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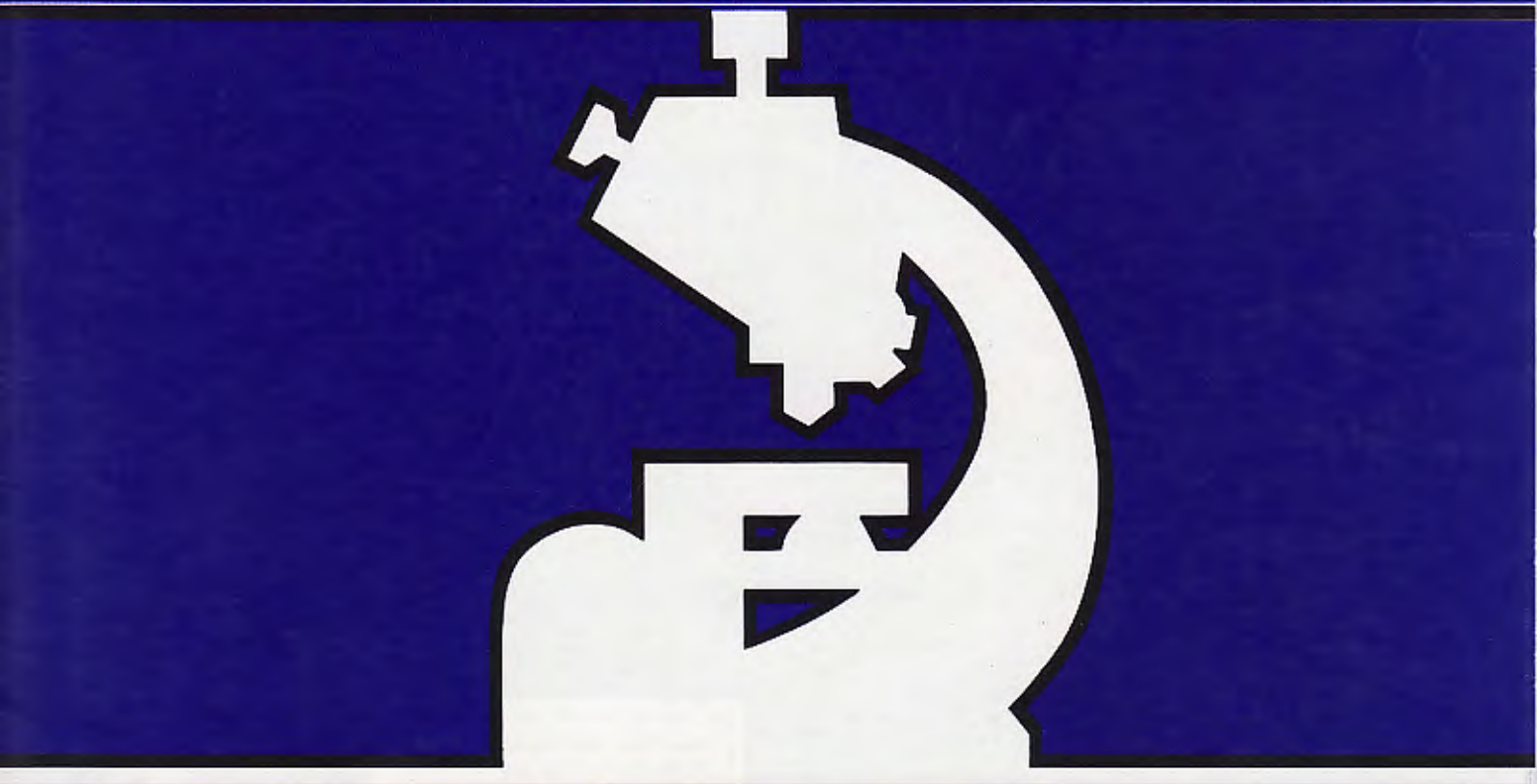

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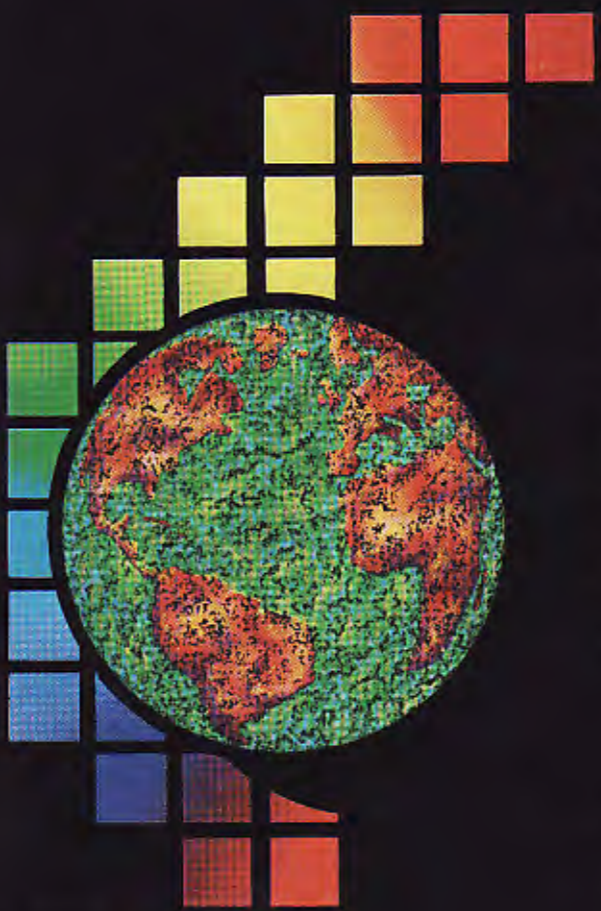

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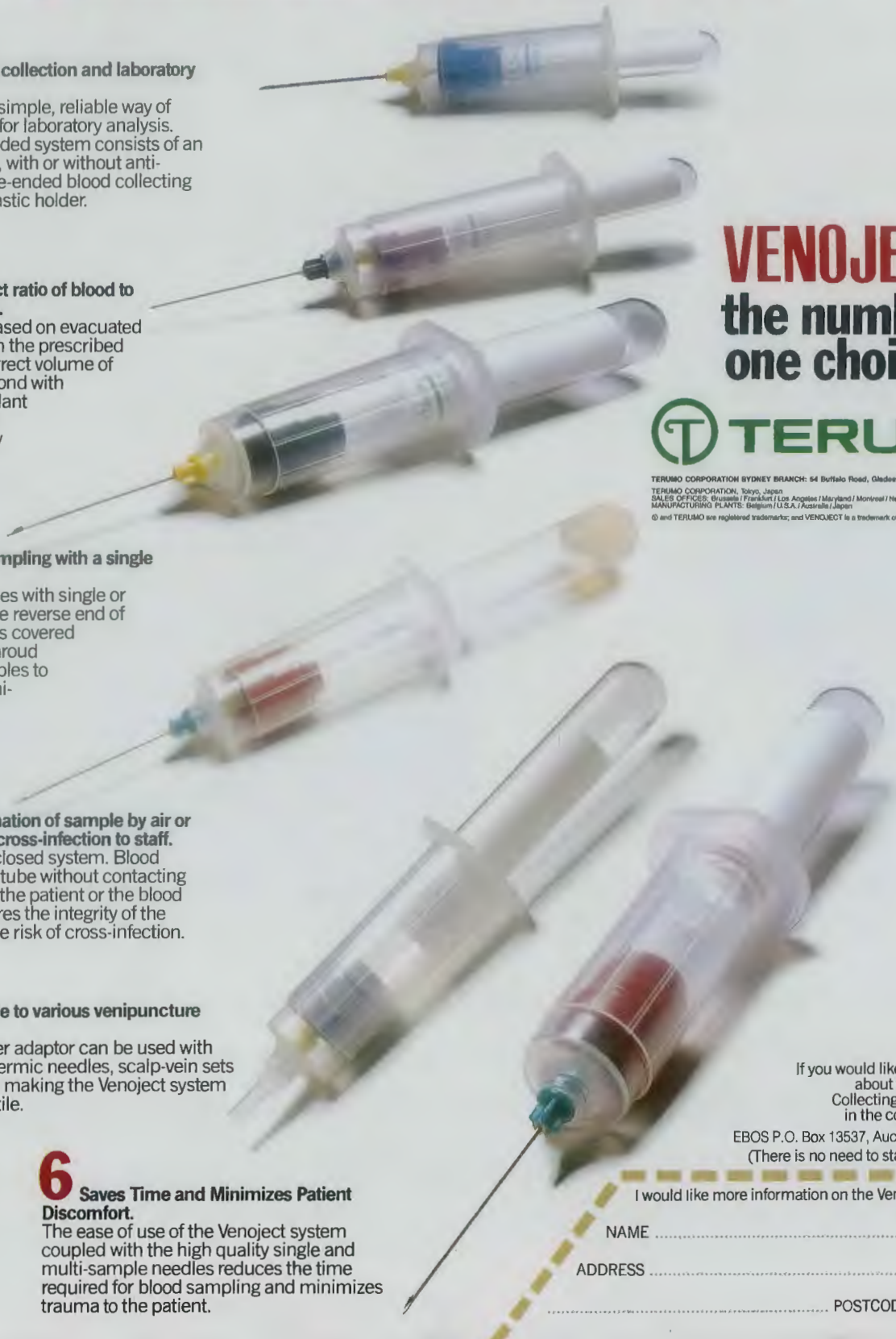

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TABLE OF CONTENTS

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A Comparison of the *in vitro* Activity of Ampicillin/Sulbactam and Amoxycillin/ Clavulanic acid.

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Microbiology Laboratory, Middlemore Hospital, Auckland.

This work was funded by Pfizer Laboratories N.Z. Ltd.

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Running head:
ampicillin/sulbactam and amoxycillin/clavulanic acid.

Abstract

The *in vitro* activity of ampicillin/sulbactam (1:1 ratio) against ampicillin-resistant clinical isolates was compared with that of ampicillin/clavulanic acid (2:1 ratio).

The overall activity of ampicillin/sulbactam was very similar to that of amoxycillin/clavulanic acid. Each combination inhibited approximately two thirds of ampicillin-resistant isolates of *Enterobacteriaceae* at concentrations ≤16mg/L. MIC's of amoxycillin/clavulanic acid and ampicillin/sulbactam differed by ≥3 doubling dilutions for 13/90 (14%) *Enterobacteriaceae* isolates. The two combinations are not interchangeable for purposes of sensitivity testing. Both combinations were very active against *Bacteroides fragilis, Haemophilus influenzae* and *Branhamella catarrhalis*. MICs for both methicillin-susceptible and methicillin-resistant staphylococci were reduced, but the latter remained relatively resistant.

Key words:
in vitro activity, beta-lactamase inhibitors, ampicillin, sulbactam, amoxycillin, clavulanic acid, augmentin.

Introduction

Sulbactam and clavulanic acid are competitive, irreversible inactivators of beta-lactamases commonly produced by staphylococci, members of the *Enterobacteriaceae, Haemophilus influenzae* and *Bacteroides fragilis.*[1,2] Neither agent has useful antibacterial activity on its own, however both effectively extend the spectrum of beta-lactamase-susceptible penicillins such as ampicillin and amoxycillin.[3,4,5,6] A previous comparative study, which used fixed concentrations of sulbactam and clavulanic acid with conventional doubling dilutions of penicillins, has shown that whereas clavulanic acid is generally 2-5 times more potent against beta-lactamases from most species, there is greater potentiation with sulbactam in a minority.[3] In order to explore the relevance of such differences to proposed susceptibility breakpoints the present study employed doubling dilutions of ratios expected *in vivo*. Amoxycillin/ clavulanic acid or Augmentin is presently available in New Zealand in syrup and tablet forms. An ampicillin/sulbactam combination has not yet been released.

Materials and Methods

Six methicillin-resistant *S. aureus* and 6 beta-lactamase producing *H. influenzae* were provided by the National Health Institute, Wellington. All other organisms were recovered in our laboratory and identified according to standard bacteriological methods.[7] Ampicillin resistance was provisionally inferred from the results of disc testing using Stokes' method[8] and was confirmed by a minimum inhibitory concentration (MIC) ≥ 32 mg/L for aerobic Gram negative bacilli; and ≥ 8mg/L for *B. fragilis*. Beta-lactamase production was demonstrated for *H. influenzae, B.*

Table I

In vitro activity of ampicillin/sulbactam (1:1 ratio) and amoxycillin/clavulanic acid (2:1) ratio vs. ampicillin resistant isolates.

ORGANISM (Numbers)	DRUG	RANGE MIC (mg/L)*	$MIC°_{50}$ (mg/L)	$MIC°_{90}$ (mg/L)
Escherichia coli	ampicillin/sulbactam	4 — 64	16	32
(39)	amoxycillin/clavulanic acid	2 — 64	16	16
Klebsiella sp.	ampicillin/sulbactam	2 — 128	8	64
(21)	amoxycillin/clavulanic acid	1 — 128	4	32
Enterobacter sp.	ampicillin/sulbactam	8 — 128	16	64
(13)	amoxycillin/clavulanic acid	16 — 128	16	128
*Proteus spp***	ampicillin/sulbactam	8 — 16	8	16
(12)	amoxycillin/clavulanic acid	4 — >128	64	>128
Serratia sp.	ampicillin/sulbactam	64 — 128	64	128
(2)	amoxycillin/clavulanic acid	64 — 128	64	128
Citrobacter sp.	ampicillin/sulbactam	4	4	4
(3)	amoxycillin/clavulanic acid	2 — 4	4	4
Acinetobacter sp.	ampicillin/sulbactam	2 — >128	2	>128
(4)	amoxycillin/clavulanic acid	8 — 128	16	128
Bacteroides fragilis	ampicillin/sulbactam	0.25 — 4	0.5	2
(18)	amoxycillin/clavulanic acid	0.125 — 8	0.25	4
Haemophilus influenzae	ampicillin/sulbactam	0.5 — 1	1	1
(7)	amoxycillin/clavulanic acid	1 — 2	1	2
Branhamella catarrhalis	ampicillin/sulbactam	0.015 — 0.03	0.015	0.03
(2)	amoxycillin/clavulanic acid	0.06	0.06	0.06
Staphylococcus aureus	ampicillin/sulbactam	0.125 — 1	0.5	1
(methicillin-sensitive)	amoxycillin/clavulanic acid	0.25 — 1	1	1
(13)				
Staphylococcus aureus	ampicillin/sulbactam	4 — 16	8	16
(methicillin-resistant)	amoxycillin/clavulanic acid	8 — 16	16	16
(6)				
Staphylococcus epidermidis	ampicillin/sulbactam	8 — 16	8	16
(methicillin-resistant)	amoxycillin/clavulanic acid	8 — 32	16	32

(TOTAL 144)

* Expressed as the concentration of ampicillin or amoxycillin.
° minimum inhibitory concentration for 50% and 90% of isolates respectively.
** *Proteus spp.* includes *P. mirabilis* 3, *P. vulgaris* 3, *Morganella morganii* 5, *Providencia rettgeri* 1.

Table II

Ratio of MIC of ampicillin/sulbactam to MIC of amoxycillin/clavulanic acid for 144 isolates.

ORGANISM (numbers)	1:≥16 (ampicillin/sulbactam:	1:8	1:4	1:2	1:1 amoxycillin/clavulanic acid)	2:1	4:1	8:1	≥16:1
Escherichia coli (39)		1	1	4	14	11	8		
Klebsiella sp. (21)			2	1	3	8	4	2	1
Enterobacter sp. (13)	2	1	3	4		1	2		
Proteus sp. (12)	4	2	3	1	1	1			
Serratia sp. (2)					2				
Citrobacter sp. (3)					2	1			
Acinetobacter sp. (4)		1	1			1	1		
Bacteroides fragilis (18)				2	5	8	3		
Haemophilus influenzae (7)				4	3				
Branhamella catarrhalis (2)			1	1					
Staphylococcus aureus (methicillin sensitive) (13)				7	4	2			
Staphylococcus aureus (methicillin resistant) (6)			1	4	1				
Coagulase negative staphylococci (methicillin resistant) (4)				3	1				

catarrhalis and *Staphylococcus species* (Cefinase B.B.L. microbiology systems, Becton Dickinson & Co. Cockeysville, M.D. 21030).

The agar dilution method of susceptibility testing was used.[7] Sulbactam was provided by Pfizer Laboratories, N.Z., clavulanic acid and amoxycillin by Beecham Research Laboratories, N.Z. and ampicillin by the hospital pharmacy. Doubling dilutions, from 128-0.3mg/L of the penicillin or penicillin component, were prepared for ampicillin, ampicillin/sulbactam (1:1 ratio) amoxycillin and amoxycillin/clavulanic acid (2:1 ratio). MICs were recorded as the concentration of ampicillin or amoxycillin inhibiting growth of 99.9% of the inoculum. Plates were prepared immediately before use. Mueller-Hinton agar was used for non-fastidious isolates, Columbia base with 5% chocolatised sheep blood and isovitalex for *H. influenzae,* and Schaedler's agar (Difco) for *B. fragilis.* After incubation in peptone water for 2-6 hours, inocula were adjusted to 0.5 McFarland barium sulphate standard, then diluted 1:10 prior to delivery of 1-2μL by a replicator (H.I. Clements Pty., Ltd., Sydney). In the case of *H. influenzae* and *B. fragilis,* overnight colonies were suspended in peptone water to obtain the desired turbidity. These methods result in approximately 10^4 colony forming units (cfu) per spot. The effect of increasing the inoculum to 10^6 cfu was determined for representative isolates. Plates were incubated at 35°C for 18 hours. *H. influenzae* was incubated in 8% CO_2 atmosphere, *B. fragilis* in an anaerobic chamber (Forma) and all others in air. *Escherichia coli* A.T.C.C. 25922, *S. aureus* A.T.C.C. 25923 and *S. aureus* A.T.C.C. 29213 (a weak beta-lactamase producer), were used as controls.

Table III

Ratio of MIC of ampicillin to MIC of amoxycillin for 144 isolates.

ORGANISM (numbers)	1:8	1:4	1:2	1:1 (ampicillin:amoxycillin)	2:1	4:1	8:1
Escherichia coli (39)				39			
Klebsiella sp. (21)	1	3	4	13			
Enterobacter sp. (13)	2	1	3	7			
Proteus sp. (12)			1	11			
Serratia sp. (2)			2				
Citrobacter sp. (3)		2	1				
Acinetobacter sp. (4)	1		1	2			
Bacteroides fragilis (18)			7	7	3	1	
Haemophilus influenzae (7)		3	3		1		
Branhamella catarrhalis (2)		1	1				
Staphylococcus aureus (methicillin sensitive) (13)		4	7	2			
Staphylococcus aureus (methicillin resistant) (6)			3	2	1		
Coagulase negative staphylococci (methicillin resistant) (4)		3	1				

Results

MICs of amoxycillin/clavulanic acid and ampicillin/sulbactam for the 144 ampicillin-resistant clinical isolates are shown in Table I. The numbers of each species tested are approximately proportionate to the over-all isolation rates in this laboratory except that beta-lactamase producing *H. influenzae* and methicillin-resistant *S. aureus* are over-represented and methicillin-susceptible *S. aureus* are under-represented.

Sixty-nine percent of *Enterobacteriaceae* isolates were susceptible or of intermediate susceptibility (MIC ≤ 16mg/L) to amoxycillin/clavulanic acid and 64% to ampicillin/sulbactam. While the overall activity of amoxycillin/clavulanic acid was similar to that of ampicillin/sulbactam, MICs for individual isolates varied by as much as four doubling dilutions (Table II). MICs of amoxycillin/clavulanic acid were increased ≥ 8 fold (compared with ampicillin/sulbactam) for 6/12 (50%) isolates of *Proteus sp.* and for 3/13 (23%) isolates of *Enterobacter sp.* Four isolates of *Proteus sp.* and three isolates of *Enterobacter sp.* had MICs of amoxycillin/clavulanic acid ≥ 128 mg/L and MICs of ampicillin/sulbactam ≤ 16mg/L. MICs of amoxycillin were within one doubling dilution of those of ampicillin for most *Enterobacteriaceae* (Table III), but were increased ≥ four fold for 4/21 (19%) isolates of *Klebsiella sp.,* 3/13 (23%) isolates of

Enterobacter sp. and 2/3 (66%) isolates of *Citrobacter sp.* Two isolates of *Enterobacter sp.* were susceptible to ampicillin (MIC=8-16 mg/L) but resistant to amoxycillin (MIC=128 mg/L). Both were susceptible to ampicillin/sulbactam (MIC=8 mg/L) but resistant to amoxycillin/clavulanic acid (MIC=64 mg/L).

All isolates of *B. fragilis, H. influenzae* and *B. catarrhalis* had MICs of amoxycillin/clavulanic acid and ampicillin/sulbactam ≤ 8mg/L (Table I). MICs of amoxycillin/clavulanic acid and ampicillin/sulbactam (Table II) were within two doubling dilutions of each other as were MICs of amoxycillin and ampicillin (Table III).

All isolates of methicillin-sensitive *S. aureus* were susceptible to ≤ 1mg/L of either amoxycillin/clavulanic acid or ampicillin/sulbactam. However all isolates of methicillin-resistant *S. aureus* and methicillin resistant coagulase negative staphylococci were resistant to 2mg/L of either amoxycillin/clavulanic acid or ampicillin/sulbactam.

Increasing the inoculum of representative organisms to 10^6 cfu produced comparable increases in MICs of both combinations. The increase was commonly 2 to 16 fold, somewhat less than seen for ampicillin or amoxycillin alone.

Discussion

This study confirms that the antibacterial activities of ampicillin and amoxycillin are usefully extended by the addition of sulbactam and clavulanic acid respectively. These beta-lactamase inhibitors potentiated ampicillin or amoxycillin against over 90% of resistant *Enterobacteriaceae* and reduced MICs to, or below, the accepted susceptibility breakpoint of 8mg/L in 40-50%. Differences between the activities of ampicillin/sulbactam and amoxycillin/clavulanic acid were such that these combinations cannot be regarded as interchangeable for the purpose of susceptibility testing. These differences were largely attributable to the beta-lactamase inhibitors but we also encountered two enterobacter isolates which were resistant to amoxycillin but relatively susceptible to ampicillin. Since we selected organisms on the basis of resistance to an ampicillin disc we cannot comment on the frequency of this phenomenon.[9]

Methicillin-sensitive staphylococci are clearly susceptible to both combinations but difficulties arise in interpreting susceptibility in the case of methicillin-resistant staphylococci. Because these organisms are also beta-lactamase producers the intrinsic activity of ampicillin or amoxycillin against them is not ordinarily considered. Until adequate *in vivo* studies of the efficacy of the combinations against infections due to methicillin-resistant staphylococci have been performed, *in vitro* susceptibility breakpoints must remain tentative. In the light of data on other beta-lactam antibiotics with methicillin-resistant staphylococci it has been recommended that such organisms be considered resistant to amoxycillin/clavulanic acid irrespective of susceptibility test results.[10] Similar caution is presumably indicated with ampicillin/sulbactam even though this combination has shown promise in the treatment of endocarditis due to methicillin-resistant *S. aureus* in a rabbit model.[11]

Both combinations were very active against *B. fragilis, H. influenzae* and *B. catarrhalis* and evidence of their efficacy in infections due to these organisms is accumulating.[5,6] Whether they can be relied on to treat meningitis due to beta-lactamase producing *H. influenzae* awaits further study. We found that increasing the inoculum of *H. influenzae* to 10^6 cfu/mL. increased MICs at least 8 fold. Counts in excess of 10^7 cfu/mL are commonly found in CSF[12] and an inoculum effect, as well as the ability of the inhibitors to attain adequate levels in the central nervous system, must be taken into account.

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REFERENCE INTERVALS FOR ALKALINE PHOSPHATASE, ANGIOTENSIN CONVERTING ENZYME, ASPARTATE AMINOTRANSFERASE, CREATINE KINASE AND γ-GLUTAMYL TRANSFERASE IN ELEVEN YEAR OLD CHILDREN

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Running title: Enzyme levels in children

Abstract

We have measured five enzyme activites in the sera of eleven year old children. While aspartate aminotransferase activity was comparable with adult levels, alkaline phosphatase, creatine kinase and angiotensin converting enzyme activities were higher. In contrast, γ -glutamyltransferase activity was lower in eleven year olds than in adults. Sex-related differences were apparent for alkaline phosphatase, creatine kinase and γ -glutamyltransferase. We report reference intervals for the five enzymes derived by the nonparametric percentile technique.

Introduction

It is well established that the concentrations of many serum constituents change with growth and development[1]. In particular, serum enzyme levels show age related trends during childhood and adolescence. Thus it is inappropriate to apply adult reference limits to children. Our observations lead us to believe that whilst the age related changes in serum alkaline phosphatase (ALP) activity are usually appreciated by clinicians, age related variations in other enzyme activities are not. Reference limits in the literature are not always transferable between laboratories because of differences in methodology and/or the populations sampled. Therefore, our aim was to begin a study defining reference limits for selected serum enzymes in children and adolescents using well established methods thereby ensuring the general usefulness of our data.

Herein, we report reference intervals for ALP, angiotensin converting enzyme (ACE), aspartate aminotransferase (AST), creatine kinase (CK) and γ -glutamltransferase (γ -GT) derived from a representative sample of eleven year old children.

Methods

Subjects and specimen collection

The subjects were 561 children (303 boys; 258 girls) drawn from the Dunedin Multidisciplinary Health and Development Study sample who voluntarily consented to give blood as part of their assessment at Phase XI (age 11 years ± 2 months). In that phase 803 children attended the Research Unit, and 70 per cent gave blood. Most of those whose blood was not included were refusals, although a small number of samples were missed because insufficient was collected.

The Dunedin Multidisciplinary Research Health and Development Study involves the longitudinal study of a large group of children who were born at Queen Mary Maternity Hospital, Dunedin between 1 April 1972 and 31 March 1973 and whose mothers were resident in the metropolitan area at the time of birth. The cohort, which is slightly socio-economically advantaged and under-representative of Maori and Polynesian races compared with the country as a whole, has been fully described elsewhere[2].

The children attended the Research Unit within two months of their eleventh birthdays. Venous blood was taken by a medical officer between 0845-0915 h using a 30-mL disposable plastic syringe (Terumo Pty Ltd., Melbourne, Vic., Australia) and a 21-gauge needle (0.80 x 38 mm, Terumo) with the use of a tourniquet and with the subject lying down. The syringe needle was removed and the blood promptly aliquoted for each of eight studies.[3] according to a schedule of priority. For the enzymes reported in this paper, blood was aliquoted into plain, red-topped vacutainers (Becton, Dickinson and Co., Rutherford, NJ 07070, USA) and allowed to clot at room temperature. Within 3h of collection the specimens were centrifuged, the serum harvested and stored frozen at — 15°C for up to 7 days.

Analytical methods

All test were performed in batches at weekly intervals. The

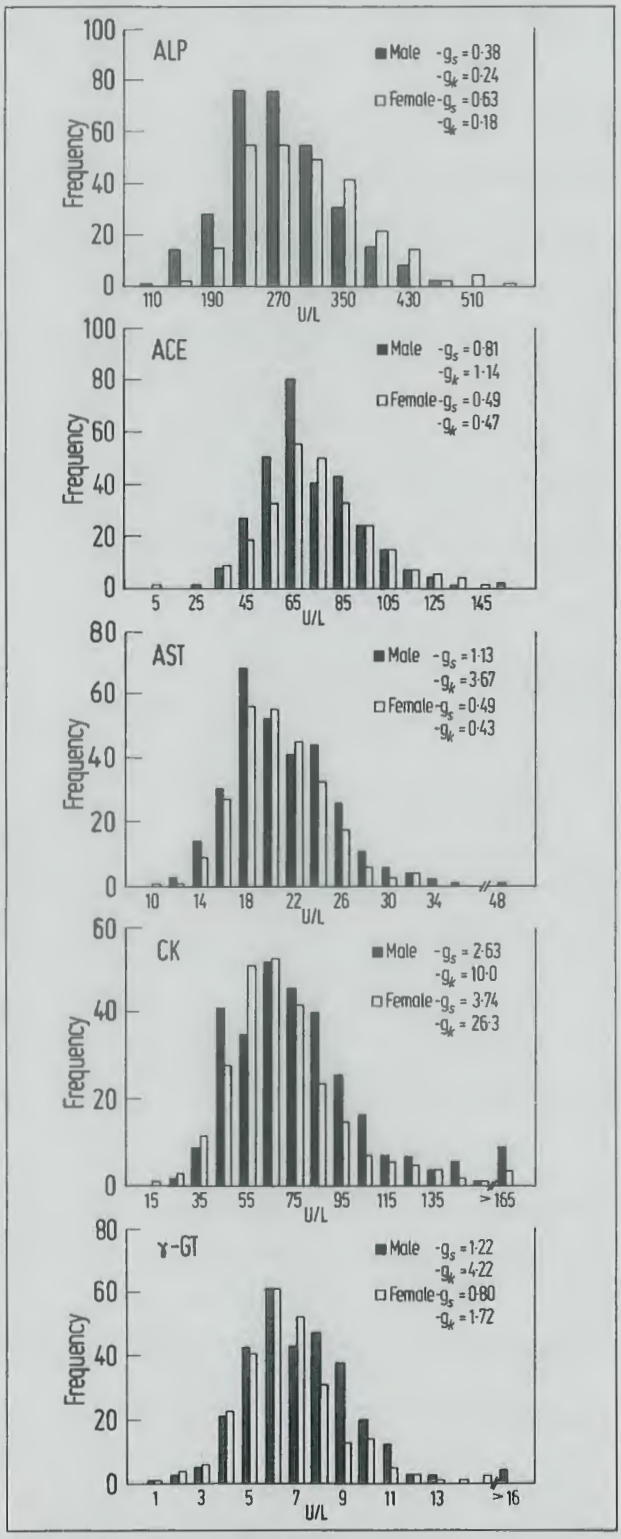

Figure 1. *Distribution of serum enzyme activties (U/L) in eleven year old children.*

g_s — coefficient of skewness g_k — coefficient of kurtosis

specimens were allowed to thaw at room temperature for 30 min. For ALP, specimens were diluted with an equal volume (200 μL) of 145 mmol/L NaCl solution before analysis, thus ensuring raw results within the linear range of the method. All other tests were performed on undiluted sera.

ALP activity was measured at 37°C on a continuous flow analyser (ChemLab Instruments Ltd., Hornchurch, Essex, UK) using a modification[4] of the method of Morgenstern et al.[5] calibrated with Versatol Automated Hi reference serum (General Diagnostics, Division of Warner-Lambert Co., Morris Plains, NJ 07950, USA). ACE activity was measured at 37°C as previously described[6]. AST activity was measured at 30°C on a Multistat III microcentrifugal analyser (Instrumentation Laboratory, Lexington, MA 02173, USA) using either Gilchem (Gilford Diagnostics, Cleveland, OH 44135, USA) or Dynazyme II (J.T. Baker Diagnostics, Bethelehem, PA 18017, USA) reagent kits supplemented with pyridoxal-5-phosphate according to the International Federation of Clinical Chemistry recommendation[7].

CK was measured at 30°C on the Multistat using reagent kits employing N-acetyl cysteine as the recommended [8,9] activator (Calbiochem-Behring, La Jolla, CA 92037, USA; or Boehringer Mannheim Australia Pty Ltd., North Ryde, NSW 2113). γ-GT was measured at 30°C on the Multistat using a reagent kit (Instrumentation Laboratory) that is a modification of the method of Szasz [10].

Freshly reconstituted lyophilised control sera (Ortho Diagnostic Inc., Raritan NJ 08869, USA) were used to monitor the precision of all test methods except ACE. Pooled human serum, which had been previously divided into aliquots and stored at -15°C, was used to follow the precision of the ACE method.

In keeping with current guidelines, reference intervals were calculated using the nonparametric percentile technique[11]. Outliers were removed using the Dixon range statistic[11,12]. Significance of difference between means was examined by dividing the numerical difference by its standard error[13] or by the Student's *t*-test[13].

Results

The inter-assay precisions for each test obtained during the fourteen month testing period were, respectively: ALP, CV = 5.3% at 112 U/L and CV = 4.9% at 246 U/L; ACE, CV = 5.0% at 42 U/L; AST, CV= 8.0% at 39 U/L and CV = 4.3% at 117 U/L; CK, CV = 9.7% at 61 U/L and CV =6.8% at 231 U/L; γ-GT, CV = 12.3% at 15.5 U/L and CV = 3.2% at 65 U/L.

For each enzyme the data were partitioned according to sex. Histograms showing the distribution of values are displayed in Figure 1. Clearly some enzymes (notably CK, γ-GT) show considerable deviation from Gaussian distribution with positive skewness and leptokurtosis. According to Dixon[11,12] only two values could be considered as outliers (AST_{male} = 48 U/L and CK_{female} = 366 U/L) and these were discarded before the reference ranges were calculated. Means, the significance of their difference and standard deviations (Table 1) show that sex differences were apparent for ALP, CK and γ-GT; however, for the latter enzyme the difference was small and unlikely to be of clinical significance.

Reference limits as defined by the 2.5th and 97.5th percentiles are presented in Table 2. For comparison the corresponding adult limits are also shown. Alkaline phosphatase, ACE and CK activities were higher in eleven year olds than in adults whereas γ-GT activity was lower. Aspartate aminotransferase activity was essentially similar in both groups. Differences in γ-GT and ACE activities between sexes seen in adult subjects were not manifest in eleven year olds. However, differences in ALP and CK activities between sexes were evident in eleven year old children.

With the exception of ALP, the enzyme activities in this study were stable to freezing and subsequent thawing. Serum ALP activity is variously reported to increase[14,15], decrease[15] or to be unaffected[16] by a freeze/thaw regime. To ascertain if our protocol was leading to a systematic bias in the ALP values, the ALP activities of twenty-six fresh sera were determined before and after 3 day storage at -15°C. No change in activity was seen (range 41-564 U/L, $mean_{fresh}$ = 117.2 U/L, SD = 105.0 U/L; $mean_{frozen}$ = 116.7 U/L, SD = 104.0 U/L; P>0.5).

Approximately mid-way through the testing period the laboratory changed its supplier of CK and AST kits. Comparative studies of the kits were undertaken with patients' specimens. For CK, regression analysis between the Calbiochem kit (y) and the Boehringer kit (x) for 61 specimens (activity range 5-350 U/L) gave

Table 1. *Serum enzyme activities (U/L) in eleven year old children.*

Enzyme	Male Mean	Male SD	Female Mean	Female SD	Significance of difference between means
ALP	272.7	63.9	300.1	71.1	p<0.001
ACE	71.8	20.7	74.1	21.8	NS*
AST	20.5	4.5	20.2	3.7	NS*
CK	79.4	38.4	71.3	32.6	p<0.01
γ-GT	7.2	2.5	6.6	2.2	p<0.01

NS — not significant (p<0.10)

y = 1.02 x + 2.01, r = 0.999. For AST, regression analysis between the Gilford kit (y) and the Baker kit (x) for 77 specimens (activity range 7 - 112 U/L) gave y = 1.00x - 4.5, r = 0.989. No attempt was made to adjust the study data for the slight differences between kits. Values for the respective enzymes were combined and the reference ranges determined on the pooled data. In the case of AST this approach may have resulted in the defining of slightly wider reference limits, since the intercept represents about one-quarter of the reference range.

Discussion

The limited volumes of sera (0.5-1.0 mL) available for this study did not permit their distribution to separate workstations (ChemLab, Multistat, manual enzymes). Thus, rather than being assayed on routine worklists, the specimens were stored frozen then analysed in batches at weekly intervals. We believe that this protocol did not introduce bias to the results. The limited volume of specimen also precluded the measurement of a full liver function profile.

Differences in reagent formulation rather than in instrumention are largely responsible for the variability of enzyme analyses between laboratories[17]. For CK at least, our patient data confirm previous findings[18] that different manufacturers' kits based on the same recommended method give virtually identical results. Hence, the use of recommended enzyme methods should substantially reduce between-laboratory variation and allow transfer of reference ranges, although ethnic differences in populations may have to be considered[1]. For example, CK and ALP reference limits for Dunedin children may not be entirely appropriate for use in Auckland.

It is well documented that total ALP activity peaks during early adolescence in coincidence with the growth spurt[19,20]. Changes in the bone fraction of ALP are responsible for this phenomenon[21]. In accord with others[20-23] we observed higher ALP activity in girls at eleven years than in boys of the same age. Furthermore, our reference limits agree well with those from a large French study[21] in which the same analytical technique was used.

Serum ACE activity is elevated in most patients with active sarcoidosis and declines with spontaneous remission or steroid therapy. While ACE levels in neonates[25,26] are equal to or slightly lower than in maternal controls it is generally agreed that ACE levels in children and adolescents are higher than in adults[27-30]. Our data which shows a mean value 1.5 fold greater than the adult mean[6] concurs with this view.

Aspartate aminotransferase activity has been reported to decrease gradually in childhood to reach adult values in the mid-teens[23,31]. These data, however, were obtained in the absence of added pyridoxal-5-phosphate. Our figures showed a narrow distribution with the upper reference limit being rather less in eleven year olds than in adults. Although adult reference ranges

Table 2. *Serum enzyme reference limits (U/L) in eleven year old children*

Enzyme	Sex	Lower Limit	Upper Limit	Adult reference limits
ALP	M	154	418	30 - 90
	F	185	457	30 - 90
ACE	M	39	120	22 - 82
	F	37	127	25 - 69
AST	M	13	30	8 - 35
	F	14	29	8 - 35
CK	M	34	208	20 - 140
	F	33	140	25 - 104
γ-GT	M	3	12	0 - 30
	F	3	12	0 - 25

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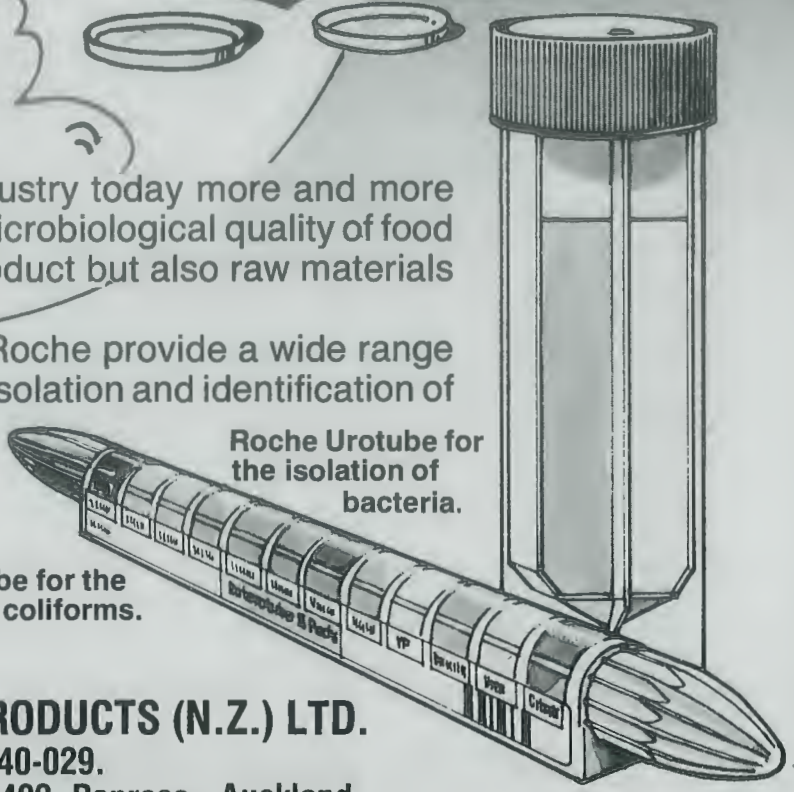

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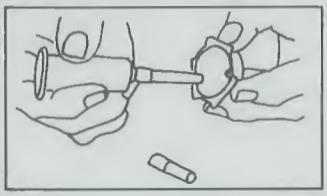
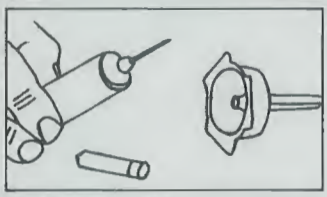
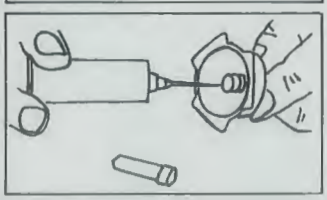


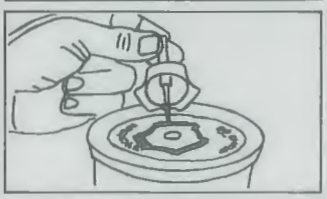
1 Insert needle with its cover on into ***Needle guard.***



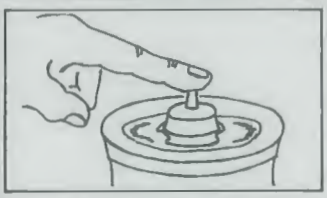
2 Remove needle cover to inject or bleed patient.



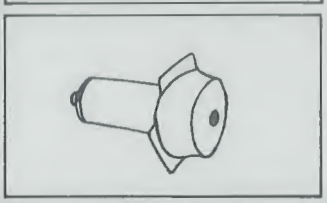
3 Replace needle into its cover.



4 Dispose of covered needle into ***Needle safe*** container.



5 Eject covered needle from ***Needle guard.***



6 Clip ***Needle guard*** to tubeholder for storage.

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for AST activity measured with pyridoxal-5-phosphate are in the literature[32,33], comparable figures for children could not be found.

The distribution of CK activities in healthy populations is markedly skewed toward higher values[18,34]. Our results are no exception. While some of this skewness may be due to recent exercise[35] it is impossible to quantify its contribution. No attempt was made to limit the physical activity of the subjects prior to blood taking. The tendency for males to have higher CK levels than females is illustrated by our data. Greater muscle mass in the former is usually given as the reason for this observation. Additionally, the hormonal status of women undoubtedly has an effect on CK since levels are highest in premenarchal girls, fall progressively in postmenarchal girls and mature women; are further suppressed in pregnancy and rise again in postmenopausal women[36,37]. Our data is consistent with these observations in that 140 U/L, the upper reference limit for eleven year old girls is greater than 104 U/L the limit previously established for young women (16-30 years, unpublished results).

We found a small but significant difference in ɣ - GT activity between the sexes in eleven year old children. Most authors[24,38,39] have found this difference begins with puberty, but Vanden Broeck and Geubelle[40] observed no difference in ɣ - GT between boys and girls up to 15 years old. The narrow distribution and low magnitude of ɣ - GT activities we found surprised us since previous investigators[24,41] noted that women and children have virtually identical reference ranges. Our data clearly disagrees with these findings; perhaps this reflects a low alcohol intake by these children[42].

In summary, we have established reliable reference intervals for five serum enzymes applicable to eleven year old children. While this work was confined to a narrow age group, these reference limits nevertheless will provide a sound basis for assessing the normality of enzyme results in paediatric and adolescent patients.

Acknowledgements

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An Evaluation of the Spectrum 10 Series for the Identification of Gram Negative Bacilli at 4 hours and 24 hours Following Inoculation.

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Abstract

The Spectrum 10 identification system for identification of gram negative bacilli was compared with other systems. A high test correlation of identification was established — 97% for oxidase negative and 96% for oxidase positive organisms.

The test system can be used at either a 4 hour or a 24 hours incubation period and results of rapid identification — i.e. 4 hours incubation — are given.

Key Words

Identification; gram negative bacilli; oxidase negative and oxidase positive identification system.

Introduction

Identification of gram negative bacilli is a major function of clinical microbiology laboratories and the rapid identification of some species is of clinical importance.

A new test system, Spectrum 10, has been developed by Austin Biological Laboratories (A.B.L.) Austin, Texas. The data base was created initially from tables published by Edwards and Ewing[1], and Farmer[2], and updated and modified, as necessary, by results obtained from clinical isolates. The data base recognises 52 oxidase negative and 39 oxidase positive gram negative bacilli.

This paper presents the results obtained in an initial laboratory evaluation of the system, compares them with results obtained from Microbact 12E (MBE) and API 20E, and reports the applications made in this laboratory of the special features of the Spectrum 10 system.

Materials and Methods

The initial evaluation was performed with 620 oxidase negative and 124 oxidase positive gram negative bacilli isolated from clinical specimens.

MBE and API 20E were performed and reported in accordance with the manufacturers' instructions. All isolates inoculated into the test systems were checked for viability and purity by subculturing the inoculum onto a split plate containing blood agar/MacConkey agar. Any mixed growths were repeated using single colonies so that only pure culture results were recorded.

Where indicated serological typing was performed, and in the case of salmonellae and shigellae, this was the final confirmation of identity.

When oxidase positive organisms were tested with API 20E the manufacturers recommendations in respect of glucose O/F, nitrate reduction, motility and growth on MacConkey agar were followed using established methods.[4].

Spectrum 10:

Spectrum 10 consists of a series of 3 moulded polystyrene trays each containing 10 dehydrated biochemical substrates. Access to the compartmented substrates is by way of an inoculating trough at the rear of the tray, and the biochemical substrates are challenged by using a suspension of the organism. This suspension is distributed evenly along the inoculating trough and the tray is tipped forward to allow the fluid to flow into each compartment. Where necessary the compartments are sealed with sterile mineral oil prior to incubation at 36°C. Spectrum 10 Tray 001 consists of 10 wells testing for the following biochemical reactions —B-galactosidase, ONPG; arginine dihydrolase, A.D.H.; lysine decarboxylase, LDC.; ornithine decarboxylase, ODC; hydrogen sulphide, H_2S; urea, UR; Voges Proskauer, VP; phenylalanine, P.D.; tryptophane for indole production, IND; and citrate, CIT.

Tray 002 consists of 10 wells containing sodium malonate, MAL; rhamnose, RHA; adonitol, ADO; salicin, SAL; arabinose, ARA; inositol, INO; sorbitol, SOR; sucrose, SUC; mannitol, MAN; and raffinose, RAF.

Tray 003 consists of 10 wells containing cetrimide, CET; acetamide, ACE; malonate, MAL; citrate, CIT; maltose, MLT; esculin, ESC; arginine, ADH; urea, UR; and tryptophane, IND. A control well is included for the arginine dihydrolase test.

Trays 001 and 002 contain sufficient tests to recognise the oxidase negative organisms listed in the data base.

On many occasions an identification can be established with

Tray 001 alone using the 4 hour testing procedure and Tray 002 is an additional battery of tests required in specified circumstances. Tray 003 will screen the oxidase positive organisms and requires overnight incubation only.

4 Hour Testing

Where sufficient colonies are available in a pure culture the organism is suspended in 3mL of sterile distilled water to a turbidity of approximately MacFarland scale #2. The tray is inoculated by sliding the transparent lid forward and introducing 1mL (+/− 0.2mL) of the inoculum into the rear trough. The lid is returned to the closed position and the tray is tilted back to 45°C and then rocked from side to side to distribute the inoculum evenly along the trough. The tray is returned to the level flat position and then tilted forward to 45°C and the wells are filled. A smart tap ensures that all the fluid comes over. Where necessary, mineral oil is added and the tray is incubated at 36°C for 3 - 5 hours.

After incubation the reactions are read, recorded and reagents added where necessary. It is best to add the reagents to the Voges-Proskauer (V.P.) test first, allow to stand for 5 minutes, then add the 10% ferric chloride to the phenylalanine (P.D.). After 4 hour incubation, a positive PD will give a green colour immediately but will often fade after standing for 3 - 4 minutes. Finally, add the Kovacs reagent to the indole well and read that reaction after 1 - 2 minutes.

Overnight and oxidase positive testing

Where there is insufficient growth of an oxidase negative organism or the organism to be identified is oxidase positive, one colony of the organism is suspended in 3 mL of sterile distilled water. The oxidase negative organism is inoculated into the Spectrum Tray 01 and, if required, Spectrum Tray 02. The oxidase positive organism is inoculated into Spectrum Tray 03 and the method of inoculation is as outlined in the 4 hour procedure. Sterile mineral oil is overlaid on the indicated wells as per the instructions and the tray/s are incubated overnight. Reactions are read, recorded and reagents added as per the manufacturer's instructions.

Interpretation of Test Results

The Test systems are based on the "traditional" biochemical reactions and care is needed in the reading of the trays at all times.

ONPG - any shade of yellow is positive

ADH - uses the Moeller base. Positive is a definite purple colour; negative is yellow.

O.D.C. - as for A.D.H.

L.D.C. - as for A.D.H.
It is sometimes useful, if results are difficult to intrepert, to look at the A.D.H., O.D.C., and L.D.C. together and observe if there are any definite colour changes in any one or two wells as compared to the remaining decarboxylase wells.

H_2S - positive is a black precipitate which may vary from very small e.g. *S. typhi* to very large e.g. *Proteus mirabilis.* A tan or brown precipitate is negative.

URE - cherry red or magenta is positive. Some slow reacting organisms may show red/orange at 18 hours and this is compensated for in the data base by being listed in the profile codes as either positive or negative.

V.P. - After the addition of 1 drop of 6% alpha-naphthol and 1 drop of 40% KOH a positive will show a pink colour in 4 - 5 minutes developing to a red colour in 15 - 20 minutes.

P.D. - After the addition of 1 drop of 10% $FeCl_3$ solution an immediate green colour is positive.

Ind - a pink or red colour, after the addition of 1 drop of Kovac's reagent will develop in 1 - 2 minutes with a positive indole-producing organism.

Cit - blue or blue-green is a positive reaction as compared to the very light green of the reagent.

Mal - a positive reaction is a blue colour as opposed to the yellow colour of a negative reaction.

Rha-Raf - all the carbohydrate reactions are yellow for positive and blue to bluegreen for negative. It is important to note that this change is the exact opposite to the malonate test in compartment 1 of this tray and inexperienced or unwary users may mistakenly record the malonate reactions in reverse as they record the sugar reactions further on in the tray.

It is sometimes possible for an occasional fermentative organism to leach the pH indicator in all the carbohydrate test wells. This gives an appearance of a light or worked out yellow-green — after incubation. If the carbohydrates are necessary for final identification the tray 002 should be repeated on a fresh subculture. This phenomenon has occured on two occasions during usage and a repeat tray has resolved the problem.

Identification Profile:

For Tray 01 a four digit profile is constructed using the reactions in groups of 3, and the final test i.e. CIT gives the fourth digit in the series 0 for negative or 1 for positive. The tests are weighted as 1 for positive in 1st well, 2 for positive in the second well and 4 for positive in the 3rd well. The same pattern is followed for Tray 002 and a second four digit number is constructed.

Reference to the Manual is initially on the four digit code established from Tray 001. This code will:

either a) give a positive identification of the organism and no further action is required;

or b) will list several possibilities from the first four digits and will then speciate to specific organisms on the second four digit code number;

or c) list two organisms and give a specific biochemical reaction that will distinguish the two listed organisms.

Table 1 reproduces a segment of the Manual and illustrates the above scheme.

The oxidase positive spectrum tray 003 has the following reactions:

CET : positive is demonstrated by growth, negative is no growth.

ACE, MAL, CIT : blue is positive, green is negative.

MLT : Yellow is positive, red is negative

ESC : positive is the formation of a black precipitate. The precipitation is very definite and any tan or brownish pigmentation is negative. Some Pseudomonas will show a darkening "mat" in the well and this is a negative reaction.

ADH : this is a different test system to Tray 1 and in this tray a positive is orange to red and a negative is yellow

CTL : this is an A.D.H. control and gives a good contrast for reading the A.D.H. test well. Some fermentative organisms will attack the substrate and show a very definite yellow — a pH decrease in the test system.

URE : red to magenta from the negative yellow colour.

IND : a red ring after the addition of the Kovac's reagent.

This tray is read at 18 - 24 hours after inoculation and any prolonged incubation will not enhance the test reactions. The spectrum 10 oxidase positive manual contains a 3 digit code for identification. This code is derived by dividing the 9 tests — the A.D.H. control well does not code– into 3 groups of three with the same assigned values as previously described.

Evaluation

No attempt was made to evaluate each test system component with an accepted reference manual or macro method. A preliminary evaluation using some stock cultures had shown that the systems employed by each of the test methods compared had a greater than 95% similarity and on some later occasions specific test substrates were tested using independent methods where there had been significant variation.

The data shown in Tables 2 & 3 lists the identification given by the Spectrum system on the left column and the identification given by the MBE 12E or the API 20E systems along the top line.

Results

The results obtained for the 620 oxidase negative organisms are shown in Table 2 and reveal that there was total agreement with API 20E, MBE 12E and Spectrum with 605 (97.5%) of isolates.

MBE 12E coded 5 isolates as *Klebsiella ozaenae* which Spectrum identified as *E. coli.* Retesting of the isolates using Simmons citrate agar showed all were negative for citrate utilisation and all were indole producers using 1% peptone water conventionally and spot indole testing using dimethylaminocinnamaldehyde.

```
2040     1 IN 02146   SH.BOYDI                                                    SEROLOGICAL TYPING          2040
2040     1 IN 03289   SH.DYSENTERIAE

2100     1 IN 00578   SAL.PARATYP.A          00 99 00 50 99 00 99 00 99 00      SEROLOGICAL TYPING
2100     1 IN 00631   CEDECEA DAVISAE        90 00 00 10 01 30 00 99 99 00
2100     1 IN 02922   SAL.CHOL.SUIS          00 94 00 00 00 00 85 00 99 00
2100     1 IN 06598   CEDECEA SP. 5          95 00 00 10 00 00 95 99 99 00


                                  2 1 0 0 0 0 6 0   1 IN  10745   CEDECEA DAVISAE

                                  2 1 0 0 0 0 7 0   1 IN 165588   CEDECEA SP. 5

                                  2 1 0 0 0 1 6 0   1 IN  96713   CEDECEA DAVISAE

                                  2 1 0 0 0 2 5 0   1 IN 125279   SAL.PARATYP.A

                                  2 1 0 0 0 3 5 0   1 IN 125279   SAL.PARATYP.A

                                  2 1 0 0 0 4 6 0   1 IN  25074   CEDECEA DAVISAE

                                  2 1 0 0 0 5 6 0   1 IN 225665   CEDECEA DAVISAE

                                  2 1 0 0 1 0 2 0   1 IN 118205   CEDECEA DAVISAE

                                  2 1 0 0 1 0 4 0   1 IN 118205   CEDECEA DAVISAE

                                  2 1 0 0 1 0 6 0   1 IN   1193   CEDECEA DAVISAE
                                  2 1 0 0 1 0 6 0   1 IN 165588   CEDECEA SP. 5

                                  2 1 0 0 1 0 6 1   1 IN 118205   CEDECEA DAVISAE

                                  2 1 0 0 1 0 7 0   1 IN   8715   CEDECEA SP. 5
                                  2 1 0 0 1 0 7 0   1 IN 118205   CEDECEA DAVISAE
```

Spectrum 10 identified 3 organisms as Shigella species which were serologically negative with antisera for *Sh. sonnei, Sh. flexneri* and *Sh. dysenteriae.*. Reference to the National Health Institute (NHI) drew an identification of "anaerogenic *E. coli*".

Spectrum 10 identified 21 isolates of salmonellae which were confirmed by serology but 2 of these were misidentified by MBE 12E as *Citrobacter freundii.*

Spectrum 10 identified 5 isolates from enteric media as *Hafnia alvei* and MBE 12 E identified these as Salmonella species — all isolates were serologically not salmonellae. API 20E had problems with these organisms, a finding also reported by Izard et al[3].

One organism was identified by Spectrum 10 as *Yersinia enterocolitica* and as *E. coli* by API 20E.

MBE 12E did not recognise any of the 4 *Acinetobacter calcoaleticus* strains or the 9 strains of *Pseudomonas maltophila* isolated. The agreements shown in Table 2 were between API 20E and Spectrum 10 after the MBE 12E had failed to produce a sensible answer.

Table 3 shows the results obtained with 128 oxidase positive organisms using spectrum 003 and API 20E. Spectrum 003 were incubated for 18-24 hours and API 20E for 48 hours. The level of agreement of identification was again very high, 124/128 (96.8%), and the divergent results were Spectrum 003 coded 3 isolates 713 — best choice *Ps. aeruginosa* — and API 20E coded the same isolates 2204004.63 *Ps. fluorescens*; Spectrum 003 coded 1 isolate 713 — again best choice *Ps. aeruginosa* — and API 20E gave 2006004 — *Chromobacterium* 1:3, *Ps. aeruginosa* 1:4.

Applications of 4 hours Testing

Table 4 shows a compilation of results obtained from isolates

	MICROBACT 12E OR API 20E	E. coli	Sh. sp.	Ed. tar	Cit freu	Cit div	Salm aris	Salm ent	Kl. pn	Kl. os	Kl. rh	Ent aer	Ent clo	Ent agg	Haf alv	Ser mar	Prot mir	Prot vulg	Prot rett	M. morg	Prov alc	Prov st	Yer ent	Ac coal	Ps alt	Kl oxy
	E. coli	356								5				1(3)												
S	Shigella sp.	3(1)	19																							
P	Edwardsiella tarda			2																						
E	Citrobacter freundii				46																					
C	Citrobacter diversus					14																				
T	Salmonella arizonae						2																			
R	Salmonella enteriditis				2(2)			19																		
T	Klebsiella pneumoniae								35			1														
M	Klebsiella ozaenae									14																
	Klebsiella rhinoscleromatis																									
I	Enterobacter aerogenes																									
D	Enterobacter cloacae												4													
E	Enterobacter agglomerans													3												
N	Hafnia alvei							5(4)																		
T	Serratia marascens															5										
I	Proteus mirabilis																41									
F	Proteus vulgaris																	10								
I	Proteus rettgeri																									
C	Morganella morganii																			5						
A	Providencia alcalifaciens																									
T	Providencia stuartii																					6				
I	Yersinia enterocolitica	1																					5			
O	Acinetobacter calcoaceticus																							4		
N	Pseudomonas maltophilia																								9	
	Klebsiella oxytoca																									6

COMPARATIVE RESULTS FOR 620 OXIDASE NEGATIVE GRAM NEGATIVE BACILLI

A.B.L's SPECTRUM VERSUS MICROBACT 12E OR API 20E

SPECTRUM IDENTIFICATION (24 hour)

	Ps aer	Ps put	Aer hyd	Fl men	Ps pick	Vib ph	Vib alg	Aoh	Fla sh	Mor	Past mul	Chr	Ps flu
Pseudomonas aeruginosa	56											1(2)	3(1)
Pseudomonas putida		4											
Aeromonas hydrophilia			6										
Flavobacterium meningosepticum				1									
Pseudomonas pickettii					1								
Vibrio parahaemolyticus						5							
Vibrio alginolyticus							3						
Achromobacter sp.								12					
Pleisomonas shigelloides									5				
Moraxella										10			
Pasteurella multocida											21		
Chromobacterium													
Pseudomonas fluorescens													

API 20E (48 hours)

COMPARATIVE RESULTS OF 124 OXIDASE POSITIVE GRAM NEGATIVE BACILLI USING API 20E (48 hour) AND SPECTRUM (24 hour)

from faecal samples cultured. Following screening of suspicious colonies with API Z system [6] 739 organisms were identified. 464 (62%) were coded by Spectrum 10 Tray 001 in the 4 hour incubation as per the table. The 58 organisms recognised as salmonellae/shigellae were confirmed by serological identification on the day of isolation and the additional 43 required the inoculation of Spectrum 10 Tray 002 and overnight incubation before the identification was completed. Similarly 8/12 *Salmonella arizonae* were identified within the working day.

106 Proteus sp of 108 subcultured did not need any additional identification after 4 hours and the same applied to 300/530 of the non intestinal pathogens subcultured.

Table 5 shows the results obtained from urinary tract specimens showing significant growths of bacterial pathogens. The *E. coli* tested did not conform to an initial screening of being lactose fermenters on MacConkey agar, being citrate negative and producing indole. The *Proteus mirablilis* species tested would all have been non-lactose fermenters on Cysteine Lactose Electrolyte Deficient agar (C.L.E.D. — Scott Laboratories) and had not been screened for swarming on blood agar at the time of the initial culture. Thus 74% of the isolates requiring identification from these samples were completed within 4 hours of isolation.

Table 6 lists the results obtained from the respiratory area and here the 4 hours technique has identified 51.9% of the isolates. [All this preceding data was presented at the Annual Meeting of the NZIMLT in Dunedin August 1984.]

The additional results listed below are taken from identifications performed in the period 2 January 1985 to 18 February 1985.

449 organisms from faecal cultures were put through the Spectrum system — 363 identified on Tray 001 and 86 required Tray 002 for final identification. 7 isolates gave results that required further testing and API 20E strips were inoculated. From 449 organisms, 4 *Shigella sonnei,* 3 *Shigella flexneri,* 1 *Salmonella typhi* and 50 salmonella species were serologically confirmed following biochemical identification.

4 isolates from C.I.N. agar (Oxoid) coded in Tray 001 as possible *E. coli,* possible Yersinia and these four were subcultured through API 20E and recognised as *E. coli.* It is now practice that, where the code obtained indicates possible Yersinia species, these organisms are inoculated into urea broth and kept at room temperature for up to 4 hours. If the urea is negative they will not be *Yersinia enterocolitica* and no further testing is required.

3 isolates from X.L.D. agar coded 1000 in Tray 001 i.e. only ONPG was positive. This code lists several Shigella sp. as a possibility and API 20E's were inoculated at the same time. Both systems gave identifications in the final form as *Enterobacter agglomerans.* No significant isolates were misidentified or not coded in the Spectrum system in this period.

A further 534 gram negative bacilli were identified from specimens submitted from surgical, skin, ear and nasal specimens in the same period. Table 7 lists these isolates and

Table 4

FAECES:

Total number of organisms identified:	739
Identification completed on Tray I (4 hour)	464
Identification completed on Tray I & II (overnight)	275

	4 hr.	overnight
Salmonella enteriditis	52	22
Shigella sonnei	4	14
Shigella flexneri	2	7
Proteus sp.	106	2
Salmonella arizonae	8	4
Providencia stuartii	3	6
Ecoli/Enterobacter/Klebsiella/Hafnia	289	220
	464	275

Table 5

URINES:

Total number of organisms identified:	1516
Identification completed on Tray I (4 hour)	1123
Identification completed on Tray I & II (overnight)	393

	4 Hour	Overnight
Acinetobacter		8
Citrobacter amaloniticus		2
Citrobacter diversus		6
Citrobacter freundii	16	20
Enterobacter aerogenes		27
Enterobacter agglomerans		2
Enterobacter cloacae		3
Enterobacter sakazaki		2
Escherichia coli	803	83
Hafnia alvei		2
Klebsiella pneumoniae	42	80
Klebsiella oxytoca	21	10
Klebsiella ozaenae	35	52
Morganella morganii	13	4
Proteus mirabilis	172	6
Providencia rettgeri	8	13
Proteus vulgaris	6	7
Providencia stuartii	5	12
Pseudomonas maltophilia		17
Salmonella sp.	1	1
Serratia liquefaciens		16
Serratia marcescens		16
Serratia oderifera		1
Serratia rubideae	1	2
Shigella sonnei		1
	1123	393

Table 6

RESPIRATORY: includes throats, sputa, nasal, ears, eyes, tongues

Total organisms identified:	260
Identification completed on Tray I (4 hour)	135
Identification completed on Tray I & II (overnight)	125

	4 Hour	Overnight
Acinetobacter		14
Citrobacter amaloniticus		1
Citrobacter diversus		3
Citrobacter freundii	2	5
Enterobacter agglomerans		14
Enterobacter cloacae		6
Enterobacter aerogenes	1	5
Enterobacter sakazaki	4	1
Escherichia coli	59	13
Klebsiella pneumoniae	9	6
Klebsiella oxytoca	3	1
Klebsiella ozaenae	7	20
Morganella morganii	1	3
Proteus mirabilis	40	1
Providencia rettgeri	1	
Proteus vulgaris	1	
Providencia stuartii		3
Pseudomonas maltophilia		5
Serratia liquefaciens	1	14
Serratia marcescens	2	7
Serratia oderifera		3
Serratia rubideae	4	
	135	125

shows that 10 organisms were unable to be satisfactorily identified in the Spectrum system. These 10 oxidase positive organisms reacted in the Spectrum 003 trays but the codes obtained listed 4 or more choices with the comment "At least 3 other organisms may have this same code. We recommend retesting by other methods".

API 20NE identified 4 of these isolates as *Pseudomonas putida,* 3 as Pseudomonas species, 1 as a Group Ve biotype 1, 1 as *Vibrio alginolyticus* and the final isolate was not identified by API 20 NE.

Discussion

The initial testing completed in January 1984 had demonstrated that the Spectrum system produced identifications with 603 isolates from a total of 620 (97%) organisms tested that agreed with API 20E and/or MBE 12E. This is a highly acceptable level of agreement for the oxidase negative, gram negative bacilli.

Where it was possible to obtain a sufficiently heavy inoculum in pure growth the reading and reporting of results within the 4 hour period produced significant advantages in the management of this laboratory, as well as having these results available for the clinician significantly earlier. This was particularly valuable in the area of faecal identification. Unlike the API Rapid 20E, it is possible to read the Spectrum trays at either 4 or 18 hours without losing results.[3]

With the Spectrum system technologists participation and understanding is still very important. The test reactions require an understanding eye as it is possible to glance at the decarboxylase wells and record all as positive when, in fact, none have changed to the desired deep purple colour.

The identification of *Enterobacter agglomerans* has proved a stumbling block for several staff members until they learnt to look critically for a satisfactory degree of growth in both trays and the purity subculture.

The oxidase positive system was originally designed to target *Pseudomonas aeruginosa* and this has proved to be satisfactory. Where other identifications have been valid the code has suggested one or several individual tests to supplement the Tray 003 and help in final identification. Where the system has been unable to identify an isolate satisfactorily i.e. it has nominated several similar species, it has been necessary to retest with other systems as recommended by the manufacturer.

The system has been accurate in identifying *Vibrio alginolyticus,* a not uncommon pathogen in the ear in the Auckland environment, and has also been accurate with the identification of *Aeromonas hydrophila* from both skin/wounds swabs and faecal sources.

Professor John Matsen[5] summarises "that the laboratory ought to be geared to provide information in as rapid a manner as possible whenever method validity and cost effectiveness can be maintained". The Spectrum 10 system fulfils these criteria and has proved to be the system of choice in this laboratory.

Table 7

Oxidase negative:	
Acinetobacter calcoaceticus	22
Citrobacter diversus	2
Citrobacter freundii	16
Enterobacter aerugenes	5
Enterobacter agglomerans	9
Enterobacter sakazakii	12
Enterobacter species	4
Escherichia coli	64
Klebsiella oxytoca	11
Klebsiella ozaenae	12
Klebsiella pneumoniae	39
Morganella morganii	5
Proteus mirabilis	35
Proteus vulgaris	4
Providencia alcalifaceins	2
Providencia species	6
Pseudomonas stuartii	4
Pseudomonas maltophila	2
Serratia liquefaciens	5
Serratia marcescens	3
Serratia oderifera	1
Serratia plymuthica	1
Serratia species	4
Profile not recognised	4
Oxidase positive:	
Aeromonas hydrophila	4
Aeromonas/Ps. pseudomallii/Flavob.	2
Alcaligines denitrificans	1
Chromobacterium violaceum	3
Flavobacterium meningosepticum	5
Flavobacterium species	1
Pasteurella/Pseudomonas/Vibrio	1
Pseudomonas cepacia	2
Pseudomonas aeruginosa	151
Pseudomonas fluorescens	56
Pseudomonas picketti	1
Pseudomonas pseudomallei	1
Pseudomonas putida	3
Pseudomonas putrifaciens	1
Pseudomonas species	15
Vibrio alginolyticus	3
Profile not recognised	2
Identification repeated using other systems	10

Identifications established for 272 oxidase negative and 262 oxidase positive gram negative bacilli January — February 1985

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WEM G II	(Granulocyte)

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Continuing Education

JK (a - b -): Blood Group Gems of the South Pacific

C. John Lyne
Tutor Technologist, Auckland Blood Transfusion Centre

History:

The Kidd blood group system was first reported by Allen et al [1] in 1951.

For a number of years, it was accepted as being a simple two allele system containing the antithetical antigens, JK^a and JK^b. (Table 1) These antigens are of low immunogenicity and rarely stimulate the production of strong antibodies. Furthermore, the Kidd system antibodies are usually unstable which makes them among the most difficult to work with. They are frequently seen as one of the several antibodies in the serum of multiparous or multitransfused individuals. Characteristically, Anti JK^a and Anti JK^b cause delayed transfusion reactions and mild hemolytic disease of the newborn.

In 1959, Pinkerton et al[2] reported the first example of the JK (a-b-) phenotype in a Hawaiian of mixed-Asian ancestry. Attention was drawn to this subject's serum by the presence of Anti JK^3 (inseparable Anti JK^a JK^b) which reacted with 100% of Caucasian red cell samples. Subsequently, further examples of JK (a-b-) were reported in Brazilian Indians[3], Chinese[4] and Hawaiian Chinese[5].

In 1967, the first JK(a-b-) phenotype was seen in the Auckland Blood Transfusion Centre. The serum of Mrs. Te R., a prenatal Maori woman, was shown to contain a complex antibody, which was later identified by the New York Blood Center as being Anti JK^3.

At this point, it became clear that more examples of Anti JK^3 would be seen in New Zealand and that appropriate facilities were required for the long-term storage of rare donations. Consequently, a liquid nitrogen blood storage unit was established in the Auckland centre.

Between 1969 and 1974, Douglas and Staveley[6] tested 7007 group O Polynesian donor samples against the Te R. serum. Sixty-two JK(a-b-) samples were found. From these results, it was calculated that the JK(a-b-) phenotype had a frequency of 0.885% in the population tested. This figure appears to relate to the incidence in the present non-Maori Polynesian population. European admixture has reduced the frequency of JK(a-b-) from what it would have been in full-blooded Polynesians, and is clearly continuing to do so. Nevertheless, New Zealand has proved to be the richest source of JK(a-b-) donors in the world.

To date, 15 examples of Anti JK^3 have been identified in New Zealand hospital patients, the majority being antenatal. In each case, fresh compatible JK(a-b-) blood was available for transfusion. In one instance, blood was provided for open-heart surgery, and in another, the patient was having ongoing transfusions following radical pelvic surgery.

Further requests have been received from as far as New York, Los Angeles and Sydney.

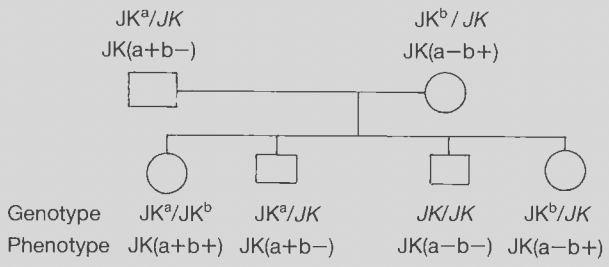
Inheritance:

Family studies reported in many cases[7] indicate that the JK(a-b-) phenotype arises from the inheritance of two recessive amorphic JK genes. Figure 1 illustrates the typical autosomal recessive mode of inheritance. The heterozygote parents give rise to 1:4 offspring homozygous for the recessive trait. Note that the silent *JK* gene cannot be detected in the heterozygotes and that the recessive homozygote is detected by the absence of both JK^a and JK^b.

The frequency of *JK* appears to be very low or absent in most racial groups. It has not been reported in Negroids and has only been reported on several occasions in Caucasoids[12]. There is no doubt that the gene occurs in some Asians, (Filipinos[2], Chinese[4], Japanese[13]) Polynesians and Amerinds of Brazil.

The Polynesians[6,8] are the only group in which extensive studies have been undertaken, and from these a gene frequency

Figure 1



(*JK*=0.092) has been calculated. It is unlikely that any other ethnic group has a higher frequency than this, except perhaps the Brazilian Indians[3] on whom a limited study was undertaken.

Imunogenicity:

Pinkerton et al[2] found that Anti JK^3 is not a simple mixture of Anti JK^a and Anti JK^b. Rather it is a single antibody that can be absorbed and eluted from both JK(a+b-), and JK(a-b+) cells and still showing Anti JK^a JK^b specificity. Furthermore, Marsh et al[9] demonstrated that the antibody is specific for an antigen, JK^3 which is present on red cells containing either JK^a or JK^b.

JK^3 is considerably more immunogenic than JK^a or JK^b. Douglas[6] and Woodfield[8] demonstrated that a JK(a-b-) woman delivering a JK^3 positive child was at 5-10% risk of producing Anti JK^3. Mollison [10] reports that 70% of D negative subjects respond to D, 10% of Kell negative subjects respond to Kell and 0.1% of JK^a negative subjects respond to JK^a. JK^3 is clearly 50-100 times more immunogenic than JK^a and possibly as immunogenic as Kell.

The immunogenicity of JK^3 is further exemplified by the frequent appearance of Anti JK^3 on its own. This is in sharp contrast to Anti JK^a and Anti JK^b which are usually present with mixtures of antibodies to other blood group determinants.

Of the 15 examples of Anti JK^3 identified in our laboratory only one has contained a second antibody, Anti E, a common finding in Polynesians.

Urea Lysis:

Heaton and McLoughlin[11] (Christchurch 1980) made the remarkable discovery that JK(a-b-) cells resist lysis with 2M urea. Spuriously high platelet counts in a thrombocytopenic Samoan led to the finding that 2M urea (red cell lysing agent for Technicon Platelet Autocounter II) was ineffective at lysing the patient's JK(a-b-) red cells. A further 12 JK (a-b-) samples demonstrated the same resistance. Red cells with the rare phenotypes hh, Rh null, Rh mod, U negative, Fy(a-b-), Lu(a-b-), Co(a-b-), Mcleod,

Table I

Phenotype and Gene Frequencies of The Kidd System in Caucasians

Phenotype	% Frequency
JK (a+b−)	27.5
JK (a+b+)	49.4
JK (a−b+)	23.1
Gene	**Gene Frequency**
JK^a	0.5162
JK^b	0.4838

Gerbich negative, ii, did not resist lysis. An explanation as to why JK(a-b-) cells resist lysis still awaits biochemical elucidation.

One wonders as to how many more blood group determinants can be identified by simple, non-serological techniques, especially as the availabilty and expense of reliable blood grouping sera is a growing problem for Immunohematologists.

Resistance to urea lysis lends itself to being an automated screening test for JK(a-b-) donors. The author introduced manual urea lysis screening of Auckland blood donors.The technique simply involves preparing a 5% concentration of donor red cells in 2 M urea, waiting for one minute, and then examining for hemolysis. JK(a-b-) cells were found to resist lysis for up to 20 minutes. Cells of all Kidd groups containing JK^3, including four samples know to be heterozygous for *JK* (i.e. JK^3/JK), hemolysed almost immediately.

To date, the cells of all 70,000 Caucasian donors tested have been lysed with 2 M urea. All previously registered JK(a-b-) donors (20) have resisted lysis. Eight new donors and nine patients referred from the Hematology Laboratory, Auckland Hospital, as a result of spurious platelet counts, resisted urea lysis. Subsequent phenotyping with Anti JK^3, Anti JK^a and Anti JK^b confirmed all 17 to be JK(a-b-).

In our hands the 2 M urea screen test has been a rapid and reliable means of mass screening for JK(a-b-) donors.

Periodically, a laboratory worker will uncover an irksome or unexplainable phenomenon; so often such pearls are put aside to be investigated at a later date and eventually forgotten. This review demonstrates how a number of New Zealand workers have followed through some unusual findings to make a useful contribution to the understanding of blood group genetics, and to improve blood transfusion medicine.

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IAMLT AWARD PROGRAMME

SUMMARY OF AWARDS AVAILABLE IN 1986

Donor	Conditions	Prize
ORTHO DIAGNOSTICS INC., USA	Educational award on recommendation (special application form)	Attendance at a one-week course in immunohaematology for 3 persons.
GENERAL DIAGNOSTICS WARNER LAMBERT, USA	Papers in the area of Quality Control, Clinical Chemistry, Immunohaematology, Coagulation, Microbiology.	US $1,500
MERZ + DADE SWITZERLAND	On recommendation for "Outstanding services to Medical Laboratory Technology".	Sw.F. 2,000. Also travel and hotel expenses for International Congress
BIOMERIEUX FRANCE	Papers in an area of clinical diagnosis, such as Microbiology, Clinical Chemistry, Coagulation. Prize will not be awarded for any study involving the use of competitors' reagents.	Fr.F. 5,000
AMES-MILES USA	1 award for best paper submitted on "Immunology" from each of the following regions: Europe and Africa America and Caribbean Latin America Far East Region Japan Region, There must be at least 3 papers from each area before an award will be granted.	Each award:— US $2,000
IAMLT	Scholarships — on recommendation	US$750

Detailed information on the conditions of each award are available from the Secretary, NZIMLT.
All applications have to be sent **IN TRIPLICATE** (typed or block letter) to the Executive Office of IAMLT at Mast House, Derby Road, Bootle, Merseyside, L20 1EA England.
Deadline: 30th November 1985
Application form for the Ortho Diagnostics Educational Award available at the Executive Office.
For the awards requiring a paper, the winner will be notified about the possibilities of presenting the paper at the Congress in Stockholm.

FELLOWSHIP COMMITTEE

Members of the Committee are K. McLoughlin (Convener) and G. R. Rose.

The Fellowship regulations were revised during the year. This revision was considered necessary to resolve some problems which had arisen especially regarding the examinations. To some, the guidelines for the treatise were not sufficiently detailed to give candidates a clear indication of exactly what was required. There was also no provision in the original regulations for applicants to revise and resubmit a treatise which had not met the standard required for a pass mark. It is hoped that ammendments to these sections in particular and other minor changes will provide appropriate improvements. The revised regulations were printed in the November 1984 Journal and are also available as a separate reprinted sheet from the Fellowship committee.

In spite of the improvements to the regulations there were no applicants for the 1985 Fellowship examinations.

Fellowship was awarded to five members during the year. Allan Johns gained Fellowship by examination in Haematology with the lupus anticoagulant being his treatise topic. Jan Nelson was the last person to become a Fellow by submission of published works (this route is no longer available). Janet Montgomery was awarded Fellowship by thesis in recognition of her work on skin lesion bacteriology in Papua New Guinea. Two sagacious senior members of the Institute — Alan Harper and Gilbert Rose — were awarded Fellowship by exemption.

MEMBERSHIP COMMITTEE

Members of the Committee are Margaret Young (Convener), C.S. Curtis and W.J. Wilson.

There were 173 membership applications in the last financial year and 83 members were lost through formal resignation or mail returned, address unknown.

Although 88 technologists gained their Diploma in 'Medical' Laboratory Technology, only 44 were members, and became Associates of the Institute, compared with 144 and 66 in the previous year. 130 members allowed their membership to lapse and were removed from the roll in accordance with rule 9c.

		1983/4	1982/3
Membership as at 31st March 1984	1369	1366	1460
Less Defections	190	234	234
	1179	1132	1226
Plus Membership Applications	173	237	140
Memberships as at 31st March 1985	1352	1369	1366

A Current Breakdown of Membership is as follows:—

	1984/85	1983/84	1982/83
Members	495	531	524
Associates	610	668	676
Fellows	40	51	38
Life Members	15	15	13
Honorary Members	15	14	14
Non-Practising	77	90	101

Sadly we record the death of Mrs A.A. North of Auckland.

As of the 1st April, the composition of the Membership Committee will change with the transfer of our Membership File from the Hamilton Medical Laboratory to Online Business Management Ltd, of Auckland. David Pees from Greenlane Hospital, Auckland will be the new convener, with assistance from Walter Wilson and Margaret Young. It is anticipated that the service provided by O.B.M Ltd should obviate much of the tedious clerical double handling which had arisen with our previous system. However one of our main problems still remains — the failure of members to notify changes of address and status, and it would be greatly appreciated if this could be done.

PUBLICATIONS COMMITTEE:

Members of the Committee are: D. Dixon-McIver (Convener) D. Reilly, W. Wilson, Mrs P. Reilly (Advertising).

There have been 26 articles presented for consideration for publication. Two were rejected as unsuitable and 21 have been accepted for publication so far. This compares with 31 in 1983, 25 in 1982 and 26 in 1981.

Analysis of contributors to the Journal shows that Auckland and Dunedin have supplied 60% of the papers published between them over the past five years. It is to be hoped that those from other centres, especially Christchurch and Wellington will increase their efforts to show active support for the Journal.

MANAGEMENT COMMITTEE

Members of the Committee are J. Parker (Convener) and P. McLeod

The Department of Health has decided to establish a Working Party to investigate the most appropriate standard means of collecting precise laboratory statistics. This is fairly much in line with what the Institute wanted, and it was proposed that membership consist of one nominee from the following:—

New Zealand Society of Pathologists.
N.Z.I.M.L.T.
N.Z.A.C.B.
Hospital Boards Association.
Management Services Research Unit.
Health Statistics Centre.

At the time of writing this report, the committee had yet to meet.

On the recommendation of this committee, Council submitted to all the 1985 MLTB syllabus review committees a submission requesting the deletion of the section titled, "Laboratory Operation and Administration." It was submitted that the sections involving workload units, laboratory design and the future roles of the various departments could be placed in other sections.

AWARDS COMMITTEE

Convener — J. Parker.

The Institute would once again like to extend its thanks to the sponsors of the various awards. They are:

Roche Products (NZ) Ltd
Kempthorne Medical Supplies Ltd
Technicon Equipment Pty Ltd
General Diagnostics
Medic DDS Ltd
Ortho Diagnostic Systems
Wellcome NZ Ltd
Hoechst NZ Ltd
Gibco NZ Ltd
Watson Victor Ltd
Sci Med (NZ) Ltd
Wilton Instruments
NZ Blood Foundation

Our congratulations to the recipients of the Awards. The NZ Medical Laboratory Sciences Foundation is to be set up in the coming year with the facility to grant money to members of the NZIMLT for continuing education, research and development and travel. The terms of current awards are somewhat restrictive in terms of timing and the sum of money offered may be inappropriate to the requirements.

SAFETY AND STANDARDS COMMITTEE

Members of the Committee are J. Parker (Convener) and P. McLeod.

An AIDS Task Force Committee has been set up with the following terms of reference:

1. To gather information on AIDS as it affects laboratory workers.
2. To establish safety codes for laboratory workers.
3. To liaise with the Department of Health on the disease.
4. To negotiate with the ACC over classifying the disease as an accident for laboratory workers.
5. To do all other things in the interest of laboratory workers regarding the disease.

The members of the AIDS Task Force are: B. Cornere, R. Law, W. Wilson and D. Pees.

The draft copy of the Guidance notes on the use of Formaldehyde and similar products at work has been received and is presently being considered.

NEGOTIATIONS COMMITTEE

Members of this Committee are: — C. Campbell (Convener), B. Main (Chief Negotiator), J. Elliott, P. McLeod and W. Wilson

Two members, Des Phillip and Frank Smith stepped down during the year. I thank them most sincerely for their contribution on behalf of the membership over a number of years.

The change of Government led to a lifting of the wage freeze and a limited negotiating round occurred in January 1985. The change of Government however made no difference to the

intransigence of the Health Service committee which would not agree to our request.

This was all reported in detail in the March 1985 journal. The final paragraph of that report is worth repeating.

"In spite of the very spirited efforts of the Committee in negotiation it is disappointing that so little has been achieved. It does illustrate however how difficult it is to make any progress when the claim is inter-service. There is one hope for progress in the laboratory assistant area as it was acknowledged that there are problems, particularly in the Blood Transfusion Service and Mortuary area. We are able to resume negotiations on or after 10.7.85 and the Annual General Adjustment will apply to all laboratory workers when finalised".

Membership will be aware that the general direction of our claims has been similar since 1979. As with all other state workers we have to be able to demonstrate serious difficulties in retention and recruitment of staff. Until this occurs it is unlikely that any approach to Tribunal could be successful. Even with the quite obvious retention problems in the nursing profession their salary claim met with no success.

This committee has resolved a number of problems during the year where hospital boards interpretations have been at variance with the regulations.

I would again urge all members with problems to bring these to any member of the negotiations committee. We may not always be able to help but if the case is unjust we will try very hard to sort it out.

TECHNICAL ASSISTANTS EXAMINATION COMMITTEE

Members of the Committee are:— B.T. Edwards (Convener), K. McLoughlin, G. Paltridge and T. Rollinson.

The 1984 examinations were conducted on 15 and 16 May. There were 111 candidates for the examination with 96 gaining the Certificate of Qualified Technical Assistant. The pass rate was 86% compared with 82% in 1983 and 87% in 1982. There were 93 applications for the 1985 examinations.

The breakdown of figures is given below:—

	1984		1983	
	Sat	Passed	Sat	Passed
Clinical Biochemistry	19	19	21	21
General Certificate	5	1	10	9
Haematology	24	23	21	16
Histological Technique	10	10	13	11
Medical Cytology	13	11	10	7
Medical Microbiology	14	8	31	25
Mortuary Hygiene & Technique	3	3	1	1
Radioisotope & Radioassay Technique	0	0	2	1
Immunohaematology	7	6	17	13
Immunology (Microbiology)	5	5	5	4
Special Certificates	11	10	10	8
	111	96	141	116

During the year a syllabus committee convened by Trevor Rollinson reviewed the Clinical Biochemistry syllabus. A new syllabus has been approved and will apply for the 1986 examinations.

EDUCATION COMMITTEE

The members of this Committee are:— K. McLoughlin (Convener), A. Harper, B. Edwards, C. Campbell, J. Parker and J. Marsland.

This year will go down as the year in which the Massey course fell through. This was largely due to a lack of financial support from the Hospital Boards Association and the Health Department. To Alan Harper who has worked so hard and for so long on the Massey scheme this was a major disappointment.

There is little that the committee can do now apart from starting back at square one investigating technology training schemes overseas. It is fortunate that our fall-back position, the current scheme with NZCS and certificate in specialist exams is serving us so well. As far as the Christchurch incentive is concerned the only thing we can do is wait and see.

LABORATORY ASSISTANTS COMMITTEE

Members of the Committee are M. Young (Convener), D. Pees, J. Hopkins and A. Pratt.

The aim of this committee is to inform laboratory assistants throughout New Zealand of the negotiations undertaken on their behalf by the N.Z.I.M.L.T. with regard to their salary structure, and of the negotiations with regard to working conditions in general e.g. hours of work, meal breaks, allowances etc.

We also want to hear from laboratory assistants about their concerns or grievances in connection with their work and/or conditions of employment. This would be of use in discussions and negotiations in the future.

As many laboratory assistants do not as a rule get to Conference to voice their opinions at the Annual General Meeting, this will give them a chance to express their feelings, good or bad, through this committee.

We hope that by the giving and receiving of this information that laboratory assistants will see that they are not "left out in the cold" by the Council, and that they will perhaps give us some support in our efforts for the future.

To this end, the relevant information, along with a brief questionnaire is being circulated to all laboratory assistants.

LEGISLATION COMMITTEE

Members of the Committee are P. McLeod (Convener), C. Campbell and A.D. Nixon.

With the advent of self-testing procedures and simplified analysers requiring minimal operator training, the situation of the legal standing of medical laboratory technologists and their involvement in this area came into question. However, before any answers could be provided it was considered necessary to establish the actual situation on Extra Laboratory Testing (ELT) in New Zealand. To this end, a comprehensive questionnaire was sent to eleven hospitals of various sizes. The topics covered in the questionnaire were:

1. Equipment and consumables available.
2. Maintenance of side room analysers.
3. Quality Control of ELT.
4. Training of staff and patients involved with ELT.
5. The future and the role of laboratory staff.

The results and findings of the questionnaire confirmed several situations which were thought to exist. In addition, other situations were highlighted which were not anticipated. Resulting from this investigation, a comprehensive proposal was drawn up and put to the M.L.T.B. which would legally allow for the correction of several anomalies in the practise of ELT as it presently stands. In addition, these proposals would also allow for the control of ELT in the years ahead.

Investigations are proceeding to establish the legal liability of medical laboratory employees in the area of criminal negligence. Although the Accident Compensation Act gives very broad cover to most areas, the committee felt that there are possibly some situations where the Act may not give cover. At the time of writing this report, the outcome of legal advice was still awaited.

CONTINUING EDUCATION

Convener D.M. Reilly

This year there were eight courses available to members with topics ranging from 'Infectious Diarrhoea' to 'Microcomputers'. The Course 'New Ideas in teaching and learning' was a success with a total of about 200 members attending throughout the country. This format of the Author travelling around the centres appears to be popular, and allows members a better opportunity to attend. 'Intestinal Protozoa' is another with this format.

The responses from Course Authors has ensured that the programme has reached all disciplines and Council is thankful for their time and effort.

I would like to establish a Talent Bank of Course Authors, so if you have any ideas or suggestions please let me know.

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC.

TREASURER'S REPORT

This year has traded with a deficit of $7185. This deficit is due to substantial increases in Journal and Travel expenses.

Journal costs have increased because of improvements to size, content and presentation, and although advertising rental has increased by 137%, the members are still subsidising each issue by approximately $3000. Council attempted to reduce costs for future issues by prepaying $5500 for Journal paper, of which half has been used.

Travel Expenditure increases were due to:

(a) 15% increase in Air Fares
(b) one extra Council member (Past President)
(c) Continuing Education (Allergy Seminar)
(d) Presidential Visit to Inaugural Meeting of the Fiji Med. Lab. Association
(e) Negotiations

In the coming financial year, Negotiations and the Journal are areas which will be difficult to budget for. Members may wish that more funds be spent on Professional Advisors for Negotiations and with a turnover in excess of $100,000 another deficit is likely.

D.M. Reilly
HONORARY TREASURER

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. STATEMENT OF FINANCIAL POSITION AS AT 31 MARCH, 1985

	1985 $	1984 $
ACCUMULATED FUNDS		
Balance as at 1 April 1984	53,782	42,085
Surplus (deficit) for the year	(7,185)	11,697
	46,597	53,782
Clinical Laboratory Special Fund	641	641
TOTAL INSTITUTE FUNDS AS AT 31 MARCH, 1985	$47,238	$54,423
These funds were represented by the following items		
CURRENT ASSETS		
Cash at bank	13,745	23,774
Stock of examination stationery	50	50
Journal paper stock	2,750	—
Air New Zealand Bulkair Deposit Account	—	614
Stock (Ties/Badges/Cufflinks)	521	551
Conference advances	—	200
Sundry debtors	598	580
Subscriptions in arrears	1,854	1,925
TOTAL CURRENT ASSETS	19,518	27,694
LESS CURRENT LIABILITIES		
Sundry creditors	6,760	—
Net funds on hand for 1985 conference	2,302	—
Subscriptions in advance	224	283
Examination fees in advance	2,663	3,187
Air New Zealand Bulkair Deposit Account	32	—
TOTAL CURRENT LIABILITIES	11,981	3,470
NET CURRENT ASSETS	7,537	24,224
INVESTMENTS (Note 2)	38,000	28,000
Fixed Asset (at cost less depreciation)		
Typewriter	1,701	2,199
	$47,238	$54,423

The attached notes form part of this Statement

Treasurer — D.M. Reilly

President — C.H. Campbell

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. STATEMENT OF INCOME & EXPENDITURE FOR THE YEAR ENDED 31 MARCH, 1985

	1985 $	1984 $
INCOME FOR THE YEAR WAS DERIVED FROM:		
Subscriptions	37,240	38,247
Conference surplus (as per statement)	3,539	3,770
Interest received	5,939	5,449
Examination surplus	278	819
Miscellaneous income	4,394	5,406
	51,390	53,691
FROM THIS INCOME THE FOLLOWING EXPENDITURE WAS MET:		
Accommodation etc.	4,119	5,009
Fees — C.S.U., IAMLT and NCCLS	2,292	2,830
Journal cost (as per statement)	22,802	14,052
Honoraria, Gratuities & Prizes	6,624	2,684
Computer services	2,027	724
Printing, stationery and typing	3,465	3,825
Postage and tolls	2,036	2,612
Travelling expenses	12,613	5,948
Post Grad. Education and Pacific Training	1,732	3,618
Sundry expenses	367	571
	58,077	41,873
Plus Depreciation of typewriter	498	121
Total expenditure for year	58,575	41,994
Which leaves an excess of expenditure over income (1984: income over expenditure) for the year	$(7,185)	$11,697

The attached notes form part of this Statement

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. CONFERENCE ACCOUNT STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 MARCH, 1985

	1985 $	1984 $
Registration	7,103	6,385
Trade rentals and advertising	10,800	8,125
Donations	1,909	1,743
Social functions	3,518	3,047
Workshops	1,488	—
Bank interest and other income	302	101
	25,120	19,401
FROM THIS INCOME THE FOLLOWING EXPENDITURE WAS MET:		
Accommodation, meals and travelling costs (net)	5,448	1,095
Social function costs	11,646	10,354
Rentals	534	1,775
Postage, stationery, promotion and administration	3,409	2,407
Other expenditure	544	—
	21,581	15,631
Which leaves an excess of income over expenditure transferred to the Statement of Income and Expenditure	$3,539	$3,770

JOURNAL ACCOUNT STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 MARCH, 1985

	1985 $	1984 $
Advertising rental	10,776	4,544
Subscriptions	502	1,013
Bank interest and miscellaneous income	—	169
	11,278	5,726
FROM THIS INCOME THE FOLLOWING EXPENDITURE WAS MET:		
Printing — Journal and Newsletter	30,253	15,985
Postage and stationery	3,776	3,194
Sundry expenses	51	599
	34,080	19,778
Which leaves an excess of expenditure over income transferred to the Statement of Income and Expenditure	$22,802	$14,052

The attached notes form part of this Statement.

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. NOTES TO THE 1985 FINANCIAL STATEMENTS

1. STATEMENT OF ACCOUNTING POLICIES

The historical cost basis of accounting has been used in the preparation of the financial statements. Reliance is placed on the fact that the Institute is a going concern. Accrual accounting is used to match expenses and revenues.

Particular accounting policies:

(a) Fixed asset and depreciation

Depreciation is calculated on the straight line basis at 20% per annum of cost price to write off the typewriter over five years.

(b) Stock is valued at actual cost.

There have been no changes in accounting policies. All policies have been applied on bases consistent with those used in previous years.

2. INVESTMENTS

Investments comprise Debenture Stock:

(a) General Finance Ltd

$20,000 @ 16.00% — matures on 21 August 1987
$ 5,000 @ 15.75% — matures on 5 December 1985

(b) BNZ Finance Ltd

$ 3,000 @ 16.00% — matures on 24 December 1985
$ 5,000 @ 16.00% — matures on 9 June 1986
$ 5,000 @ 15.00% — matures on 14 September 1987

AUDITORS' REPORT TO THE MEMBERS OF THE NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC.

We have audited the financial statements on pages 1 to 4 in accordance with accepted auditing standards and have carried out such procedures as we considered necessary.

In common with other organisations of a similar nature, control over the income prior to its being recorded is limited, and there are no practical audit procedures to determine the effect of this limited control.

Subject to the possible effect of the limited control over the income referred to in the preceding paragraph, in our opinion the financial statements give, using the historical cost method, a true and fair view of the financial position of the Institute as at 31 March 1985 and the results of its activities for the year ended on that date.

21 June 1985
Auckland, N.Z.

DELOITTE HASKINS & SELLS
CHARTERED ACCOUNTANTS

MILES

DISTRIBUTORS: EBOS DENTAL & SURGICAL SUPPLIES LTD.
AUCKLAND: P.O. BOX 68-232, NEWTON, PHONE 795-540, TX: 2469

The Members,
N.Z. Institute of Medical
Laboratory Technology.

Dear Members,

On January 1st, 1985 Miles Laboratories (Aust) Pty Ltd commenced marketing its products direct in New Zealand. Ebos Dental and Surgical Supplies Ltd continue as our national distributors.

AMES urine chemistry reagent strips and blood glucose self-monitoring systems have been market leaders and household names for many years.

Miles Laboratories now wish to introduce you to our innovative range of laboratory products, namely:

* MILES SCIENTIFIC - TISSUE TEK EMBEDDING SYSTEMS, V.I.P., IMMUNOCHEMICALS AND BIOCHEMICALS.

* NOVA BIOMEDICAL - ISE ELECTROLYTE ANALYZERS, TOTAL AND IONIZED CALCIUM

* AMES SERALYZER - DRY PHASE POTASSIUM, THEOPHYLLINE PLUS 12 OTHER ANALYTES

* AMES OPTIMATE - AUTOMATED SPECTROPHOTOMETER / FLUOROMETER

* AMES TDA KITS - S.L.F.I.A. THERAPEUTIC DRUG ASSAYS

* AMES CLINITEK - AUTOMATED URINALYSIS & LEUCOCYTES

To introduce the above range, demonstrate and discuss your laboratory requirements, Miles have appointed two representatives, Mr Phil Turner in Christchurch and Mr Jan Battaerd in Auckland.

May I take this opportunity to invite you to meet our staff and view a comprehensive range of laboratory products at the forthcoming NZIMLT Conference in Palmerston North. I look forward to meeting you there.

Yours faithfully,
MILES LABORATORIES

George E. Bongiovanni
Area Manager NZ/South Pacific

LABORATORY SAFETY — AIDS

Recent publications on AIDS have lead to considerable discussion and concern by many people in a variety of professions. As a result of this highly emotive issue and the many misconceptions about AIDS the Council of the N.Z.I.M.L.T. has established a Task Force on AIDS with specific terms of reference.

Until the Task Force has addressed the problem fully the following general comments are for the attention of **ALL LABORATORY WORKERS.**

The causitive agent of AIDS, HTLV3 is not highly infectious. It is spread mainly by homosexual intercourse, and by blood and blood products in a similar way to hepatitis B. There is no evidence that it is spread by casual contact, by food, sweat, saliva or by airborne routes.

In New Zealand there is no data on the incidence of carriers or those infected, and there will be some considerable time lapse before these figures become available.

The following basic precautions are relevant in light of current knowledge.

1) Treat **all** specimens as potentially infectious.
2) Maintain high standards of personal hygiene (hand washing).
3) Wear protective clothing when handling large numbers of blood specimens.
4) Protect open wounds.
5) Prevent wounds from sharp instruments and needles.
6) Dispose of contaminated articles appropriately.
7) Clean up all blood spills promptly, using an approved disinfectant.
   e.g. (i) 0.5-1.0% sodium hypochlorite.
   (ii) 40% aqueous formalin.
   (iii) 2% glutaraldehyde.
8) Use disposable gloves for any procedure which may appear hazardous.
9) Disinfect work surfaces regularly.
10) Be ALERT and stay INFORMED.

IN THE CASE OF A CONFIRMED OR SUSPECTED AIDS CASE FOLLOW HEPATITIS-B PROCEDURES.

1. Avoid direct contact of your skin and mucous membranes with blood, blood products.
2. Avoid splashing blood in the eyes or mouth.
3. Avoid shaking or homogenizing.
4. Take care when opening sealed containers or bottles.
5. Protective clothing including gloves and facial covering (if danger of splashing) should be used.

Careful technique and good personal practice should be followed at all times.

There are no known cases of health-care personnel or other care providers contacting the illness by caring for AIDS patients. However, until further information on the New Zealand scene is available the utmost care is required in handling all specimens.

B. CORNERE
Convenor,
Special Task Force On Aids.

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The ABL4 has been designed to meet the ultimate demands in Cardiac Surgery Departments and ICUs. It will also greatly improve the capability of any stat lab where safe and uncomplicated K + /blood gas analyses are required 24 hours a day.

Features of the new ABL4 include:

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— built-in-gas mixer requiring only 100% CO_2
— low maintenance commitment
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ABL4 joins the ABL blood gas family viz:

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ABL3 — Automated, CRT Display, Keyboard control.

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With the KNA1 STAT means much more thanjust "prompt processing". Thus, the analyzer fulfils the most stringent demands of any hospital ward — in the clinical chemistry lab as well as in all wards responsible for critical care.

— data out in 1 minute, on 125ul of whole blood, plasma or serum
— ONE sample mode, no risk of losing a sample
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The Pacific Way

Pacific Paramedical Training Centre — P.P.T.C.

An important milestone in the history of the P.P.T.C. occurred on Friday 26th April, 1985, when His Excellency Lupematasila Aumua Ioane, High Commissioner for Western Samoa, presented certificates to trainees who had completed the three month Diarrhoeal and Acute Respiratory Diseases Course. This was the first time an eminent Pacific Island representative had participated in the formal proceedings of the P.P.T.C. and it is the hope of all concerned that it will be the beginning of a closer liaison with official representatives from the Pacific Region and with other Pacific Island Organisations within New Zealand. Twelve students received certificates from His Excellency. This was the largest class of students attending a course at the P.P.T.C. since its inception in 1981. The High Commissioner paid tribute to the way in which the Government Departments and other organisations involved all contributed and co-operated together to ensure the P.P.T.C. is able to function and provide courses appropriate to the needs of the Pacific Region. He expressed the sincere hope that this co-operation would continue in the future.

Students who received certificates at the function on 26th April were: Santos Borja (WHO Fellow) Palau, Trust Territories Pacific Islands; Kesler Lakutak (WHO Fellow) Kostae, Trust Territories Pacific Islands; Thomas Aldan (WHO Fellow) Saipan, Trust Territories Pacific Islands; Mavis Tiatia (N.Z. Government Bilateral Aid Programme) Western Samoa; Karotu Babiano (N.Z. Government Bilateral Aid Programme) Kiribati; Wilson Kikolo (WHO Fellow) Tonga; Piisi Ahosivi (WHO Fellow) Tonga; Frances Tavalo (Red Cross Health Science Award) Solomon Islands; Katsuo William (WHO Fellow) Kostae, Trust Territories Pacific Islands; Billy Bryce (N.Z. Government Bilateral Aid Programme) Western Samoa; Fele Gasetoto (WHO Fellow) American Samoa; Teura Simiona (N.Z. Government Bilateral Aid Programme) Cook Islands.

P.P.T.C. students on the Diarrhoeal and Acute Respiratory Diseases Course, February—April, 1985. The course Tutor (back row) Mr. M. J. Lynch.

Annual Report

The annual report of the P.P.T.C. also paid tribute to the work of the various Departments and organisations involved. "While the function of the P.P.T.C. annual report is to outline the events of the past year and consider possible directions for the future, it also provides a vehicle to convey thanks to all those individuals and organisations who have assisted the Centre in so many ways over that period of time.

The Committee now exercises this opportunity, and to the Ministry of Foreign Affairs threefold thanks are extended. Firstly, for the aid grant which makes the continuation of the Centre possible. Secondly, to the Executive and Project Officers of the External Aid Division for their valued advice and co-operation. And, thirdly, for the production of the information brochure which details the work of the Centre and the planned course. This is an excellent publication and the Committee is especially grateful to Mr David Bartle for his help in organising this venture and to Mr Neville Peat, Information Officer, for layout and production. Special thanks go to the Wellington Hospital Board, Dr Linda Holloway and the Charge Technologists of the Department of Laboratory Services at Wellington Hospital for much appreciated assistance. The New Zealand Red Cross Society has continued to make a major contribution to the success of the Centre's activities, and the Committee records it sincere appreciation to the Society for financial assistance, for the Health Science Awards which have enabled Pacific Island trainees to attend courses at the P.P.T.C. and for all the services given so generously by the Secretariat at Red Cross Headquarters.

Thanks also go to the Western Pacific Regional Office and Suva Office of the World Health Organisation for their continued help and guidance, and to the executive officers of the International Division of the Department of Health for advice and support. As in previous years, the Centre records appreciation to the New Zealand Institute of Medical Laboratory Technology, members of which continue to make a vital contribution to the work of the Centre. Finally, thanks must go to the Dannevirke, Palmerston North, Wairarapa and Wairau Hospital Boards who have provided valuable work experience facilities for P.P.T.C. trainees over the past year. To all of these organisations and individuals the Committee expresses sincere thanks

Thanks are again expressed to a number of clinical laboratories around New Zealand, both hospital and private, which donated useful items of equipment. The equipment budget remains limited and gifts of equipment are greatly appreciated.

Visitors to the Centre

There have been a number of visitors to the Centre this year; we were pleased to welcome Mrs M. E. Bruce, Chairman, Wellington Hospital Board, who presented certificates to trainees who completed the Blood Bank Technology/Haematology Course in August, 1984.

It was also a pleasure to welcome four overseas Red Cross Society visitors to the P.P.T.C. In December 1984, Miss Noreen Minogue, Assistant Secretary General of the Australian Red Cross Society, visited the Centre to discuss the Centre's training programme for blood bank personnel from developing blood transfusion services.

In February of this year we had the pleasure of a visit from three delegates from the Red Cross Society of China. They were Mr Wang Min, Vice President of the Red Cross Society of China (Head of Delegation), Mr Huang Shushan, Adviser to the International Liaison Department and Miss Gong Yiyi, Staff Member of the International Liaison Department and Interpreter. The delegation was particularly interested in the appropriate technology concept on which the Centre's courses are based and discussed the importance of short-term technical training programmes in developing countries.

In addition to these overseas visitors there have been visits from people in local health, education and service organisations."

INSTITUTE BUSINESS

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

Membership Secretary
David Pees
P.O. Box 29-115, Greenwoods Cnr, Auckland.

Membership Fees and Enquiries

Membership fees for the year beginning April 1, 1985 are:
For Fellows — $45

For Associates — $45

For Members — $30

For Non-practising Members — $20

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

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

NEW ZEALAND/SWITZERLAND TRAINEE EXCHANGE SCHEME

The Governments of Switzerland and New Zealand have announced a New Scheme encouraging New Zealand and Swiss nationals to undertake a limited period of employment in Switzerland or New Zealand.

The scheme is primarily aimed at those people who have some expertise in their field of employment and wish to use the scheme to share their knowledge and further their experience while at the same time improving their linguistic skills.

Trainees should:

* be over 18 and not more than 30 years of age;
* have a working knowledge of German, French or Italian. (The degree of fluency and language required will depend on the industry and location in which each trainee chooses to work;
* be New Zealand nationals (this includes those people living in the Cook Islands, Niue and Tokelau).

The training period shall normally be one year, but may be extended up to 18 months.

Application forms can be obtained from the Employment Services Division, Department of Labour, Private Bag, Wellington.

Applicants who do not have pre-arranged employment in Switzerland at the time of applying to participate in the scheme are required to complete the "Search for Employment for Stagiaires" form in duplicate and return it to the Executive Officer, New Zealand/Switzerland Trainee Exchange Scheme (Employment Services Division), Department of Labour, Private Bag, Wellington. A short curriculum vitae and copies of educational certificates should be attached to the application form, together with a photo as indicated on the form.

Applications which are recommended for referral to Switzerland will be forwarded by the Department of Labour to the Federal Office for Industry and Employment (BIGA) in Berne which will make every effort to find suitable employment in Switzerland. When a suitable offer is found, BIGA shall forward details to New Zealand. Subject to trainees then complying with Swiss laws and regulations concerning the entry, residence, departure and employment of non-citizens, each trainee shall be granted an entry permit and authority to undertake employment for the agreed period of training.

At the time of making application, trainees may have already found employment in Switzerland through their own initiative. Where this is the case applicants are required to complete in quadruplicate an 'Application for a permit for a Temporary Stay in Switzerland to Take Up Employment as a Trainee' and forward this to the Department of Labour.

A copy will be sent to BIGA which must be satisfied that the remuneration and other terms and conditions of employment are acceptable. If everything is in order the Swiss authorities will make arrangements for their immigration procedures to be completed.

Please note:

* The costs associated with this scheme must be met by trainees.
* Trainees are expected to make their own arrangements regarding accommodation, travel etc.
* It is the trainees responsibility to ensure that they are adequately covered with accident and health insurance.
* Should a dispute occur between the trainee and his/her Swiss employer, BIGA will provide assistance to settle the dispute. In the event of the dispute remaining unsettled, BIGA may seek suitable alternative employment or require the trainee to return home.
* At the end of the exchange period, trainees will be expected to provide the Department of Labour with a report commenting on their period of employment and training in Switzerland.
* Applications will be considered having regard to the annual quota of trainees and the distribution within the limits of the quota among different occupations.

Any queries should be addressed to:

The Executive Officer
NZ/Switzerland Trainee Exchange Scheme
Department of Labour
Head Office
Private Bag
Wellington.
Telephone (Wgtn) 737-800.

Welcome to Stockholm, Sweden 3 — 8 August 1986 Invitation to

All medical laboratory technologists and other representatives for medical and technical science and firms and other interested and proficient persons wherever they might live in the world. You are invited to attend and contribute at the 17th Congress of the International Association of Medical Laboratory Technologists in Stockholm, Sweden, 3-8 August, 1986.

Our theme is MEDICAL TECHNOLOGY IN MODERN AGE and we are preparing a scientific program which we hope will meet the

A few clues about hunting for Rotavirus

Bio Mérieux makes it easy

In the old days (about six months ago) it would have required a Sherlock Holmes with an electron microscope to check on Rotavirus who was like Moriarty a "damned elusive chap".

Non detection could result in unnecessary prescriptions for antibiotics, leading to a harmful imbalance of bacterial flora. And certainly resulted in large numbers of cases of unknown etiology.

Well now, all that is a thing of the past, and the solution to Rotavirus's identification is . . . well "elementary my dear Watson" because Bio Merieux have provided a Rotavirus detection kit which can give you a result in minutes.

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highest demands you may have on modern laboratory technology of today. It will include various fields of Laboratory Specialities, focusing on Laboratory Techniques. Furthermore, the following five specific subjects have been selected to detailed coverage: Immunology, The Urinary Tract, Genetics, Working environment and Education.

Common subjects/issues will be classified in mini-symposia where an expert in the field will introduce each subject and act as a moderator. The contributions will then be presented and the symposium will be concluded, with generous time for discussions.

In order to make this Congress a success, your support is necessary whether it is by your attendance or whether you are planning to present a paper or contribute to the poster session in the following laboratory specialities: Clinical Chemistry, Blood Group Serology, Hematology, Microbiology, Immunology, Histopathology, Cytology, Medical Chemistry, Clinical Physiology.

In Sweden Clinical Physiology is an exclusive laboratory speciality, which we wish to introduce with lectures covering physiological laboratory methods of investigating heart function, peripheral circulation, the lungs, the kidneys, the gastrointestinal tract and the nervous system. In addition to the scientific program, educational visits, workshops, exhibitions and association meetings will be arranged and you will be able to take part in round-table discussions.

We also hope you will spare some time to enjoy the social events in the beautiful city of Stockholm. As a cultural center, Stockholm offers a stimulating environment for activities after-congress-hours. Post-tours will also be arranged both in Sweden and in other parts of Scandinavia.

The City of Stockholm has actively created an environment and atmosphere conducive to international congresses. The delightful surroundings in one of the cleanest cities in the world, as you will realize, are an extra bonus. The Congress and Exhibition is going to take place at the Stockholm International Fairs Center at Älvsjö, just 15 minutes by car and 8 minutes by rail from downtown Stockholm.

Stockholm is no longer one of the most expensive cities in the world. It currently ranks 16th after London, Tokyo and New York. There are more than 200 restaurants providing a wide range of Swedish and international cuisine at competitive prices.

Further information will be given in the Invitation program which will be distributed in the beginning of 1985. Anyone who wishes to present a paper or poster is already now invited to make application to the Secretariat as soon as possible.

As there will run parallel many scientific sessions at the same time we look forward to a great response.

The official language of the Congress will be English, therefore applications should be written in English as will the abstract and paper/poster.

The deadline for submission of abstracts is 1 October 1985 and authors will be notified about acceptance of their papers by February 1986.

Please address all correspondence to: **IAMLT Congress, c/o Stockholm Convention Bureau, Box 1617, S-111 86 STOCKHOLM, Sweden. Telephone** +46 8 23 09 90. Telex 11556 Congresx S.

Membership Committee Report To NZIMLT Council Meeting 30-31 May 1985

Applications for membership

As Members

Miss Vanessa Lisa MIHALJEVICH, Auckland; Miss Rosemary Anne SYNNOTT, Wellington; Mrs Janice KARAKA, Auckland; Miss Sonia Margaret ASH, Auckland; Miss Wendy Joyce GAUSEL, Dargaville; Miss Hester Elisabeth Van Der MARK, Auckland; Miss Catherine Mary WHERWOOD, Auckland; Miss Maria Elizabeth GIRLING, Auckland; Miss Kim DAVIES, Auckland; Ms Susan SMITH, Wellington; Mrs Helen Gwen LAL, Auckland; Miss Angela Maria STODDARD, Auckland; Mr Grant Selwyn ROWLEY, Auckland; Mr David Aaron BROPHY, Auckland; Mr Dennis Phillip YEP, Auckland; Mrs Deborah Sharon McINTYRE, Auckland; Mrs Elizabeth M. FISHER, Masterton; Mr George E. BONGIOVANNI, Auckland; Mrs Karen McLEISH, Auckland; Mr Parmenara KRISHNAN, Auckland; Miss Carolyn Fay CROWTHER, Auckland; Miss Susan Elizabeth WHITTAKER, Auckland; Miss Julie TORRIE, Auckland; Miss Adele Vivienne KNIGHT, Auckland; Mrs Anne Patricia AMESS, Te Kuiti; Miss Sharon Lee WILKINS, Auckland; Ms Anna Louise BREWER, Auckland; Miss Selina Natasha FAY, Auckland; Mr David Anthony REDDY, Auckland; Mrs Lynda Susan McPHEE, Dunedin; Miss Ekaterina Stephanavna DMITRIEFF, Auckland; Miss Geeta MAKAN, Auckland; Mr Deane Andrew GRIFFITHS, Auckland; Miss Stephanie EYRES, Auckland; Miss Dinah Kaye KINNEAR, Auckland; Miss Sharon ROBINSON, Auckland; Miss Kay Maria THOMAS, Auckland; Mrs Rosemary Audrey McANULTY, Christchurch; Mrs Caroline ABERNETHY, Wellington; Miss Gillian Delwyn NELSON, Auckland; Miss Ann-Marie Jasmine HICKLING, Auckland; Ms Gillian Elizabeth WHITTAKER, Auckland; Miss Damante MANGA, Auckland; Mrs Michelle Lorraine CLOTWORTHY, Auckland; Mrs Christine LANHAM, Auckland; Mr Craig BURNET, Auckland; Miss Gillian Heather STONEHOUSE, Auckland; Mrs Michelle Catherine CUBITT, Auckland; Miss Eileen KIRK, Auckland; Miss Annette Corry VAN OSSENBRUGGEN, Auckland; Miss Rachel Louise PICKERING, Wellington; Miss Kristen Louise JAMESON, Auckland; Miss Andrea Helen BAKER, Auckland; Mrs Deborah WHITE-PARSONS, Auckland; Miss Evelyn Brenda PLIM, Auckland; Miss Harleigh Anne O'BRIEN, Auckland; Miss Angela Maree Walton SMITH, Auckland; Miss Joanne Elizabeth REECE, Auckland; Miss Tania Marie SAMUELS, Auckland; Miss Karen Jane FALCONRIDGE, Auckland.

As Associates

Miss Lee GLOGOSKI, Auckland; Mrs Marian Rose SMITH, Auckland; Mr David A. FISHER, Masterton; Miss Gillian Kaye HENDERSON, Auckland; Ms Anne Patricia DERVAN, Auckland; Mrs Bettina Alice HEATON, Auckland; Miss Angela D. THOMPSON, Porirua; Mrs Marion DONNELLY, Auckland; Mrs Lesley Ann WIGGINS, Te Kuiti; Mr Hamish PATTERSON, Auckland; Mrs Jennifer Robyn DOWLING, Auckland; Mr Christopher David JAGGS, Auckland; Mr Roger DAVIES, Christchurch; Mrs Jillian Christina ROWLANDS, Dunedin.

Resignations

Mrs Vivienne J. McNEIL, Mt Maunganui, (going overseas); Miss Lynda POGSON, Auckland, (going overseas); Mrs G. J. BOYD, Dunedin, (leaving laboratory work); Mr D. W. FITZGERALD, Timaru, (retirement); Mr Keith SCOGGINS, Nelson; Mrs Heather DONNELL, Auckland (leaving laboratory work); Mrs Carole A. SEARLE, Cambridge; Mr R.M. COTTELL, New Plymouth; Mrs Leonie A. BELL, Wanganui.

Gone No Address

Ms J.V. CLEAVE, Mr M.J. WILDBORNE, Miss V.A. WOODS, Mr J.C. MUIR, Miss G.M. FLAMANK.

Unfinancial Members Removed

Miss L.P. WELMAN, Miss L.J. HENDERSON, Miss R.L. HARRISON, Miss L. BLUNDELL, Miss B.A. MORONEY, Mr P.J. McMANUS.

Membership at 31.5.85

	31.5.85	13.3.85
Membership	1373	1411
less resignations	6	7
less G.N.A.		2
less deletion unfinancial	30	130
	1332	1272
plus applications	74	101
plus reinstatement	3	-
	1409	1373

Membership Composition

1. Life Member (Fellow)	13
2. Life Member (Associate)	2
3. Life Member (Member)	-
4. Fellow	43
5. Associate	683
6. Member	524
7. Complimentary Member	110
8. Non-practising Member	19
9. Honorary Member	15

Salaries

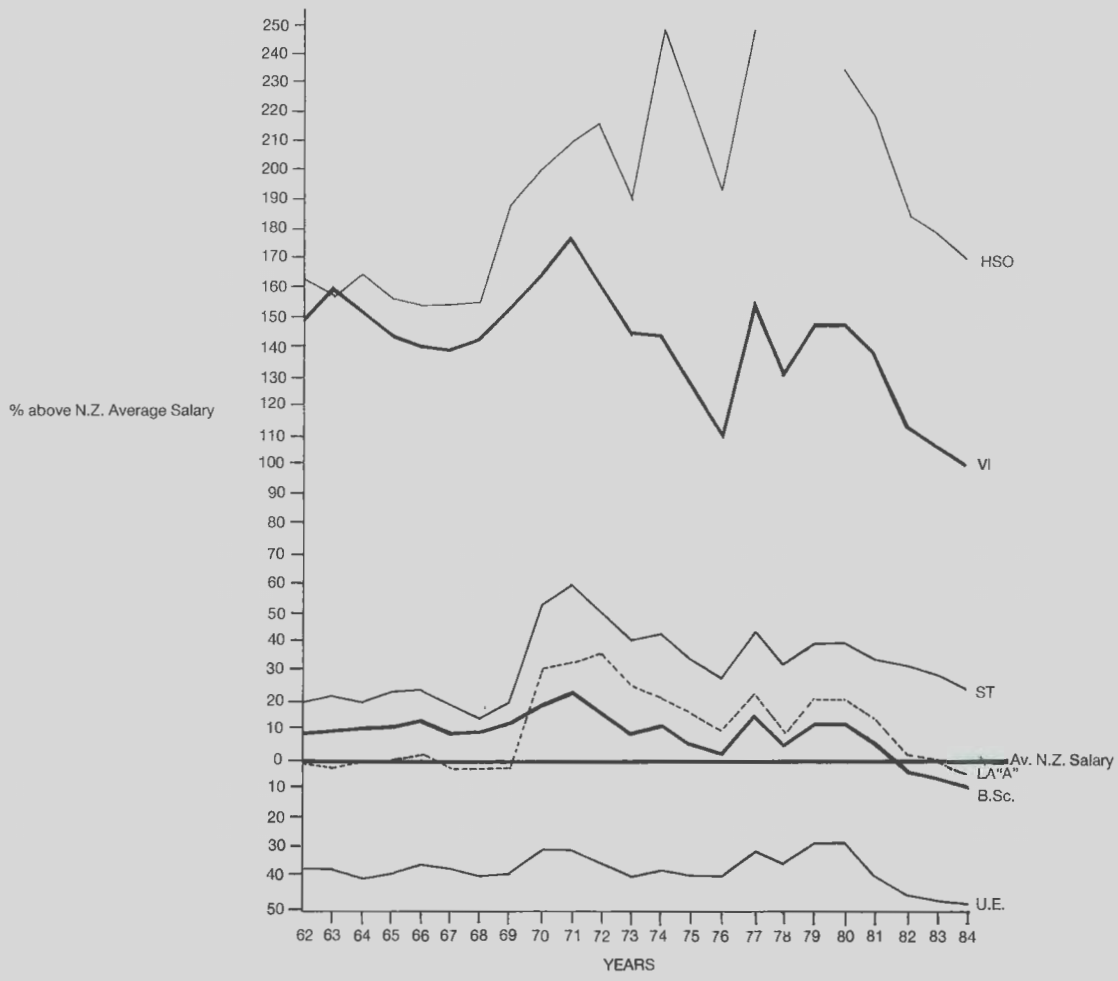
Many laboratory workers have felt that their salary levels have deteriorated in comparison with other workers. Tabulated is the average N.Z. Salary (wage) for each year back to 1962; for comparison the following are also listed — the U.E. rate, the B.Sc. rate, the top rate for lab assistants ("A" scale), the minimum rate for staff technologists, the grade VI rate and the top rate for hospital scientific officers.

These rates are then expressed as % above the average N.Z. salary (wage) and plotted graphically. The results speak for themselves.

Note: the large jump between 1969 and 1970 is due to the increase for NZCS.

SALARIES AS AT NOVEMBER EACH YEAR.

Year	N.Z. Ave Salary	U.E. Rates	B.Sc Rates	L.A. Top "A" Rates	Minimum Staff Tech. Rates	Grade VI Rates	H.S.O. Top Rates
1962	1590	1020	1730	1576	1930	3960	4180
1963	1634	1050	1790	1618	1990	4270	4240
1964	1730	1050	1920	1738	2080	4350	4590
1965	1816	1130	2020	1812	2230	4450	4670
1966	1898	1260	2140	1934	2360	4590	4840
1967	2000	1275	2170	1951	2360	4800	5090
1968	2123	1275	2330	2084	2390	5130	5430
1969	2225	1370	2505	2153	2650	5754	6436
1970	2526	1734	3041	3341	3880	6780	7584
1971	2972	2064	3646	3957	4732	8271	9251
1972	3257	2122	3748	4396	4864	8503	10278
1973	3735	2293	4051	4636	5257	9189	10518
1974	4453	2826	4980	5380	6379	10943	15488
1975	4974	3056	5210	5840	6609	11173	15718
1976	5707	3487	5808	6239	7304	12028	16829
1977	6453	4441	7343	7857	9229	16569	22431
1978	7314	4752	7708	7857	9594	16934	22431
1979	8707	6052	9818	10471	12220	21568	
1980	10476	7282	11814	12600	14704	25953	34937
1981	12579	7646	13546	14447	16859	29758	40059
1982	13967	7646	13546	14447	16859	29758	40059
1983	14292	7646	13546	14447	16859	29758	40059
1984	14867	7956	13962	14863	17275	30174	40475



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Circle 74 on Reader's Reply Card

Current Pay Scales

Health Service Determination No. HS 19: Health Service Laboratory Workers

1. The effect of Amending Determination No. HS 2269 attached is to implement a revised salary scale for Graduate Technologists following negotiations between the Institute of Medical Laboratory Technology (Inc) and a sub-committee of the State Services Co-ordinating Committee and to apply the recently announced General State Adjustment.
2. The 10 November 1981 salary rates for this group are thus revised on and from 10 January 1985 by the following adjustments listed in order of application.

(1) The application of negotiated increases to the graduate technologist scale.
(2) The incorporation of the 1 April 1984 Cost of Living Allowance into current 10 November 1981 salary rates on the following basis:
— Minimum Adult Level and Above
The application of the full $417 allowance to rates at the minimum adult level and above. For the purposes of the COLA the minimum adult rate of pay of $10,350 (10/11/81).
Below the Minimum Adult Level
At this level a percentage of the COLA of $417 is applied to salaries based on the proportion that the actual salary rate bears to the minimum adult rate.
(3) The application of the General State Adjustment of 7 pecent.

Note
The fact that salary payments made since 10 January 1985 will have included the COLA must be taken into account when calculating any arrears in pay since 10 January 1985.
3. Employees who have resigned
Employees who have resigned since 10 January 1985 should, on application to the board, be paid any arrears due.
4. Costs
A board may claim by way of supplementary grant the nett cost of the increases only if the board makes payment from its base allocation for salaries and wages. Such a claim should be recorded against the appropriate item on the monthly accounting statement making reference to this circular. Other costs arising from these amendments should be met from the boards base allocation.
5. Any matters of doubt or difficulty should be referred to this office for decision.

Yours faithfully

T.J. Neilson
for Chief Executive

Pursuant to the State Service Conditions of Employment Act 1977, the Health Service Personnel Commission hereby makes the following amending determination.

Application of Amending Determination

1. Health Service Determination No. HS 19 as amended from time to time is further amended as follows.
2. The first Schedule Part A to Determination No. HS 19 is hereby revoked and is replaced by the First Schedule attached to this amending determination which, in order of application, has the effect of:
   (1) Applying the negotiated increases to the graduate technologist scale.
   (2) Incorporating the 1 April 1984 Cost of Living Allowance into current 10 November 1981 salary scales on the following basis.
   Minimum Adult Level — $10,350 (10/11/81) — and above — application fo the full $417 allowance.
   Below the Minimum Adult Level — a percentage of the allowance based on the proportion that the salary bears to the minimum adult rate.
   (3) Applying the General State Adjustment of 7%.
3. Replacement pages incorporating these amendments are attached.
4. The revised salary scale prescribed in the First Schedule shall apply on and from 10 January 1985.

Dated at Wellington this 15th day of March 1985.

J.R. Martin — Chairman

R.H. Kerr — Member

R. McEwan — Member

First Schedule — Part A
Salaries and Wages of Health Service Laboratory Workers

1 Grade Laboratory Officer
A grade laboratory officer shall receive a yearly rate of salary from time to time determined in each case by the Health Service Personnel Commission, that scale being one of the five following:

	10.11.81	10.1.85
	$	$
5	28,175	30,593
	26,888	29,216
4	25,999	28,265
	24,909	27,099
3	24,020	26,148
	22,931	24,982
2	22,040	24,029
	21,150	23,077
1	20,162	22,020
	19,271	21,066

A grade laboratory officer may be paid a yearly rate of salary of $29,758 (10.11.81), and $32,287 (10.1.85) provided that advancement to this level shall be restricted by the Health Service Personnel Commission to officers who either in terms of the criteria set out in Section 26(1) of the Health Service Personnel Act or on the basis of individual skills and achievement clearly merit a margin over other Grade 5 officers.
2 The scale of salaries applicable to laboratory workers other than grade laboratory officers shall be:
(1) Staff Medical Laboratory Technologist

10.11.81	10.1.85
$	$
18,638	20,389
17,982	19,687
17,492	19,163
16,859	18,485

(a) The salary of a staff medical laboratory technologist being a person employed first as a trainee and then as a staff medical laboratory technologist shall commence on the first day of the month immediately succeeding the day on which was held the last part of the written examination, the passing of which together with the associated oral and practical examinations, whenever held, entitles him to his Certificate of Proficiency or other recognised qualification.
(b) Progression within the scale shall be by automatic annual increment.

(2) Trainee

10.11.81	10.1.85
$	$
15,592	17,130
15,011	16,508
14,447	15,904
14,026	15,454
13,546	14,940
12,656	13,988
11,829	13,103
11,026	12,244
10,196	11,349
9,289	10,340
8,468	9,426
7,646	8,511

Provided that:
(a) a trainee who holds a New Zealand Certificate of Science (Medical) or the Medical Laboratory Technologists Board Basic Training Certificate shall receive a minimum salary as from time to time advised by the Health Service Personnel Commission.
(b) the minimum salary rate (as advised by the Health Service Personnel Commission) for a trainee medical laboratory

technologist who attains a N.Z. Certificate of Science (Medical) or the Medical Laboratory Technologists Board Basic Training Certificate shall commence on the first day of the month immediately succeeding the day on which was held the last part of the written examination the passing of which together with the associated oral and practical examination, whenever held, entitles him/her to the certificate.

(c) a trainee who holds New Zealand Certificate of Science or the Medical Laboratory Technologists Board Basic Training Certificate, but does not attempt to qualify for the Medical Laboratory Technologists Board Certificate of Proficiency, will be reclassified as a laboratory assistant whereupon he may be paid according to subclause 2(4) of the schedule.

(d) a trainee who is a registered nurse shall receive the commencing salary of a second year trainee.

(e) a trainee may be paid a commencing salary higher than the first year salary, subject to the prior approval of the Health Service Personnel Commission, having regard to the age, educational qualifications, and experience of the person to be appointed as a trainee.

(3) Senior Laboratory Assistant

10.11.81	10.1.85
16,442	18,039
15,985	17,550
15,529	17,062
15,074	16,575

Entry to the senior laboratory assistants scale shall be restricted by the Health Service Personnel Commission to laboratory assistants who hold an appropriate qualification and/or have achieved an exceptional level of competence in developmental or specialised service. Progression within the grade shall be by automatic annual increment.

(4) Laboratory Assistant

10.11.81	10.1.85
$	$
14,447	15,904
14,026	15,454
13,546	14,940
12,989	14,344
12,145	13,441
11,026	12,244
10,217	11,373
9,360	10,419
8,503	9,465
7,646	8,511
6,995	7,786
6,475	7,207
5,726	6,374
5,318	5,920

The salary scale for laboratory assistants specified in subclause 2(4) shall be subject to the following general provisions:

(a) a minimum commencing rate of $7,646 (10.11.81) and $8,511 (10.1.85) for a laboratory assistant holding University Entrance in one or more subjects relevant to laboratory work.

(b) a minimum commencing rate of $6,995 (10.11.81) and $7,786 (10.1.85) for a laboratory assistant holding School Certificate (or entry to form VI) or Endorsed School Certificate in one or more subjects relevant to laboratory work.

(c) notwithstanding (a) and (b) above, subject to the prior approval of the Health Service Personnel Commission, a commencing salary higher than the first year salary may be paid, having regard to the age, educational qualifications and experience of the person to be appointed as a laboratory assistant.

(d) subject to 'the prior approval of the Health Service Personnel Commission', special advancement may be granted to a laboratory assistant having regard to his special merit or responsibilities or educational qualifications attained.

(e) a laboratory assistant who obtains the "Certificate of Qualified Technical Assistant" and/or the "Certificate of Qualified Technical Officer" (issued by the New Zealand Institute of Medical Laboratory Technology) shall be granted a salary increment to the next step in the laboratory assistants or senior laboratory assistants scale (if any) on the first day of the month immediately following the date on which he completed the examination. Thereafter he will retain his present incremental date.

(5) Graduate Technologist

A graduate technologist shall receive a yearly rate of salary according to the scale of salary from time to time determined in each case on the recommendation of the board, with the approval of the Health Service Personnel Commission, that scale being one of the following:

	10.11.81	10.1.85
	$	$
(i)	21,986	24,350
	20,665	22,883
	19,394	21,464
	18,126	20,049
	17,492	19,342
(ii)	16,859	18,637
	16,225	17,932
	15,592	17,215
	15,011	16,575
	14,447	15,949
	14,026	15,475
	13,546	14,821

Provided that:

(a) on the recommendation of the board and subject to prior approval of the Health Service Personnel Commission a commencing rate higher than the minimum may be determined within either scale (i) or scale (ii) having regard to the educational qualifications or postgraduate experience of the appointee.

(b) on the recommendation of the board and subject to the prior approval of the Health Service Personnel Commission, accelerated advancement may be granted within either scale (i) or (ii), regard being had to special merit or special responsibilities, special academic qualifications, or such other special factors as may be recognised by the Health Service Personnel Commission.

(c) No further appointments to the graduate technologists scale shall be made on or after 1 September 1978.

New Products and Services

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ATTAINING A NEW DIMENSION IN WATER PURITY

The problem with water is that it is almost the universal solvent. All elements are soluble in water to a greater or less extent and, as the essential supporter of life it is the habitat, even in its cleanest drinkable form, for a variety of organisms and other impurities.

For many practical purposes 'pure' water can be obtained by chemical or filtration methods, but each process leaves a large proportion of the total impurities untouched. Among troublesome contaminants are dissolved gases, metallic ions and bacteria, viruses and pyrogens. Moreover, some processes are vulnerable to particular contaminants; high-performance liquid chromatography (HPLC), for example, must have low ultra-violet absorption, and must therefore be free of organics, which themselves absorb UV energy, while in atomic absorption (AA) analyses, less than one part per billion of some trace metals can be tolerated.

Traditionally, distillation has been the means of obtaining sterile, ion-free water for medical, pharmaceutical and specialised processing needs. But distillation does not necessarily remove such contaminants as ammonia, carbon dioxide and volatile organics; it is also a slow process, which consumes large amounts of energy and cooling water. Deionisation, in which inorganic salts are removed from feed water in a reversible chemical reaction, is a more economical and generally more convenient process. Nevertheless, some organic substances can only be dealt with by specific ion-exchange resins. However, ion-exchange resins cannot remove bacteria.

'Frontier' Applications

In haemodialysis, where a patient's blood is cleansed by allowing it to flow along the surface of a semi-permeable membrane whose other surface is in contact with conditioned water, impurities pass from the bloodstream through the membrane into the water. However, dissolved trace elements in the water can pass in the opposite direction and build up to dangerous levels in the patient's blood. Therefore, since the volume of water involved is more than a hundred times greater than a healthy person would normally come in contact with, its degree of purity is clearly critical.

Mixed-bed deionisers, like the Elgastat B124, are widely used in this application; but reverse osmosis (RO), in which raw water is forced through a semi-permeable membrane which rejects a high proportion of inorganic and virtually all large organic contaminants (in particular colloidal aluminium, pyrogens and micro-organisms), is fast becoming a more widely accepted method of dealing with the problem. Single-patient machines, such as the Elgastat MediRO, have been developed for the purpose.

The sciences of biotechnology and bio-engineering are also areas where ultra-pure water supplies are an essential requirement. In biochemical analyses, for example, water used for cleaning equipment or for reference solutions must be reliably free of any contaminants being sought. Where total dissolved solids in the feed water exceed 500 ppm, reverse osmosis followed by deionisation will be found the most economical method to use. Where bacteria, colloids and/or particulates must also be removed, sub-micron filtration will almost certainly have to be considered. For other specialised needs, particular combinations of ion-exchange resins, activated carbon and filtration techniques may be required.

Materials analysis is a further growth industry. Modern equipment and techniques must be capable of resolving elements to very low levels, and increasingly down to parts per billion (ppb). In two particularly sensitive techniques — atomic absorption and inductively-coupled plasma spectroscopy — ultra-pure water is an absolute need for error-free functioning, and up to now deionisation with standard resins followed by nuclear resins has usually been found effective. Nevertheless, demands for ever greater purity are continually emerging, so that here again more specialized techniques may have to be considered.

Building a System

Few, if any water-purification needs can be met by a single treatment method, nor does it follow that the same sequence of purification techniques will be appropriate in every instance. And the problem may vary from one geographical area to another, since no two feed waters are the same.

Research into ion-exchange and membrane technology has enabled Elga to evolve a range of fully automatic two-bed and mixed-bed deionisation and reverse osmosis plants, which build up into integrated water treatment systems for industrial applications. Units for low volume industrial and laboratory users, including mixed-bed deionisers with exchangeable cartridges, as well as vessels containing specific purification media and reverse osmosis equipment, have also been developed. Systems incorporating a reverse osmosis stage employ high-flow non-degradable polyamide membranes which will usually operate on feed waters containing up to 4500 ppm total dissolved solids, over a pH range of 3-11. They will remove up to 95% of the ions and up to 99.5% of the total organic matter — including pyrogens — from feed water supplies.

From this broad spectrum of products, water treatment systems to meet individual demands for any volume, flow-rate or water purity can be designed.

Ion-Exchange Options

An analytical grade of anion and cation deionisation resins, developed originally for the nuclear energy industry, can further upgrade pre-purified water to resistivities of 18 megohm-cm. Systems employing these resins coupled with reverse osmosis have, for example solved the water quality needs of such UK companies as biochemical engineers, Celltech Ltd., who use a complete Elga water purification system in their fermentation laboratories. Analytical systems engineers, Perkin-Elmer, use an Elga reverse-osmosis and mixed bed deionisation system to prevent spurious reading during analysis at ppb levels on atomic absorption equipment.

While the examples described are among current 'frontier' applications, where there is a need to obtain ultra-pure water fast and cost effectively, more general requirements, such as glass-washing and the make-up of reagents and buffer solutions must not be overlooked. Reagents have a better chance of approaching absolute purity, and pharmaceutical manufacturing problems are reduced, if the processing and make-up water used is highly purified.

Wiltons, Scientific, Ltd. Private Bag Northcote, Auckland. 9. or **circle 48 on Readers Reply Card.**

HEWLETT PACKARD AUTOMATED SYSTEM — DELIVERS ACCURACY IN BACTERIA IDENTIFICATION — REQUIRES MINIMAL GC KNOWLEDGE

The new Hewlett Packard 5898A automated microbial identification system available from Northrop Instruments & Systems Limited accurately identifies bacteria, yeasts, moulds and other microbes, frequently to the sub-species level.

It is expected that applications for the new system will be found in sterility control laboratories for pharmaceuticals, foods and cosmetics, and in laboratories involved in human and agricultural pathology, where speed and reliability are important considerations. The product is not being marketed for in-vitro applications.

System Configuration and Capabilities

The system, composed of an HP 7670 series automatic sampler, HP 5890A gas chromatograph (GC), HP 3390 series integrator and HP 9000 series 200 desktop computer with various peripherals, automatically injects, sequences and chromatographs samples, handles system calibration and generates reports.

At the heart of the system lies a software library of known strains of bacteria, developed by a team of university scientists. After performing high-resolution chromatographic analysis of cell wall lipids, the system references the resultant chromatogram against the software library to provide fast and accurate identification. Although whole cell, fatty acid profiling has been used by research scientists for a number of years, the HP 5898A is believed to be the first product to automate this technique for the commercial market.

Advances in Microbe Identification

The system offers many advantages over standard biochemical tests and biochemical strips, the current commercial methods of microbial identification. The advantages include better accuracy, elimination of human error in reading results and decreased risk of exposure to infectious cultures.

Instead of relying on colour perception and other subjective tests — the analytical methodology of biochemical identification — the HP 5898A uses proven GC and computer technology to perform data interpretation

One basic sample preparation procedure works for all microbes, lowering the risk of a misidentification due to incorrect sample preparation. Similarly, because the system uses precise chromatographic measurements to identify the sample, the possibility of a biochemical test being misinterpreted is eliminated.

The single method approach also lowers the amount of training necessary for personnel to operate the system. The system can be operated with little or no GC experience.

Introduction of the HP 5898A system greatly increases the accuracy of the identification. The system provides test results that are as or more specific than biochemical tests, frequently achieving identification to the sub-species level.

Laboratory safety increases with the HP 5898A because of reduced handling of live cultures and because bacteria are killed during the first step of sample preparation.

The system's extensive software library of bacteria profiles and its computer aided search capability mean the time required for identification of fatty acid analysis is comparable to that of rapid biochemical strips.

Culture requirements are no more stingent than those necessary for biochemical testing. Saponification, methylation and extraction of fatty acids can be completed in less than 90 minutes for large batches of isolates, requiring only about four minutes of technician time per sample. The entire process, from sample preparation through final identification reports generation, takes approximately two hours, regardless of the sample.

For further information, contact Wayne Sprosen, Northrop Instruments & Systems Limited, Telephone: 856-658, Wellington. or **circle 58 on Readers reply card.**

DETERGENT REMOVING GEL

Rockford, Illinois — Pierce Chemical Company has just announced an unique, new affinity chromatography gel for the removal of detergents from protein solutions. Extracti-Gel D is an exclusive product from Pierce and and has high detergent binding capacity over a broad range of pH and buffer compositions.

According to Mr Tim Brennan, Marketing Manager for BioResearch Products, "detergents are trapped within the porous gel matrix while proteins greater than 10,000 molecular weight are excluded and recovered in very high yields." Mr Brennan also said that "until Pierce released Extracti-Gel D, the researcher's task of removing detergents from protein solutions was inefficient, time-consuming and often resulted in large protein losses."

Extracti-Gel D is suited for both column and batch techniques. A packed column can be used repeatedly until capacity is reached, then regenerated and used again.

The binding properties for Extracti-Gel D have been determined for CHAP-S, SDS and Triton X-100. However, Extracti-Gel D will be effective for removing all detergents common to protein purification schemes. Extracti-Gel D is available in convenient 10 mL and 100 mL quantities.

For more information contact Lab Supply Pierce P.O. Box 34-234 Auckland, 10 or **circle 50 on Readers Reply Card.**

EXCELLULOSE DESALTING GEL

Rockford, Illinois — Pierce Chemical Company has announced the availability of Excellulose Gf-5, a pre-swollen gel filtration support for desalting solutions containing macromolecules. Excellulose GF-5 is a cross-linked beaded cellulose with an exclusion limit of 5000 daltons.

Macromoleules, with a molecular weight greater than the desalting gel's exclusion limit pass around the beads and are eluted in the column's void volume. Smaller molecules penetrate the pores of Excellulose beads and are eluted in one column volume. Excellulose GF-5 is also suitable to fractionate small molecules. Polyethylene glycols, with a molecular weight of 400 to 5000 have been successfully separated using this support.

According to Mr Tim Brennan, Market Manager for BioResearch Products at Pierce, "This unique cellulose material is an ideal medium for both laboratory and industrial desalting procedures. Excellulose GF-5 assures a clean separation every time."

WELCOME TO STOCKHOLM

The 17th Congress of the International Association of Medical Laboratory Technologists Stockholm 3—8 August, 1986

- A SCIENTIFIC PROGRAM, INCLUDING VARIOUS FIELDS OF LABORATORY SPECIALITIES AND FOCUSING ON LABORATORY TECHNIQUES
- AN EXHIBITION OF LATEST TECHNIQUES AND MODERN EQUIPMENT
- AN EXHIBITION OF EDUCATIONAL MATERIAL USED IN THE TRAINING OF MEDICAL TECHNOLOGISTS AND RELATED HEALTH PERSONNEL
- A SEMINAR SUPPORTED BY WORLD HEALTH ORGANIZATION ON "THE LABORATORY IN PRIMARY HEALTH CARE"

WORKSHOPS LABORATORY VISITS HOME HOSPITALITY

CONTRIBUTIONS OF PAPERS AND POSTERS

Abstract forms can be obtained from each member society or SLF.

CLOSING DATE OCTOBER 1, 1985

The congress and the adjoining exhibition MEDLABTEC 86 will take place at the Stockholm International Fairs and Congress Centre

Hotel rooms have been reserved in various categories

An exciting social program in and around Stockholm, the beautiful summer capital, with plentiful amusement for all.

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For more information contact Lab Supply Pierce P.O. Box 34-234 Auckland. Or **circle 49 or Readers Reply Card.**

DNA STAINING TEST FOR MYCOPLASMA DETECTION

Cell cultures are often contaminated by mycoplasma (smallest know organisms), which leads to unpredictable biochemical reactions and wrong test results.

The isolation and identification of mycoplasma on special nutrient media is time-consuming, and does not always supply reliable information about actual contamination of the cell cultures.

With the DNA staining test, however, the control of cell cultures, sera, media, etc. for mycoplasma becomes routine work. It is also possible to differentiate between bacterial contamination which does not cause visual changes of the cell culture and mycoplasma contamination.

To detect contamination the cell cultures are stained with a dye which stains DNA selectively. If a cell culture is contamination-free, there will be a noticeable fluorescence of the cell nucleus, while the cytoplasm shows no fluorescence. Cell cultures contaminated by mycoplasma show fluorescent nuclei and noticeable fluorescence of the cytoplasm and between the cells. The mycoplasma appear either as particles evenly distributed over the cytoplasmic membrance or as aggregates on the cell surface or between the cells.

The fluorescence becomes clearly visible at 500X magnification. Suitable equipment are all Zeiss microscopes with filter set 487705, HBO 50 and condenser III RS or IV FI.

It is becoming routine in overseas laboratories using cell cultures to test each new cell for mycoplasma before use, and to regularly control prepared cell cultures as well.

From Carl Zeiss West Germany in house magazine Mikro-Express.

BRAND MICRO-DISPENSER. DISPENSING IN THE MICROLITRE RANGE — IN SMALL AND MEDIUM SMALL AND MEDIUM SERIES

Many laboratories are confronted with the same problem; Certain tests are carried out repetitively, but the series are too small to justify the purchase of an automatic instrument. Conventional pipetting is time-consuming and fatiguing (annoying to and fro, tip replacements, etc.), and routine errors can quickly occur, just in the microlitre range:

The BRAND micro-Dispenser is the answer to almost all dispensing problems. The reagent bottle is directly attached to the instrument. Adapters which are supplied as standard ensure direct dispensing from almost all original reagent bottles. Each dispensing is made just by pressing down the push button.

The range from 10 uL to 1000 uL is covered by 4 instruments with stepless and digital volume setting. When dispensing in small and medium series, the contents of one bottle lasts for several weeks.

Contact Watson Victor for further information. Or **circle 59 on the Readers Reply Card.**

CHROMOSOME ANALYSIS ON IBAS

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

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

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

For information please contact: Carl Zeiss Pty. Ltd. 4th floor, Mayfair Chambers, The Terrace, Wellington. Or **circle 57 on Readers Reply Card.**

FLUORESCENCE MICROSCOPE FOR CHLAMYDIA DIRECT SPECIMEN TEST.

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

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

With the introduction of direct specimen tests — e.g. SYVA'S MICRO TRAK — using specific FITC conjugated monoclonal antibodies, diagnosis is rapid and easy-to-perform.

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

For information please contact: Carl Zeiss Pty. Ltd. 4th Floor, Mayfair Chambers, The Terrace, Wellington. Or **circle 56 on Readers Reply Card.**

AIDS TEST KIT FROM ORGANON TEKNIKA/ENI APPROVED BY THE FDA

A new test kit from Organon Teknika/ENI gives 99% accuracy in detecting antibodies to HTLV-III, the virus which is suspected of causing AIDS. The new kit gives a higher proportion of correct positive diagnoses than any other tested to date. It will allow blood and blood products to be screened for the presence of the virus at the same time as they are screened for hepatitis B.

The new test kit was approved by US Food and Drug Administration on March 8, 1985. It was one of five such kits presented at a workshop session organised by the FDA and the Center for Disease Control in the U.S.A. The Organon Teknika/ENI test detected 99% of clinically confirmed AIDS patients compared to 95.6% for Litton, 95% for Abbott, 85% for DuPont and 82% for Travenol-Genentech, the other manufacturers taking part.

AIDS, a common disease in Zaire, was brought to Haiti, from here to New York and subsequently to Europe and Australia. Today it is thought that there are approximately 9000 registered AIDS patients, of which 75% are homosexual and 15% drug users. Because the AIDS virus is transmitted through the blood, haemophiliacs — as users of blood and blood products — can also be at risk. At present, 1% of registered AIDS patients are haemophiliacs. Blood Banks are therefore concerned about the problem, even though not more than 100 cases can be associated with the 3-4 million blood transfusions conducted in the U.S.A. per year. In Europe there are at most 10 haemophiliac patients who have become AIDS victims, in the USA 52.

The new test satisfies the growing need of blood banks to avoid the transmission of AIDS. However, the accidental and sexual transmission of AIDS remains a hazard, because it cannot as yet be prevented through vaccination or cured.

Test Principle

Vironostika anti-HTLV III uses the ELISA (Enzyme-Linked Immunosorbent Assay) technique patented by Organon Teknika. Basically the test depends on the use of purified viral antigen which reacts with the HTLV-III antibodies (if these are present in the patient's blood). The complex is then detected by means of an enzyme-labelled reagent, which can generate colour in proportion with the amount of antibodies in the patient's blood.

The new test is compatible with Organon Teknika ELISA tests for hepatitis B, so it is now possible to screen blood for both these infections simultaneously.

Organon Teknika is the hospital supply group of AKZO-PHARMA, a worldwide manufacturer of healthcare products and a division of AKZO.

Further information from: S.A. Van den Berg Organon Teknika 2300-Turhout Belgium.

ACID HEMOGLOBIN KIT—NEW FOR BECKMAN PARAGON ELECTROPHORESIS

For the identification of hemoglobin variants, Beckman Instruments, Inc., introduces the Paragon Acid Hb Electrophoresis reagent kit. The new Acid Hb kit is an alternative to Citrate agar electrophoresis, for use in differentiating between common hemoglobin variants that show similar migrations on alkaline electrophoresis. Citrate agar electrophoresis has been widely used in reference hematology laboratories, but has been rejected by other laboratories as being difficult, time consuming and showing variability in the quality of hemoglobin separations from lot to lot of agar.

The easy to use Acid Hb kit eliminates the lot to lot variability of agar by utilizing agarose and a more stable buffer in the gel matrix. Utilization of a highly sensitive protein-specific Coomassie type stain results in patterns that are sharper and easier to interpret than those resulting from heme-specific stains. Also, variants can be easily quantitated by densitometric scan.

The gels in the Paragon Acid Hb Kit are ready for use and require no special treatment prior to electrophoresis. The electrophoretic buffer does not require refrigeration and the Paragon system runs at room temperature. Total procedure time is less than 70 minutes.

Each Acid Hb kit contains prepared agarose gels, buffer, hemolyzing reagent, violet stain, templates, gel and template blotters and complete instructions to perform 100 tests. The Paragon Acid Hb Kit conforms to the simple procedures and template methodology of the other Beckman electrophoresis reagent kits.

When used in conjunction with the Paragon Hb reagent kit, an alkaline gel system (pH 8.6), the Paragon Acid Hb reagent kit provides excellent resolution and identification of most hemoglobin variants. The high sensitivity of the Acid Hb kit makes the Paragon system useful for cord blood screening.

Other reagent kits available in the Paragon Electrophoresis line include Serum Protein (SPE and high resolution SPE-II), Immunoelectro-phoresis (IEP), Lactic Dehydrogenase Isoenzyme (LD), Creatine Kinase Isoenzyme (CK), and Lipoprotein in addition to the standard Hemoglobin (Hb) test. The complete Beckman electrophoresis system includes a microprocessor-controlled densitometer and the Paragon workstation. For more information contact Alphatech Ltd phone 770-392 Auckland or **circle 11 on Readers Reply Card**

BECKMAN HAND-HELD pH METERS OFFER QUALITY, CONVENIENCE, AFFORDABILITY

Combining a recent breakthrough in technology and the company's long experience in pH meter design, Beckman Instruments, Inc. introduces two hand-held, battery-operated pH meters that provide accuracy, reliability and convenience. The pHI 20 and pHI 21 pH Meters simplify accurate pH measurement in quality control, environmental and industrial research laboratories and in-field applications.

A custom-designed integrated chip gives the pH meters the sophistication of larger models while making them easy to use. The pH meters feature the automation of microprocessor control for unattended measurement and the convenience of simple, one-button operation. They have display, error and out-of-temperature-range flags; constant temperature display; and temperature computation with or without an automatic temperature compensation (ATC) probe.

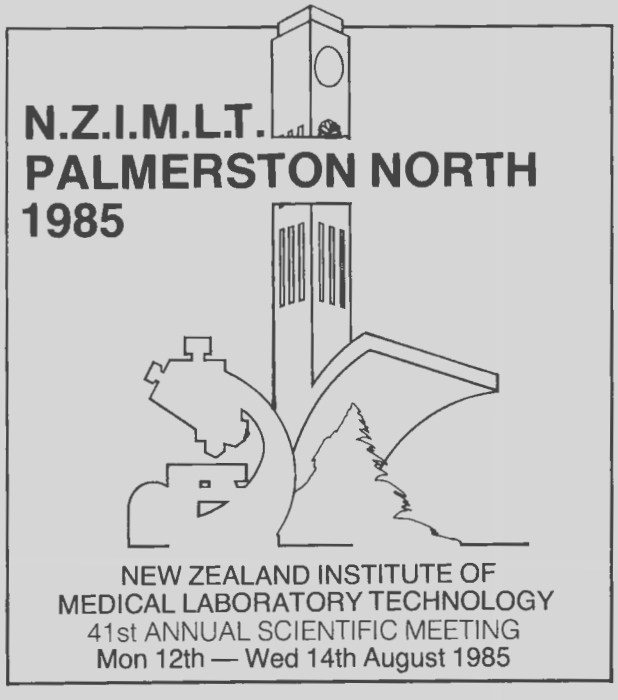
As on other pHI meters, the pHI 20 and 21 feature Auto Read, Auto Find, ATC, slope indication and computation, automatic calibration and automatic recognition of five buffers. A clear, universal-language keyboard further simplifies operation.

Both instruments measure pH in the 0-14 range with resolution to 0.01 and temperature in the range of 0-99.9C with resolution to 0.1C. The pHI 21 measures mV with resolution to 1.0.

The pHI 21 features manual turnoff of the Auto Read function and automatic or manual instrument turnoff for longer battery life. The pHI 20 automatically turns itself off. Both instruments are powered by lithium batteries with a 3-year life.

Optional accessories include a laboratory bench organizer and a field carrying case. A complete line of electrodes, buffers and other accessories is available.

Beckman offers an extensive service and support network. The circuit board is easy to remove for replacement. For further information contact Alphatech phone 770-392 Auckland. Or **circle 51 on Readers Reply Card.**



ORTHO SPECTRUM III*
LASER FLOW CYTOMETRY SYSTEM
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Fast and efficient for high volume testing.

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We designed ORTHO SPECTRUM III to meet your present day requirements and to take your research far into the future. We're committed to providing you with both preprogrammed and experimental test protocol discs, along with reagents to fully support that effort.

Preprogrammed discs optimize frequently performed test protocols to provide even more operational ease. Alternatively, the experimental program disc gives the operator the ability to design and easily reproduce a wide range of new programs.

ORTHO SPECTRUM III can be used for general cellular immunofluorescence testing. Currently, test procedures are being developed for the following:

T cell enumeration†
B cell enumeration†
T cell subset analysis†
Analysis of other cell-surface markers†
Reticulocyte enumeration
Platelet counts
Platelet antibodies†
Malarial parasite enumeration†

†For Research Use Only. Not for use in diagnostic procedures.

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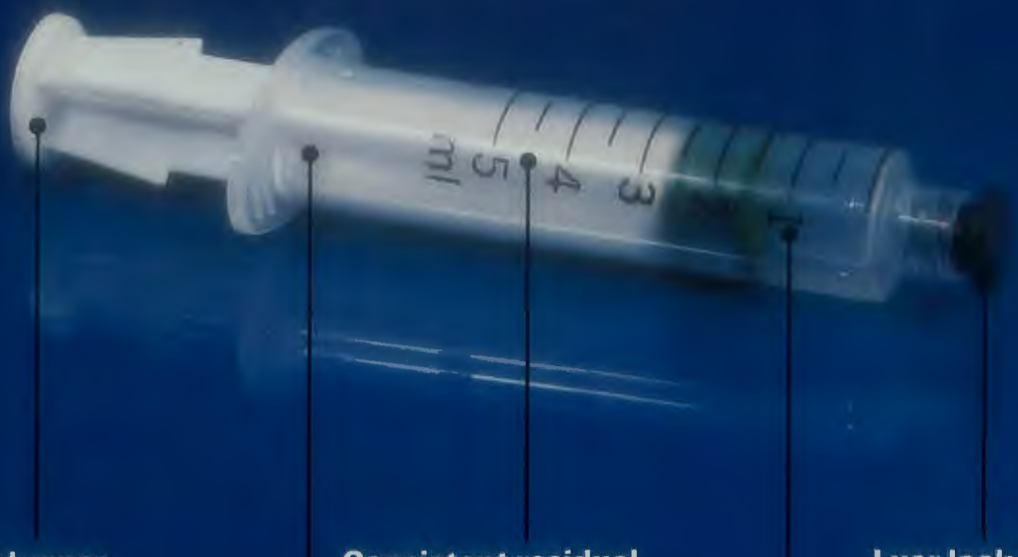

Easy-slide plunger
returns smoothly, easily, automatically under arterial pressure.

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

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

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

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

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

If you would like more information on the Preza-Pak range, or if you would like a representative to call, please fill in the coupon and send to: Terumo, P.O. Box 13537, Auckland, N.Z.

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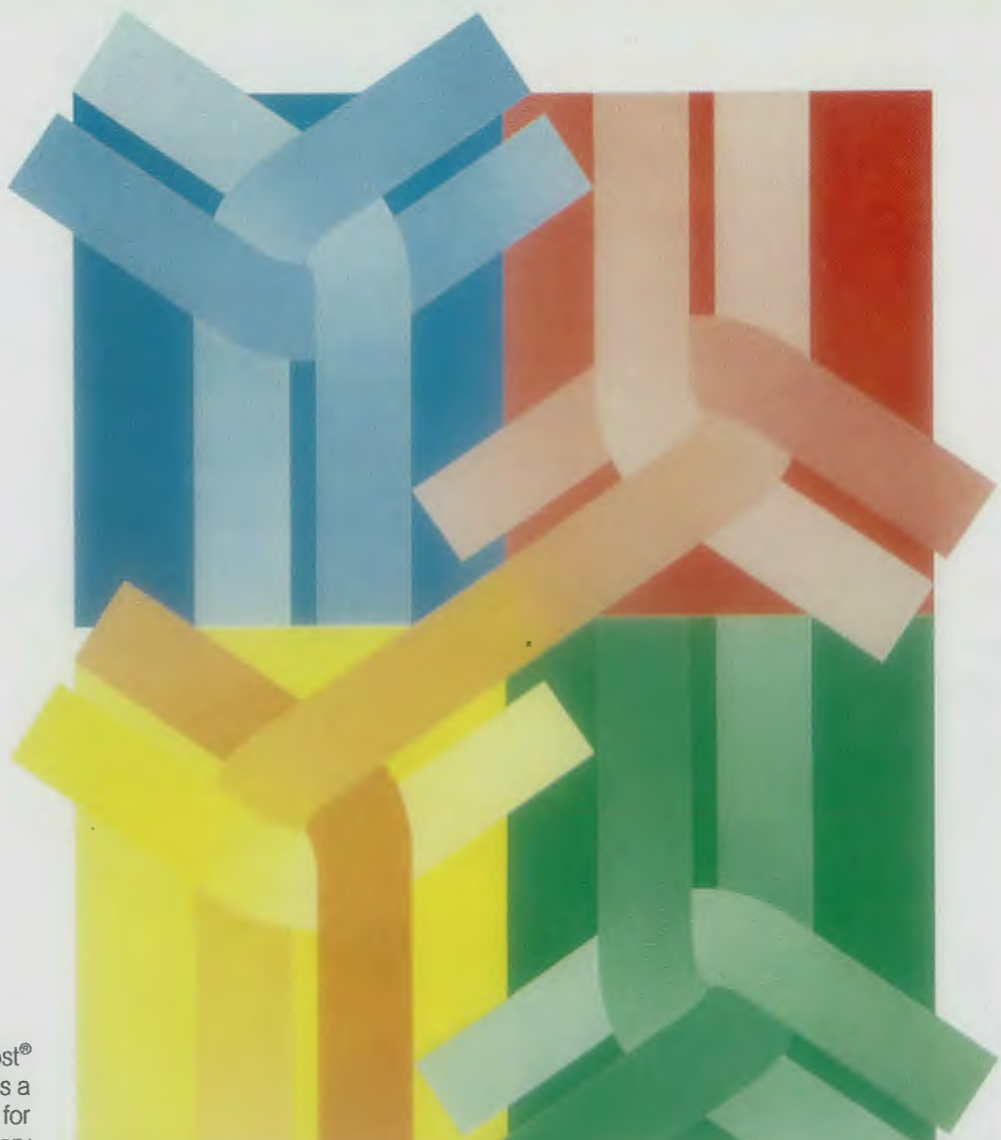

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