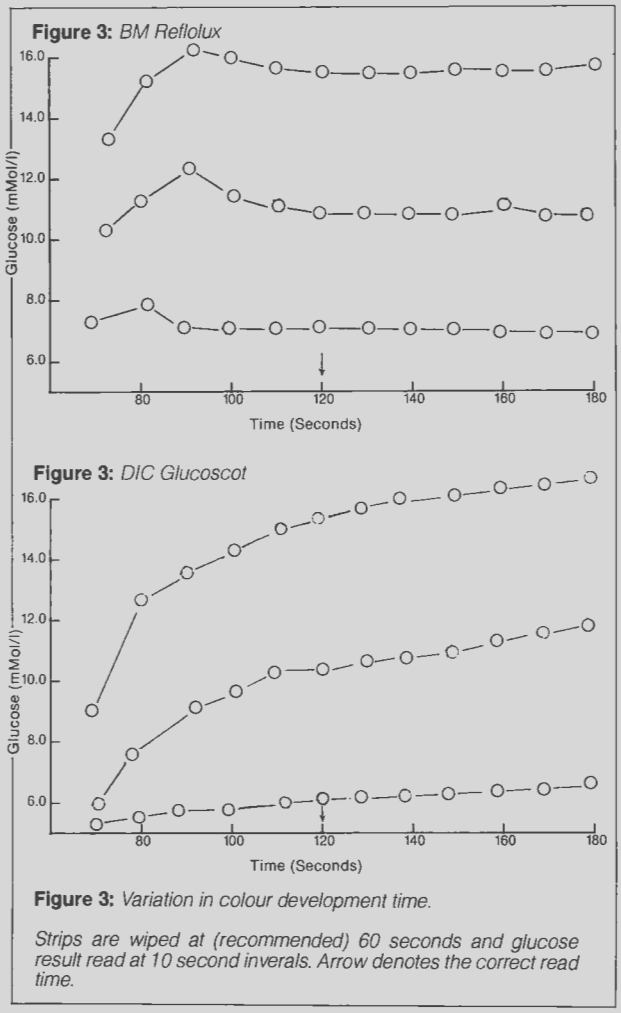


Figure 3: *Variation in colour development time.*

Strips are wiped at (recommended) 60 seconds and glucose result read at 10 second inverals. Arrow denotes the correct read time.

It is proposed that the initial peaks in the Reflolux graphs are due to increased reflectance of the incompletely dried strip at this early read time.

Reflolux shows a colour development end point at least 20 seconds prior to the recommended 120 seconds and is stable thereafter.

Glucoscot demonstrates a rate type reaction, results being dependent on read time.

Colour stability of strips:

I studied the stability of the developed strips after correct development procedure.

Strips were stored in empty capped metal cannisters, at room temperature for a period of up to seven days.

Figure 4: *Reflolux*

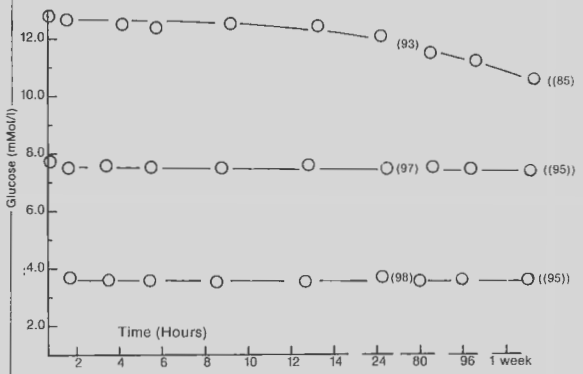


Figure 4: *Glucoscot*

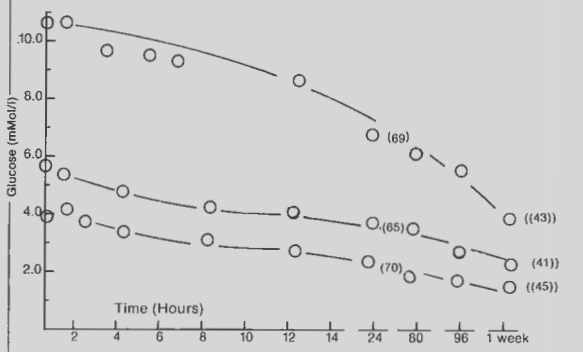


Figure 4: *Stability of developed strip stored at RT in capped cannister for up to one week. Strips were reread at intervals and the mean glucose result plotted. Figures in () denote the percentage of initial glucose concentration at 48 hours and (()) at 1 week after initial application per manufacturers instructions.*

Glucoscot strips are not stable (Figure 4) and cannot be considered useful after a time lapse of only a few hours, whilst the Reflolux strip could be rechecked with confidence after several days and up to a week later with some compromising of accuracy at elevated levels.

It is my opinion that a laboratory with a Reflolux monitor and a full range of calibration bar-code strips could be helpful to the diabetic patient. There are occasions when the patient obtains a result that does not correlate with their expectation after consideration of exercise, insulin dosage, food intake, etc.

Suitably trained laboratory staff could check the strip for evidence of correct blood application and removal, and check the strip in a laboratory calibrated monitor. Early warning and remedy of technique or monitor fault could be available if blood application time and strip batch number were noted.

Effect of using an incorrectly calibrated monitor:

Reflolux uses a bar-code film strip for calibration for every pack of strips. This code is lot specific, the information being stored in the instrument until re-calibration is performed.

Glucoscot uses a single digit code entered by key input for calibration. For all three different batch/lot number strips used in this study, the calibration digit required by Glucoscot was the same. This suggests a greatly reduced lot specificity by this monitor.

The effect of entering the wrong calibration information was studied using ten blood samples with a glucose value in the range 3.4 — 16.4mMol/L.

Although Reflolux shows a greater variation of values resulting from incorrect calibration suggesting increased lot specificity of calibration, both monitor types are affected more towards the higher glucose results (Figure 5). This is probably due to linearity variation from lot to lot of strips and is the most important aspect of calibration, therefore increased accuracy at high levels.

Figure 5: *Reflolux*

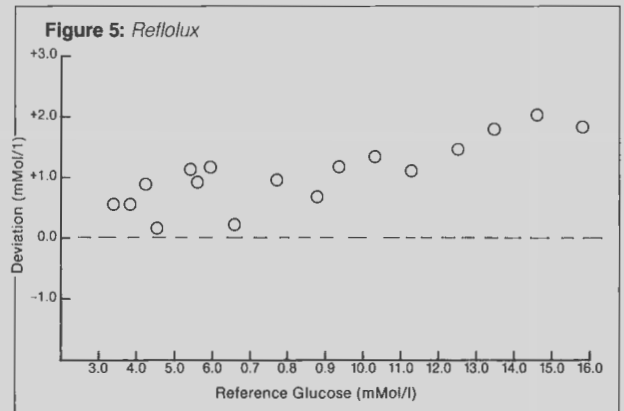


Figure 5: *Glucoscot*

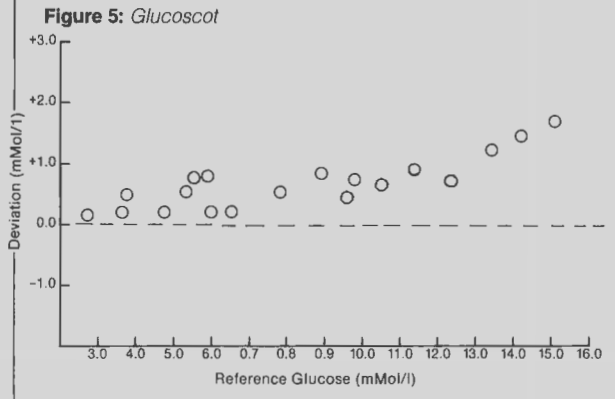


Figure 5: *Effect of using incorrect calibration. Blood glucose was estimated using manufacturers recommended procedure except for entering the wrong calibration strip/number. Graphs show mean deviation from target values at various glucose levels for both monitor types. Dotted line denotes no variation, i.e. result equal to target or correct calibration result.*

A further aspect of calibration technique needs to be noted:

Glucoscot strip entry is via a sliding aperture, the optical window aligning with a white pad, blanking on this pad for each glucose determination.

Any blood contamination of the back of a strip due to poor wipe procedure will contaminate this area, resulting in deterioration of results with no error code warning (Figure 6.). A regular visual inspection and cleaning (awkward) procedure cannot be emphasised enough.

Reflolux performs a blanking procedure once per pack of strips at time of calibration. The strip entry port assembly is totally removable, making inspection and cleaning (recommended prior to each new calibration/pack of strips) much easier.

By its nature, contamination of this port is virtually eliminated and related error minimized. It is also possible to remove this assembly with a strip installed and visually inspect blood coverage at the optical window site, ensuring technique has adequately covered the strip pads.

Figure 6

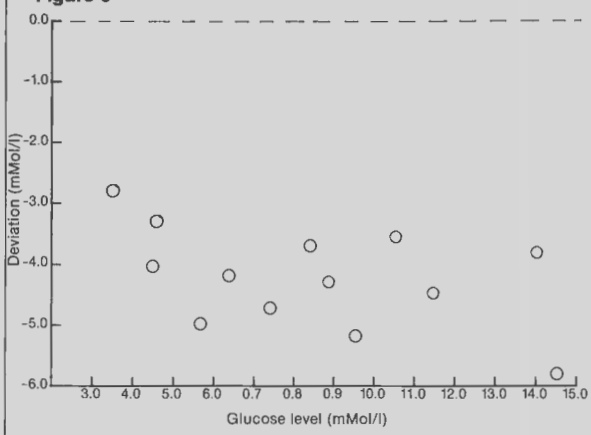


Figure 6: *Effect of blood contamination of the blanking pad of the Glucoscot monitor. Graph shows the deviation of glucose value from that observed with a clean pad. Reflolux is not prone to this error as blanking is performed at time of calibration only, not every assay as with Glucoscot. (See text.)*

Effect of storage conditions on strips:

A number of strips from each manufacturer were stored for one week at conditions contrary to recommendation. They were compared at the end of this time with strips from the same batch stored correctly.

The mean glucose value for each group at glucose 4.0mMol/L and 13.0mMol/L was obtained after performing several repeats on each group per manufacturer's procedure.

Conditions: Correct (for both types) — capped at room temperature. 4° capped, RT (22°C) uncapped, 30°C capped.

Glucoscot showed a mean variation of no greater than ±6% at all conditions for both levels.

Reflolux showed a mean variation of no greater than ±4% at all conditions for both levels.

Neither showed any bias for a particular condition although Glucoscot showed greater percentage error (still small actual mMol/L difference) at low glucose concentration.

Visual displays and audibility:

The glucose monitor is marketed for the out-patient diabetic for self testing. Consideration of clarity of display and warning signals is, therefore, important.

Both monitors have large LCD displays:

Glucoscot	15 x 7mm digits
Reflolux	12 x 5mm digits

Audible warning is by beep tone. Both are in the range 55-60 dB at 300mm in a sound-proof room, the difference between the two being a single beep warning of wipe time at 60 seconds, plus visual display instruction for Glucoscot, while Reflolux gives four advance warning beeps at second intervals up to the 60 second warning which is a longer tone.

The Reflolux monitor tone is over a wider frequency range, giving better audibility to the hearing-impaired or over background noise distraction likely to be encountered in the out-patient environment.

As high pitch definition is the first lost, the Glucoscot monitor is thus more prone to timing errors if noise distraction, coupled with loss of attention, occur, and being more sensitive to timing error (Figure 3) this compounds the potential for error.

Variation of assay temperature:

Monitors and stoppered strips were stored overnight at two temperature extremes — 6° and 37° and evaluated the following morning for the effect of temperature on their performance.

It was considered that these two extremes could be realistically expected in the home environment without central heat control at the extremes of seasonal temperature change, and would, therefore, highlight the effect to the home user of operating outside manufacturer's quoted operating temperature range:-

Reflolux between 18° and 35°C.

Glucoscot between 20°C and 30°C with a warning that low temperatures may cause low results.

6°C:

Reflolux would not perform at 6°C in the glucose range 3-20mMol/L. It consistently gave Error code messages. It was noted that the developed strip colour on one of the pair of reagent areas on the test pad was markedly different from the package key, precluding manual assessment of results at this extremely low temperature.

Glucoscot gave low results at this temperature, the difference between them and YSI reference values (Figure 7.1) ranges from -1.8mMol/L at low glucose concentrations to -6mMol/L at high concentrations.

Figure 7.1: *Glucoscot at 6°*

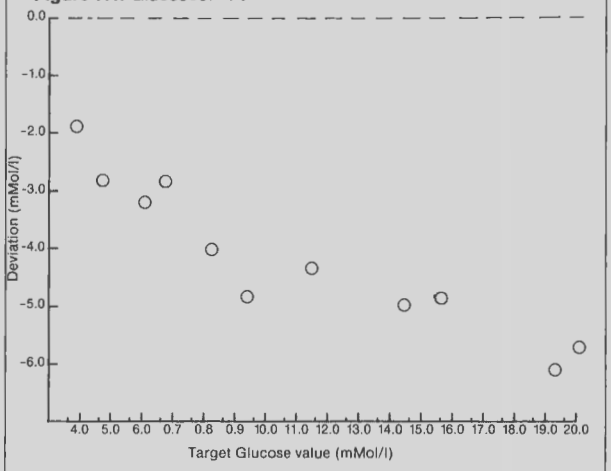


Figure 7.1: *Results show the mean deviation from reference glucose values when monitor and strips are stored and used at 6°C. No results were obtained for Reflolux at this temperature. (See text.)*

37°C:

The high extreme of temperature gave less dramatic effect on Glucoscot, with glucose values less than 10mMol/L giving a mean negative bias of -0.6mMol/L, and values greater than 10mMol/L showing a mean positive bias of +1.3mMol/L (Figure 7.2).

Reflolux gave a mean negative bias of -0.7mMol/L throughout the range 3.0 — 19.0mMol/L at this temperature. Less effect was noted at glucose values around 10 ± 0.1mMol/L with a greater effect at both high and low levels (Figure 7.2).

Temperatures intermediate to these extremes and manufacturer's recommendations were not studied.

Agreement between methods:

Two of each monitor type were compared with our YSI Glucose method for a range of glucose values (2.0 — 25.9mMol/L n = 38. The following data was obtained applying normal regression statistics:

BM Reflolux	Monitor A	r = 0.9974
		y = 1.0659x - 0.4509
	Monitor B	r = 0.9974
		y = 0.9818x + 0.1464
DIC Glucoscot	Monitor A	r = 0.9859
		y = 0.9765x - 1.06
	Monitor B	r = 0.9924
		y = 1.054x - 1.406

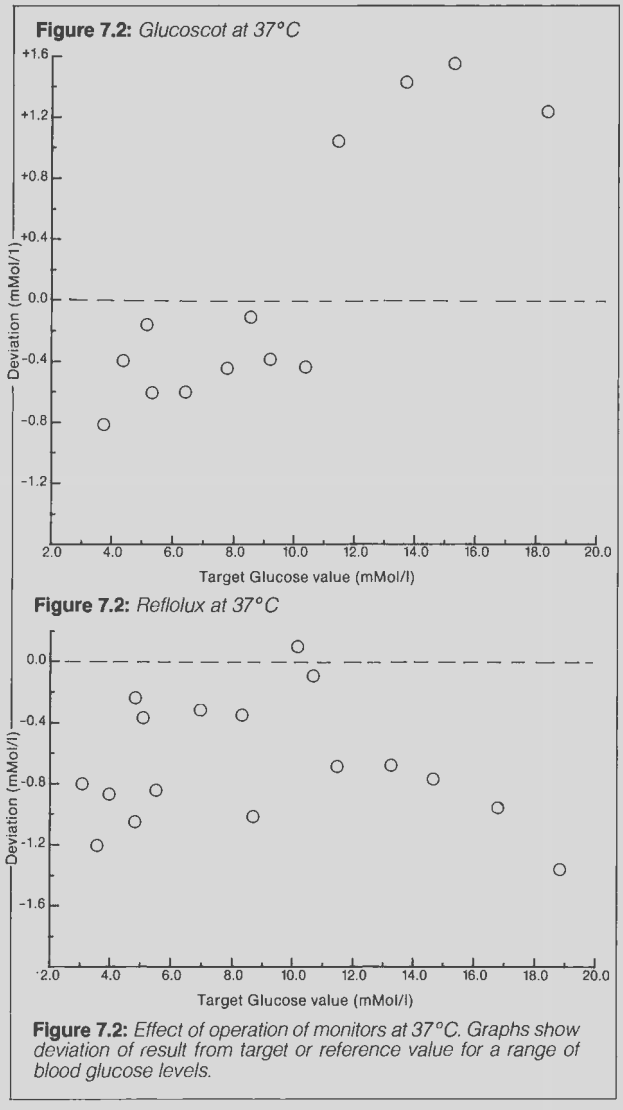


Figure 7.2: *Effect of operation of monitors at 37°C. Graphs show deviation of result from target or reference value for a range of blood glucose levels.*

In each case monitors and strips were handled per manufacturer's instructions under ideal conditions, as determined by the preceding experiments.

While both monitor types show good correlation with the YSI glucose method, graphical representation of this data is better handled by Altman-Bland plots [3], plotting the individual differences between monitor and YSI.

Reflolux shows a mean positive bias of 0.33mMol/L (Figure 8.1) while Glucoscot gives a comparatively large negative bias of -1.13mMol/L (Figure 8.2).

Agreement with routine laboratory method:

The slight positive bias shown by Reflolux, although not claimed as deliberate by the distributor, does in part give a mean correction toward plasma/serum results as normally assayed in the laboratory on a routine method, from the whole blood result obtained by the home user on this monitor. In our laboratory this would give excellent, direct, uncorrected equality of result from this monitor to our routine serum method.

Intra batch precision of strips:

Two levels of blood glucose were repeatedly (n = 20) assayed on both monitor types yielding the following data.

Reflolux
Level: 1 $\bar{x}$ = 2.88 SD = 0.103 % CV = 3.59
2 $\bar{x}$ = 11.85 SD = 0.251 % CV = 2.11

Glucoscot
Level: 1 $\bar{x}$ = 3.73 SD = 0.134 % CV = 3.58
2 $\bar{x}$ = 11.48 SD = 0.419 % CV = 3.65

Inter batch precision of strips:

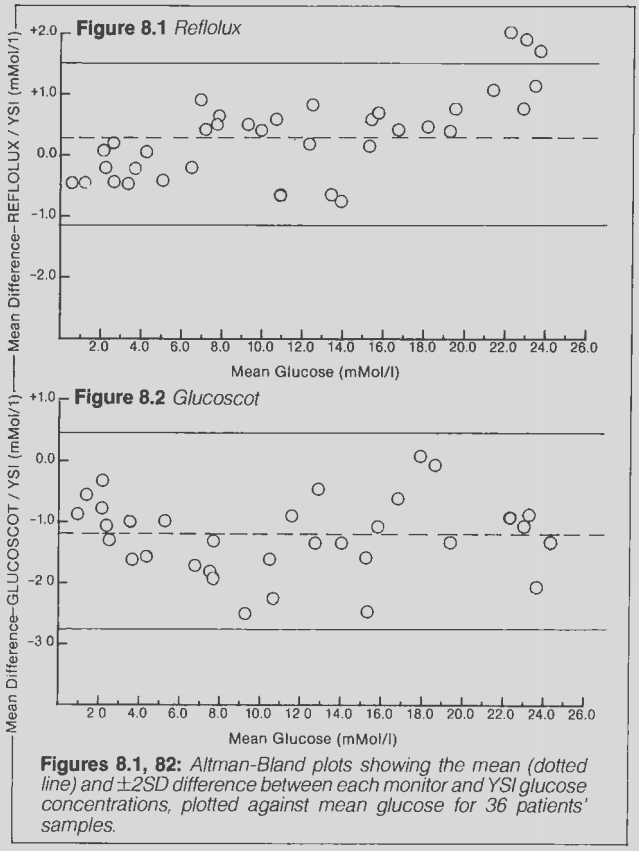
Blood samples in the range 3.1 — 21.3mMol/L (n = 25) were assayed on three different batch/lot numbers of strips for each monitor type. All batches used were inside manufacturer's expiry and the correct assay procedure was employed.

The mean differences for each glucose value between strip batch/lots were calculated and expressed as a percentage.

Reflolux, for batch/lot numbers 62332, 67031, 62341 gave a mean variation of ±3.1% for any glucose result between any lot number.

Glucoscot, for batch/lot numbers 7078, 8098, 8108 gave a mean variation of ±4.3%.

It is noted that greater variation is demonstrated on both monitors at low level glucose (being up to ±8%), but at a level of 4.0mMol/L glucose this would only amount fo ±0.3mMol/L which is of little clinical significance. At high levels both gave less difference suggesting better precision at medium to high levels of glucose, Reflolux showing less variation overall.



Figures 8.1, 82: *Altman-Bland plots showing the mean (dotted line) and ±2SD difference between each monitor and YSI glucose concentrations, plotted against mean glucose for 36 patients' samples.*

Discussion:

The YSI Glucose Analyser used in this study estimates whole blood glucose and was chosen for this reason.

The accuracy and precision of both the Reflolux and Glucoscot is impressive, although Glucoscot shows a negative bias against our whole blood method (Figure 8.2).

Many assessments of Blood Glucose Monitors have been performed [4,5,6] but to my knowledge not of the DIC Glucoscot.

Used per manufacturer's recommendations and limitations the Glucoscot Monitor is simple to use, but I make the following observations when compared with Reflolux.

The Glucoscot requires a larger blood volume (Figure 1) for adequate strip coverage. As finger puncture wounds may not always bleed freely, the requirement of a larger volume has the potential for inaccuracy of result.

Both monitors have large, clearly read displays, with the Reflolux having better audibility making it slightly less concentration intensive to use.

As the Glucoscot is more sensitive to incubation and

reaction time (Figures 2,3) I feel this to be a disadvantage to the user in a non-controlled home environment where background noise and other activity cause distraction which may cause strip handling to deviate from manufacturer's recommendation.

As previously discussed, the colour stability of developed Reflolux strips has advantages for rechecking of results (Figure 4), while the non-endpoint behaviour of Glucoscot strips also introduced potential error where indecision of manual reading of strips occurs. (Manual use of strips was not studied).

Although more difficult to calibrate with the requirement to use a bar-code film strip, with familiarity the Reflolux calibration system and its once per calibration blanking procedure has advantages over Glucoscot with blanking each read time. Inherent problems of this procedure are demonstrated (Figure 6).

Glucoscot stores the previously obtained glucose result and displays this until the timer is activated.

Reflolux stores thirty previous results available by a recall function. This data can also be transmitted to the (additional) Camit log-book with entry of date, time and insulin dosage, therefore available as reference by the diabetic user and their consultant physician.

Both meters display the calibration code last entered so this can be checked against strips at each use.

Glucoscot supply two check strips with stated values for use as reflectance checks. Similar checks can be performed on the Reflolux system using (additional) control solutions of high and low values.

Reflolux would not operate at a temperature of 6°C (stated range = 18-35°C) whilst Glucoscot continues to operate giving spurious results (Figure 7.1).

Both strip types are of robust manufacture and do not show appreciable loss of performance when stored under adverse conditions as is likely in the market place.

While I am aware that the capillary blood sample obtained by the 'home user' will, potentially, be contaminated with tissue fluid, the effect of using venous versus capillary blood samples was not studied.

Therefore, any assessment of the suitability of a glucose monitor for 'home use' should bear in mind the effects of such introduced error that are not inherent in laboratory controlled tests undertaken by technical staff.

References:

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6. Brooks Klazine E, Rawal Naresh, Henderson Ralph. Laboratory assessment of three new monitors of blood glucose. *Clin Chem* 1986; **12**: 2195-2200.

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THE NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY (INC.)

Title	NZIMLT Journal Student Award
Donor	NZIMLT (Inc.)
Nature	To encourage the publication of new work and article in the Journal by providing opportunity, guidance and incentive for students to attempt this task and develop an interest and facility in performing it. An award of two hundred dollars ($200) will be made bienially to a student member (defined as a trainee technologist or pre QTA laboratory assistant) who is the author of an original review article or a technical paper describing work of an innovative nature or having a novel application. In the case of joint authorship both authors must be student members.
Eligibility	All financial Student Members of the NZIMLT (Inc)
Method of Entry	Publication in the Journal of the NZIMLT an article of the nature previously defined by a Student Member.
Date of Entry	All articles by Student Members which have been published during the two year period ending in July 1990 will be considered for this award.
Judging	The judge shall be the Editor of the Journal who may also seek advice from the Awards Committee. If in the opinion of the judge the standard of papers submitted does not merit an award then no award shall be made.

THE NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY (INC.)

Title	NZIMLT Journal Prize
Donor	New Zealand Institute of Medical Laboratory Technology (Inc.)
Nature	An award of two hundred dollars ($200.00) will be made bienially to the author of the best original or review article published in the Journal of the NZIMLT concerning a medical Laboratory discipline other than related to the subject of Microbiology, Clinical Chemistry, Haematology and Immunohaematology or for another where a specific award or prize has been offered.
Eligibility	All financial Members of the New Zealand Institute of Medical Laboratory Technology (Inc.)
Method of Entry	Publication of an original or review article in the Journal of the NZIMLT.
Date of Entry	All original and review articles on Medical Laboratory subjects other than those previously excluded which have been published during the two year period ending in July 1990 will be considered for the award.
Judging	The Judging Panel shall consist of the Editor of the Journal, the President and one of the Vice-Presidents of the Institute. If in the opinion of the Judging Panel the standard of the articles do not merit an award or if there are no eligible articles in any one judging period, then no award shall be made.

ROCHE

Roche Products (New Zealand) Ltd

Title	Roche Products Clinical Chemistry Award.
Donor	Roche Products (New Zealand) Ltd
Nature	An award of two hundred dollars ($200.00) will be made bienially to the author of the best original or review article concerning Clinical Chemistry published in the New Zealand Journal of Medical Laboratory Technology.
Eligibility	All financial members of the New Zealand Institute of Medical laboratory Technology (Inc).
Method of Entry	Publication of an original or review article in the Journal.
Date of Entry	All original and review articles on the specified subjects which have been published during the two year period ending July 1990 will be considered for this award.
Judging	The judging panel shall consist of the Editor of the Journal, the President of the Institute and a person nominated by the donor company. If in the opinion of the judging panel the standard of the articles do not merit an award or if there are no eligible articles in any one judging period then no award shall be made.

Title	Travenol-Dade Haematology Award
Donor	Travenol Laboratories (NZ) Ltd
Nature	An award of two hundred dollars ($200.00) will be made biennially to the author of the best original or review article concerning Haematology or Immunohaematology published in the New Zealand Journal of Medical Laboratory Technology.
Eligibility	All financial members of the New Zealand Institute of Medical Laboratory Technology (Inc.).
Method of Entry	Publication of an original or review article in the Journal.
Date of Entry	All original and review articles on the specified subjects which have been published during the two year period ending in July 1990 will be considered for this award.
Judging	The judging panel shall consist of the Editor of the Journal, the President of the Institute. If in the opinion of the judging panel the standard of the articles do not merit an award or if there are no eligible articles then no award shall be made.

TRAVENOL

TRAVENOL LABORATORIES (N.Z.) LTD

The Pacific Way

Swamp Technology

Mark and Liz Thompson, Balimo, Papua New Guinea.

We are working in a hospital laboratory at Balimo, in the Western Province of Papua New Guinea. The area's claim to fame is that it is the world's largest swamp. It contains low lying land interlaced with lagoons and meandering rivers, and stretches right across the bottom of the island of New Guinea. The large Fly River (named for the abundant insect population) lies 50km south of Balimo. The climate, as you can easily guess, is hot and humid. Heavy rain falls through March to July, often making the clay roads impassable and preventing planes from landing at the local grass airstrip — the only way into Balimo apart from boat. Because of its geographic isolation, it is one of the least developed regions of PNG.

The hospital serves a population of 30,000 in the immediate area. There are very few Europeans, and the people are mainly of the local Gogodala race. The hospital is one of only four in the large province, and takes many cases from places right throughout the province. It is run by the Evangelical Church of Papua, to which we are affiliated through our posting by the Asia Pacific Christian Mission. There are two doctors here, the Medical Superintendent and a surgeon. The surgeon is Dr. Graham Tucker formerly of Tauranga. He is the only surgeon in the province. The other doctor is Dr. Graham Zerk from Queensland. The hospital has 120 beds and is well equipped by PNG standards. It is built of a combination of split black palm and milled timber, on posts about 4 feet above the ground, with iron roofing and verandahs serving as walkways between and around the different wards and offices. All the woodwork has to be regularly replaced because of the prolific termites in residence.

There is a Nursing School associated with the hospital, training about 45 nurses at a time to State Registration over a 3½ year course. The staff and trainees make regular day trips to outlying villages to do immunizations, nutrition checks etc., and also longer patrols to villages further away. There are six health sub-centres, also run by Balimo Hospital, scattered across the province at other population centres. These are very basic and are usually each staffed by two nurses and two nurse aides. They perform a vital role in making medical treatment available to these isolated settlements. The doctors at Balimo can be radioed about emergency cases, and arrangements often need to be made for patients to be flown, or to come by canoe or dinghy to the hospital. A four wheel drive ambulance arrived in early 1989, and became a real novel attraction here. As well as being extremely useful for transporting patients to and from nearby villages and the airstrip (except in the very wet season when roads are impassable even for four wheel drive), it has been used to attract blood donors in emergencies — by offering them a ride in the ambulance!

We came here in October 1988 after working as technologists in Gisborne, with qualifications in microbiology, biochemistry and haematology between us. Our aim has primarily been to serve the Lord Jesus in whatever way we can here — helping to meet the needs of the people spiritually, as well as physically through our assistance in providing a good diagnostic service in the laboratory.

Before our arrival, the lab had been set up and run by a succession of Australian technologists over a period of 8 years, therefore t was in good shape.

The haematology is done using the oxyhaemoglobin method for haemoglobins, and all techniques are manual. We have made quite a number of improvements, including arranging for a new microscope — it finally arrived in August, replacing one which required a good imagination to use with its mouldy lenses. We now use critoseal instead of yellow soap for plugging PCV tubes, and we have improved the quality of the staining. The glass slides are of very poor quality and must be thoroughly cleaned before use.

The microbiology department is now able to culture specimens, and offer a greatly improved service, including Campylobacter and Cryptosporidium staining, and blood cultures.

Blood banking here is considerably different to what we were used to. There is only a kerosene refrigerator which is not suitable for long term storage of blood, so donors can only be bled when there is a transfusion actually required. It is often very difficult getting donors as people are usually only willing to give blood to relatives. The crossmatch method is by one tube saline, albumin and Coombs technique, and we have not had any adverse reactions yet.

The biochemistry work is very limited due to a lack of equipment and reagents as well as a lack of demand. There is a Spectronic 20 for manual tests such as urea, protein and glucose and an ancient flame photometer which we can get reasonable potassiums from, but the sodiums need more work — and probably a purer water supply.

Dubuna Danaya has been the laboratory assistant here for about 7 years. He is a very nice chap and would like to train as a technologist when he has completed further high school studies by correspondence. There is another local man, Peter Mulake, staffing the malaria section. He looks at about 150 slides per week and finds a high rate of P. vivax and P. falciparum. Slides are also sent in from health sub-centres and aid posts throughout the area.

Dubuna Danaya with Mark in the Balimo Hospital Laboratory

We have found Balimo Hospital a very interesting place to work. There are all sorts of cases — snake bites (at least one per week), victims of crocodiles, wild pigs, and humans (knife, axe and spear wounds). Coconut trees contribute to some serious injuries — people fall from them, coconuts drop down on people (sometimes killing them), and last year a child contracted severe meningitis when throwing a stick up into a tree to try and knock coconuts down—the stick pierced his skull. Obstetric cases are often complicated, and a high incidence of severe anaemia in pregnancy does not help. Ther are about 40 births per month, and many others take place in the bush. Serious medical cases include cancer,

renal failure (often after pyelonephritis), pneumonia (common in the wet season when temperatures drop to the low 20°C's) and tuberculosis. Some Tb cases are brought in to the hospital too late, but we have also seen marvellous recoveries. There is a Tb ward where an average of 20 patients stay long term to ensure medication schedules are adhered to. This ward also has the leprosy patients, 20 at present, and another 60 receive treatment as outpatients. New cases are regularly diagnosed. Malaria is prevalent here and contributes to many of the other diseases we see, as a complicating and debilitating factor. There are also numerous gastroenteritis patients — many young children. We have had an ongoing Shigella flexneri outbreak since April 1989, but other causative agents have been Salmonella, Cryptosporidium and Campylobacter. We have not tested for Rotovirus yet, but expect to find a lot when we do. Meningitis cases, again usually infants, are often severe by the time the patients get to hospital and, sadly, brain damage is commonly a result. Amoebic meningitis occurs seasonally. We are now prepared to attempt culture of the next case. There have been two patients with chronic leg ulcers caused by Mycobacterium ulcerans. Sexually transmitted diseases are rampant here; we find gonorrhea, Donovanosis, trichomoniasis, and some cases of syphilis. Recently there have been two cases of probable melioidosis — the second being a very serious systemic case in a young girl.

Our lifestyle here is very enjoyable. The living conditions are quite good, and although many food items cannot be obtained, an abundance of fresh pineapple and pawpaw in season is a consolation. We have made many good friends amongst the local people, and it has been very rewarding to learn some of their culture and a little of the language. Most hospital workers speak English reasonably well, having studied up to the equivalent of Form 5.

Having returned here in January 1990, after a couple of months in New Zealand for the birth of our baby daughter, Abigail, we see a number of priority areas for the lab work in the coming year:

— Commencement of HIV testing for the whole province.
— Setting up of full blood facilities once 24 hour power is connected.
— Training of health centre staff to screen for tuberculosis, and obtaining of sunlight powered microscopes for them.
— Sending local lab staff Dubuna and part-timer Mary on suitable courses.
— Lecturing in science and microbiology to trainee nurses, and rewriting both sets of notes.
— Overseeing the hospital lab at Rumginae, 300kms from here, where there is no lab technologist.
— Providing reference data for the national quality assurance programme now being set up.

As well, in April and May, we will be having help from Wayne Melrose, the technologist in charge of Special Haemotology at the Royal Hobart Hospital, Tasmania. We are looking forward to his contribution in a number of areas, and he may bring haemoglobin electrophoresis equipment to study the thalassaemia cases here.

The problems we face are many and varied. We often have difficulties obtaining the laboratory supplies we require — they are either not available, out of stock or even if sent to us, there are delays in getting them aboard one of the few boats that come here from Port Moresby. The hospital itself is, for the same reasons, often desperately short of medicines. The P.N.G. Government has had a big loss of revenue since the closure of the Bougainville Island Copper Mine due to insurrection there. This has already meant a 10% cut in funding for health services, and will make the provision of even minimally adequate health care that much harder.

Day-to-day, the heat, humidity and mosquitoes are usually bearable, but in the wet season, everything becomes a sea of mud and it is hard work getting from the house to the hospital and back. In the dry season, dust and ash from grass fires cover everything, and water becomes very precious. We are not looking forward to the prospect of an exceptionally dry season this year. An irregular power supply, termites infesting the previously sterile blood donor collection packs, humidity affecting many of our reagents and geckoes drowning in containers of disinfectant . . . the list continues.

Our two year term here finishes in October, 1990. Now that we have probably thoroughly put most people off, we are wondering if there is anybody (or bodies) reading this who would like to replace us here and take up the challenge of being "swamp technologists", using their skills of improvisation, innovation and an essential prerequisite — a good sense of humour. We can guarantee a very interesting time for you, both in laboratory work and lifestyle. We are still really enjoying being here, experiencing another culture, developing the lifestyle and stretching our own capabilities. We can warmly recommend it to you. If interested contact us (soon) at: P.O. Box 4, Balimo, Western Province, Papua New Guinea.

VIDEO

The Medical Section of the NZ Reference Culture Collection (NZRM) has acquired a copy of a video called **'Back-up'**, made for the World Federation of Culture Collections by the University of East Anglia's Audio-Visual Centre.

This 15 minute VHS Video, which is now available for loan, shows the ways in which service culture collection support microbiology and how best use can be made of them.

Apply to:

The Curator
NZ Reference Culture Collection
Medical Section
NZ Communicable Disease Centre
PO Box 50-348
PORIRUA

Phone: (04) 370-149
Fax: (04) 378-983

ATTENTION ALL LABORATORIES

DIRECTORY OF SPECIALIZED BIOCHEMISTRY TESTS

A new edition of The Directory of Specialized Laboratory Tests is now available. This booklet prepared by the Waikato branch of the NZACB replaces the 1980 edition. Many new tests have been added and existing data updated. The presentation has been improved. We regret that circumstances beyond our control now make it impossible to distribute this book free of charge.

The new edition is available from Dr Gerald Woollard Secretary of the NZACB at the department of Toxicology Auckland Hospital. The cost will be $15.00 per copy. Please include payment with your order. We cannot process orders without payment.

INSTITUTE BUSINESS

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Membership Fees and Enquiries

Membership fees for the year beginning April 1, 1990 are:

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

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

NEW PRODUCTS AND SERVICES

Trimtech instruments are pleased to announce that they have been appointed New Zealand agents for the range of optical microscopes manufactured by Carl Zeiss JENA.

Carl Zeiss JENA is a well-established and respected company — they are one of the world's largest and most prestigious manufacturers of scientific and optical instruments.

Carl Zeiss JENA manufacture an extensive range of instruments for the medical laboratory. Trimtech are introducing much of their range, including:

* Eduval-4:	Low cost transmitted light microcope for teaching and training purposes.
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* JENA Accessories:	Systems for co-observation, photomicrography and video/ CCTV imaging.

Trimtech Instruments operate their sales office and microscope servicing unit in Auckland. For further information regarding Carl Zeiss JENA microscopy products contact: Trimtech Instruments (Carl Zeiss JENA) P.O. Box 76-356, Manukau City. Telephone (09) 277-9184, Facsimile: (09) 277-7689.

IMPROVEMENTS TO MYCOPLASMA TEST KIT

Mp Test is a single ELISA test for the differential determination of IgM and IgG+IgM+IgA antibodies to Mycoplasma pneumoniae in human serum. The test enables early diagnosis of current infection in a single serum specimen in the majority of cases by determination of IgM antibodies. In other cases the test also provides the diagnosis of current infection by determining the rise in IgGMA antibodies in paired sera, taken 7-10 days apart.

Mp Test, has now had modifications in order to be more "user friendly". Firstly Diatech Diagnostica have reduced the total incubation time and it is now 1.5 hours. Secondly the calculations involved have been simplified to a one step simple formula. Shelf life of kits has also been extended to a minimum of six months.

Comparative studies with other kits performed recently in Australia and Israel show Mp Test to have superior performance. Copies of studies available on request.

Mp Test is also now available in an optional format that measures IgM only. This Kit has a sensitivity fractionally less than the IgGMA Mp Test Kit but costs less.

Further information from Diatech Diagnostica's N.Z. Distributor: Ngaio Laboratories, P.O. Box 4015, Nelson South.

NEW RANGE OF PLASTICWARE PRODUCTS FROM LINKSEAS

Linkseas Trading Company, whose Microbiological Loops and Streakers are proving very popular in New Zealand, now have a complete range of quality disposable plasticware available.

Examples of products available in this new range include:

Culture tubes (Polystyrene, all standard sizes).
Culture tubes (Polypropelene, all standard sizes).
Autoanalyzer Sample Cups.
Petri dishes — 3 sizes and 2-compartment.
Multipurpose container — 40 ml and 120 ml.
Multipurpose container — 40 ml with spatula.
Plastic inoculating loops (1ul and 10ul).
Mailing vials.
Dilution vials.
Centrifuge tubes — 10 ml polystyrene and polypropylene with push-in or screw caps.
Elisa plates — U shape and V shape.
Transfer pipettes — all sizes.
Pipette tips — to fit Eppendorf style pipettes.
Microcentrifuge tubes — 0.5 ml and 1.5 ml.

For more details on this range of products please contact the New Zealand Distributor for Linkseas Trading Company: Ngaio Laboratories, P.O. Box 4015, Nelson South.

HISTOLOGY TISSUE CASSETTE SYSTEM FROM LKS

Part of Linkseas Trading Companies new range of disposable plasticware is a tissue cassette system for Histology Departments.

Ten different coloured cassettes are available at very competitive prices. For further details and samples of these quality cassettes please contact the New Zealand Distributor for Linkseas Trading Company: Ngaio Laboratories, P.O. Box 4015, Nelson South.

BLOOD COLLECTION TUBES FROM LKS

Linkseas Trading Company are pleased to advise the

availability of a range of evacuated blood collection tubes. These tubes are compatible with standard needles and holders and also feature standard colour coding system.

Most importantly, these tubes are manufactured from polypropylene meaning they are virtually unbreakable and totally combustible on incineration. The following options are available:

Plain
Sodium Heparin
Sodium Citrate
Fluoride
Dried EDTA
Trisodium Citrate (ESR)

For further details on these Blood Collection Tubes please contact the New Zealand Distributor: Ngaio Laboratories, P.O. Box 4015, Nelson South.

MELOTEST HIV-1 EIA TEST
Based on synthetic Peptides

An Antibody Test for HIV-1 using a non-infectious synthetic peptide as the antigenic material, corresponding to a sequence of the envelope and core proteins of the HIV-1 virus, with improved sensitivity and specificity.

It is based on 8 well microtiter strips, coated with the Peptide. All the incubation steps are performed at room temperature, and results are ready in 1 hour. The serum samples are incubated in the wells 15 minutes. After a washing step, a HRP/anti-IgG Conjugate is added and incubated 15 minutes. After a second washing step, the Substrate solution is added to the wells. The enzymatic reaction is stopped after 30 minutes. Positive samples develop a deep blue-green colour. The intensity of the colour is measured at 398-415 nm. The absorbance value of the sample is compared to a calculated cut-off value. Positive and Negative controls are used to monitor assay performance. The Kit is supplied as a 96 Test Kit. All reagents are supplied ready for use and have a long shelf life at 4C.

A 1.5 hour STANDARD Incubation Test, and a 20 minute RAPID Test version are also available.

The MELOTEST HIV PROGRAM is completed with MELOTEST HIV-2 and MELOTESTHIV-1+2 Kits, in similar formats as HIV-1, and also using Synthetic Peptides.

For further details of the MELOTEST HIV PROGRAM contact: Ngaio Laboratories, P.O. Box 4015, Nelson South.

UNIVERSITY INTRODUCES DNA MEDICAL TESTS

The latest DNA technology is now being used in Auckland for a variety of medical tests by DNA Diagnostics Ltd.

The company has been established as a joint venture between Uniservices, the commercial arm of Auckland University, and Diagnostic Laboratory Holdings Ltd, a prominent medical pathology service.

Located in the University's School of Medicine, the company is providing testing for several serious diseases. Tests for identifying Human Papilloma Virus (HPV), cystic fibrosis carriers and parentage are already offered. Other tests will be available shortly.

DNA technology is much more reliable than other conventional techniques for many applications in the medical area, according to Dr Patricia Stapleton, technical manager of DNA Diagnostics.

As well as detecting the HPV virus, the DNA method may yield information to help treatment, she says. "For parentage testing, DNA techniques are providing more precise information than traditional means."

Testing individuals for carrier states of certain genetic diseases such as cystic fibrosis and haemophilia may be extremely important in preventing children being born with the more severe state. It is also possible to predict whether a foetus has been affected by some of these disorders relatively early in conception, says Dr Stapleton.

DNA Diagnostics Ltd has been set up on a commercial basis and charges rates which are competitive. It is providing a new range of testing not routinely available elsewhere.

The chief executive of Uniservices and director of DNA Diagnostics, Dr John Kernohan, describes this venture as yet another example of a university partnership with the commercial world. "We are making available the very latest technical expertise which, combined with the skills of an established service organisation, will provide the community with additional high quality diagnostic tests."

For further information contact Dr John Kernohan 737-808, or Dr Patricia Stapleton, 795-780 Ext 6407.

UNIQUE COLOUR TEST FROM WELLCOME SPEEDS SHIGELLA DIAGNOSIS

Wellcome Diagnostics, a division of The Wellcome Foundation Limited, has introduced a unique colour latex test that will identify Shigella species within 24 hours. This represents a considerable advance over current screening techniques which demand a time-consuming array of tests that in most laboratories can take up to 3 days.

The Wellcolex Colour Shigella test incorporates red and blue latex particles sensitised with antibodies raised to specific antigens of different Shigella species. In studies where the disease incidence was 33%, sensitivity and specificity were established as 99.8% and 99.3% respectively (using primary plate, broth subcultures and pure culture plates).

In a single test, this simple protocol allows Shigella species to be identified from the colour of the agglutinated particles and the contrasting change in background colour. Results are easily interpreted by laboratory personnel.

This is the only colour latex test for Shigella able to distinguish between species and give results on the second day (24 hours after receipt of the sample). In addition, the Wellcolex Colour Shigella protocol can be easily incorporated into the current routine for laboratories screening faecal samples. As many samples prove to be negative, using this test means that they can be discarded early in the screening process; therefore, saving considerable time and money in the diagnosis of Shigella.

Wellcolex is a trademark of The Wellcome Foundation Limited.

For further information, please contact: Wellcome New Zealand Limited, P.O. Box 22-258, Otahuhu, Auckland. Phone: (09) 276-1877

WELLCOME'S NEW COMBINED HIV-1 AND HIV-2 ASSAY OFFERS HIGHEST POSSIBLE SENSITIVITY

Wellcome Diagnostics (a division of The Wellcome Foundation Limited) has introduced a combination assay that offers excellent sensitivity and specificity to both HIV-1 and HIV-2 antibodies.

In a single test, the Wellcozyme HIV 1+2 kit can detect extremely low levels of HIV antibodies especially at or around the time of seroconversion to either HIV-1 or HIV-2. The high sensitivity and specificity of the test will help to detect those individuals who are antibody positive and maintain confidence in the security of donor blood supply.

From studies where the prevalence of HIV-1 antibody in European AIDS and ARC patients is assumed to be 100 per cent, the sensitivity of HIV 1+2 kit to HIV-1 antibodies is estimated to be 100 per cent. With European samples, when a zero per cent prevalence of HIV antibody in random donors is assumed, the specificity of the test was estimated to be 99.92 per cent.

The high performance capability of Wellcome Diagnostics' HIV 1+2 kit has been achieved using advanced enzyme-labelled antigen sandwich technology. This is based on a proven Wellcome recombinant HIV-1 core and envelope fusion protein, an ultra pure synthetic HIV-2 envelope peptide and an amplified enzyme detection system. Positive control sera for both HIV-1 and HIV-2 are supplied for added confidence in interpretation of results.

In addition to high sensitivity, the advanced technology used in the HIV 1+2 kit also provides excellent specificity. This allows the detection of HIV-2 antibodies without compromising specificity to HIV-1. Therefore, Wellcome Diagnostics' new assay offers considerable advantages over conventional combination HIV 1+2 kits where significantly decreased specificity has frequently been a major practical drawback.

Wellcozyme is a trademark of The Wellcome Foundation Limited.

For further information, please contact: Wellcome New Zealand Ltd, P.O. Box 22-258, Otahuhu, Auckland. Phone: (09) 276-1877.

"NEW" POLYPROPYLENE "PLUG TOP" 5ML TEST TUBE

Labserv has a New Zealand made, polypropylene 5ml tube with a "much in demand" plug top.

The precision moulding provides Tolerance and Uniformity and prevents cracking and leaking.

Polystyrene is available if required, and the polypropylene, 76mm x 12mm, are colour coded in blue, orange, yellow, green and red. Plug caps come in natural and white.

Available through: Biolab Scientific, Private Bag, Northcote. Phone (09) 418-3039, Fax (09) 418-0729.

BECKTON DICKINSON BRINGS YOU AWARD WINNING TECHNOLOGY WITH AN INEXPENSIVE HAEMATOLOGY ANALYZER

QBCII is a Centrifugal Haematology System which allows quick determination and 8 parameters in a single test:-

* Hemoglobin
* Hematocrit
* Platelet Count
* Total white cell
* Total Granulocyte
* % Granulocytes
* Total Lymphocyte/Monocyte
* % Lymphocyte/Monocyte

Specimens are whole — either capillary or anticoagulated venous sources. The reagents are dry and require no refrigeration or preparation.

Little maintenance is required and the analyzer has simple start-up and shut-down.

The QBC II is now used around the world as a stat backup in field laboratories, emergency rooms and in physician's own laboratories.

For more information contact:- Biolab Scientific, Private Bag, Northcote, Phone (09) 418-3039, Fax (09) 418-0729.

EASY BREEZE - HOEFER'S NEW AIR GEL-DRYING SYSTEM

Easy Breeze can dry as many as six 20 x 20 cm gels or twenty-four 8 x 10 cm gels at a time. This self-contained system includes the Easy Breeze Open Air Oven, precision-machined Hoefer Gel Frames to hold the gels, and a specially designed platform for easy loading. No need for a vacuum pump or cold trap. Compact, 12" wide x 18½" long x 9½" high, the Easy Breeze Oven takes up little bench space. The Hoefer Gel Frames hold gels taut and free of wrinkles or other surface irregularities. Precision machined of ⅜" acrylic, each Gel Frame holds one 20 x 20 cm standard gel or four mini gels on clear cellophane. After loading the gel in the Hoefer frame, slide the frame inside the Easy Breeze Oven. Warm air will blow across the top and bottom of each gel. Gels generally dry in only 2-3 hours.

For more information on the SE 1200 Easy Breeze Air Gel Dryer, contact: Biolab Scientific, Private Bag, Northcote. Phone (09) 418-3039, Fax (09) 418-0729.

LETTERS TO THE EDITOR

Dear Sir,

I would like to offer some further information concerning the situation described by Lyn Happy *[NZJ Med Lab Technol. 1990; **44** (1): 22].* The private hospital referred to is the Mercy Hospital in Auckland and the private laboratory is Auckland Diagnostic Laboratory. For many years the Mercy operated its own Private Laboratory which was staffed to a substantial extent by the Nursing Sisters. As the years went by, outside paid staff were required to an increasing extent and about five years ago it became clear to the management that the Laboratory was running at such a loss that something needed to be done about it. It was pointed out that the laboratory as it stood was too small to be viable so they asked Diagnostic Laboratory to take over. A computer screen and printer were installed at the Mercy to provide on-line enquiries and stat printing of results.

The system has worked well but unfortunately substantial financial losses continue, a significant proportion of these coming from the all-night service for blood gases required following open-heart surgery.

In the end we decided to do what most public hospital Laboratories have done long ago and that is have the nurses and/or medical staff in the Mercy Intensive Care Unit do the blood gases themselves through the night. Auckland Hospital Intensive Care does this, so does Waikato Hospital. So does Christchurch and probably quite a few others.

Although we feel sympathy for Lyn in losing her job as Night Technologist, we feel we must also point out that we did not invent this solution, we are merely copying what we have seen in the public hospitals.

There is a tide of change running in health care at the moment and trying to stem that tide is unlikely to be successful. These changes include looking at less costly ways of achieving the same result. There is also a move towards having patients themselves do their own tests — witness blood glucose in diabetes.

If we are to hold our position as leaders in the laboratory we need to be out there at the front end, advising, selecting methods, interpreting, applying quality control.

One last point. Lyn states that two thirds of all tests available in the present system "will be sent to the all ready over-burdened Public Hospitals involving unnecessary time delays." This is incorrect. All the tests currently being done at the Mercy will continue to be done either there or at Diagnostic Laboratory.

Yours sincerely

D M Reilly
PRINCIPAL TECHNOLOGIST
DIAGNOSTIC LABORATORY

Dear Sir,

One must feel sympathy for Lyn Happy with her problems re: Nova Stat.

I wonder however if her concerns would not be better handled by the Medical Laboratory Workers Union.

Over the years the Institute has shot itself in the foot time and time again, from the Palmerston North Private Laboratory fiasco, to the Extra Laboratory testing endorsement, and for the series of meetings over the status of technologist, a thinly disguised them and us i.e. technologist vs pathologists.

The Institute has been used as a ready vehicle for any real or imagined problems. I would ask when will the Institute finally divorce itself from Union activities and concentrate on the real issues. ie. education and professional development.

The Institu e has a large private laboratory membership and this type of letter however justified needs to be handled in different forum. I wonder whether or not the Institute is aware of the sensitive nature of the letter and its effect on private laboratory members.

Before this letter was published did the Editor:

(a) Approach the private laboratory concerned?
(b) Ascertain the letter was factual and also investigate situation in other institutions in order to give a valid comparison?
(c) Refer the letter to the Medical Laboratory Workers Union for their comment?
(d) Consider not to publish the letter because of sensitive nature?

These are questions that the Editor must answer.

If the Institute, through its Journal still wishes to pursue its union activities then it has the responsibility to present a more balanced account in order to retain credibility with its private laboratory members.

Yours faithfully

Godfrey Dodd

EDITORS NOTE:

Letters to the Editor present an open forum for members — it is not the policy of the current or previous Editors to investigate items accepted for publication.

Where a person or organisation is identified they are offered right of reply prior to publication, for publication with the original letter, wherever possible.

Dear Sir,

In reply to the points raised by Mr Dodd's letter on behalf of the Institute I have the following comments.

1). The acceptance and/or rejection of correspondence to the Journal is a discretionary right of the Editor and is neither under the direction nor is it considered by the Institute's Council.

2). The profession through the Institute has a very definite role in the establishment of standards of practice for Medical Laboratory Technology. As a registered profession in the Public interest it must advise on proper practice. This is not an Industrial perogative.

The establishing of standards of practice are applicable to all under-taking Medical Laboratory Technology whether in private or public employment.

W.J. Wilson
President

Trichophyton Soudanense Isolations in New Zealand — Two Case Reports

Brian J. Allred, A.N.Z.I.M.L.T, Microbiology Department, Medical Laboratory, Wellington, New Zealand.

Dinah Parr, B.Sc, Microbiology Department, Auckland Hospital, Auckland, New Zealand.

Abstract

Two cases of superficial fungal infections with *Trichophyton soudanense* are presented with a description of this dermatophyte's features. Some cultural variation was noted. In each instance, (the first published accounts of this fungus being isolated in New Zealand) the infection was acquired in Africa. Attention is drawn to the possibilities of isolating this and other fungi not endemic to this country with the increased mobility of people around the world.

Key words

Trichophyton soudanense, tinea capitis, tinea corporis.

Introduction

In this country the most common cause of tinea capitis is *Microsporum canis*. It is also second in prevalence as the cause of tinea corporis (1).

Trichophyton soudanense (Joyeux 1912) (2) is a frequent cause of tinea capitis and corporis in Africa, particularly across central Africa from Senegal in the West to Somalia in the East (3). Although it is an uncommon isolate outside of Africa, there have been case reports in Europe and in the U.S.A. (4,5). Such cases have been associated with African immigrants or their contacts. In some instances infections have been of unexplained origin.

Two recent isolations of *T.soudanense* in New Zealand are described and attention is drawn to the features of this dermatophyte and the need to be vigilant for the more exotic fungi that may be isolated in this country.

Case 1

In December 1985 a six year old boy who had a patch of partial alopecia was seen by his family doctor in Wellington. The lesion measured approximately 10cm in diameter and was near the vertex of his scalp. The child was born in Sierra-Leone, his father was an African and his mother a European. The family had recently immigrated to New Zealand. The doctor referred the patient to the Wellington Medical Laboratory for mycological investigations. Some of the hair follicles contained "black-dots" of broken off hairs. Scrapings of these were taken for mycological investigations.

The patient was treated with oral griseofulvin, 125mg twice daily for 10 weeks, and miconazole cream was applied also. When the patient was seen again 3 months later the lesion was clinically improved. Parental permission was not granted to take scalp brushings from the patient to test for mycological cure, or from other family members, to test for further dissemination of the fungus.

Case 2

A 27 year old black Ghanian student presented to the Dermatology Clinic, Auckland Hospital in December 1984. He had been in New Zealand for three months to study accountancy.

A rash had been present on his hands for seven months. There was fine scaling on the palm and dorsum of each hand with no obvious erythema. Skin scrapings were taken from these sites for mycological investigations.

He was treated initially with topical econazole for one month with little response. The therapy was changed to griseofulvin 1 gram daily for three months, but after completing the course, fungal elements were still present. He was therefore commenced on ketoconazole 400mg per day over the next two months and clinically his hands improved.

Skin scrapings taken on completion of this treatment failed to demonstrate fungal elements and culture was negative. Six months after treatment there had been no recurrence of the infection.

Mycology

Direct microscopy of the potassium hydroxide preparation of scrapings taken from both patients were positive for fungal elements. The hair fragments from Case 1 contained chains of large spores (6-7 microns diameter) within the hair shaft — endothrix [Fig. 1.]. Skin scrapings from both sites in Case 2 contained mycelium and arthroconidia.

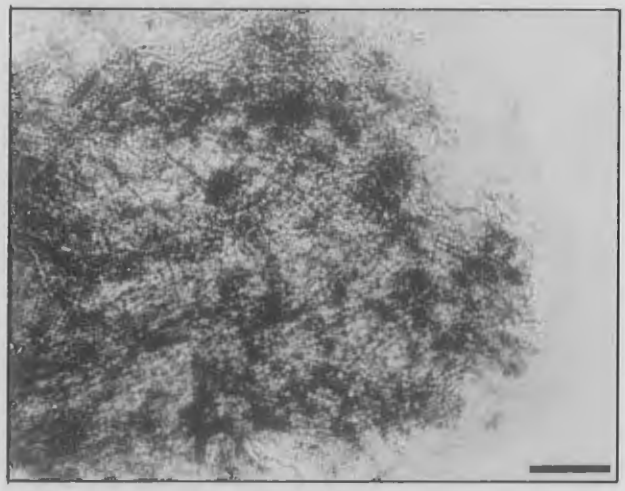

Figure 1: *Microscopy of hair fragments in KOH from Case 1. Bar indicates 100 mm.*

Cultures from the scalp of the Wellington case and the palm of the Auckland case were similar in that they yielded a slow growing (approximately 1.5cm diameter in 2-3 weeks) fungus on Sabouraud dextrose agar, containing gentamicin and cycloheximide. The Wellington isolate had a folded deep yellow-apricot coloured surface with a marked fringe of submerged mycelium ("eyelash" appearance) [Fig. 2]. The palm isolate in the Auckland case had a bright yellow suede-like colony with a markedly radiating edge and a brilliant yellow reverse. Subculture on lactritmel (Borelli) and potato dextrose agar gave yellow colonies, the microscopy of which showed moderate numbers of clavate microconidia in both isolates. The Auckland palm isolate also produced occasional smooth-walled macroconidia, chlamydospores and arthroconidia on these media. Reflexive branching was seen in both cultures either on the fringe of Sabouraud dextrose agar plates or in slide cultures of Sabouraud dextrose, Rice extract — Tween 80 or Corn Meal — Tween 80 agars (6).

Subcultures were made on a variety of media including peptone agar which gave the most stable colonial morphology with the Auckland isolates, i.e. a 1cm slightly wrinkled pale-orange colony with a distinct peripheral fringe of hyphae. The Wellington isolate was also subcultured on Lowenstein-Jensen medium which gave a characteristic dark-brown coloured colony (6). From these features the fungi were identified as *Trichophyton soudanense*.

Figure 2: *T. soudanense culture on Sabouraud dextrose agar.*

By contrast, the dorsal isolate of the Auckland case gave a smaller (0.5cm) glabrous, wart-like raised grey-purple colony, with an entire edge, at 18 days on Sabouraud dextrose agar. Short greyish-mauve aerial mycelium developed with age. Subcultures on lactritmel agar and potato dextrose agar produced brilliant red pigmented colonies with identical microscopy to the palm isolate. The gross morphology suggested a glabrous strain of *Trichophyton rubrum* but the subculture on peptone agar gave the identical picture to the palm isolate. Reflexive branching was also evident in the slide culture. It was assumed that this must be Vanbreuseghem's purple variant of *T. soudanense*. All isolates remained true to form when subcultured back onto Sabouraud dextrose agar.

Both Auckland isolates were confirmed as *T. soudanense* by St John's Hospital for Diseases of the Skin, London.

Discussion

In the two cases described both patients had the lesions before entering New Zealand. Both infections were acquired in Africa. They are of particular interest because the fungus causing the infection, *T. soudanense* is an unexpected isolate in this country. However, the lesions were quite typical of any caused by an anthropophilic *Trichophyton spp.*.

The initial lack of response to topical econazole and oral griseofulvin in the Auckland case may have been due to non compliance; otherwise this remains unexplained.

The treatment of the Wellington case was uncomplicated although it was unfortunate that mycological cure could not be proven by taking scalp brushings subsequently.

The detection of tinea capitis caused by *Trichophyton spp.* can present some pitfalls for the unwary. Whereas the common cause of tinea capitis in this country, *M. canis*, gives a quite defined, patchy alopecia, *Trichophyton spp.* may give a very diffuse lesion containing large amounts of unaffected hair. This can lead to occult lesions being overlooked. For this reason it would have been helpful to have screened close contacts of the Wellington case by scalp brushings also.

As *M.canis* is so prevalent, the Wood's light is a useful aid to diagnosis. The infected hairs show a characteristic yellow-green fluorescence although it should be noted that such hairs do not always fluoresce. (7,8). Hairs parasitised by *Trichophyton spp.* do not show any fluorescence except in the case of *T.scoenleinii* which may show a bluish-white fluorescence. This latter species is endemic to North Africa and the Arabic Middle East.

Trichophyton spp. produce a characteristic large-spored endothrix hair invasion which was evident in the Wellington case. This may initially have suggested *T.tonsurans* which is endemic in New Zealand, and the second most common cause of tinea capitis, however, an awareness of the geographic origin of this patient suggested other possible aetiological agents.

The isolates showed differences in their macroscopic and microscopic morphologies. The Wellington isolate showed features typical of the species. By contrast the Auckland isolates were different in a number of respects. The macroscopic appearance of the palm isolate was similar to the Wellington isolate but more diverse in microscopic morphology. The use of lactritmel agar, which enhances conidia production could account for this. Macroconidia are not a common finding in *T.soudanense* and has only recently been documented by Ajello (9). The isolate from the dorsum of the hand varied significantly from the palm in that it was slower growing and showed a purplish pigmentation. Microscopy was similar to the palm isolate.

Although a purplish variant has been well documented, it was unusual to find the two colonial types isolated from the same patient. This emphasises the need to exercise caution in identifying atypical isolates.

Dysgonic strains of *M.canis* may be confused with *T.soudanense* on primary culture. The yellow-orange glabrous thallus of these strains, together with a lack of any conidia, may suggest *T.soudanense* although the "eyelash" appearance of the thallus periphery is absent. Evaluation of the patient's geographical history, sporulation on subculture media, and in the case of hair infection, hair invasion type, will exclude *T.soudanense* and confirm the isolate as a dysgonic *M.canis* strain.

The ease of travel these days increases the need for vigilance in detecting the more exotic dermatophytes that may be introduced to this country. Because of proximity, the Pacific Basin is the most likely source of these. *Trichophyton concentricum*, endemic to the South Pacific area, has been isolated occasionally in New Zealand from returning travellers.

From the above, it is shown that clinicians and microbiologists need to be aware of exotic fungi that may occasionally be isolated. Mycologists also need to note that dermatophyte species can be extremely variable as shown by the Auckland *T.soudanense* isolate.

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Guidelines For Prospective Applicants

Purpose

1 Money donated in New Zealand for a memorial to Sir Winston Churchill forms a trust fund administered by a Trust Board of nine persons appointed by the Governor-General. The income from the fund is used to enable people to study and travel so that their contribution to the community and their trade, industry, profession, business or calling would thereby be increased. The Trust Board welcomes any donation, gift, or bequest to help it in its work.

2. The Winston Churchill Memorial Trust Act 1965 provides in section 18 that the Trust Board may as it thinks fit apply the income of the fund to benefit the community by making grants or awards or providing fellowships to qualified persons who will contribute to the general advancement of any occupation, calling, trade, business, or profession carried on or intended to be carried on in New Zealand, or to the benefit in general of New Zealand, or to the maintenance or advancement of the Commonwealth as a beneficial influence in world affairs.

Objective

3. To enable responsible people in all walks of life with potential for leadership to undertake projects in accordance with the Trust's purpose thereby increasing awareness generally about the memorial purpose of the Trust and to encourage support for it.

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4 The Trust Board is not empowered to give scholarships and the assistance it offers is not intended for scholarship or gaining academic qualifications. Provided, however, that an eligible project which benefits New Zealand may include a course of studies which is secondary to but part of the primary purpose of benefit to New Zealand.

5. Applicants must have a good background of ability and experience in their project subject and the potential to influence developments in that subject. Formal educational qualifications are not necessary

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   (a) New Zealand citizens, or,
   (b) A person who is ordinarily resident in New Zealand
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   (d) Recipients must submit 15 copies of a report on their project within six months of their return.
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   (j) Fellowship projects may be in New Zealand or overseas.

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   (m) The closing date for references is also 31 July. Late references may result in exclusion of the application from consideration.

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General

9. Applications and any enquiries should be made to:
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10. The Trust Board places great importance on the benefits for New Zealand. Applicants must therefore state clearly what the benefit will be and how they are qualified to discover and promote that benefit.

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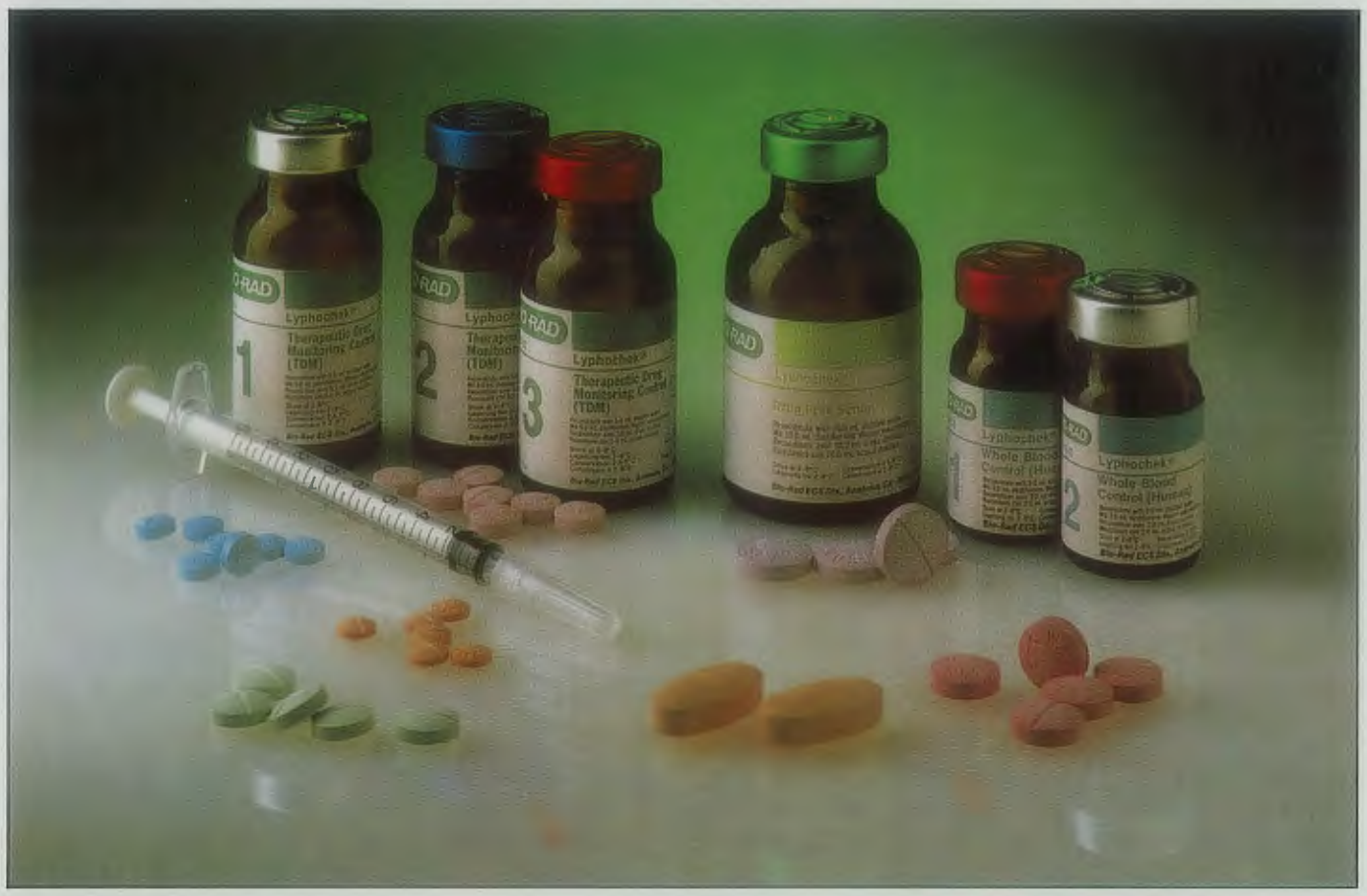

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