による技術指導（基準値の設定レベルまでの）が望まれる。特に，トンガ近海から取れる魚に含まれる水銀の分析に関しては，トンガ側も関心が深いことから十分な配慮を希望する。

e　臨床病理学・細胞学（表Ⅴ－49）

この部門は理化学部門と同様に全く新たに導入された部門である。技術協力としては，日本へのトンガ人研修員1名の受け入れ，日本およびWHOからの専門家のそれぞれ1名づつの派遣が行われた。

現在，臨床病理学に関してはすべてのspecimenに対して検査が行えるようになり，細胞学に関しても痰，頸管スメア，胸水・腹水について実施可能となっている。

今後の問題としては，これらは各部門にも共通していることであるが，技術能力の維持，新しい技術に対する対応（トンガ人技師自身の勤勉意欲の向上），臨床医の啓蒙，さらには長期間にわたる指導体制（地方検査所も含めた）の確立が必要である。

C．全国的検査組織網の形成

本プロジェクトは，1981年12月におけるR／D（Record of Discussion）の締結に基づき，トンガの中央保健衛生検査所CPHL（Central Public Health Laboratory）の検査能力の充実・向上をはかるとともに，地方にある病院および保健所などを結んだ全国的な検査網の確立を目的として，日本としては初めてのWHO（World Health Organization）との合同プロジェクトとしてスタートしたものである。

この5年間におけるプロジェクト期間内に5回にわたる調査団の派遣，日本人専門家の派遣（延べ27名）およびトンガ人研修員（12名）の受け入れという技術協力を行ってきた。

このなかで1984年3月にCPHLが完成に致り，その結果，臨床（細菌学，生化学，血清学，血液学，細胞学，組織病理）および公衆衛生（水と食品の理化学検査）の両方の検査が実施できるような一様な体制となった。加えて，毎年検査所各部門に対して前述の技術協力の他に備品，消耗品の設置，供与を行ない，CPHLのより進歩，発展に協力してきた。

これら経緯のなかで，1984年9月の巡回指導調査団に対してトンガ側より地方検査所の整備とその組織網の確立への依頼があった。

この地方における病院（CPHLに隣接するバイオラ病院以外にエウワ，ハアパイ，ババウに各1カ所づつ）および保健所（15カ所）とCPHLとを結んだ全国的検査組織網の整備，拡充に関しては，日本としてもCPHLにおける検査能力の充実，発展ばかりでなく，地方機関での基本的な検査能力の向上の必要性を感じていたことから，CPHLおよび地方機関におけるそれぞれの検査項目を設定し，簡易検査の普及，CPHLへの地方機関からの移送およびCPHLから地方機関への検査成績の還元さらには情報の分析，評価の問題を踏まえ表Ⅴ－

50 に示すような計画案が作成された。さらに図Ⅴ－51 に示したような中央および地方の組織体系となっているのである。

今回のプロジェクト終了直前評価段階における地方機関に対するトンガ側の見解は，地方検査全体としては，今回のプロジェクトの中ではCPHLの充実・向上が中心であったために著明な改善は得られなかったが，1986 年に日本側より供与される備品，消耗品を地方機関（検査所，保健所）に配置し，地方機関で実施可能な検査の充実をはかるとのことである。

さらに人の配属の問題に関しても図Ⅴ－51 に示してある欠員分のHematology 部門の２名およびナグ病院，ニウウイ病院の各１名（計４名）はすでに配属されており，ニウエイキ病院の１名に関しても 1987 年のはじめには配属予定であり，検査組織網は人に関しては予定されていた人数は満たされたのである。

今後，全国的検査組織網の整備，充実，向上のためには，技術面に関しては，前述の検査技術者を含めて海外研修の経験を積み，自らの能力を向上してきたトンガ人技術者自身がCPHLをはじめとして地方機関で働いている未だ技術の未熟な者に対して，社会教育を含めての指導を行ない，全体的なレベルアップに努めることが望まれる。

施設面に関しては，トンガ国自身年度予算におけるこれら全国的検査組織網のための支出割合の増加を行い，できるかぎり消耗品の確保に努め，加えて備品の維持やインフラストラクチャーの強化，特に電圧の変動は備品の故障を起こすため，安定した電気の供給も望まれるところである。

本プロジェクトを更に発展させるためには，日本およびＷＨＯは技術面に関しては，CPHLが近隣の島国に対して中心的役割を果たすことができるようになるまで技術協力（備品の修理技術指導も含む）を持続し，地方機関に対してもできるかぎり専門家派遣等の技術協力をすることが望まれる。また，施設面に関しては全国的検査組織網の拡大，充実に伴なう消耗品等の不足を補なうことが望まれる。

表V－47

Bacteriology Unit

Tests performed prior to the Project

1.	BLOOD	: Aerobic culture
2.	STOOL	: Wet film for amoeba, ova & cyst Culture for Salmonella, Shigella, and Vibrio Full identification were done overseas
3.	URINE	: Microscopy Identification of organism
4.	WATER	: Millipore methods (NOT regular baiss)
5.	SPUTUM	: AFB Smear (direct)
6.	EAR LOBE/ NASAL SWAB/ SKIN BIOBSY	: AFB Smear
7.	SKIN SCRAPPING	: KOH preparation for yeast and fungal elements
8.	SEMINAL FLUID	: Full analysis
9.	BODY FLUIDS	
	a) CSF	: Total Cell Count : Gram stain : Culture : AFB
10.	SWABS	
	a) Urethral	: Gram Stain for gram negative dipplococci
	b) HVS/Cervical	: Gram Stain : Culture
	c) Ear, Eye, Pus etc	: Gram Stain : Culture : Antibiotic Susceptibility test

Tests and procedures introduced during the period of the Project.

(1) Diagnosis of Diarrhoeal Diseases;

Microscopy: A new technique was introduced for screening stool specimen for ova, cyst and parasite. This new Cellophane technique is easy, rapid and more sensitive than the saline wet preparation. Formal/ether concentration method for special request.

Culture: Not only Salmonella and shigella can now be fully identified and typed, but other enteric pathogens can be screened, and identified as well.

1. E:coli - typing EPEC, EIEC, ETEC
2. Campylobacter
3. Vibrio parahemolyticus
4. Rota virus
5. Yersinia and other less important entero bacterical

表 V－47(続)

Immunology of Sexually Transmitted Diseases

a) Syphilis - Now VDRL screening of all ANC cases, blood donors as well as patients and visa applicants.

TPHA & FITA also available on request.

b) Acquired Immune Deficiency Syndrome

Recently AIDS routine screening runs parallel with VDRL tests.

Tuberculosis

Culture for T.B bacilli was introduced, late last year including culture of specimens other than sputum.

- direct smear
- concentrated smear
- culture and identification of M.TB.

Leptospirosis

Diagnostic procedures for leptospira was also introduced last year which includes dark field microscopy and culture, also haemagglutination titres.

Blood Cultures

Improvement in technical aspects of blood cultures both aerobic and anaerobic leads to better isolation rate of pathogen.

Swabs and Body Fluids

New procedures for identification of organisms have been implemented

eg. N. Gonorrhoea, C. Neofomans, Yeast and trichomonas

表V－48

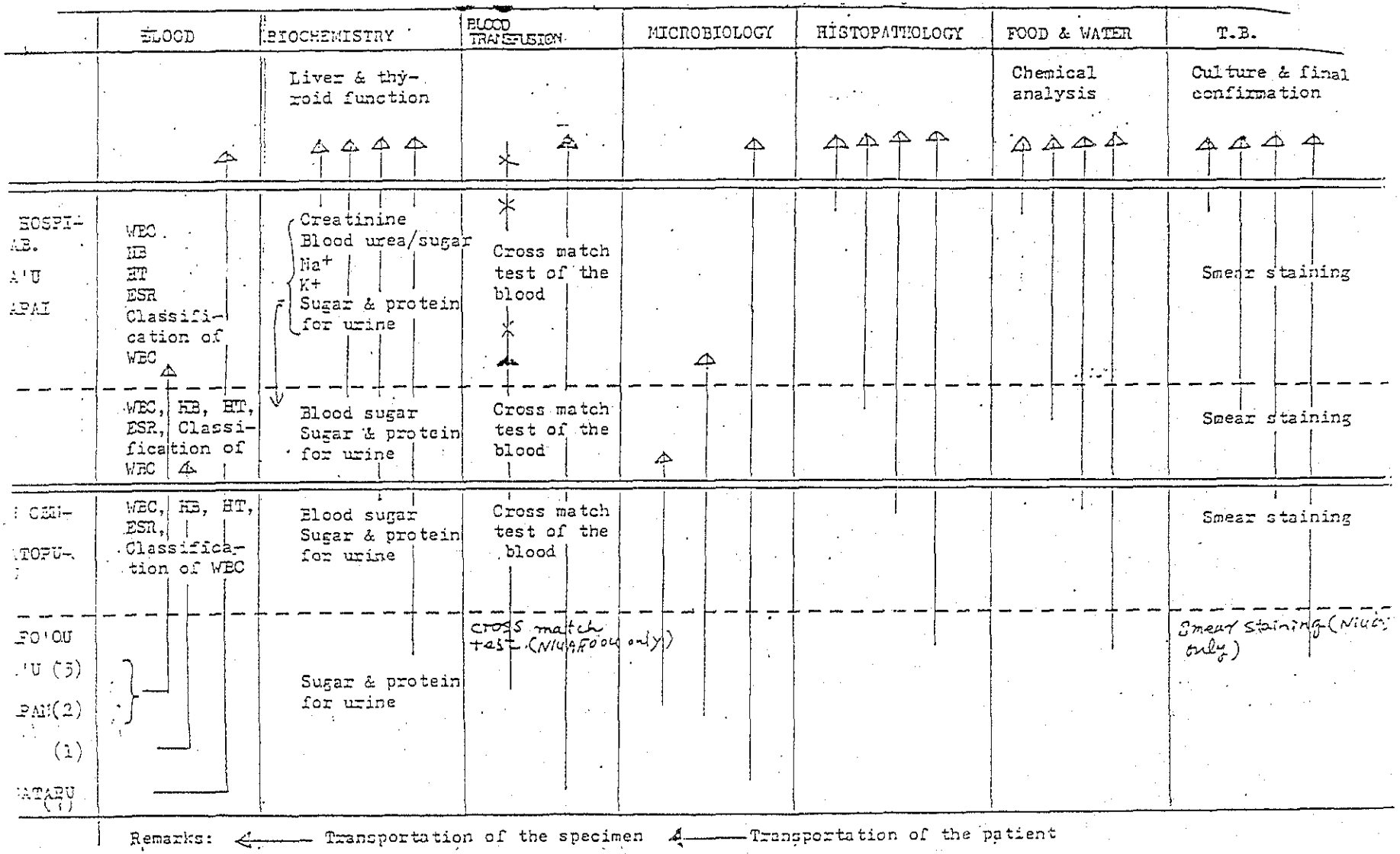
Items	Present Situation
1. Food (Tinned food, Ice Cream, Soft drinks, Fish, Fried noodles etc.)	
1. Nutritional Analysis 1) Fat 2) Protein 3) Total ash	Available
2. Fat Analysis 1) Acid value 2) Peroxidative	Available
3. Food additives for Soft drinks 1) Artificial color (11 items) 2) Preservative (Sorbic Acid)	Available
4. Total mercury for Fish	Available
5. Inorganic analysis for environmental materials and food 1) Assine 2) Tin	Available
6. Alcohol analysis 1) Ethanol % 2) Methanol	Available
7. Bacteriological Tests 1) Faecal E. Coli 2) Total Colonies 3) Other pathogens	Available
8. Ciguaterra toxin for Fish	Not available yet but WHO training course in Japan for two months (Mr S. Maka is nominated)
9. Pesticides for locally produced vegetables	Not available yet but samples should be sent to overseas because of too expensive of equipment & supplies
2. Water (well water & sea water) 1) pH (Potential Hydrogen) 2) Taste 3) Odor 4) Color 5) Turbidity 6) Hardness 7) Organic substances ($FMNO_4$) 8) NO_2^- N (Nitrite Nitrogen) 9) NO_3 - N (Nitrate Nitrogen) 10) NH_3 - N (Ammonium Nitrogen) 11) Total residues 12) Residual Chlorine 13) Cl^- 14) Bacteriological tests 1) M.P.N. E.Coli 2) Total colonies 3) Vibrios 4) Other pathogens	Available

表V－49

	Before project	Now	Remarks
A. Cytology			
1. Sputum		Papanicoleau Stain of	Further training
2. Cervical & vaginal smear	NONE	Gimusa	Special training for the technologist (3 months)
3. Pleural fluid			Interpretention by Medical Doctor (3 months)
4. Ascitic fluid			
B. Histopathology			
All specimens		All specimens are routinely	Additional Special staining
	NONE	Processed with H & E	- Mucin carmin - PAS - Z-Neilsen

表 V－50

LABORATORY NETWORK IN THE KINGDOM OF TONGA (PLAN)



Remarks: ⟵ Transportation of the specimen ⟵ Transportation of the patient

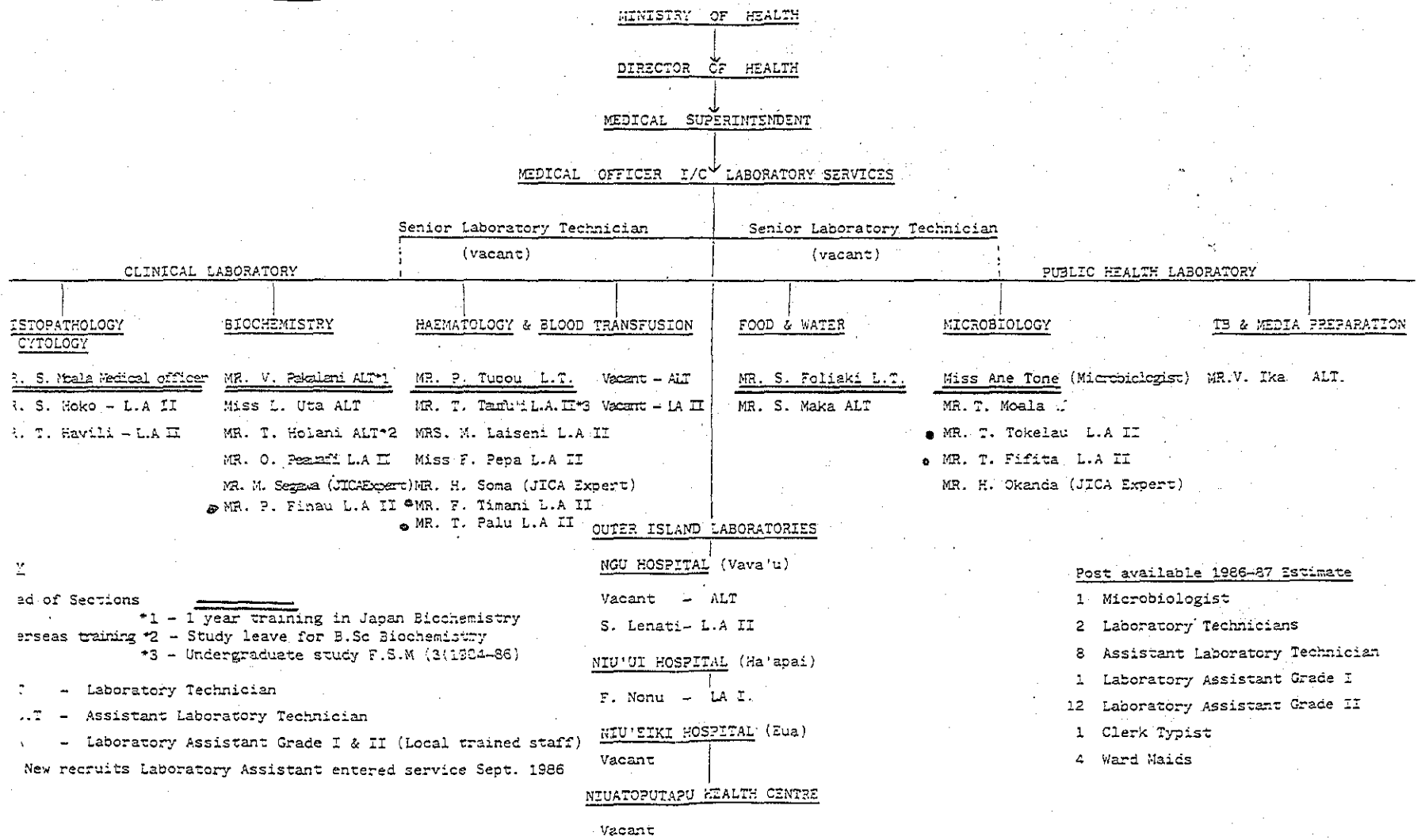
※ Ecea Hoap tal はオーストラリアの aid（537,000T ≒75,180,000円）で近々建設されることになっている。

（Hospfal にはX-Ray，検査室も設けられる。また，職員用の住宅もこの aid で建てられる）

表V－51

LABORATORY STAFF ORGANIZATION CHART

13th October 1986



Y

ad of Sections

*1 - 1 year training in Japan Biochemistry
erseas training *2 - Study leave for B.Sc Biochemistry
*3 - Undergraduate study F.S.M (3(1984-86)

T - Laboratory Technician
..T - Assistant Laboratory Technician
\ - Laboratory Assistant Grade I & II (Local trained staff)

New recruits Laboratory Assistant entered service Sept. 1986

Post available 1986-87 Estimate

1 Microbiologist
2 Laboratory Technicians
8 Assistant Laboratory Technician
1 Laboratory Assistant Grade I
12 Laboratory Assistant Grade II
1 Clerk Typist
4 Ward Maids

Ⅵ　プロジェクト・マネジメント

A. 日本国内の体制

2で詳細述べる如く，R/D終了後WHO，西太平洋地域事務局（WPRO）と友好的，且つ綿密な連絡をとりつつ，本検査所の自律を見届けるため，国内委員会は，委員の承諾を得たうえで，機能の存続をはかる。開催は討議に必要な問題が生じた場合にJICA事務局の判断により適宜開催するものとする。

又'62年9月にDR. 宍戸がWHOコンサルタントとして現地に赴くが，このような際は事前にT/Rを日本側でも検討し意見を前もって，WHO，WPRO梅内部長に具申し，日本側との連携をはかる。加えて，WHO秋葉職員の来日時には可能な限り，旧国内委員会の開催を行い，現状の把握に努めるものとする。

B. WHOとのコーディネイション

今回のプロジェクトは国連機関であるWHOとの初の合同医療協力により行われたものであり，将来のマルチによる協力形態を模索するうえでの試金石であったといえる。

日本側は既に別章で述べたような協力活動を行ってきたわけであるが，一方WHOは，DR. N. U. Raoを現地に一年十ケ月派遣し，一般微生物，特に水の細菌検査の技術移転を行い，DR. Manchal を一ケ月レプトスピラ症の専門家として駐在させた。更に現地スタッフを2名各々インド，シンガポールへ留学研修を行わせ，又，現地に於てワークショップの開催を行った。しかし，今回の調査で明らかになったことは，本来，立体感のあるマルチの協力形態を志したにも拘らず現実には，各々が独自で協力計画を策定して活動を行っており，WHOとJICA間の有機的連携は存在し得ず，JICA側は，いつどのようなWHO専門家が来るのか，どのような企画がWHO側にあるのか知らされず，極端な場合には，WHO専門家により，現場の優秀な事務スタッフを秘書的役割として無断で配置換えが行われた事実もあった。これは必ずしもWHOの組織の行動形式に原因があったわけではなく，個人の資質に由来する部分が大部分と考えられる。

今回調査団にWHO側代表として参加したWPRO梅内疾患予防対策部長は，そのような経緯を冷静に受けとめ深い理解を示し，そのような結果はWHO側の意図とはかけ離れることを強調した。

そのような両者の認識の中でR/D終了後の本検査所に対する協調follow up計画を策定し，以下の点で合意を得た。

1) JICA，WHO，Tongaの三者で文書は交換しないが，1～2年間，検査所の自助努力が安定するまでの期間，WHO，JICAの合意した形での支援を行う必要を認める。具体的には

① WHOは現地に生化学の専門家をWHO職員として常駐させ検査所全体の活動を指導監督するものとするが，その人選は，JICA，WHOで共同して行う。尚東北大よりDR. 秋葉が8月より赴任。

② WHO職員，常駐後，WHOはJICA側の本プロジェクト経験者の中からコンサルタントを選び，派遣し，本検査所機能維持に関し，提言，勧告を行うものとする。これには元予研所長DR. 宍戸が決定。

③ JICA側はそのWHO提言，勧告を受けて，短期専門家の派遣を含め，技術支援を行う。

④ 環境の生活形態や変化による疾患形態の変ぼう等による新しい保健衛生問題に関しては，本検査所を有効利用する観点のみならず，更に活性化する意味で，JICA, WHOで討議し，可能な限り対応する。これら，WHOとの合意点を遂行するためには，1.で述べた国内体制の機能維持は不可欠である。

Ⅶ　資　　料

1. 討議議事録
   1－1　討議議事録（The Summary of Discussions）
   1－2　討議議事録（Notes of Discussion）
2. トンガ保健省 "Progress Report of the Joint Health Laboratory Project (1982－86.)"
3. 現地日本チーム提出資料
4. WHO提出資料 "Tonga, Japan/WHO Joint Health Laboratory Project, WHO Collaboration"。
5. プロジェクト方式技術協力の要請内容
   （事前調査団報告書より抜粋）
6. R/D 全文
7. 日本側投入実績
   7－1　専門家
   7－2　研修員
   7－3　調査団
   7－4　機材

The Summary of Discussions
between
the Japanese Evaluation Team and
the Authorities concerned of the Government of the Kingdom of Tonga and
the World Health Organization on the Japan-WHO Joint Technical Cooperation Project
in the Kingdom of Tonga, Health Laboratory

The discussion for the final evaluation of the Tonga Government-Japan-WHO. Joint Technical Cooperation Project was held from 20th to 22nd October 1986 in the Ministry of Health of Tonga by the authority concerned of Tonga Government and the Evaluation Teams of Japan International Cooperation Agency (JICA) and of the World Health Organization (WHO).

Through the friendly process of discussion, the three parties have agreed that the Project has generally accomplished its objectives targeted in the original agreement.

Hereinafter, the summary of discussion will be described following the order of the Agenda.

A. Review of Project Inputs from Different Sources (MOH, JICA & WHO)

1. Equipment and Supplies

The total amount of expenses for supplies, equipment and manpower borne by the three parties were summed up and confirmed.

The Tonga side is satisfied with the overall provision of equipment and supplies from both JICA and WHO.

2. Overseas Training

The number of laboratory staff with their specific feilds having been trained overseas under the Project was presented.

The Tonga side expressed its great appreciation for the contribution of JICA and WHO to the training.

3. Guidance by Visiting Experts

The number of experts dispatched from JICA and WHO were shown with their duration of stay and their specific fields.

The Japanese experts currently working in the Project expressed their comments individually and raised some issues involved.

The Tonga side is satisfied with the overall accomplishments by the Japanese experts with the exception of minor problems to be solved.

B. Review of Various Project Activities

1. Construction of Health Laboratory and Intercountry Seminars and Workshops

The new Central Public Health Laboratory (CPHL) constructed by the Project was inaugurated in February 1984 thereby creating working spaces for both clinical and public health activities.

An Intercountry Training Course and four Workings were organized and conducted at CPHL with domestic and/or overseas participants in the fields relevant to the Project.

Such undertakings were found to be useful in upgrading knowledge, and in familizrization with sophisticated laboratory techniques.

2. Others

The attempt to publish the data originating from the activities relevant to the Project in international journals was strongly suggested which eventually, contributes to the development of knowledge and allows a third party to review the work performed in Taonga.

C. Review of Project Target Achievements

1. Improvement of Laboratory Examination Techniques

The Tonga side is satisfied with the overall achievements in which the number of tests as well as the reliability of their results have increased.

However, the Section of Food and Water, and Histopathology and Cytology are not well developed thus requiring further efforts to attain the expected level.

In addition, a newly arisen requirement for the establishment of a Blood Bank that raised which will enable the provision of safe blood on the ground that recent investigations revealed a significantly high prevalence rate of hepatitis B virus antigens among Tongan people.

2. Development of National Health Laboratory Service Network

The general layout of the network was explained by the Tonga side and accepted by both of JICA and WHO.

Under the understanding of the importance in strengthening the network function, JICA stated its ongoing endeavor to supply equipment with possible dispatch of experts for its adequate placement and operation. WHO also expressed its willingness to support further activities through their existing WHO technical co-operation programme.

3. **Tangible and Intangible Effects of the Project**

As tangible effects of this Project was noted elsewhere in this Summary, the impact of the success can be easily seen in various aspects of clinical activities. With respect to the public health side, it would take time to realize the impact in a visible manner. Noteworthy among intangible effects is the development of mutual understanding in relationship between the Japanese people and the Tonga people.

D. Assessment of Future Sustainability of the Project

Three factors considered to be essencial for the sustainability and further development of the Project, viz. manpower, supply and equipment, were analyzed and discussed. The Tonga team indicated its willingness to maintain the full establishment of staff of the Project including arrangements for continuing education in the future.

The Tonga side also indicated its willingness to maintain and fulfil the laboratory needs in terms of supplies by increasing the allocated budget to be requested in the next fiscal year.

Regarding the maintenance of the equipments, strengthening the infrastructure such as stable supply of electricity within the potentiality of the Kingdom is firstly desired.

With the above-mentioned expectation to the Tonga side, JICA and WHO should co-ordinatingly pave the way for the Kingdom of Tonga to sustain and further develop the function of the OPHL activity to uch extent that it becomes a potential to play a leading role in transferring laboratory technology and experiences gained through the Project to the neighbouring countries.

In conclusion, WHO expressed its sincere appreciation for JICA's contribution to the Project and this was received with mutual appreciation by the meeting.

Furthermore, JICA and WHO extended their respect for the unyielding endeavors submitted by the Tonga Government.

Nuku'alofa, Tonga, 22 Oct. 1986

Akira Shishido, MD, Ph.D Head, Japanese Evaluation Team, Japan International Cooperation Agency	Takusei Umanai, MD, Ph.D Director, Disease Prevention and Control Regional Office for the Western Pacific World Health Organization	Dr. Supilee Foliaki, Director of Health, Kingdom of Tonga

(資料 1 － 2)

Notes of Discussion of Final Evaluation of
the Tonga Government-Japan/WHO Joint Technical Cooperation Project
in the Kingdom of Tonga, Health, Laboratory,
Nuku'alofa, 20–21 October, 1986

Tonga Government Team:

- Dr. S. Foliaki, Director of Health (Team Leader)
- Dr. D. Abbott, Acting Director of Planning
- Mr. T.T. Tupou, Secretary for Foreign Affairs (Represented by Ms. L. 'Ilaiū, Assistant Secretary)
- Mr. S. Jones, Secretary for Finance (Represented by Ms. S. PUloka, Assistant Secretary)
- Mr. S. Taumoepeau, Director of Works (Represented by Mr. I Grant, Chief Architect)

The Japan Team:

- Dr. Akira Shishido, Ex-Director General, National Institute of Health (Head of the JICA Team)
- Dr. Hideyo Yamaguchi, Director (Professor), Research Centre for Medical Mycology, Teikyo University
- Dr. Kinya Kawano, Professor of Clinical Pathology, Nihon University, School of Medicine
- Dr. Jun Igari, Professor of Clinical Pathology, Ryukyu University, School of Medicine
- Dr. Takatoshi Kobayakawa, Head Medical Cooperation Division, Japan International Cooperation Agency
- Dr. Motonobu Miyazaki, Port Health Administration Food Sanitation Division, Ministry of Health and Werfare
- Dr. Norihisa Kawamura, Chief of Food and Drug Section, Aichi Pref., Institute of Public Health
- Mr. Toru Kasai, Representative of JICA Office, Fiji
- Mr. Y. Hodate, Local Team Leader, JICA

World Health Organization Team:

- Dr. T. Umenai, Director, Disease Prevention and Control, Regional Office for the Western Pacific World Health Organization

Also in Attendance:

- Dr. S. Moala, Medical Officer Special Grade in charge of the Laboratory, Ministry of Health, Tonga

- Dr. S.T. PUloka, Senior Medical Office in charge of PUblic Health Division, Ministry of Health, Tonga
- Mr. B.S. Kautoke, Assistant Secretary for Health, Ministry of Health, Tonga
- Mr. M. Segawa, Expert from Japan on Biochemistry and Serology
- Mr. M. Okanda, Expert from Japan on Bacteriology
- Mr. H. Soma, Expert from Japan on Haematology
- Ms. Charlottee Knaub, WHO Acting Country Liaison Officer

1. Introduction:

1.1 Dr. S. Foliaki, Director of Health, Leader of the Tonga Government Team, welcomed the members of the JICA Team and the World Health Organization Team. Dr. Foliaki proposed that a Chairman be elected. Dr. Akira Shishdo, Leader of the JICA Team was elected Chairman.

1.2 Dr. Shishido, Head of the JICA Team thanked the members of the three teams for electing him Chairman. He stated that it is a pleasure for the Japanese Government to work together with the Tonga Government and the World Health Organization in the final evaluation of this Health Laboratory Project. It may sound premature tor eview thisproject before its ends in December 1986 but it is important not only to Tonga in terms of discussion of future sustainability of this project but also important to Japan for this review will assist in reviewing similar project in other parts of the World.

1.3 Dr. T. Umenai the WHO representative to the meeting duly expressed his appreciation for the Ministry of Tonga and JICA for organizing this final evaluation meeting.

1.4 Each member present individually introduced himself. The draft agenda was proposed and was accepted by the meeting. The meeting noted that a summary of discussion will be prepared and signed at the end of th4se discussions. Furthermore a note on discussions made will also be prepared.

2. Review of Project Inputs from Different Sources:

2.1 Equipment, Supplies and Manpower:

2.2.1 The meeting noted that the total amount of supplies and equipment equivalent to 385,067,000 yen was donated by JICA to this project. It was also noted that with the cooperation of the World Health Organization during 1984/85 biennium a total amount of US$20,400 worth of supplies and equipment and local cost in laboratory

were provided by the World Health Organization. In the biennium 1986/87 the provision of supplies and equipment and local cost from WHO totalled US$30,780. For the 1988/89 biennium, WHO received a request from the Tonga Government for a total amount of US$29,000 worth of supplies, equipment and local cost.

2.1.2 The Tonga side expressed its satisfaction with the overall provision of equipments and supplies from both Japan/World Health Organization but in stated that it envisages a seizable amount of problems with maintenance of these equipments. This is shown with the blood gas analyzer that broke down in 1985 and it costed approximately $16,000 to repair. The meeting agreed that this problem of maintenance would be an important item for discussion later in the agenda item on the assessment of future sustainability of the project.

2.1.3 The Japanese side wishes to know the full number of staff in the Laboratory and the manpower assistance from the WHO side. The Tonga side explained that there are now a total number of 24 technical staff in the laboratory. Some delays as made at the beginning due to the processing to Government of new staff proposals. The WHO side advised that it provided a Microbiologist from 1984 to 1985 and at the request of the Tonga Government, this post has been changed to Biochemist. The slow recruitment of this Biochemist was a concern to Tonga and the WHO representative stated that he will follow up and try and accelerate this recruitment based on the expectation of the continuation of some aspects of the Project.

2.2 **Overseas Training:**

2.2.1 The meeting noted that 12 laboratory staff from Tonga have now been trained in Japan under this programme, and four were trained overseas by the World Health Organization. The Tonga side expressed its satisfaction with the overall training of Tongans overseas both in Japan by the JICA and in other parts of the world by the World Health Organization. Japan was involved with postgraduate training whereas the World Health Organization was involved with undergraduate and postgraduate trainings.

2.2.2 Still there were some minor problems faced and were more to do with the selection of trainees and their placement overseas. This can be shown with the undergraduate training of technicians at the Fiji School of Medicine funded by the World Health Organization. Only one has been sent and second candidate was lately recruited in February, 1986. The Tonga side stated that training in Japan of laboratory staff was satisfactory.

2.3 Visiting Experts:

2.3.1 The meeting noted that the experts from Japan have been provided from Japan in the field of Microbiology, Serology, Biochemistry, Bacteriology and Haematology, Histopathology and Cytology, Food and Water Analysis, Maintenance and Setting up of Equipments. The World Health Organization has been providing the Laboratory short term visits of WHO consultants and also experts from its intercountry teams.

The Tonga side expressed its satisfaction with the overall success of experts from Japan. Yet there were minor problems involved. The time of visit of most experts were adequate and long enough but some experts were here for too short a time. The expert for Haematology was here for 8 months, Bacteriology for 11 months, Microbiology for a very long time while the Food and Water expert was here only for 4 weeks; Histopathology and Cytology only two weeks; Maintenance and setting up equipment was only for 10 days. Those fields that were too short would have been better if they were a bit longer. Some difficulties were also faced with inadequate coordination of sending of experts to Tonga and sending of Trainees from Tonga to Japan. Some experts while in Tonga had to do line duties for the local counterpart having been out in Japan on training. Perhaps with better coordination these problems would have been lessened.

The Japan side stated that there have been some difficulty in recruiting Japanese Experts to work overseaws. Japan had tried its best and things are now improving. The Japanese Experts presently working in Tonga stated their satisfaction with the work they do here in Tonga. Handing over of technology to Tonga counterparts was easy enough and the Tongan counterparts were responsive in receiving these new technical knowledge.

3. Review of Various Project Activities:

3.1 Intercountry Seminary and Workshops:

The meeting noted that the World Health Organization has been sending Tonga nationals to attend Laboratory Intercountry Workshops in other parts of the World. The most importantof which was the intercountry training course on "Diagnosis and Prevention and Treatment of Intestinal Parasite Infections at the Community Level", which was held at Nuku'alofa on 25th September to 5th October 1984 and at the Central Public Health Laboratory. This workshop aimed at diagnosis of intestinal parasitic infections for use in designing suitable control and preventing methods and secondly to enable participants upon completion of the course to design appropriate controlled programmes based on improved sanitation in the context of Primary Health Care. Participants from various Pacific countries partici-

pated in this Workshop and was proved successful.

3.2 **Local Workshops:**

3.2.1 The Committee noted that the four workshops were organized and run here in Tonga at the Central Public Health Laboratory. In February 1984 the World Health Organization organized the Workshop on Strenghtening of Surveillance System and Utilization of existing health records. JICA Consultants were involved in runnning this workshop. In July 1985, WHO also organized a Workshop on Laboratory Utilization for Medical Doctors and Health Officers in Tonga. In August 1984, the WHO also organized a Workshop on Laboratory Support for Primary Health Care for most district Nurses, Health Inspectors and Health Officers. In September 1986, JICA organized a Workshop for Public Health Laboratory Utilization in which Health Officers, Public Health Nurses working in hospitals and Health Cntres participated. This workshop was primarily set up to update the knowledge of hese staff in disease control and to familiarize them with specific laboratory tests and also to establish a linkage between the Central Public Health Laboratory and District Hospitals, Health Centres and the Public Health Services.

3.2.2 These two-days workshops on Public Health Laboratory Utilization raised some concern over the duration of the workshop which was only for two days. The WHO representative showed some concern after he made a visit to Health Centres in Tongatapu where sterilization of equipment in a couple of Health Centres were done by chemical sterilization. The autoclaves were broken down and needed reapir. He stated that it is important to let these Health Officers know that it is more important to sterilize equipments using autoclave. Repair and maintenance of equipment are also very important. JICA and Tonga Governments representatives responded by saying that even though this workshop only for two days, the participants already had long experiences and follow-up supervision as carried out after the Workshop. Maintenance is a problem that seriously needs improvement.

3.3 **Others:**

3.3.1 The meeting noted that the Central Public Health Laboratory was also involved in other activities such as the test for mercury content of fish; the investigation for the extent of the spread of poison from the accident at the Sawmill at the Ministry of Agriculture; test on pesticide residue on food items; and test on imported food from overseas.

3.3.2 The Tonga side expressed its satisfaction with the result of these special investiga-

tions and tests. Without these assistances from the Central Public Health Laboratory and Experts from Japan these tests would have to be sent overseas.

3.3.3 The Japan side felt that a list of chemical analysis required here in Tonga should be made for special chemical tests which may be too expensive and not be really required here in Tonga. A limited list of needed tests need to be drawn out.

3.3.4 The Japan side suggested that it is important to publish results of investigations done by the Central Public Health Laboratory in professional journals. These publications are important contributions to the developmentof knowledge and allows a third party to review the work being carried out here in Tonag in the Laboratory. This publication of these results in the report of the Annual Report of the Minister of Health and local publications is a good thing but may not be adequate. Publication in international professional journals is recommended. The Tonga side responded that this suggestion for publication is highly welcomed. The same time, several investigations presently undertakne by the Central Public Health Laboratory, such as diseases surveillance for hepatitis B, syphilis and the diarrhoeal diseases are not yet completed. The Tonga side will try and publish these results when they are completed.

4. Review of Project Target and Achievements

4.1 Improvement of Laboratory Examination Techniques:

4.1.1 The Tonga side stated its satisfaction with the overall achievement made in the number of tests that can be carried out here in Tonga now by the Central Public Health Laboratory. At the same time Tonga realized that not all sections of the Laboratory are well developed together. Some sections have been developed more than others. The Microbiology Section is the most advanced of the lot. This is due to the fact that the two technicians were sent at first to Japan for training from the Microbiology Section.

4.1.2 The technicians in the Microbiology Section trained in Japan have now been working in the Microbiology Section for more than four years. They have been receiving assistance with transfer of technology from four Bacteriology experts from Japan and one Microbiology expert from WHO over the past few years. It performs both Pacific Health and Clinical Bacteriology tests. Surveillance of diarrhoeal diseases; syphilis and gonorrhoea could now be carried out here in Tonga. With respect to clinical bacteriology, cultures of blood, and pus swabs with wider range of pathogens are now being done as routine.

4.1.3 Biochemistry and Haematology are the one next in line in development. The expert in Biochemistry from Japan has been here in Tonga since November 1984 and the Technician from Tonga trained in Japan returned in January this year, after spending 14 months of training in various aspects of laboratory technology, especially in Biochemistry in Japan. The Biochemistry Section could now perform a lot of laboratory tests that previously could not be done here in Tonga, e.g. liver function tests, serum amylase, hepatitis B markers and blood gas analysis. With respect to Haematology, the expert from Japan has been in Tonga since Maythis year and the laboratory technician from Tonga has completed training in Japan. The development of this section has been quite satisfactory. Noted progress in this unit is shown in the introduction of special staining and bone marrow examination.

4.1.4 Food and Water and Histopathology and Cytology Sections are not well developed and would need more time to reach the expected level. The main reasons for this slow development in these two fields were due to later dispatch of experts from Japan and sending of trainees from Tonga for training in Japan. Two trainees from Tonga were sent to Japan on Food and Water Analysis. One returned in February 1985 and the second one only returned in September this year 1986. One expert came from Japan on Food and Water but unfortunately he came only in October 1986 and only for 4 weeks. This section needs more time for its development to reach a satisfactory level. With respect to Histopathology one technician was trained in Japan and one was trained by WHO for four months in Fiji. The expert from Japan on Histopathology was in Tonga for only 3 weeks and this duration is considered rather short. It is considered that the Laboratory Assistant in Histopathology needs more training. The four months training in Fiji is not adequate.

4.1.5 The Japan side agreed to the statement from Tonga. Histopathology and Food and Water need more time to reach a satisfactory level of development. Bacteriology is quite advanced for it was the first section to be started. But at the same time the achievement made in Food and Water and Histopathology Sections have reached a stage quite advance than what they were before. General tests could be done in Tonga now but were not done here before. The Japanese experts presently in Tonga started that the progress in transfer of technology to local technicians is progressing satisfactorily. Food and Water Sections need more time for transfer of technology and some tests will still need to be done overseas.

4.1.6 With respect to food and water analysis the issue of test for mercury content of fish in Tongan waters was an issue found interested by oil parties. The Tonga side stated that it is important for the economy of Tonga to find out the mercury content of fish in Tongan waters.

4.1.7 The Japanese side stated that it may be necessary to carry out a survey on this water and can be monitored by the Central Public Health Laboratory.

4.1.8 The Japanese side raised the question as to the reason why specimen received and test performed by the Haematology Section seems to be decreasing since 1982 whereas the specimens and tests carried out by the other sections are all increasing since 1982. The Tonga side responded by saying that the figures for 1986 for haematology is only from January to August 1986. With one specimen in haematology, several tests could be carried out.

4.1.9 The Tonga side raised the question of the need for blood bank in Tonga. The present method of tests by random collection of donors wherever and whenever they are required is slow and unsafe. It is immoral to provide the usable blood to recipients. The WHO side supported this need for blood bank in Tonga particularly the need to provide safe blood for patients. Proper tests for safe blood could be done when blood could be collected in time and stored properly. The blood bank cut down the time for waiting of both the donor and the recipient and also the medical staff.

4.1.10 The Japanese side raised the question as to why the need for blood bank was not raised at the beginning of the Project. The Tonga side responded by saying that at the beginning of the Project there was a separate programme of cooperation between the Tonga Red Cross Society and the Ministry of Health in setting out a Walking Blood Bank. The full tests for pure safe blood was not able to be carried out at the Laboratory at that time. Tonga now realises the need for proper and full screening of all blood donations, especially against hepatitis B since the laboratory was able to test for hepatitis B units markers in 1983 with the cooperation of JICA and WHO.

4.2 Development of National Health Laboratory Services Network:

4.2.1 The Tonga side jointly with the Japanese side, explained the layout of this Health Laboratory Network. This network has the Central Public Health Laboratory as the focal point in around that other district hospitals, health centres and other health facilities. At the peripheral areas minor simple tests could be carried out. More laboratory test can be carried out as it progresses upward from health centres to district hospitals. Another important aspect for peripheral areas is the training for the collection of specimen. The efficiency of this network will further develop with more training and the arrival of the equipment which are the pipe line.

4.2.2 The WHO side stated its agreement with the satisfactory set up of this network. They raised the question as to why there are vacancies in the network. For proper net work to function all its elements has to function properly. The Tonga side replied that the two vacancies at the haematology section and one vacancy each at Ngu Hospital and Niu'ui Hospital have all now been filled with the recent recruitment of laboratory assistants. The two vacancies for senior laboratory technicians under the Medical Officer in charge are proposals for latter promotions. The total number of technicians within the laboratory network have all been filled.

4.2.3 The Japanese side offered the assistance of an expert in developing of the laboratory at peripheral areaas. This expert is to assist in setting up of equipment, operation and training of staff. It is realised that this expert assistance would very much assist in the development of the peripheral laboratory services. This offer was highly welcomed by the Tonga side.

4.3 Tangible and Intangible Effects of the Project

4.3.1 The Tonga side commented by saying that the tangible effects of this project as has already been explained are already very well realised here in Tonga. A full assessment of the impact of success of this project will be better carried out at the end of the project. Nevertheless what has been achieved so far can be easily identified. The impact of the success of the Central Public Health Laboratory in the clinical side, as already been mentioned, can be shown by the number of tests available now which assist the medical profession in diagnosis of clinical patients. With respect to the Public Health side it would take time to realise the impact of the laboratory services in this area. Nevertheless what has been achieved now can be easily seen in many areas. Requests to the Central Public Health Laboratory from other Government Departments have already been met, e.g. the explosion of the sawmill and the spread of the poisons from this sawmill; the investigation for mercury content of fish; the tests for the spread of poisons due to insecticide of food; and the tests on imported food.

4.3.2 The Japanese side stated that the intangible effects from the diplomatic point of view is the improvement of understanding in relation between the Japanese people and the Tongan people. The Japanese side stated that their experts in Tongan received in a friendly way by the Tongan people and developed mutual understanding and friendship with the staff of the laboratory and also outside of work. The Tonga side stated that trainees in Japan picked up not only the technology in laboratory but also understand the Japanese cultures and the Japanese people. This understanding very much improve the relationship between the Japanese people and the Tongan people.

5. Future Sustainability of the Project

5.1 The Director of Health as head of the Tonga team expressed his concern of the above important issue by stating that there are 3 main constraints to the future sustainability of the Project.

5.1.1 Manpower:

The Labortory service appears to have adequate manpower at present with adequate training of its more senior staff. However in the future, there is still a need for further training overseas perhaps in short term basis and in specific areas of laboratory work. Similarly experts visit to Tonga should be encouraged as part of the continuing education plan.

The Ministry if hopeful that the training program for the Laboratory Assistants will be implemented in early 1987 so as to upgrade the knowledge and technology of the local-trained members of the technical staff.

5.1.2 Availability of Supplies:

The Tonga Government will try its best to maintain and fulfil the laboratory needs in terms of supplies by increasing the allocated budget in the next fiscal year. However, any assistance in this matter by the two international agencies will be greatly appreciated.

5.1.3 Maintenance of Equipments:

This is the most important issue of when considering the future sustainability of the Project as the Tonga team emphasized that at present there is a lack of the maintenance expertise in Tonga to maintain some of the sophisticated equipments in the Laboratory. The Tonga government will greatly appreciate any assistance in this matter by the two international agencies.

5.1.4 Dr. T. Umenai, the WHO representative in this meeting in response to the above important issues stated that WHO will continue to support the Laboratory service in Tonga by producing consultant services now and then in the future in order to sustain the high technical level already achieved by the local staff. With its limited budget; WHO may assist the Laboratory in future activities such as the development of a blood bank and hepatitis B vaccination program.

5.1.5 The JICA Team expressed their concern over this important matter and showed their understanding of the necessity in arranging for a training schedule for individual trainees in maintenance matters in Japan. The team expressed its wish that the CPHL could be further developed as to be able to organize a third country

training course like that being set up in Manila, Philippines. If this seems to be materialized, JICA may dispatch a mission team to check on the status of the CPHL before accepting Tonga as the site for the above mentioned workshop.

5.1.6 The Tonga side showed their willingness to host such a workshop which will be very prestigious to the Ministry of Health here in Tonga. WHO also showed their willingness to assist in such a workshop as part of their continuing assistance to the Laboratory.

5.1.7 The JICA team expresses their concern over the problem of unstable electrical supply here in Tonga which the JICA experts gave as one of the main cause of the breakdown of sensitive equipments in the Laboratory.
The Tonga side informed the meeting that there is standby electric generator for the whole hospital but unfortunately it is manually operated and not automatic. The electric stabiliser is currently operating at the laboratory but the problem of a sudden cut-off of electricity is beyond the control of the Ministry of Health. This problem of electrical supply is also true for the peripheral Laboratories.

5.1.8 The Tonga side enquired to JICA the possibility of supplying spare parts as part of a technical aid program as seen in the Fishery department here in Tonga. JICA responded that this is not so and that requesting countries cannot get spare parts alone. The Tonga side informed the meeting that spare parts may be procured from New Zealand or Australia or even Japan whenever it is necessary.

5.1.9 Similarly in matters of supplies, the Tonga side stated that needed supplies are usually ordered from New Zealand and Australia and maybe from Japan in the future which depends on their cost.

5.2

5.2.1 In his concluding remarks, the leader of the JICA delegation expressed their gratitude to the Tonga government and also to WHO for their joint efforts in making this Project the first of such venture in the world a success. He asked WHO if it has a willingness to collaborate with JICA in the development of the functions of CPHL. WHO representative responded by saying that WHO is willing to support such continuing collaboration in future.

5.2.2 The leader of the Tonga team in conclusion also expressed deep gratitude and appreciation to the two international donor agencies for their assistance over the period of the Project and thereby helps making it successful. As an example of the

continuing joint efforts by the three pariteis is the hepatitis B vaccination program currently being set up at the laboratory.

This vaccination program is considered by the Ministry as of high priority due to the high prevalence rate of hepatitis infection in Tonga which subsequently lead to the development of hepatoma. The set up of an organized blood banking system will assist in getting the needed plasma for this vaccination project. The Tonga side therefore will much appreciate any assistance from the two international agencies in this respect.

5.2.3 The WHO representative also thanked the Tonga Government and JICA for their good cooperation during the period of the Project and stated that WHO will continue to provide technical cooperation to the Laboratory services here in Tonga whenever possible. The post of the Biochemist at the Laboratory is hopeful to be filled in early 1987.

5.3 The Chairman closed the meeting at 11:30 a.m.

Agenda of the Meeting on Final Evaluation of the Tonga Government-Japan/WHO Joint Technical Cooperation Project of Health Laboratory in the Kingdom of Tonga, Health Laboratory, Nuku'alofa, 20–21 October, 1986

A. Review of Project Inputs from Different Sources (MOH, JICA & WHO)

1. Equipment and Supplies
2. Overseas Training
3. Guidance by Visiting Experts

B. Review of Various Project Activities

1. Intercountry Seminars
2. Workshops
3. Others

C. Review of Project Target Achievements

1. Improvement of Laboratory Examination Techniques
2. Development of National Health Laboratory Service Network
3. Tangible and Intangible Effects of the Project

D. Assessment of Future Sustainability of the Project

(資料 2)

Ministry of Health Progress Report of the Joint Health Laboratory Project (1982–1986)

1. Introduction

The five-year Health Laboratory Project Tonga/Japan/WHO joint venture is drawing near it's final stages and although it may seems premature to evaluate fully all the laboratory activities under the joint Project, the general feeling is that the objectives laid down in the original agreement has been accomplished.

The hallmark of the five-year Project since it's beginning in 1982 are:

- Construction of the new Central Public Health Laboratory which was opened in February 1984 thereby creating working spaces for both clinical and public health activities.
- Provision of new and better equipments and supplies each year for both of the above major laboratory sections.
- Transfer of new laboratory technology to Tonga through trainees sent oversews and also from visiting overseas experts to the laboratory.
- Development of laboratory activities in various sections.

2. Laboratory Services

2.1 Biochemistry Section

This unit showed an example of the impact that the Project produces during the period of implementation. New equipments and expertise provided by JICA greatly help to increase the range of tests performed locally and also shorten the time taken for them to be done but above all increases the validity and reliability of the results obtained. Among the new tests introduced (see Annex I) worth noting are the liver function tests, serum amylase, cardiac enzymes, cholesterol and triglycerides, hepatitis B markers and blood gas analysis.

The unit benefitted greatly by the presence of the JICA biochemist Mr. M. Segawa who has been working in the unit since October 1984 and also Miss L. Uta who returned from Japan in January this year after spending 14 months training in various aspects of laboratory technology in particular biochemistry.

Unfortunately this unit as anticipated with its modern equipments would need

special maintenance and care as seen with the costly repair of the blood gas analyser late last year.

2.2 Haematology and Blood Transfusion Sections

The technician in charge of this unit Laboratory Technician Mr. P. Tupou recently returned from Japan after 12 months training in specialized haematology and blood transfusion procedures. He is assisted by a JICA expert Mr. H. Soma who arrived in the Kingdom in May 1986.

Notable progress in this unit is seen with the introduction of special staining, bone marrow examination and coagulation studies which help in making the haematological diagnostic.

The Coulter-Counter equipment serves to quicken the time taken for the routine haematological examinations to be performed. Unfortunately this equipment is now undergoing maintenance work and repair in Japan. The blood transfusion unit currently under the charge of the haematology unit needs further organization and planning in order to fulfil the needs of the clinicians (see Annex III).

2.3 Microbiology Section

This is one unit of the Laboratory which has a greater advantage over the others in matters of technology transfer. The two most senior members of this unit namely Mr. V. Ika an Assistant Laboratory Technician and Miss Ane Tone the Microbiologist were the first trainees to be sent to Japan in 1982 and 1983 respectively.

The unit also benefitted by the visit of several overseas consultants with 3 bacteriologist from JICA who carried out the diarrhoeal disease surveillances, short term WHO consultants in leptospirosis and AIDS and a WHO Microbiologist Dr. N. Rao who spent 2 years at this unit during the early stages of the Project.

Please note that this unit is involved in both public health and clinical activities. Notable progress in public health activities carried out in this laboratory during the Project are:

- Surveillance of diarrhoeal diseases here in Tonga.
- Screening for sexually transmitted diseases such as syphilis, gonorrhoea and AIDS.
- Improvement in the Tb cultures. (as seen in 7 positive cases with negative ZN Smear)

– Improvement in typhoid cultures (1 positive healthy carrier isolated).

On clinical bacteriology aspect there are advances in the cultures of blood (anaerobic & aerobic) and pus swbs with wider range of pathogens identified and subsequent sensitivity being done routinely.

2.4 Food & Water Section

This new section is under the charge of Laboratory Technician Mr. S. Foliaki who spent 12 months training in Japan in food and water analysis and ably assisted by Assistant Laboratory Technician Mr. S. Maka who recently returned from Japan after 4 months training in the same field.

They are assisted by a JICA expert in food and water analysis Mr. Kawamura who is here for 3 weeks in view of setting up the equipments and initiating the tests that can be performed locally. Fortunately some of the needed equipments and supplies arrived just in time for theexpert's arrival in Tonga.

Obviously it is too premature to evaluate this unit at this stage of early development however there is an indication that mercury analysis in fish can be done locally among other metallic compounds.

Routine monitor of thewater supply around Tongatapu and Eua are currently being done which includes bacteriological examination and minor physico-chemical analysis.

2.5 Histopathology & Cytology Section

This new unit is under the charge of Dr. S. S. Moala who spent 12 months training in histopathology in Japan. He is assisted by a Laboratory Assistant Grade II Mr. S. Hoko who spent 4 months training in histopathological technology in Fiji this year.

A visiting consultant from JICA Dr. T. Okano from Nihon University Hospital helped to set up this new unit in June 1986.

Routine examinations of all pathological and cytological specimens are now being done at this unit. Hopefully this can help in decreasing the number of specimens sent overseas which are often costly (see Annex II).

The staff of this unit, both the Medical Officer and technician still needs short term training in overseas institutes to upgrade their diagnostic capabilities. The visiting consultant from JICA in June spent only 10 days in the Laboratory which is considered inadequate in view of this being a new set up and when compared to other units of the laboratory mentioned previously.

2.6 Peripheral Laboratories

Overall there hasn't been much progress or involvement of the peripheral laboratories, in the Project so far. However the equipments and supplies from JICA for the 1986 fiscal year are aimed mainly to equip the peripheral laboratories and certain health centres with the necessary equipments and thereby increases the range of tests that can be performed locally.

The post of a laboratory technician at Niu'eiki hospital which has been vacant for the past few years due to shortage of staff is expected to be filled in early 1987.

3. Building and Equipment

The new building, built adjacent to the Clinical Laboratory, to house the public health laboratory services, has been found to be appropriate and adequate in design and construction. If the proposal to set up a blood bank is approved, consideration should be made on appropriate space to be used. Within the clinical laboratory area, there are two rooms for bleeding and storage, and may be inspected by an architect for their appropriateness for this proposed blood bank.

The maintenance of the new and modern equipment remain as the most important issue for consideration after the project ends in December 1986. A more realistic view of this anticipated problem can be demonstrated by the coat of repair of the blood gas analysis last 1985 which amounted to approximately T$15,000. Fortunately this was paid by JICA. Funds allocated by Tonga Government for the maintenance of hospital equipment amount to only TS3,800 for thepresent financial year 1986/87.

A rough estimate of the cost of maintenance of laboratory equipment for the next financial year 1987/88 by the Hospital Electro-medical equipment maintenance technician, amounts to T$30,000 and will increase each year corresponding with the aging of the equipment.

4. Future Prospects

4.1 Maintenance of Equipment

Because maintenance of equipment in envisaged to be a serious problem if not taken care of, it is suggested that one expect, perhaps under the Japan Volunteer Program, should be provided during the first three years after completion of the project and a Tongan national to be further trained on maintenance of Laboratory equipment.

4.2 Blood Bank (Refer to Annex III)

This is one area of the health laboratory activities which needs up-grading and better organization. Two factors appears to stand out, that there is a need to screen the donor's blood for syphillis and hepatitis B virus prior to the actual blood transfusion. It is both morally and ethically wrong to give blood with positive hepatitis B carriers first and do the screening after. Secondary the clinicians would like to have an ample supply of blood in hand in case of an emergency.

4.3 Overseas Training

In order to keep up and refresh the memory on current medical technology, short term training program in overseas institute should be encouraged regularly for the technical staff.

4.4 Local Training

A formal training program for the Laboratory Assistants is under preparation and should be ready for presentation to the authorities concerned at the end of the month. Thetraining program is planned to start in April 1987 for two years and in two groups.

Similarly short term visiting consultants should also be encouraged to teach the technical staff at the Laboratory.

4.5 Disease Surveillances

The laboratory has been involved in several disease surveillances in the past and will continue to support public health activities in the future. This will provide useful basic data for the planning and implementation of public health measures in the Kingdom. Such projects which are currently being implemented included rheumatic

fever, hepatitis B vaccination program and diarrhoeal diseases.

4.4 Monitor of Environment Waters in Tonga

The laboratory is prepared to collaborate with the chemistry section at the USP in Fiji to carry out studies of the environmental waters here in Tonga. The studies consist of bacteriological analysis, determination of pH, chlorinity, salinity etc. of coastal waters with determination of traces of heavy metals to be done at the USP. This studies is scheduled to start in January 1987.

4.7 Control and Prevention of Hepatitis B Infection in Tonga

It has been found that Hepatitis B infection is highly endemic in Tonga (16–18% of the pregnant mothers tested) and that about 80% of liver cancer in caused by this virus especially during infancy. Vaccine are commercially analiable but at a very high cost. The 3 parties of the Project has shown a good example of their continuing collaboration where WHO has provided the necessary equipments and training for the local staff of the laboratory to obtain the appropriate sera which are to be sent to Japan for the final processing of the vaccine. The vaccine is to given to all the newborns in the Kingdom.

5. Staff

There are 24 technical posts available in the present 1986–87 Estimates for the Laboratory Services which ranges from a Microbiologist to the new recruits of Laboratory Assistants (refer to Annex IV).

The administration of the Laboratory Services is under the charge of Dr. Sione S. Moala who is well supported by Laboratory Technician Mr. S. Foliaki and the head of sections.

There were times when the implementation of the project was difficult due to shortage of staff inparticular in late 1985 and early this year. This was a result of the overseas training program in which at one time there were four qualified technicians being away oversews. The staff status however have improved greatly due to the return of the overseas trainees and also 5 new recruits who entered the service this year.

There should be no further hinderance to the implementation of the activities of the project as of now and in particular after the local training program is completed.

The senior members of the staff who had the opportunity to be trained overseas

during the project should utilize their knowledge gained to improve their own sections of speciality and also to help in training junior members of the staff.

6. Conclusion

We conclude from the above presentation that the main objective of the Project and its related activities as stated in the original agreement has been achieved in the five-year period of implementation.

Understandably, in a joint new venture of this nature there were problems encountered during various stages of implementation of the Project, fortunately however these were readily cured. There is a strong belief that the host country should be able to carry on steadily on the road of progress after the Project ends in December 1986.

Lastly the Ministry of Health, Tonga would like to take this opportunity to thank the two International Agencies namely the Japan International Cooperation Agency and the World Health Organization for their great support and assistance to enable this Joint Project in Tonga a success.

Date: 14th October 1986.

ANNEX I. NEW TEST

TESTS EMPLOYED AT VAIOLA HOSPITAL

1. **Blood Transfusion:**

   (a) ABO & Rh Grouping
   (b) Cross match
   - Saline
   - Albumin
   - Coombs

   (c) Antibodies screening
   (d) Bleeding of donors

   Blood Fractionation and Cryoprecipitation is expected to commence soon.

2. **Haematology:**

   - Direct and Indirect coombs Test
   - Haemoglobin
   - PCV
   - MCHC
   - MCV
   - MCH
   - RBC
   - ESR
   - WBC
   - White Cell Differential Count
   - Blood Film
   - Microfilarial parasites
   - Malarial parasites
   - LE Cells
   - Platelet Count
   - Reticulocyte Count
   - Bleeding Time
   - Clotting Time

   \+ – PCT (Prothrombin Clotting Time)
   \+ – APTT (Activated Partial Thromboplastin Time)
   \+ – TCT (Thrombin Clotting Time)

+	–	FACTOR XIII
*	–	Bone Marrow Smear
*	–	SPECIAL STAIN
*	–	FDP (Fibrinogen Degradation Products)
*	–	Eosinophil Count
*	–	Phagocyte test (Monocytes)

Note: * Tests trialed out and introduced in 1986.
+ Tests introduced in 1982.

TESTS EXPECTED TO BE CARRIED OUT IN THE FUTURE

- Blood Fractionation
- Heinz bodies
- Sugar water test
- Haemoglohin – H
- Donath – Landsteiner test
- Ham's Acid Serum test

BIOCHEMISTRY UNIT – VAIOLA

Blood Tests Available Beofore 1982

Electrolytes
Glucose
Urea
Creatinine
Uric Acid
Total Bilirubin
Total Protein
C – Reactive Protein
Infections Mononucleosis
Rh Factor

Tests Available 1982–86

Equipments provided included:

1) Corning – Blood Cases
2) Beckman – Electrolytes

3) Seralyzer – Glucose
Creatinine
Uric acid
Total Bilirubin
Cholesterol
Myocardial Enzymes

4) Bilirubin meter – Micromethod (infacts)

5) Spectometer – Total Protein

Equipments + Kits for Manual Testing for:

Liver Function Tests
Strept. Antibodies
Hepatits Surface Antizen & Antibody
Amylase
Triglycerides
Rh Factor

Tests Available at the Biochemistry Unit – Vaiola Hospital

C.T.T.
Sugar (Glucose)
Urea
Sodium
Potassium
Creatinine
Uric Acid
C. Reactive Protein
Rheum Toid Factor
Infections Mononucleosis

* Tot. Protein
* ALT
* AST
* &-GTP
* Alk. Phosphatase (ALP)
* HEs Ag & AB
* Tot. Bilirubin
Direct Bilirubin
* Cholesterol
* Anylase

* ASOT
* ASK
* ADB
* CK
* LD
* Blood Cases
* Triclycerides

Urine:	HCG
	Sugar
	Protein
	pH
	Ketone
	Blood
	Nitrite
	Urobilinogen
	Sp. Gravity
CSF:	Sugar
	Protein
Stool:	Occult Blood
Body Fluid:	Proteins

* Tests introduced through the Project (1982–86).

BACTERIOLOGY UNIT

Tests Performed Prior to the Project

1.	Blood:	Aerobic culture
2.	Stool:	Wet film for amoeta, ova 7 cyst
		Culture for Salmonella, Shigella, and Vibrio
		Full identification were done overseas
3.	Urine:	Microscopy
		Identification of organism
4.	Water:	Millipore methods (NOT regular basis)
5.	Sputum:	AFB Smear (direct)
6.	Ear Lobe/ Nasal Swab/ Skin Biobsy:	AFB Smear

7.	Skin Scrapping:		KOH preparation for yeast and fungal elements
8.	Seminal Fluid:		Full analysis
9.	Body Fluids		
	a)	CSF:	Total Cell Count
			Gram Stain
			Culture
			AFB
10.	Swabs		
	a)	Urethral:	Gram Stain for gram negative dipplococci
	b)	HWS/Cervical:	Gram Stain
			Culture
	c)	Ear, Eye, Pus etc.:	Gram Stain
			Culture
			Antibiotic Susceptibility test

Tests and procedures introduced during the period of the Project.

Diagnosis of Diarrhoeal Diseases

Microscopy:

A new technique was introduced for screening stool specimen for ova, cyst and parasite. This new **Cellophane technique** is easy, rapid and more sensitive than the saline wet preparation. Formal/either concentration method for special request.

Culture:

Not only Salmonella and shigella can now be fully identified and typed, but other enteric pathogens can be screened, and identified as well.

1. Eccoli – typing EPEC, EJEC, ETEC
2. Campylobacter
3. Vibrio parahemolyticus
4. Rota virus
5. Yersinia and other less important entero bacterical

Immunology of Sexually Transmitted Diseases

a) Syphilis – Now VDRL screening of all ANC cases, blood donors as well as patients and visa applicants.
TPHA & FITA also available on request.

b) Acquired Immune Deficiency Syndrome
Recently AIDS routine screening runs parallel with VDRL tests.

Tuberculosis

Culture for T.B. bacilli was introduced, late last year including culture of specimens other than sputum.

- direct smear
- concentrated smear
- culture and identification of M.T.B.

Leptospirosis

Diagnostic procedures for leptospira was also introduced last year which includes dark field microscopy and culture, also haemagglutination titres.

Blood Cultures

Improvement in technical aspects of blood cultures both aerobic and anaerobic leads to better isolation rate of pathogen.

Swabs and Body Fluids

New procedures for identification of organisms have been implemented.
e.g. N. Gonorthoea, C. Neofomans, Yeast and trichomonas

ANNEX II. ESTIMATED EXPENSES PER MONTH FOR EACH SECTION

List hereunder are estimated expenses by each section per month

MICROBIOLOGY

Culture Media

1.	BA	–	5 L	=	200 g	dehydrated	=	$21.64
2.	DHL	–	8 L	=	504 g	dehydrated	=	$55.48
3.	SS	–	4 L	=	240 g	dehydrated	=	$45.36
4.	TCBS	–	2 L	=	172 g	dehydrated	=	$29.86
5.	CA	–	600 L	=	43.2 g	Base	=	$3.94
				=	12.0 g	Hb	=	$0.50
				=	(plus 6 vials enrichment)		=	$86.00
6.	MHM	–	3.5 L	=	122.5 g	powder	=	$12.34
7.	Blood Culture Broth	–	3 L	=	82.5 g	TSB/HIB	=	$6.55
				=	7.5 g	Dextrose	-	$0.20
				=	3.0 g	Bacto-Agar	=	$0.30
8.	Selenite F	–	1 L	=	28.5 g	Base	=	$2.39
				=	6.0 g	Biselenite	=	$3.05
9.	APW	–	500 L	=	10.0 g	powder	=	$0.87
10.	TSI	–	2 L	=	126.0 g	powder	=	$17.66
11.	LIM	–	1.9 L	=	57.0 g	powder	=	$12.72
12.	VP	–	100 ml	=	3.1 g	powder	=	$0.65
13.	S. Hitrate	–	100 ml	=	2.42 g	powder	=	$0.86
14.	Ornithine	–	100 ml	=	1.08 g	powder	=	$2.87
15.	Arginine	–	100 ml	=	1.08 g	powder	=	$2.95
16.	Transport Medium	–	200 ml	=	2.82 g	powder	=	$0.32

17.	MacConkey Broth	–	4.5 L	=	240 g	=	$21.52
18.	BGLB	–	1 L	=	40 g	=	$4.43
19.	L-J Medium	–		=	1,865 g	=	$1.50

Antibiotic discs

20.	Penicillin G			=	30 discs	=	$2.64
	Tetracyline			=	45–50 discs	=	$4.41
	Cloxacillin			=	30 discs	=	$2.64
	Erythromycin			=	30 discs	=	$2.64
	Ampicillin			=	40 discs	=	$3.53
	Co-trimoxazole			=	40 discs	=	$3.53
	Nalidixic Acid			=	20 discs	=	$1.77
	Nitrofurantoin			=	20 discs	=	$1.77
	Gentamycin			=	25 discs	=	$2.20
	Chloramphenicol			=	10 discs	=	$0.88
	Bacitracin			=	5 discs	=	$0.88
	Optocin			=	5 discs	=	$0.44
	XV, V, X Factor			=	5 discs	=	$1.32
21.	Anaerobic System			=	15 Gas Generator	=	$17.42
				=	15 Indicators	=	$6.34
22.	VDRL Antigen			=	4 vials	=	$7.00
23.	TPHA			=	1/2 kit	=	$40.80
24.	E. Coli Shigella Antisera Salmonella					=	$28.38
					Microbiology Total	=	$462.55

HAEMATOLOGY

1.	Blood grouping serum Anti--A	4 vials	=	$54.72
2.	Blood grrouping serum Anti–B	4 vials	=	$54.72
3.	Blood grouping serum Anti-A, B	4 vials	=	$54.72
4.	Blood grouping serum Anti-D	3 vials	=	$94.66
5.	Anti Human Serum	3 vials	=	$61.80
6.	Bovine Albumin Solution	3 vials	=	$32.88
7.	Coombs Control Cells	2 vials	=	$29.76
8.	Selectogen Cells	2 vials	=	$55.68
9.	Drabkin powder	1 pack	=	$10.88
10.	Hb Standard	2 packs	=	$124.50
11.	Brain Thromboplastin	3 vials	=	$15.00
12.	Calcium Chloride Solution	1 vial	=	$3.93
13.	NormalPlasma Control	3 vials	=	$18.00
14.	Disposable cup for Coulter Counter	300	=	$30.00
15.	Isoton II	1	=	$25.00
16.	Isoterge	1	=	$15.00
17.	Dilu-Pack	4	=	$80.00
18.	Zap-oglobin	1 pack	=	$30.00
19.	Donor Pack	100	=	$198.00
20.	Leishmans Stain	500 ml	=	$10.00

21.	Disposable Syringes	400	=	$96.00
22.	Disposable Needles	400	=	$20.00
		Haematology Total	=	$1,095.25

BIOCHEMISTRY

1.	Beckman reagent kit	6 boxes	=	$153.60
2.	Seralyzer reagent kit			
	BUN	2 bottles	=	$68.16
	Glucose	2 bottles	=	$68.16
	Creatinine	1 bottle	=	$38.40
	T/Bilirubin	1 bottle	=	$34.08
	Uric Acid	1 bottle	=	$38.40
3.	Prepurex (HCS)	2 kit	=	$67.20
4.	HBs kit	2 kit	=	$163.20
5.	Multistix	2 bottles	=	$30.53
6.	Dextrostix	6 bottles	=	$40.32
7.	Glucose	500 g	=	$8.75
		Biochemistry Total	=	$710.80

HISTOLOGY & CYTOLOGY MONTHLY ESTIMATE

Reagents	Amount used in a month	Cost – T$
Alcohol (Ethanol – 99.7%–100%)	2.5 L	26.48
Xylene	2.5 L	23.09
Formaldehyde	1 L	12.93
D.P.X. (Mounting Media)	200 mls	29.09
Haematoxylin (Mayers)	500 mls	28.29
Haematoxylin (Harris)	500 mls	23.04
Eosin (5% Solution)	100 mls	16.97
EA. 50	500 mls	12.51
O.G. 6	500 mls	14.62
Ammonia Solution	500 mls	5.05
HCL	500 mls	7.27
Others:		
Paraffin Wax (Melting Point 60°C)	1 kg	17.78
Cover Glass	2 boxes	9.11
Glass Slides	2 boxes	9.80
	Total	TS236.03

ANNUAL LABORATORY STATISTICS

ANNEX III — CENTRAL HEALTH LABORATORY — YEAR:1986

SPECIMEN	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
BLOOD	1952	1800	1424	1495	1773	1786	2089	1779					
URINE	263	188	117	157	171	159	174	162					
STOOL & RECTAL SWAB	464	156	107	225	180	97	182	144					
SPUTUM	47	34	28	67	36	20	66	20					
C.S.F.	2	7	11	1	5	2	11	4					
OTHER BODY FLUID	1	5	2	1	1		4	1					
PUS & OTHER SWABS	41	59	46	47	47	46	66	34					
SKIN SCRAPING	1	1	1	1	1	2		1					
NASAL SMEAR (LEPROSY)													
EAR LOBE (SKIN BIOPSY)			7										
SEMEN		1		1		1		2					
MISCELLANEOUS													
WATER	23	30	52	38	40	73	78	99					
MEDICO-LEGAL SAMPLES	5	2	2		1	1	1	1					
OVERSEAS: BLOOD	45	29	23	27	19	29	26	15					
BODY FLUID		1	1	1	2		2	1					
BONE-MARROW	1	1	1	1				1					
C.S.F.		1											
PAP-SMEAR	2	1		2	1		2						
SPUTUM	2		1										
TISSUE	25	17	26	24	34	9	3						
MISCELLANEOUS	1			1									

ANNUAL LABORATORY STATISTICS

CENTRAL HEALTH LABORATORY YEAR: 1986

NO. OF TESTS	JAN	FEB	WAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
BLOOD	6047	6019	4658	4586	5215	5035	6113	5246				
STOOL & RECTAL SWAB	758	187	133	221	369	202	192	174				
SPUTUM	87	49	59	77	48	57	198	41				
C.S.F	5	17	24	3	14	7	33	9				
OTHER BODY FLUID	2	7	3	2	5		7	4				
PUS & OTHER SWABS	107	151	110	124	91	143	164	99				
SKIN SCRAPING	2	1	2	1	1	2		1				
SKIN & EAR LOBE (LEPROSY)												
SEMEN		3	6	3								
WATER	46	60	104	76	80	146	161	208				
FOOD												
MEDICO-LEGAL SAMPLES	5	2	2		1	1	1	1				
TOTAL												

LABORATORY STATISTICS

CENTRAL HEALTH LABORATORY

NUMBER OF SPECIFIMENTS RECEIVED	1982	1983	1984	1985	1986 *	
HAEMATOLOGY	9,537	9,172	9,619	8,512	5,979	* Jun-August
BIOCHEMISTRY	4,315	5,416	6,528	7,095	6,238	
MICROBIOLOGY	4,534	5,024	4,748	5,457	5,651	
FOOD & WATER		272	219	468	433	
HISTOLOGY & CYTOLOGY					249	
SPECIMENS SENT OVERSEAS	781	884	760	640	380	
TOTAL	19,167	20,768	21,574	72,167	18,930	

LABORATORY STATISTICS

CENTRAL HEALTH LABORATORY

NUMBER OF TESTS PERFORMED	1982	1983	1984	1985	1986 *	
HAEMATOLOGY	45,321	30,o	47,o3	41,990	29,402	* Jan. August 1956 1956
BIOCHEMISTRY	7,170	11,280	12,035	15,918	11,837	
MICROBIOLOGY	6,450	7,290	8,022	9,402	8,344	
FOOD & WATER		575		930	881	
HISTOLOGY & CYTOLOGY						
TESTS PERFORMED OVERSEAS						
TOTAL	61,903	67,980	69,113	69,281	51,006	

ANNEX III. BLOOD BANK

1. Introduction

Here in Tonga, blood bank is still insufficiently organized or wholly lacking. This situation is mainly due to a great shortage of staff, both clerical and technical, needed to create and develop such service where resources and equipment may be unavoidably restricted.

In 1983, the Ministry of Health and the Tonga Red Cross Society agreed to form a cooperative volunteer blood supply programme with the following objectives.

1. To provide the Kingdom of Tonga with a Walking Blood Bank Service of highest quality.
2. To provide blood services without the requirement that the receipient be obligated for the replacement thereof.
3. To provide blood services with no replacement fee or charges made for the blood or blood component itself.
4. To provide blood services based upon the use of a volunteer blood donor supply.

Through this programme a medical team from United States conducted a blood typing of about thousand people here in Tongatapu and Vava'u with the help of the local staff. There was also a committee who chaired by a member from the Red Cross and have met frequently to organize and plan for this mass blood typing. This was called the Tonga Red Cross and Ministry of Health Walking Blood Bank Service Committee with five representatives from Ministry of Health and five representatives from the Tonga Red Cross Society. This committee was responsible for detailed working plans covering such as orientation of volunteer workers to the concepts of this blood programme, and the actual recruitment of volumnteer blood donors and other technical aspects of this programme.

However, after the program of blood typing and recording was initiated the committee only met twice and since them they have not met again. Perhaps this was another reason that the objectives above were never implemented.

2. Problems Encounter Previous Blood Supply Programme

1. Staff:

   It was understood that the Red Cross has very few volunteer workers to cope with this programme, thus recruiting of blood donors was hardly implemented. There was no separate staff for blood banking in the laboratory. Blood bank work was

also carried out by haematology staff.

2. **Blood Donor:**
Some were not willing to become a blood donor as they were coming to the blood typing programme, only to know their blood type. Some were only willing to donate to their own relatives.

3. **Transport:**
This was a major problem as Red Cross does not have one only for this programme nor the Ministry of Health. More often a donor is willing to give blood but no transport.

4. **Donor Cards and Records:**
Certain donor cards and records were drafted to be used and there were not yet approved by the committee.

5. **Premesis:**
There is still no defenite place to hold all blood banking work including clerical work. There is no space at the laboratory and perhaps Red Cross's building is utilized for other purposes as well.

3. Present Situation

Since the previous cooperative programme was not implemented efficiently the recruitment of donors is the same as before-relatives system. Once a patient requires blood he/she asks his family or relatives to donate. If unable to get enough or the same blood type then it is requested through radio if still open.

In this system the laboratory faces with these major problems.

1. Issueing blood unit to patient without screening.
2. Most often no blood available during night and weekeneds emergencies.
3. Long hours of waiting for blood donors.

As of now, the screening of blood donor unit is done after the unit have been issued to the wards. The method used is only a finger prick for ABO and Rh typing including a cell suspension for cross matching. Usually the donor refused to donate 430 ml of blood one hour later if a 10 ml blood was collected from his for screening. In other hand, to do a screening which will approximately last 1½ hour while the patient is desperately needs blood is not practical. Again, by introducing this blood unit which may be contain Hepa-

titis B virus or other agent may endanger the patient. To avoid these problems it is best to have regular volunteer blood donors, where they can be asked to donated on certain months. It is then that the laboratory can screen these units and store in the refrigerator (blood bank) for routine and emergency needs of blood.

4. Comment

1. Staff:
It is believed that the Tonag Red Cross finds it difficult to recruit more volunteer workers to do non-technical work including recruitment of donors in this issue. The Ministry of Health can increase the number of its laboratory staff so that 3 personnel can be allocated to Blood Bank work.

2. Blood Donors:
The public can be approached in a certain way so they would understand more of this important issue. Defenitely Health Education section would play an important role in this.

3. Transport:
This again an important issue, without vehicle we cannot bring the donor from his work and return. There is a vehicle allocated to laboratory on a temporary basis. It will be quite useful if this vehicle be permanently allocated to the laboratory.

4. Donor Cards and Records:
It would be more simple if a certain cards system printed and use. This will enable the workers to trace blood donors and update its records.

5. Premesis:
The best site of blood bank is a small unit attached to the laboratory. The present situation, there is no space at the laboratory nor the Red Cross. There is a need of donors recreation room so they can relax with refreshments after donation. Perhaps it would be better to search for a organization who would be willing to provide fund for the premesis.

6. Fund:
Perhaps this is the most important part, without fund it is difficult to implement this programme. The present project of the Japanese Government with the laboratory draws to its final stage. Perhaps it would be worthwhile requesting them to extend the project to this area.

5. Recommendations

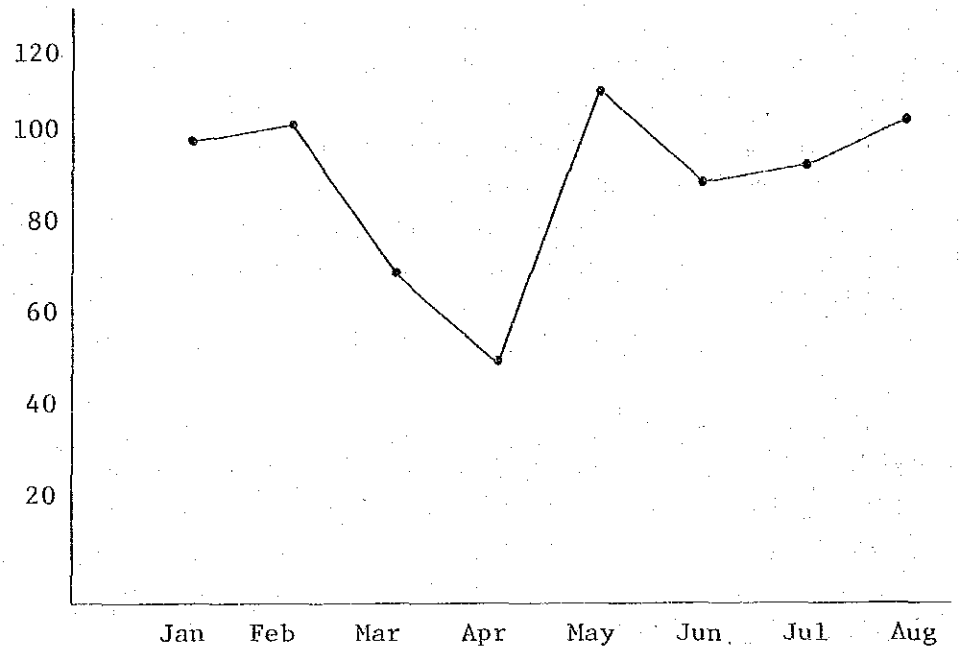
1. It is recommended that the Tonga Red Cross and Ministry of Health Walking Blood Bank Service Committee resume regular meeting to plan the working details of this programme. If unable to do so, it is recommended for the laboratory staff to work a way to start a small number of blood collections.
2. It is recommended that Health Education section should collaborate and promote this programme to the public as part of donor recruitment.
3. It is recommended that the present vehicle used by the laboratory be permanently allocated to the laboratory for transportation of blood donors and other materials relating thereof.
4. It is recommended that cards relating to donors records etc. should be printed and use.
5. It is recommended to use the present room at the alboratory for donor bleeding but to seek for an organization who would provide a better premesis.
6. It is recommended to request the Government of Japan through JICA to extend their project in the laboratory to this field.

6. Conclusion

It is not known whether a patient here in Tonga died due to shortage of blood donors that she/he requires to stay alive. Perhaps it has occurred but not recorded. There is no doubt if the blood bank is well established, this is a contribution to keep the community healthy. By doing so we must prepare that 'The blood must be available in the quantity needed, at the place and time required'.

Table I

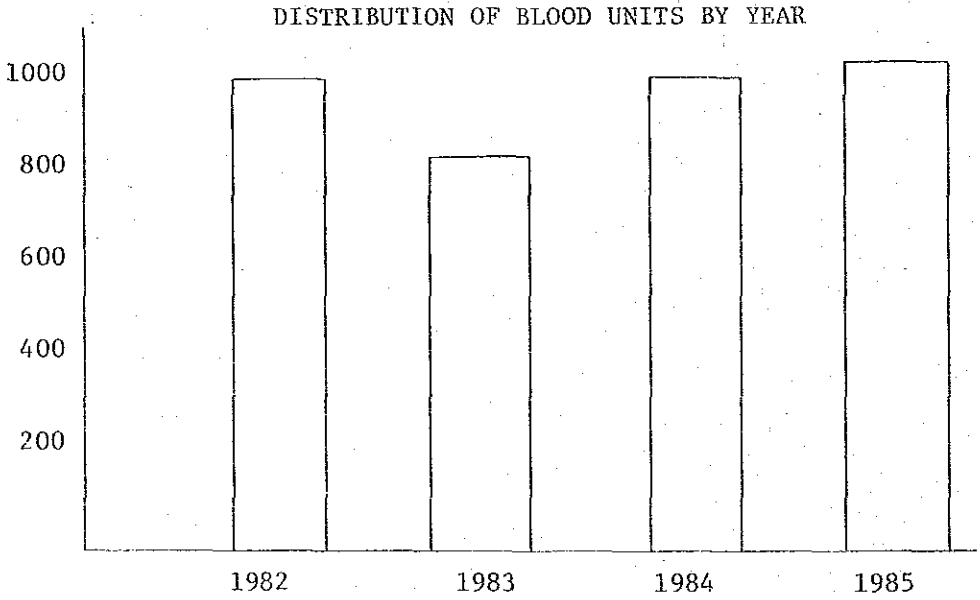
DISIRIBUTION OF BLOOD UNITS BY MONTHS 1986



The average requirement per month is 89 units. This table does not include Vava'u and Ha'apai.

Table II

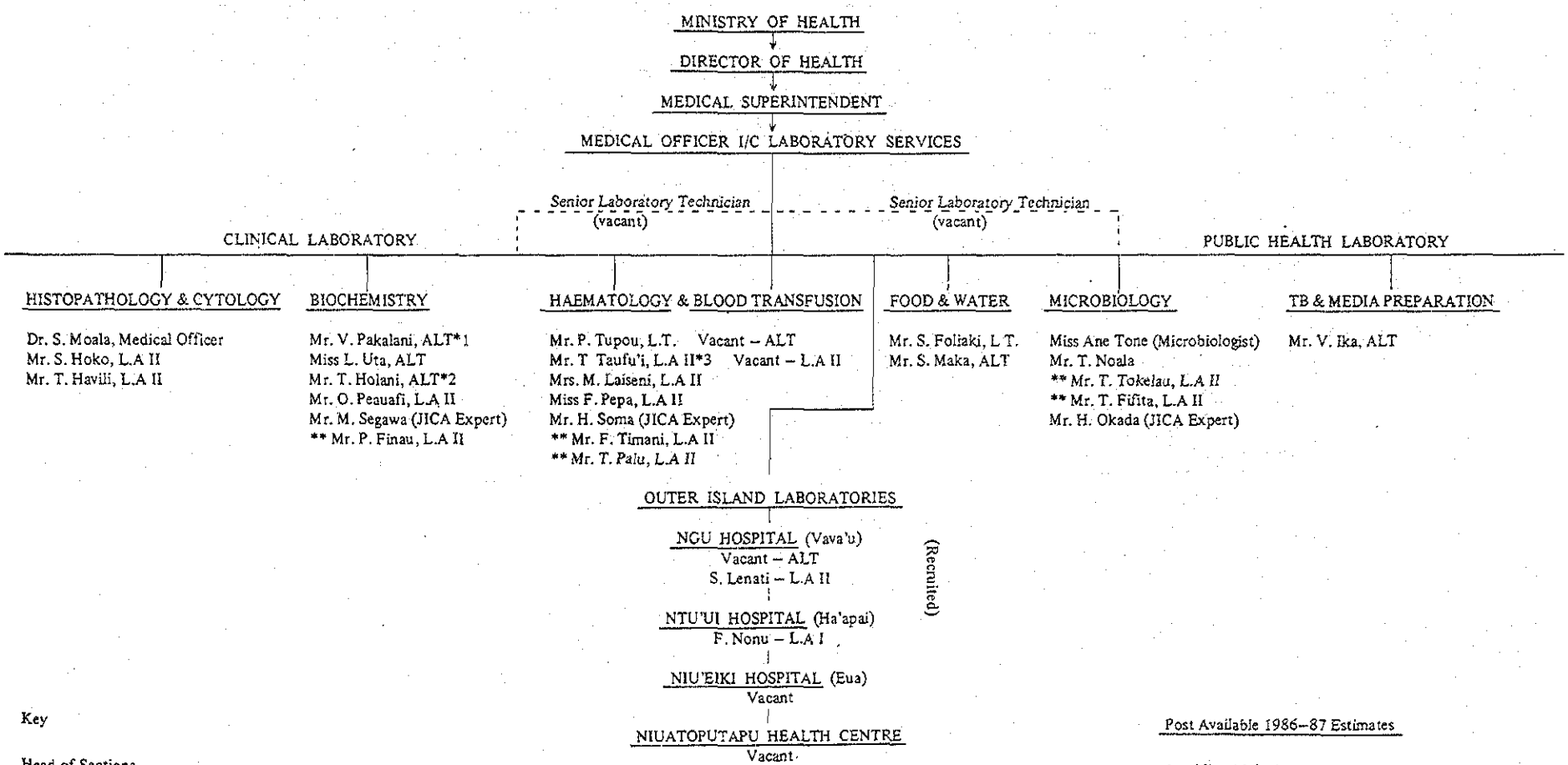
DISTRIBUTION OF BLOOD UNITS BY YEAR



The average requirement per year is 967 units. This table does not include Vava'u and Ha'apai.

ANNEX IV. PROPOSELABORATORY STAFF ORGANIZATION CHART

13th October 1986



Key

Head of Sections

Overseas training *1 – 1 year training in Japan Biochemistry
*2 – Study leave for B.Sc Biochemistry
*3 – Undergraduate study F.S.M (1984–86)

L.T – Laboratory Technician
A.L.T – Assistant Laboratory Technician
L.A – Laboratory Assistant Grade I & II (Local trained staff)
** – New recruits Laboratory Assistant entered service, Sept. 1986

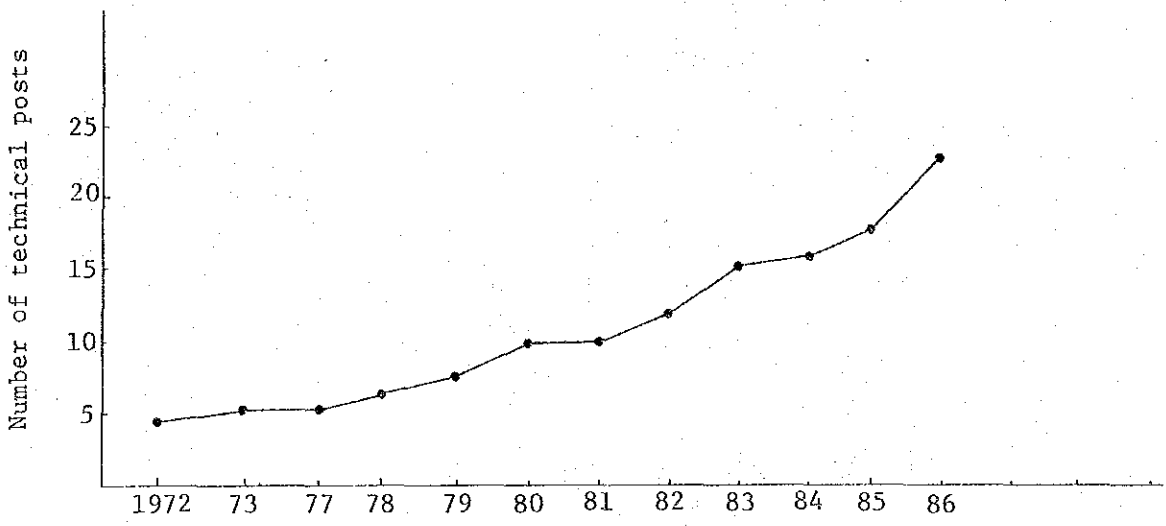
Post Available 1986–87 Estimates

1	Microbiologist
2	Laboratory Technicians
8	Assistant Laboratory Technicians
1	Laboratory Assistant Grade I
12	Laboratory Assistant Grade II
1	Clerk Typist
4	Ward Maids

(資料３)

RESULTS OF PROJECT INPUTS FROM MINISTRY OF HEALTH FOR THE JOINT PROJECT

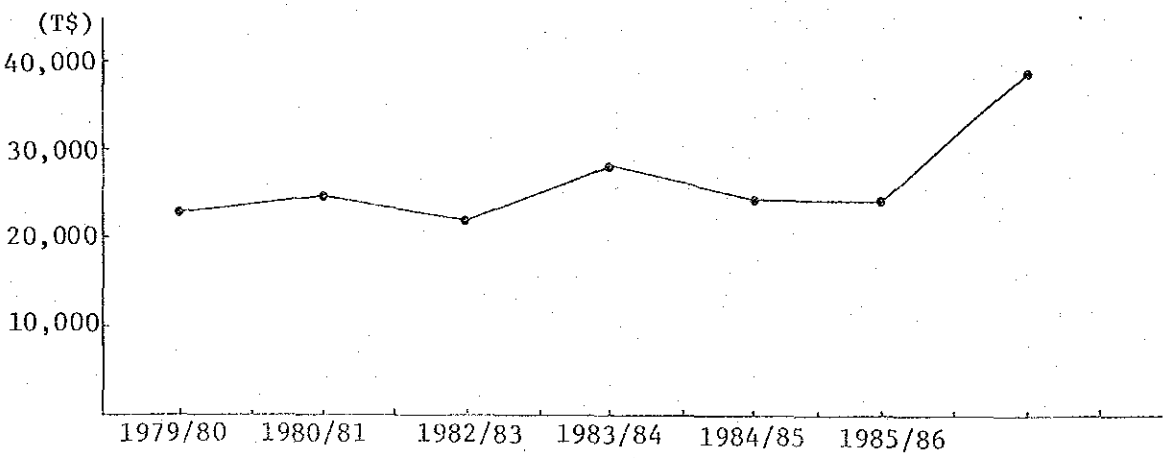
1. Laboratory manpower



In 1984:

1) Dr. S. Moala was appointed as Medical Doctor in charge of the Laboratory services.
2) One receptionist typist was employed.
3) Two laboratory maids were employed.

2. Running costs for Laboratory Services.



RESULTS OF INPUTS FROM JICA

1. Expenses Provided by JICA

Year \ Items	Expenses for: Planning/consulting teams	Experts	Equipment and supplies	Total
1981	11,470	745	0	12,215
1982	11,577	28,490	38,683	79,750
1983	5,407	89,661	43,508	138,576
1984	9,988	51,747	34,430	96,165
1985	609	40,523	18,229	59,361
1986				
Total	39,051	211,166	134,850	386,067

Numbers as indicated in 1,000 Yen.

The expenses for trainees are not included.

2. Other Contributions by JICA HDQ and Local Project Team Office

1) Expenses for installing a tank unit to pool rain water --- TS3,000. (Sept. 1985)

2) Special donation to Vava'u Hospital and Health Centres for promoting the activities of collecting specimens ---------- TS1,000. (Sept. 1986)

3) Expenses for JICA Workshop (Sept. 1986) ---------- TS6,000.

4) Fuel and overtime allowances to perform a survey for diarrheal diseases since May 1986 ---------- TS9,600.

5) Local miscellaneous expenses since 1982 ---------- TS9,600.

6) Maintenance fees for laboratory equipments:
   a. Coulter Counter ---------- TS2,200.
   b. Photocopy Machine ---------- TS 700.

7) Charge for one sample sent to and tested for chemical analysis in Japan ---------- TS 100.

8) Payment for one Receptionist/Typist of the CPHL from January to June 1986. ---------- TS 540.

Total amount TS25,540.

3. List of JICA Experts and Mission Teams Dispatched for the Joint Project

Name of personnels dispatched	Duration	Field/Objective
Mr. K. Nakajima	Aug. 1982 - Dec. 1984 (28 M)	Coordinator
Mr. Y. Hodate	Sept. 1982 - Dec. 1986 (51 M)	Local Japan Team Leader & Microbiology
Mr. Uchino	Apr. 1983 - Feb. 1984	Architect for CPHL
Dr. M. Ohashi & 5 Members	Jan. 1983 (1 W)	Planning/Consultation Team
Dr. M. Ohashi	Jan. 1984 (1 M)	Serology
Dr. J. Igari	Jan. 1984 (3 W)	Biochemistry
Mr. T. Imanari	Aug. - Dec. 1984 (4 M)	Bacteriology/Serology
Dr. H. Inoue & 5 Members	Sept. 1984 (1 W)	Consultation Team
Mr. M. Segawa	Nov. 1984 - Dec. 1986 (25 M)	Biochemistry/Serology
Mr. S. Ichiki	Jan. - Sept. 1985 (9 M)	Bacteriology
Mr. Matsuki & 4 Members	Feb. 1985 (10 Days)	Maintenance and Setting up of labpratory equipments and furnitures
Mr. M. Okanda	Feb. - Dec. 1986 (11 M)	Bacteriology
Mr. H. Soma	May - Dec. 1986 (8 M)	Haematology
Dr. Okano	June 1986 (2 W)	Histopathology/Cytology
Dr. N. Kawamura	Oct. 1986 (3 W)	Food & Water Analysis
Dr. A. Shishido & 6 Members	Oct. 1986 (1 W)	Evaluation Team

JICA Architecture Consultation Teams for CPHL construction were dispatched 4 times during construction of the building from March 1983 to February 1984.

4. LIST OF THE TRAINEES SPONSORED BY JICA FOR THE JOINT PROJEC

Name	Duration	Training field	Training Facilities	Station
Mr. V. Ika	Feb. 1982 & Nov. 1982 (9 M)	Microbiology	Tokyo Metropolitan Reasearch Institute of Public Health	Microbiology Lab/ CHHL Vaiola Hos.
Miss A. Tone	Oct. 1983 & Oct. 1984 (12 M)	Microbiology	Ditto	Ditto
Mrs. Nakakaufaki	Mr. 1984 (1 M)	Observation on Peripheral Medical System	Nagasaki Pret. & Nagasaki Univ.	Outpatient ward Vaiola Hos.
Mr. S. Foliaki	Feb. 1984 - Feb. 1985 (12 M)	Food & Water Analysis	Aichi Pref. Institute of Public Health/Tokyo Metro. Research Institute of Public Health	Food & Water Lab/ CPHL Vaiola Hos.
Miss L. Uta	Nov. 1984 ¥ Nov. 1985 (12 M)	Biochemistry	Juntendo Univ. School of Medicine/Tokyo Metro. Research Institute of Public Health	Biochemistry Lab/ CPHL Vaiola Hos.
Dr. S. Moala	Oct. 1984 & Oct. 1985 (12 M)	Histopathology & Cytology	Nihon Univ. School of Medicine	Pathology Lab/ CPHL Vaiola Hos.
Mr. T. Vi	Feb. & Mar. 1985 (1 M)	Maintenance of Lab Equipment	Lab. Machine Companies	Workshop Ministry of Health
Mr. P. Tupou	July 1985 & July 1986 (12 M)	Haematology Blood Transfusion	Nihon Univ. School of Medicine	Haematology Lab/Vaiola
Mr. V. Pakalani	Jan. 1986 & Dec. 1986 (12 M)	Biochemistry	Ditto	Biochemistry Lab/ Vaiola

Mr. S. Naka	May-Sep. 1986 (4 M)	Food & Water Analysis	Aichi Pref. Institute of Public Health	Food & Water Lab/ CPHL Vaiola
Mr. S. Telefoni	Sep. 1986 (3 W)	Food & Water Sampling method	Health Centers. Human Quarantine Stations	Public Health Department Ministry of Health
Dr. V. Tangi	Oct-Nov. 1986 (2 M) (scheduled)	Biopsy technique for Histopathology	Nihon Univ. School of Medicine	Surgical Ward Vaiola Hospital

5. JICA SPONSORED WORKSHOP FOR PUBLIC HEALTH LABORATORY UTILIZATION

Date : 10 & 11 September 1986

Place : CPHL Vaiola Hospital

Participants (37) : Health Officers, Public Health Nurses and Clinical Nurses working for Hospitals, Health Centers and Public Health Clinics in the whole Kingdom.

Objectives :

1. To update Peripheral Health Workers knowledge on Public Health diseases such as diarrheal diseases, STD and so on.
2. To familiaze Peripheral Health Workers with basic laboratory tests and facilities.
3. To establish a linkage between hopsital laboratories and Health Centers & Public Health Clinics to contribute the Primary health care in the Kingdom.

Programme : As per attached sheets.

JICA WORKSHOP PUBLIC HEALTH LABORATORY UTILIZATION

(Tonga - Japan - WHO Joint Health Laboratory Project 1982-88)

10th - 11th September 1986

Place : CPHL Education Room, Vaioin Hospital

Coordinator
MR. Y. HODATE
JICA Team Leader in Tonga

Operation Officers:- DR. Sione S. Moala
Medical Officer in charge Laboratory Services

- DR. S. T. Puloka
Senior Medical Officer in charge Public Health

Guest Speakers :- DR. S. Fujimoto
JICA Consultant (Professor at Kitasato University, Japan)

- DR. H. Nsanze
WHO Microbiologist at the Fiji School of Medicine Fiji.

- DR. S. T. Puloka
S.M.O in charge Public Health, Ministry of Health, Tonga

Local Speakers & Demonstrators Resource Personnel:- DR. H. 'Akau'ola
Medical Officer in charge Medical Ward, Vaiola Hospital

- Laboratory Staff

		JICA Experts
S. Foliaki	L. Uta	H. Okanda
A. Tone	T. Moala	H. Soma
P. Tupou	4 Wardmaida	M. Segawa
V. Ika		

P R O G R A M M E

WEDNESDAY 10th September 1986	09:00	Opening Address (MR. Y. Hodate) DR. S. T. Puloka
	09:10	Typhoid Fever & Diarrhoeal Diseases (Epidemiology & Preventive Measures) by DR. S. T. Puloka
	11:00	TEA BREAKA
	11:15	'Clinical Management' (DR. H. "Akau'ola)
	12:30	LUNCH

	13:30	'Sexually Transmitted Diseases' DR. H. (Lecture & Demonstration)
	15:00	TEA BREAK
	15:15	(Continue of Above)
	16:15	END
THURSDAY 11th September1986	09:00	"Sterilization and Disinfection' DR. S. Fujimoto (Lecture & Demonstration)
	11:00	TEA BREAK
	11:15	(Continue above)
	12:15	LUNCH
	13:30	"Sampling Preservation & transportation of Laboratory Spe cimen DR. S. T. Puloka (Lecture & Demonstration)
	15:00	TEA BREAK
	15:15	Demonstration/Explanation of basic Laboratory tests (Laboratory staff)
	16:15	END
	18:30	Social Function (Tong Hua Restaurant)

RESULTS OF PROJECT INPUTS FROM WHO FOR THE JOINT PROJECT

1. WHO Budget for the Health Laboratory Technology (1980/81 - 1986/87)

Items / Fiscal Year	Supplies & Equipment	Fellowships	Local cost	Total
1980/81	-	14,260	-	14,260
1982/83	6,200	-	3,875	10,075
1984/85	16,120	19,375	15,500	50,995
1986/87	15,810	48,670	12,400	76,880
Total	38,130	82,305	31,775	152,210

Number indicated as TS.

2. List of WHO Expert and consultants for the Joint Health Laboratory Project

Name	Duration	Field
Dr. N.U. Rao from India	Jan. 1984-Oct. 1985 (1Y & 10Ms)	Microbiology & Acting Country Liason Officer
Prof. Manchal from New Zealand	Aug. 1985 (2 Ws) Oct. 1985 (2 Ws)	Leptospirosis
Prof. Kurimura & Yoshida from Japan	Apr. 1986 (4 Ds)	AIDS

3. WHO Workshop for the Joint Health Laboratory Project

July 1984	On Laboratory Utilization for Medical Doctors and Health Officers in Tongatapu.
Aug. 1984	On Laboratory support for Primary Health Care for most District Nurses, Assistant Health Inspector and Health Officers.
Sep.-Oct. 1984	Intercountry Training course on parasitology.

4. List of the Trainees Sponsored by WHO for the Joint Project

Name of trainee	Section	Duration of	Field	Host Institution
Mr. T. Tauf'j	Haematol./ Vaiola Hos.	Feb. 1984 - Dec. 1986 (36 M)	Medical Technology	Fiji School of Medicine
Mr. S. Hoko	Histopathol. Lab./CPHL, Vaiola Hos.	Jan. - Apr. 1986 (3 M)	Preparation of specimens for histopathological examination	C.W.M. Hospital, Fiji
Mr. V. Ika	Microbiol./ CPHL Vaiola Hospital	Jan. - May 1986 (4 M)	Laboratory diagnosis of tuberculosis	India
Miss A. Tone	ditto	Apr. 1986 (10 days)	Seminar on Laboratory Diagnostic and Control of STD	Singapore

Note: WHO Scholarship available in 1986/87 fiscal year for one undergraduate staff to be trained in a 3 years-course of Medical Technology has not been performed.

(資料 4)

TONGA, JAPAN/WHO JOINT HEALTH LABORATORY PROJECT.

WHO COLLABORATION

1. Long Term Staff

One staff (Microbiologist)	1984 - 1985
One staff (Biochemist)	1986 - 1987 1988 - 1989

2. Supplies, Equipments and Local Cost

a)	1984 - 1985	Supplies & Equipment	US$ 10,400
		Local Cost	US$ 10,000
b)	1986 - 1987	Supplies & Equipment	US$ 10,200
		Local Cost	US$ 8,000
c)	1988 - 1989	Supplies & Equipment	US$ 25,000
		Local Cost	US$ 4,000

3. Consultant Services

a) One Scientist from Japan and two Scientist from Republic of Korea for Epidemiological Surveillance of Hantaan virus infection, 1985.

b) Two Scientists from Japan for screening of HIV Antibody, 1986.

c) Two Scientists and one technician from Japan for set up of laboratory for hepatitis B virus antigen positive plasma collection, 1986.

4. Workshop/Training Course

a) Laboratory Utilization 1984

b) Laboratory support for Primary Health Care activities, 1984.

c)

5. Oversea Training

a) One Technician for training on screening, separation and concentration of hepatitis B virus surface antigen positive plasma in Japan, 1985.

b) One Technician for training on isolation and characterization of Tubercul becilli and its antibiotic senstitivity in India.

（資料5）

Ⅵ　プロジェクト方式技術協力の要請内容

（事前調査報告書より抜粋）

トンガ政府は上述のような現状と問題点を踏え疾病対策及びプライマリー・ヘルス部門に寄与す可く，保健医療における検査室機能の充実・整備を計画している。具体的には，現在Vaiola 病院にある検査室機能を拡充するのみに止まらず，国家的要請の高まっている公衆衛生検査に対応しうる機能をこれに附加し，トンガの総合的中央検査機構をつくることであり，本計画に対して日本の協力を要請している。協力要請期間は1982 年から5ケ年である。

1. 検査所建設の要請

次の7部門での検査機能の整備・拡充のため，検査所の建設が要請されている。尚，これらのうち④⑤⑦の3部門は現在の検査室に収められる計画である。

① 公衆・環境衛生部門
- ○水質検査（化学検査，微生物検査）
- ○水質汚染モニタリング
- ○食品検査

② 微生物学部門
- ○細菌学，血清学，寄生虫学，菌学などの分野（サルモネラ，赤痢，ビブリオ，大腸菌，性病検査，肝炎，デング熱，レプトスピラ，麻疹，ブルセラ症，アメーバ，フィラリア，トリコモナス）

③ 結核部門
- ○ZN染色，培養（耐性試験および非定型菌類の同定は海外委託とする）

④ 血液部門
- ○一般血液検査

⑤ 免疫・輸血部門
- ○ABO型，Rh型，クロスマッチテスト
- ○血液銀行

⑥ 生化学部門
- ○臨床化学

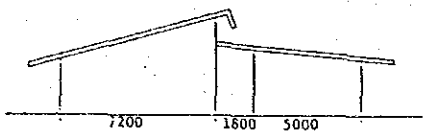
⑦ 細胞診断部門
- ○骨髄サンプルの処理及びパパニコロー

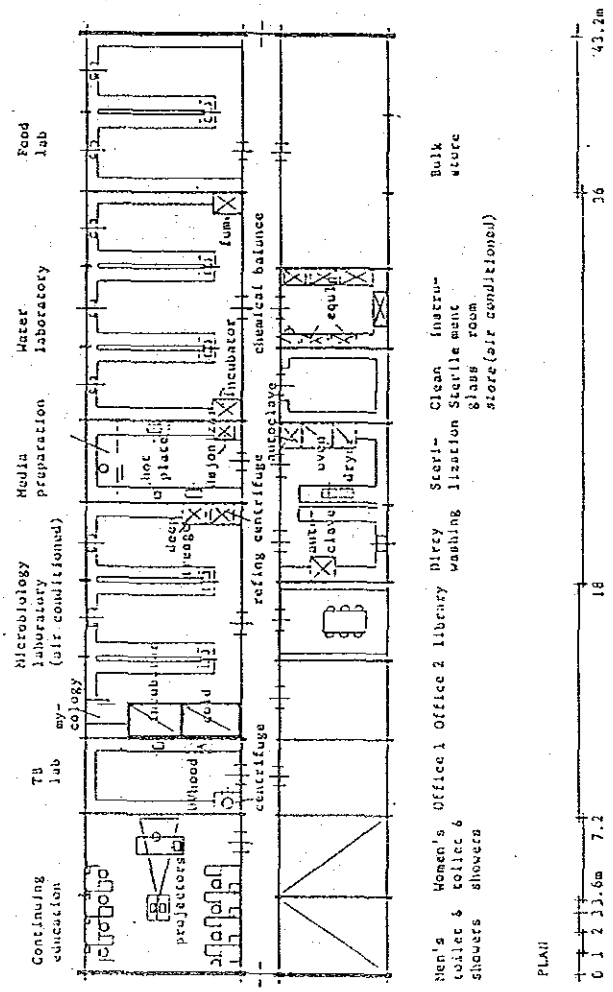
将来予定している検査項目は次のとおりである。

総タンパク，総ビリルビン，アミラーゼ，コレステロール，BSP，重炭酸塩，S-GOT，フィブリノーゲン，Ca，Al-phos，塩化物，燐，サリチル酸塩，トリグリセリド，D－xylose 吸収試験，ペンタガストリン，アスコルビン酸飽和試験，トリプシン，ポルフィリン，CSF 塩化物，総脂肪（便），システィン，骨髄関係，プロトロンビン時間，CRP，異常ヘモグロビン

トンガ側の希望する検査所の建物は 43.2×14.0 m で平屋建であり，上記 7 部門の検査室の他，洗浄・滅菌室，図書室，講議室，幹部居室などが計画されている（図－２）。建設費は US$280,000 と見積られている。ただし，建設資材，設備などの程度とするかによって建設費は変動し得るであろうが，スペースとしてほぼ妥当であるといえる。

図－２　トンガ側要請の検査所案





2. 専門家派遣の要請

最終的に提出された専門家派遣要請は次のとおりである。

① チームリーダー

広い経験を持つ上級専門家で，特定の分野を専攻している人，それも微生物学専攻であれば尚望しい。派遣期間は1982年後半より2年余り。

② 公衆・環境衛生部門

化学分析専門家で主に水質・食品検査に当る。派遣期間は1983年に6～12ケ月，1985年には3～6ケ月で各1名である。

この部門では他に微生物分野での専門家の必要性もあるが，これはチームリーダーの専門分野，或は次に述べる微生物学部門の専門家を考慮している。

③ 微生物学部門

この部門では，細菌学，血清学，寄生虫学，菌学などが扱われる計画であるが，専門家の要請は1名で1984年から1年間である。但し，これはチーム・リーダーの専門分野とのかねあいで変わりうる。

④ 血清学部門

フィルス病の血清学的診断（特に肝炎）指導のために，専門家1名を1983年に6～12ケ月間要請している。

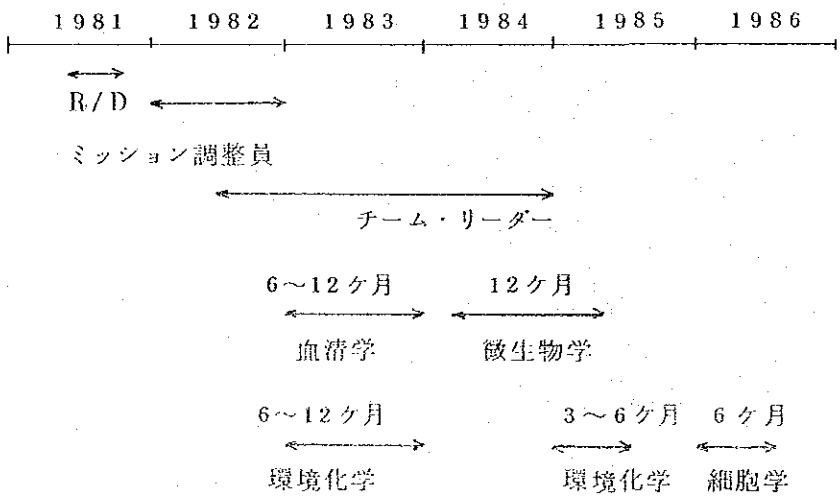
⑤ 細胞診断部門

この部門では，パパニコローを中心とする骨髄サンプルの処理が予定されており，専門家の派遣要請は1986年に6ケ月間である。

⑥ 調整員

プロジェクト発足当初から1年間，調整員の派遣を希望している。

以上の専門家派遣要請を図示すると次のとおりである。



3. 研修員受入の要請

研修員受入要請は次のとおりである。

① 公衆・環境衛生部門

現在1名がトンガ政府の奨学金により，フィジーのSchool of Medicineに留学中で，1983年に卒業の予定であるが，その後更に水・食品化学の研修を要請している。

② 微生物学部門

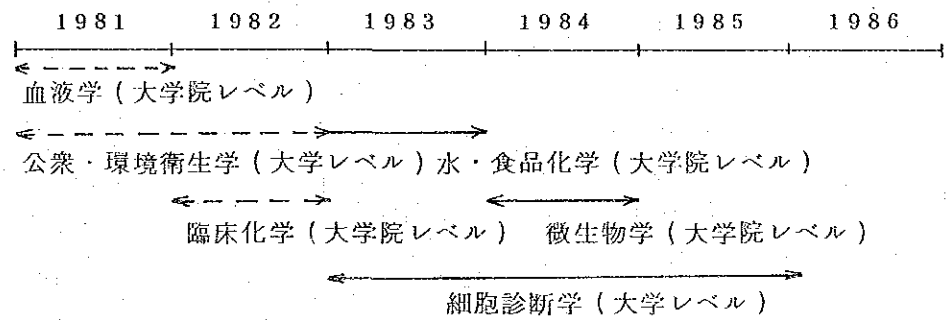
現在既に大学卒業資格を有する技師1名の大学院レベル，1年間の研修を，1984年に要請している。

③ 細胞診断部門

1名の大学レベルの研修を1983年から1985年まで（3年間）希望している。

尚，血液部門では，1名がWHOのフェローシップにより，ニュージーランドで大学院レベルの1年間の研修を受けており，1981年末には研修を終了する予定である。また，臨床化学の分野では，大学院レベル，1年間，1名の研修をWHOのフェローシップにより1982年に実施す可く申請中である。

以上の研修員受入要請を図示すると次のとおりである。



（注）－－－ 現在研修実施中或は申請中

―― 新規研修員受入要請

4. 機材の要請

トンガ側の希望する機材リストは次のとおりである。

1. 卓上電子計算器（3台）
2. 電子複写器
3. オートクレーブ（2台） 40×80cm
4. オーブン（90℃） 1,380×800×700 mm
5. 脱イオン装置
6. 乾熱滅菌器（160℃） 500×1,000×500mm

7. ウォーター・バス（100℃） 700×360×360mm
8. ワ ゴ ン（6台）
9. 双眼顕微鏡（4台） オリンパス，BH型
10 位相差顕微鏡
11. 高速冷却遠心分離機
12. ディープ・フリーザー（−20℃） 1,300×600×900mm
13. ウオーター・バス（2台） 37℃〜56℃
14. 分光光度計
15. 分光光度計スキャナー （ELIZA Test用）
16. PHメータ
17. 電気泳動装置，デンシトメーター
18. ビリルビン測定装置
19. 血液貯蔵庫（2−6℃）
20. 天 秤 （0.1mg） メトラー
21. マッフル炉（750℃） 100×130×155mm
22. 伝導度計
23. 濁 度 計 Hach model 2511
24. BODインキュベーター（20℃）
25. 乾 燥 器（103−105℃） 500×400mm
26. 実習用双眼顕微鏡（8台）
27. PCV測定器 Arthur − Thomas
28. タイプライター（2台） Long − Carriage
29. 自動車（検体，血液輸送用）
30. 定電圧装置

The Record of Discussions
between
the Japanese Implementation Survey Team and
the Authorities concerned of the Government of the Kingdom of Tonga
on the Japan WHO Joint Technical Cooperation Project
in the Kingdom of Tonga, Health Laboratory

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as JICA) and headed by Dr. Akira Shishido visited the Kingdom of Tonga from December, 10 to December, 17, 1981 for the purpose of working out the details of the technical cooperation program concerning the Japan WHO Joint Technical Cooperation Project in the Kingdom of Tonga, Health Laboratory.

During its stay in the Kingdom of Tonga, the Team exchanged views and had a series of discussions with the Tongan authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the above-mentioned Project.

As a result of the discussions, the Team and the Tongan authorities concerned agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

Nuku'alofa, Tonga, 15th December, 1981

A. Shishido

Akira Shishido,
M.D., Ph.D.,
Head of the Japanese Implementation
Survey Team,
Japan International Cooperation Agency

Hon. Dr. S. Ma afu Tupou,
Acting Minister of Health,
Ministry of Health,
Kingdom of Tonga

THE ATTACHED DOCUMENT

I. Cooperation between Both Government

1. The Government of Japan and the Government of the Kingdom of Tonga will cooperate with each other in implementing the Japan-WHO Joint Technical Co-operation Project in the Kingdom of Tonga, Health Laboratory (hereinafter referred to as "the Project") for the purpose of improving the health laboratory services in the Kingdom of Tonga.
2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.
3. The World Health Organization (hereinafter referred to as WHO) is invited to co-operate with the Government of Japan and the Government of the Kingdom of Tonga in implementing the Project.

II. Dispatch of Japanese Experts

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in Annex II through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.
2. The Japanese experts referred to in 1. above and their families will be granted in the Kingdom of Tonga the privileges, exemptions and benefits as listed in Annex III and will be granted privileges, exemptions and benefits no less favourable than those granted to experts of third countries or international organizations performing similar missions.

III. Provision of Machinery and Equipment

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials necessary for the implementation of the Project as listed in Annex IV, through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.
2. The articles referred to in 1. above will become the property of the Government of the Kingdom of Tonga upon being delivered c.i.f. to the Tongan authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese experts referred to in Annex II.

IV. Provision of Special Measures

For fostering the smooth promotion of the Project, in accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to supplement a portion of the local cost expenditures for the execution of the physical infrastructure such as constructon work of laboratory facilities and so on when necessity arises.

V. Training of Tongan Personnel in Japan

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to receive at its own expense the Tongan personnel connected with the Project for technical training in Japan through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.
2. The Government of the Kingdom of Tonga will take necessary measures to ensure that the knowledge and experience acquired by the Tongan personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

VI. Services for Tongan Counterpart Personnel and Administrative Personnel

1. In accordance with the laws and regulations in force in the Kingdom of Tonga, the Government of the Kingdom of Tonga will take necessary measures to secure at its own expense necessary services for Tongan counterpart personnel and administrative personnel as listed in Annex V.
2. As to the Tongan counterpart personnel, the Government of the Kingdom of Tonga will endeavour to allocate the necessary number of suitably qualified personnel corresponding to each Japanese expert to be dispatched by the Government of Japan as specified in Annex II for effective and successful implementation of the Project.

VII. Measures to be taken by the Government of the Kingdom of Tonga

1. In accordance with the laws and regulations in force in the Kingdom of Tonga, the Government of the Kingdom of Tonga will take necessary measures to provide at its own expense:
   (1) Land, buildings and facilities as listed in Annex VI;
   (2) Supply or replacement of machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under III above;

(3) Transportation facilities and travel allowance for the Japanese experts for the official travel within the Kingdom of Tonga;

(4) Suitably furnished accommodations for the Japanese experts and their families.

2. In accordance with the laws and regulations in force in the Kingdom of Tonga, the Government of the Kingdom of Tonga will take necessary measures to meet:

(1) Expenses necessary for the transportation within the Kingdom of Tonga of the articles referred to in III above as well as for the installation, operation and maintenance thereof;

(2) Customs duties, internal taxes and any other charges, imposed in the Kingdom of Tonga on the articles referred to in III above;

(3) All running expenses necessary for the implementation of the Project.

VIII. Administration of the Project

1. The Japanese experts will give necessary technical guidance and advice to the Tongan authorities and staff associated with the Project pertaining to the implementation of the Project, and the Tongan authorities concerned will be responsible for the administrative and managerial matters pertaining to the Project.

2. For the successful implementation of the Project, the Coordinating Committee will be established with the members as listed in Annex VII

The Committee will meet at least once a year.

The functions of the Committee are as follows:

(1) To formulate the detailed plan of works for the Project;

(2) To review the implementation of the Project;

(3) To advise the Tongan authorities concerned about the implementation of the Project at all stages.

IX. Claims against Japanese Experts

The Government of the Kingdom of Tonga undertakes to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Tonga except for those arising from the willful misconduct or gross negligence of the Japanese experts.

X. Mutual Consultation

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Attached Document.

XI. Term of Cooperation

The duration of the technical cooperation for the Project under this Attached Document will be five (5) years from the data of signature. However, there will be a general review by the Coordinating Committee on the progress of the implementation of the Project after three (3) years from the commencement of the cooperation taking account of measures to be taken by the two Governments in order to decide if the cooperation should be continued for two (2) more years.

ANNEX I. MASTER PLAN

1. **Objective**

The Project aims at improving health laboratory services in the Kingdom of Tonga with specil emphasis on functions of the Central Health Laboratory.

2. **Implementation**

The Ministry of Health of the Kingdom of Tonga will have overall responsibilities for the implementation of the Project, taking into account the proposal made by the Coordinating Committee.

For implementing the Project, the Government of Japan will dispatch Japanese experts, accept Tongan personnel for training in Japan and provide necessary equipment and materials.

The Governments of the Kingdom of Tonga and Japan will also work in cooperation with WHO, under terms of its Plan of Organizations.

3. **Activities under the Project**

The Project will consist of the following areas and related activities:

(1) Environmental & Food Sanitation
(2) Microbiology
(3) Bacteriology (T.B.)
(4) Haematology
(5) Clinical Chemistry
(6) Cytology
(7) Other fields and activities mutually agreed upon as necessary

ANNEX II. JAPANESE EXPERTS

Expert in
(1) Environmental & Food Sanitation
(2) Microbiology
(3) Bacteriology (T.B.)
(4) Haematology
(5) Clinical Chemistry
(6) Other fields mutually agreed upon as necessary

ANNEX III. PRIVILEGES, EXEMPTIONS AND BENEFITS

1. Exemptions from income tax and charges of any kind imposed on or in connection with the living allowances remitted from abroad;
2. Exemptions from import and export duties and any other charges in respect of

personal and household effects, including one motor vehicle per family, which may be brought into the Kingdom of Tonga from abroad;

3. Free medical services and facilities to the Japanese experts and their families.

ANNEX IV. LIST OF THE ARTICLES

Machinery, equipment and materials for the Project mutually agreed upon as necessary.

ANNEX V' LIST OF TONGAN STAFF

1. Project Director
2. Counter Personnel
   - in Environmental & Food Sanitation
   - in Microbiology
   - in Bacteriology (T.B.)
   - in Haematology
   - in Clinical Chemistry
   - in other fields mutually agreed upon necessary
3. Clerical and service personnel
4. Other personnel mutually agreed upon as necessary for the Project

ANNEX VI. LIST OF LAND, BUILDINGS AND FACILITIES

The Tongan authorities offer land, buildings and facilities necessary for the Project

ANNEX VII. COMPOSITION OF THE COORDINATING COMMITTEE

Chairman: Director of Health, Ministry of Health, Kingdom of Tonga

The Tongan side	The Japanese side
Senior Medical Officer i/c Vaiola Hospital	Experts
Senior Medical Officer i/c Public Health Division	
Officer i/c Laboratory Services	
Other officers may be cooperated when required.	

Note: The representative(s) of WHO will be invited to the meeting.

The Minutes of the Meeting
between
the Japanese Implementation Survey Team and
the Authorities concerned of the World Health Organization
on the Japan-WHO Joint Technical Cooperation Project
in the Kingdom of Tonga, Health Laboratory

The Japanese Implementation Survey Team (hereinafter referred to as the Team) and the Authorities concerned of the World Health Organization (hereinafter referred to as WHO) discussed the matters relating to the contributions to be made by the Government of Japan and WHO to the technical cooperation programme as provided in the Record of Discussions between the Team and the Authorities concerned of the Governmentof the Kingdom of Tonga, signed on 15th December, 1981, (hereinafter referred to as the R/D) on the Japan-WHO Joint Technical Cooperation Project in the Kingdom of Tonga, Health Laboratory (hereinafter referred to as the Project).

As a result of the discussons, the Team and the Authorities concerned of WHO agreed to recommend to the Government of Japan and WHO, respectively, the following matters:

1. The Government of Japan will take necessary measures through the normal procedures under the Technical Cooperation Scheme of the Government of Japan to dispatch Japanese experts, to provide machinery and equipment as well as to train Tongan personnel in Japan for the implementation of the Project according to the Attached Document of the R/D

2. WHO will take the following measures within its own framework to cooperate with the Governmentof Japan and the Government of the Kingdom of Tonga for the smooth and effective implementation of the Project:
   (1) To assign WHO experts in fields mutually agreed upon.
   (2) To provide fellowships, as requested by government, and intercountry training programmes, not only for Tongan personnel but also for those in the other South Pacific countries.
   (3) To provide facilities, equipment, supplies and other materials to support the implementation of the Project. WHO will set aside a portion of the present budget and will allocate the necessary amount from the next budget cycle 82/83 for the smooth implementation of the above-mentioned measures.

3. There will be lose mutual consultations between the Government of Japan and WHO for the implementation of the Project and on any matters arising from, or in connection with, these Minutes.

Nuku'alofa, Tonga, 15th December 1981

A. Shishido

Akira Shishido, M.D., Ph.D.,
Head,
Japanese Implementation Survey Team,
Japan International Cooperation Agency

H. Nakajima

Hiroshi Nakajima, M.D., Ph.D.,
Regional Director,
Western Pacific Regional Office,
World Health Organization

The Government of the Kingdom of Tonga acknowledges
the above cooperation scheme to be implemented by
both the Government of Japan and WHO

S. Ma'afu Tupou

Hon. Dr. S. Ma'afu Tupou,
Acting Minister of Health,
Ministry of Health,
Kingdom of Tonga

（資料７－１）

専　門　家

55年度

（プロファイ調査）

藤田昌彦（国立公衆衛生院）	環境衛生	56. 3. 28 ～ 56. 4. 10
伊藤雅治（厚生省）	公衆衛生	〃
森元誠二（外務省）	技術協力	〃
塚田幸三（JICA）	計画調整	〃

56年度

山本泰次（県立広島病院）	伝染病対策	57. 3. 29 ～ 57. 4 10

57年度

立入八洲（厚生省）	衛生検査兼チームリーダー	57. 9　3 ～ 61. 12. 15
中島衡平（無）	調整員	57. 8.　9 ～ 59. 12.　8
小原基文（JICA）	建築工事契約	58. 3. 21 ～ 58.　3. 30
福田　豊（石本建築）	建築請負契約	58. 3. 19 ～ 58.　4.　2

58年度

（スイス）

中沢幸一（JICA）	公衆衛生	58. 4. 30 ～ 58.　5.　8
内野敏雄（石本建築）	建設工事施工管理	58. 5. 14 ～ 59.　2. 29
福田　豊（　〃　）	〃	58. 5. 14 ～ 58.　5. 27
日和佐　章（　〃　）	〃	〃
福田　豊	〃	58. 7. 26 ～ 58.　8.　2
安　光（協立製作所）	機材据付指導	58. 12.　2 ～ 58. 12 14
長谷川　潤（　〃　）	〃	〃
河田俊郎（石本建築）	建設工事施工管理	58. 12. 10 ～ 58. 12. 21
大橋　誠（都立衛生研究所）	血清学	59.　1. 23 ～ 59.　2. 12
猪狩　淳（順天堂大学）	生化学	59.　1. 23 ～ 59.　2.　1
長谷川正男（JICA）	技術協力	59.　2.　6 ～ 59.　2. 12
加藤　宏（JICA）	〃	〃
福田　豊（石本建築）	建設工事施工管理	59.　3.　5 ～ 59.　3. 21

59 年度

瀬川宗親（順天堂大学）	生化学	59. 11. 4 ～ 61. 12. 15
今成敏夫（厚生省）	細菌学	59. 8. 12 ～ 59. 12. 8
市来重光（厚生省）	〃	60. 1. 18 ～ 60. 9. 22
森国勉（厚生省）	〃	60. 3. 3 ～ 60. 3. 13

60 年度

大神田実（厚生省）	細菌学	61. 2. 24 ～ 61. 12. 14

61 年度

岡野匡雄（日本大学）	病理学	61. 6. 1 ～ 61. 6. 18
相馬史（日本大学）	血液学	61. 5. 19 ～ 61. 12. 14
藤本進（北里大学）	公衆衛生	61. 9. 7 ～ 61. 9. 14
河村典久（愛知県衛生研究所）	理化学検査	61. 9. 28 ～ 61. 10. 25

（資料７－２）

研　修　員

57 年度

Mr　V. Ika	（微生物学）	58. 2. 10 ～ 58. 11. 17

58 年度

Ms　A. Tone	（微生物学）	58. 10. 27 ～ 59. 10. 26
Ms　　Akanesi	（医療事情視察）	59. 3. 5 ～ 59. 3. 23
Mr　S. Foliaki	（食品・水検査）	59. 2. 26 ～ 60. 2. 25

59 年度

Mr (Dr) S. Moala	（組織病理学）	59. 10. 7 ～ 60. 10. 3
Ms　L. Uta	（生化学）	59. 11. 3 ～ 60. 11. 3
Mr　T. Vi	（機材保守）	60. 2. 20 ～ 60. 3. 27

60 年度

Mr　V. Pakalani	（血液学）	61. 1. 9 ～ 61. 12. 24
Mr　P. Topou	（生化学）	60. 7. 25 ～ 61. 7. 23

61 年度

Mr　S. Maka	（食品・水質検査）	61. 5. 11 ～ 61. 9. 10
Mr　L.S. Teletoni	（　〃　）	61. 9. 7 ～ 61. 9. 28
Mr　V. Tangi	（病理）	

調　査　団

事前調査（WHOと合同）　　56. 8. 14 ～ 8. 29

金井興美	国立予防衛生研究所細菌第一部長
入山文郎	厚生省公衆衛生局保健情報課長
曽我紘一	厚生省環境衛生局水道環境部計画課課長補佐
塚田幸三	国際協力事業団医療協力部医療協力課

実施協議調査　　56. 12. 7 ～ 12. 18

宍戸亮	国立予防衛生研究所長
織田肇	厚生省大臣官房総務課課長補佐
市田八洲	厚生省公衆衛生局保健情報課検疫所管理室
杉山長	外務省経済協力局技術協力第２課
塚田幸三	ＪＩＣＡ医療協力課

実施設計調査　　57. 3. 29 ～ 4. 7

海佐裕幸	総括	広島県衛生研究所長
山本泰次（単発派遣）伝染病対策		県立広島病院
小塚良雄	建築設計指導	厚生省医務局整備課
河田俊郎	建築設計	石本建築事務所
村上弘	医療機器	〃　嘱託
塚田幸三	業務調整	ＪＩＣＡ医療協力部

計画打合せ調査　58. 6. 13 ～ 58. 6. 26

大橋誠	東京都立衛生研究所衛生物部長
宇野圭一	愛知県衛生研究所食品薬品部長
森尾真介	厚生省公衆衛生局保健情報課課長補佐
伊藤清臣	ＪＩＣＡ医療協力課長

巡回指導調査　　59. 9. 9 ～ 59. 9. 18

井上裕正	愛知県衛生研究所長
長谷川豊	ＪＩＣＡ医療協力部長
野崎貞彦	厚生省保健医療協感染症対策課長

猪狩　　淳　順天堂大学医学部臨床病理学助教授

曳地和博　JICA医療協力部管理課

機材修理チーム　60. 2. 5 ～ 60. 2. 16

松木博之　（JICA）

清水　久　（大協器械）

古川尚久　（　〃　）

今村辰也　（トミー精工）

エバリュエーション調査　61. 10. 14 ～ 61. 10. 25

宍戸　亮　鳳川診療所長

猪狩　淳　琉球大学教授

河野均也　日本大学教授

山口英世　帝京大学教授

宮崎元伸　厚生省生活衛生局食品保健課検疫所業務管理室

小早川隆敏　JICA医療協力課長

57年度　供与機材　　（資料7－4）

番号	品名及び仕様	メーカー名	数量	単価	金額
1	高圧蒸気滅菌器	平山	2式	1,600,000	3,200,000
	ＭＣＳ－３－Ｃ　手動式				
	キャビネット型　スチーム用				
	減圧弁とストレーナを付ける				
	図番MeSz－772008－Z				
	特別附属品				
	金網カゴ　　4ケ				
	上辺36×下辺20×高さ15×奥行43cm				
2	定温乾燥器	平沢	2台	750,000	1,500,000
	ＦＦＳ－８　　手動式				
	温度調節範囲　50~220℃				
	内法　80×60×60cm				
	特別附属品				
	金網カゴ　25×25×25　　3ケ				
3	硬水軟化装置	オルガノ	1		1,230,000
	ＴＳＦ－５				
	特別附属品				
	前処理装置				
	ハウジングフィルター　　90				
	イオン交換樹脂　　3式				
4	オートスチール	ヤマト	1		1,590,000
	ＷＧ－３２				
	蒸留水検取量　　約1.8ℓ/h				
	貯蔵タンク　　20ℓ				
	外寸　62.6×63.2×115cm				
	特別附属品				
	活性炭フィルター　　36ケ				
	缶石洗浄剤　1kg　　18ケ				
	冷却水循環装置				
	ＣＷ－４１　　1				
	同上台　　1				
	イオン交換樹脂　　5式				

番号	品名及び仕様	メーカー名	数量	単価	金額
5	煮沸槽	アコマ	1		480,000
	S－045				
	内寸法　45×36×30cm				
6	孵卵器	平沢	4	455,000	1,820,000
	H－8－C				
	内寸　80×50×60cm				
	両前開扉				
	特別附属品				
	試験管　18×180　500本				
	同上台　18×50　5台				
	孵卵器				
	H－10－C	平沢	1		615,000
	内寸　100×50×70cm				
	両前開扉				
	特別附属品				
	シャーレー　9cm　硝子　200枚				
	同上カゴ　2台				
7	孵卵器ウォータージャケット	平沢	1		1,640,000
	WJ－62　特注品				
	CO_2 コントロールはなしの物				
8	マッフル炉	東洋	1		480,000
	ESF－3				
	最高温度　1200℃				
	最高温度到達時間　180分				
	内寸　18.8×36.5×15.3cm				
	特別附属品				
	ルツボ　24ケ				
	ルツボ挟　1ケ				
	ルツボ架台　2ケ				
9	マイクロプレート光度計	日製	一式		2,290,000
	MTP－12　プリンター付				
	測定範囲吸光度				
	－0.100 ～ 1.999				

番号	品名及び仕様	メーカー名	数量	単価	金額
	波長　405,450,500,550,610, 660　高性能干渉フィルター				
	波長幅　8～12				
	特別附属品				
	ランプ　3ケ				
	チャート　25巻				
10	PHイオンメーター	日製	一式		325,000
	M-8S				
	ガラス電極法				
	標準目盛　PH0～14				
	特別附属品				
	電極　6328-10C　1本				
	標準液　102S　1				
	アダプター　1				
11	双眼顕微鏡	松吉	4台	635,000	2,540,000
	BHS-113				
	特別附属品付				
	スペアランプ　6ケ付				
	スライドグラス　500枚	松浪			
	カバーグラス　18×18　5,000枚	松浪			
	計算器ノイバエル又は	萱垣			
	フックスローゼンタール　1セット				
	染色バットワク付　2	村中			
	ピペット瓶キャップ付　2	水			
12	高速冷却遠心機	日製	一式		2,340,000
	SCR-20B				
	アングルローターRPR-202-2　1ケ				
	RPR-16　1ケ				
	Aアッセンブリ　1				
	バランサー　1				
	50PAチューブ　10ケ				
	80PAチューブ　10ケ				

番号	品名及び仕様	メーカー名	数量	単価	金額
13	恒温水槽	平沢	2台	290,000	580,000
	WT－5A				
	使用温度（常温＋5℃）～＋80℃				
	温度精度 ±0.1℃				
	攪拌機 側面スクリュー型				
	特別附属品				
	同上フタ W－5－C 1ケ				
	試験管 12×105 200本	日電			
	試験管立 12×50 2台	〃			
14	電気泳動装置	日製	一式		520,000
	EP－300B				
	特別附属品				
	セルローズアセチート膜 50入 10				
	沪紙 20入 10				
	バルビタール 5ケ入 5				
	パンソー3R 25g入 2				
	トソクロール酢酸 25g入 2				
	デカリン 500g入 1				
	ピンセット 4ケ入 1				
	パワーボックス 1				
15	ビルリビンメーター	エリマ	一式		280,000
	333				
	特別附属品				
	スペアーバルブ 10ケ付				
16	実習用双眼顕微鏡	オリンパス	4	157,000	628,000
	CHB－213				
	特別附属品				
	スペアーランプ付				
	収容箱付				
17	血中ガス分析装置	カヤガキ	1		285,000
	0760				
	特別附属品付				
	ガラス器具一式				

番号	品名及び仕様	メーカー名	数量	単価	金額
18	クリーンベンチ PCH－1302－CNG 集じん率　99.9%以上 （0.3μ粒子径にて） 外寸　130×100×160cm テーブル面　SUS ヘアーライン研磨板	日立	1		1,370,000
19	ドラフトチャンバー SA－2F－120 寸法　120×75×235 外装　木製　耐熱処理塗装 内装　アスベスト板焼付塗装 流し部　鉛　ライニング加工 特別附属品 排間機　MFC－200 給水栓　1ケ ガス栓　1ケ		1		810,000
20	血液保冷庫 MBR－505 温度範囲　－10～35℃ 内寸　64×55×124cm 特別附属品 記録紙　1函	サンヨー	1		610,000
21	実体顕微鏡　三眼式 SZ－TR－2型 特別附属品 万能照明装置　LSD TE－II付 検眼架台（X－DE） スペアーランプ（TB－1）　6ケ 〃　X－OE　F 240V　20W　6ケ 小型カメラ　PM－6	オリンパス	1		540,000

番号	品名及び仕様	メーカー名	数量	単価	金額
	露出計　EMM－7				
	スライドグラス　500枚	松浪			
	カバーグラス　18角　500枚	〃			
22	蛍光顕微鏡	オリンパス	1		900,000
	BHF－342				
	特別附属品付				
	スペア水銀灯　2ケ				
	スペア電球　6ケ				
23	上皿天秤	長計	2	490,000	980,000
	CT3－200				
	秤量　200g				
	読取限度　0.1mg				
24	遠心沈殿器	トミー	1		
	CD－50SR				
	50cc×4本　15cc×24本　兼用				
	回転数　4,000MAX				
	最大遠心力　2,700G				
	特別附属品				
	遠心管　50mℓ　4本				
	〃　15mℓ　48本				
1	材料運搬車	エレクターシェルフ	3	58,000	174,000
	UTTI－S				
	3段棚付				
2	冷凍冷蔵庫	サンヨー	4	115,000	460,000
	SR－1001				
	252ℓ				
3	低温フリーザー		2	196,000	392,000
	MDF－330				
	温度範囲　－20 ～ －30℃				
	内寸　49×48.5×129cm				

番号	品名及び仕様	メーカー名	数量	単価	金額
4	タイプライター　英文	オリベッティ	一式		312,000
	ET－121電動式				
	特別附属品				
	同上架台				
	カーボンリボン　1函				
	修正リボン　1函				
5	手動式英文タイプライター	オリベッティ	1		75,000
	12″　42キー				
	特別附属品				
	タイプリボン　1打				
	スタンド　1台				
6	卓上計算機	カシオ	1		76,000
	12桁　プリンター付				
	特別附属品				
	ロールペーパー付				
7	ミニプリンター電卓	カシオ	2台	13,000	26,000
	10桁				
8	乾式複写機	リコー	1台		757,000
	特別附属品				
	ペーパー　B4　5函				
	A4　5函				
	B5　5函				
	現像剤　42本				
	複写機トナー　12本				
	テーブル　1台				
	パーツセット　1式				
10	電圧安定装置　PCH－100－20	菊水	1		700,000
	1kW用		4	500,000	2,000,000
	合計				

58年度　供与機材　(1)

番号	品名及び仕様	メーカー名	数量	単価	金額
	昭和58年度トンガ国				
	日本/WHO合同保健衛生検査所				
	プロジェクト向け供与機材				
1	側面実験台	協立製作所	2台	83,250	166,500
	型式：TB－I				
	900×750×900(1110)mm				
	本体材質　ポリエステル樹脂合板				
2	側面実験台	〃	17台	101,500	1,725,500
	型式：TB－II				
	1200×750×900(1110)mm				
	本体材質　ポリエステル樹脂合板				
3	側面実験台	〃	12台	142,000	1,704,000
	型式：TB－II				
	1500×750×900(1110)mm				
	本体材質　ポリエステル樹脂合板				
4	流し台				
	型式：MD－II	〃	10台	155,800	1,558,000
	1200×750×900(1110)mm				
	本体材質　ポリエステル樹脂合板				
5	中央実験台	〃	1台		828,000
	型式：KF－II				
	3000×1500×900(2050)mm				
	本体材質　ポリエステル樹脂合板				
6	中央実験台	〃	5台	946,000	4,730,000
	型式：KF－II				
	3600×1500×900(2050)mm				
	本体材質　ポリエステル樹脂合板				
7	コーナー台	〃	6台	134,800	808,800
	型式：TW－II				
	950×950×900(1110)mm				
	本体材質　ポリエステル樹脂合板				

番号	品名及び仕様	メーカー名	数量	単価	金額
8	側面実験台	協立製作所			
	型式：TB－Ⅱ				
	1800×750×900(1110)㎜		1台		167,000
	1850×750×900(1110)㎜		1台		167,000
	本体材質　ポリエステル樹脂合板				
9	側面実験台	〃	2台	166,000	332,000
	型式：TB－Ⅱ				
	1800×750×900(1110)㎜				
	本体材質　ポリエステル樹脂合板				
10	側面実験台	〃	2台	222,300	444,600
	1500×600×900㎜				
	本体材質　ステンレスSUS304				
11	流し台	〃	1台		213,900
	1500×750×900(1050)㎜				
	本体材質　ステンレスSUS304				
12	ラック	〃	1台		211,400
	1500×750×1800㎜				
	本体材質　ステンレスSUS304				
13	作業台	〃	1台		131,600
	1500×750×900(1050)㎜				
	本体材質　ステンレスSUS304				
14	器具保管棚	〃	5台	353,300	1,766,500
	1520×460×1830㎜				
	本体材質　スチールクロームメッキ				
15	測定器台	〃	5台	129,400	647,000
	型式：BL－Ⅱ				
	1500×750×800㎜				
	本体材質　ポリエステル樹脂合板				
16	平秤台	〃	1台		339,400
	型式：BU－Ⅱ				
	900×750×750㎜				
	本体材質　ポリエステル樹脂合板				

番号	品名及び仕様	メーカー名	数量	単価	金額
17	側面実験台 型式：FB－Ⅱ 900×750×800㎜ 本体材質　ポリエステル樹脂合板	協立製作所	1台		75,000
18	側面実験台 型式：TB－Ⅱ 1040×750×900(1110)㎜ 本体材質　ポリエステル樹脂合板	〃	1台		87,000
19	側面実験台 型式：FB－Ⅱ 1500×750×900(1110)㎜ 本体材質　ポリエステル樹脂合板	〃	1台		146,800
	合計				16,250,000

58年度　供与機材　(2)

番号	品名及び仕様	メーカー名	数量	単価	金額
1	シーリングファン，EFD-56CK 5スピード ロータリースイッチ付・240V　1φ	サンヨー	7台	26,000	182,000
2	ルームクーラー，PA-2140C 冷房能力　2,800kcal/H以上 240V　1φ	日立	4台	172,000	688,000
3	排気ファン，VFH-25J プレードダイア　250㎜ 埋込寸法300㎜口，防雨フード付	東芝	5台	14,900	74,500
4	オフィスデスク　L-3D 1,370×740×635	ライオン	4	58,000	232,000
5	研修用机　&　椅子 机　LD-107F 椅子　25.0　〉組	〃	15組	51,000	765,000
6	椅子，790　肘掛け付	〃	15	25,000	375,000
7	椅子，310　キャスター付	〃	12	11,000	132,000
8	会議室用テーブル CR-15　2台 C-5　2台　〉組合せ	〃	1組	340,000	340,000
9	椅子，824　肘掛無し　700H	〃	12	16,000	192,000
10	ソファー，F-540	〃	3	90,000	270,000
11	キャビネット 535，ガラス扉，棚板2枚(上) 530，スチール〃，〃　(下)　組 ベース　(3×3)	〃	5組	47,000	235,000
12	ファイリングキャビネット B4-4(B4-4段)	岩本	6	45,500	273,000
13	ラボカート，LCH-71 450×770×820H	ヤマト	2	19,000	38,000
14	ラボカート，LCW-62 ポリバスケット，水受4ケ付 キャスター付	ヤマト	6	31,000	186,000

番号	品名及び仕様	メーカー名	数量	単価	金額
15	ロッカー　72 2人用，網棚，鏡，傘立，タオル掛け付	岩本	2	30,000	60,000
17	オーバーヘッドプロジェクター FP－K5 スペア，ハロゲンランプ（2ケ）付 ダウントランス付	スライダック	1式	274,000	274,000
18	導電率メーター　UC－33型 3電極方式 0～1,990　us/cm 0～19,900　〃　} 切替方式測定 温度補償範囲 0℃～50℃ 240V，50Hz，1φ	セントラル	1	250,000	250,000
19	濁度計　HACH－2100E 240V，50Hz，1φ	〃	1	680,000	680,000
20	BODインキュベーター 温度範囲　0～50℃ 内法　40×40×40cm，AC240V，50Hz，1φ 温調器　スペア1ケ付	池本	1	980,000	980,000
21	ミクロキルダール窒素定量装置 分解装置，蒸留装置，滴定装置含む 240V，1φ，50Hz，マントルヒーター付	池本	1	182,000	182,000
22	デスカッション顕微鏡　BHS－DO－1型 デスカッション装置（BH_2－DO－1） 鏡筒（BH_2－Bi30，BH_2－TR30）各1 対物 splan 4×，10×，20×，40×，100×（各1） 接眼WHK〔10×(2)，10×H(1)〕，35-WHK10×(1) NFK3.3×(1) ハロゲンランプ；スペア6ケ TDO用　〃　；スペア6ケ　} 付	オリンパス	1	890,950	890,950
23	孵卵器（台脚付）　IC－62 室温　＋5℃～60℃ 内寸　600×500×500	ヤマト	1	225,000	225,000

番号	品名及び仕様	メーカー名	数量	単価	金額
24	オートクレーブ HP－15 (B)	平山	1	160,000	160,000
	ハンデークレーブ				
	150φ×38, 7ℓ				
	常用1kg/cm²/121℃～2kg/cm²/132℃				
	滅菌タイマー ～60分				
25	ウォーターバス KU－21	サクラ	1	91,800	91,800
	室温 +5℃～60℃				
	内寸 310×295×130				
26	炎光々度計 2524 ANA10 BL	池本	1	560,000	560,000
	240V, 50Hz, 1φ				
28	水銀血圧計 JE－624	風雲堂	5	6,500	32,500
	スペアーガラス管 1本付				
29	ピペット洗浄器 2156－409	池本	1	19,000	19,000
30	同上用円筒コンテナー	池本	3	7,000	21,000
31	吊下げ秤 10g～1,000g	〃	4	1,500	6,000
32	ステン缶 20×20×15cm	〃	10	7,000	70,000
33	ピペット滅菌缶	〃	10	4,000	40,000
	ステン 7×8×40cm				
34	自動血球計数装置 M－430	日科機	1	3,300,000	3,300,000
	内訳 本体 1ケ				
	ダイリューター 1ケ				
35	デスペンサー 10mℓ	池本	1	31,000	31,000
	ソコレクス				
36	SPC実験キット 3091－1	〃	1式	71,000	71,000
37	微量ピペット 0.005 mℓ	〃	60	900	54,000
	0.02 mℓ	〃	60	900	54,000
38	全量ピペット 2040	〃	60組	1,650	99,000
	1, 2, 3, 5, 10mℓ 組/各1				
39	メスピペット 2010	〃			
	0.1, 0.2, 0.5mℓ 組/各1		120組	1,950	234,000
	1, 2, 5, 10, 25mℓ 組/各1		180組	2,720	489,600
40	ピンセット 曲, 無鉤, 約125人	風雲堂	6	1,000	6,000
	広巾, 曲, 有鉤, 約115人		6	1,200	7,200

番号	品名及び仕様	メーカー名	数量	単価	金額
41	マイクロピペット，ジャスター1100F	池本	5組	85,000	425,000
	20，50，100，200，500μℓ 組/各1				
	同上用チップ 250ケ/組当り付				
42	ポリスチレンチューブ №2054	〃			
	12×75，キャプ付(滅菌済)		1,000本	42	42,000
	12×75，キャプ無し		1,000本	20	20,000
43	試験管 バイエル 直口 18×165	〃	600	45	27,000
44	同上用モルトンキャップ B－18	〃	600	168	100,800
45	試験管 バイエル 直口 12×105	〃	1,200	31	37,200
46	同上用モルトンキャップ B－13		1,200	148	177,600
47	試験管カゴ，ステン 15×15×15cm	〃	12	2,000	24,000
	〃 10×10×10cm		12	1,500	18,000
48	試験管立，ポリプロピレン	〃			
	40本立 13×16		12	4,000	48,000
	〃 16×20		12	4,000	48,000
	24本立 21×25		12	4,000	48,000
49	ビーカー，シバタ 100mℓ	〃	10	195	1,950
	300mℓ		10	270	2,700
	500mℓ		10	410	4,100
	1,000mℓ		10	710	7,700
50	三角フラスコ，タイストン 800mℓ	〃	20	1,050	21,000
	500mℓ		10	550	5,500
	1,000mℓ		10	1,050	10,500
	2,000mℓ		5	2,080	10,400
51	トヨタ CRESSIDA 2000cc		1		1,284,900
	合計				13,950,000

59年度　供与機材

番号	品　名　及　び　仕　様	メーカー名	数量	単　価	金　額
	(A) 検査用機材				
1	エレクトロライトシンテム	ベックマン	1式		3,000,000
	Na / K分析装置, 半自動式	659306			
	標準附属品付, 240 V. 50 Hz.				
	特別附属品：				
	1. プリンターペーパー, 5本入	J-3316	10ケ	4,000	40,000
	2. 試薬キット	659500	4式	21,000	84,000
	構　成：				
	1) 希釈液, 2,000 mℓ　1ケ				
	2) 内部標準液　　1ケ				
	3) 血清用標準液　　1ケ				
	3. サンプルカップ, 0.5 mℓ　1,000ケ入	J-3317	4式	11,500	46,000
	4. 同　上　2.0 mℓ　1,000ケ入	J-3318	4式	11,500	46,000
	5. 同　上　0.25 mℓ　1,000ケ入	J-3319	4式	11,500	46,000
	6. セルクリーナー, 25 mℓ	659520	4ケ	2,000	8,000
	7. K電極チップ	669117	2ケ	22,000	44,000
	8. K電極	669114	2ケ	64,000	128,000
	9. Na電極	668295	2ケ	56,000	112,000
2	セラライザー	AMES	1式		2,200,000
	構　成：				
	1) セラライザー, 本体　1台				
	2) 専用試験紙, 50枚入, 各4ケ				
	1. クレアチニン				
	2. BUN				
	3. 尿　酸				
	4. CPK				
	5. LDH				
	6. 総ビリルビン				
	7. グルコース				
	8. コレステロール				
	9. ヘモグロビン				
	3) テストモジュール　9ケ				
	(上記9項目)				

番号	品名及び仕様	メーカー名	数量	単価	金額
	4) マルチコンポーネント				
	カリブレーターキット				
	(三種組合せ) 4組				
	標準附属品付, 240V. 50Hz.				
3-1	ソロマチック遠心器	クボタ	1式		350,000
	標準附属品付, 240V. 50Hz.	KN-70			
	特別附属品:				
	1. バケット 4ケ	0314A			
	2. 広口ネジフタ付遠心管 30㎖ 100本	3119			
3-2	ソロマチック遠心器	クボタ	2式	140,000	280,000
	標準附属品付, 240V. 50Hz.	KA-2200			
	特別附属品:				
	1) セロマチックローター		2枚	70,000	140,000
	2) 遠心管, 12.5×75㎜ 1,000本入		1箱		15,000
4	ローテーター	池本	3式	180,000	540,000
	標準附属品及びトランス付	VXR-7			
5	スライドグラスキャビネット	池本	3台	30,000	90,000
	スチール製, 引出数: 12ケ				
	1引出のスライド収納数: 150枚				
6	血液凝集反応観察箱	池本	4台	40,000	160,000
	標準附属品付, 240V. 50Hz.				
	特別附属品:				
	1) スペアーランプ		4ケ	3,000	12,000
7	オートマチック電子恒温槽	池本	1台		260,000
	標準附属品付, 240V. 50Hz.	1832A			
8	インターバルタイマー 60分用	松吉	4ケ	8,000	32,000
9	マグネチックスターラー	池本	3台	52,000	32,000
	ホットプレート付	4211			
	標準附属品付, 240V. 50Hz.				
	特別附属品:				
	1) テフロンかくはん子 2, 3, 5㎝ 各2ケ		1組		2,000

番号	品名及び仕様	メーカー名	数量	単価	金額
11	双眼顕微鏡	オリンパス	2式	660,000	1,320,000
	標準附属品付，240V．50Hz．	BHS-113			
	特別附属品：スペアーバルブ		12ケ	2,500	30,000
15	電気恒温水槽，サーモマテック	平沢	1台		310,000
	標準附属品，ステンレスフタ及びトランス付	WT-5A			
17	ヘマテックスライドステイナー	AMES	1式		2,300,000
	標準附属品付，240V．50Hz．				
18	PH／血液ガス測定装置	コーニング	1台		6,560,000
	標準附属品付，240V．50Hz．	No．168			
	消耗品：				
	1) PH 6.838 Buffer 450㎖	477068	10ケ	6,700	67,000
	2) PH 7.382 Buffer 450㎖	477073	10ケ	7,600	76,000
	3) Flush Solution Concetrate	477991	10ケ	120000	120,000
	4) PO2 Electrolyte 475㎖	477019	3ケ	10,000	30,000
	5) PCO2 Electrolyte 475㎖	477020	3ケ	10,000	30,000
	6) 4M KCL 125㎖	477428	5ケ	3,000	15,000
	7) 1N KOH	477434	5ケ	3,000	15,000
	8) Electrode Cleaning Solution	477009	3ケ	10,000	30,000
	9) Reference Electrode Membrane Kit	477378	6ケ	20,000	120,000
	10) KCL Donut Kit	477966	15ケ	6,000	90,000
	11) PO2 Electrode Membrane Kit	477576	6ケ	20,000	120,000
	12) PCO2 Electrode Membrane Kit	477575	6ケ	20,000	120,000
	13) PH Electrode	476221	1ケ		140,000
	14) Reference Electrode	470054	1ケ		33,000
	15) PO2 Electrode	476217	1ケ		140,000
	16) PCO2 Electrode	476219	1ケ		140,000
	17) Rotary Sample Port O-Ring Kit	477746	4ケ	6,000	24,000
19	ガスパック嫌気システム	ガスパック	1ケ		46,000
	標準附属品付	60626			
	特別附属品：				
	1) カタリスト，10袋入	70303	10ケ	6,600	66,000
	2) インジケーター，100枚入	70504	2ケ	9,000	18,000
	3) キャンピパック，10袋入		20ケ	3,000	60,000

番号	品名及び仕様	メーカー名	数量	単価	金額
20	戸過ユニット	ミリポア	2式	86,000	172,000
	フラスコ容量：250㎖	XX1004700			
	標準附属品付				
	特別附属品：				
	1) メンブランフイルター 100枚入	HAWP04700	4ケ	15,000	60,000
	2) 同上, 100枚入	GSWP04700	4ケ	15,000	60,000
	3) フイルターピンセット		4ケ	3,000	12,000
	4) ハンドポンプ	XKEM00107	4ケ	5,000	20,000
	5) チューブ		4ケ	10,000	40,000
21	暗視野顕微鏡	オリンパス	1台		320,000
	標準附属品付, 240V. 50Hz	JM			
	特別附属品：				
	1) スペアーバルブ, 6V. 2A.		6ケ	500	3,000
	2) 同上, 20W. JM		6ケ	500	3,000
22	加圧・減圧ポンプ	ミリポア	2台	145,000	290,000
	標準附属品付, 240V. 50Hz	XX5522050			
26	結核菌検査用クリーンベンチ	池本	1式		1,430,000
	標準附属品付, 240V. 50Hz.	1040-8EC-VP			
28	卓上小型遠心器	クボタ	2台	100,000	200,000
	容量：15㎖×8本架	KA-1000A			
	標準附属品付, 240V. 50Hz.				
29	炎光光度計用部品	東京光電			
	1) 標準液, Na, K, Ca, Li 各1ケ		1式		12,000
	2) エアーコンプレッサー 100V.		1台		80,000
	3) サンプルカップ, 5ケ入		1組		2,000
	4) テフロンチューブ, 5本入		1組		2,000
30	ブンゼンバーナー	池本	30ケ	2,700	81,000
	プロパンガス用, ガスホース3m付				
31	PHメーター	東亜電波	3台	100,000	300,000
	標準附属品付, 240V. 50Hz.				
	特別附属品：				
	1) 粉末緩衝剤, PH 6.86 500㎖×10ケ分		3ケ	5,000	15,000
	2) 粉末緩衝剤, PH 4.01 500㎖×10ケ分		3ケ	5,000	15,000
	3) KCL溶液, 100㎖		3ケ	1,000	3,000

番号	品名及び仕様	メーカー名	数量	単価	金額
40	フォトBHメーター，直読式	三光純薬	1式		400,000
	ヘマトクリット管：ヘパリン，				
	プレイン，各1,000本付				
	トランス付				
	特別附属品：				
	1) ヘマトリクット管，1,200入 ヘパリン		3ケ	6,000	18,000
	2) 同 上，プレイン，1,200入		3ケ	4,000	12,000
	3) 光源電球，3ケ入		2組	6,000	12,000
41	小型高圧滅菌器	ヤマト	2式	490,000	980,000
	標準附属品付，240V．50Hz	SDA-24			
	特別附属品：				
	1) 滅菌用カゴ 4ケ				
42	1) 上皿天ビン	池本	1台		130,000
	標準附属品付	TOP-E-500			
	2) 上皿天ビン	〃	2台	60,000	120,000
	標準附属品付	TOP-E-200			
43	血圧計，デジタル式	オムロン	3式	12,000	36,000
	(B) 一般機材				
10	インターホン，対話用	アイホン	1式		400,000
	構成：				
	1) インターホン，10局用 11ケ	LAF-10			
	2) アダプター 1ケ	PS-12A			
	3) ケーブル，100m 3ケ				
12	複写機	リコー	1式		476,500
	標準附属品及びトランス付	FT-3020			
	特別附属品：				
	1) ペーパー，A4，2500枚入		15箱	5,500	82,500
	2) 同 上，B4， 〃		10箱	8,000	80,000
	3) 同 上，B5， 〃		10箱	5,000	50,000
	4) 現像剤，1kg入		2ケ	100,000	200,000
	5) トナー，150g入		12ケ	5,000	60,000
	6) パーツセット（ドラムなし）		1式		30,000
	7) シリコンオイル		5ケ	6,000	30,000

番号	品名及び仕様	メーカー名	数量	単価	金額
13	電動タイプライター	オリベッティ			
	標準附属品及びトランス付	ET-111	2台	200,000	400,000
	特別附属品：				
	1) カーボンリボン，6ケ入		4箱	10,000	40,000
	2) 修正テープ，4ケ入		2箱	3,000	6,000
25	ビデオシステム	ソニー	1式		1,050,000
	構成：				
	1. ビデオカメラ，ACアダプター付，	BMC-100PK			
	PAL方式 1台				
	2. カメラケース 1ケ	LC-710			
	3. カメラジャケット 1ケ	LC-810			
	4. バッテリーパック 3ケ	NP-11			
	5. ビデオカセットレコーダー 1台	SL-T30ME			
	6. カラービデオモニター 1台	PVM-2010QM			
	7. BNCコード，2m 1ケ	UGC-2			
	8. 接続コード，1m 1ケ	RK-50A			
	9. POPコンソール 1ケ	SU-502			
	10. ビデオカセットテープ 24ケ	L-500HG			
	標準附属品付，240V．50Hz．				
27	映写スクリーン，1.5×1.5m	エルモ HW-3	1ケ		32,000
37	床みがき器	日立	1式		210,000
	標準附属品及びトランス付	SF-R352			
38.	自動電圧調整器				
	1) 入力電圧3相3線415V．	カスガ	1式		220,000
	出力電圧単相2線，240V．4kVA．50Hz．				
	2) 入力電圧単相2線，240V．	カスガ	2式	180,000	360,000
	出力電圧単相2線，240V．4kVA．50Hz．				
	標準附属品付				
44	ビデオカセットテープ	ソニー	20ケ	3,200	64,000
	ベータマックス用	L-500UX			
	合計				28,430,000

60年度　供与機材

番号	品名及び仕様	メーカー名	数量	単価	金額
1	ジャスターチップ，青　1,000ケ入	池本	1		9,000
	〃　，赤　1,000ケ入	〃	3	9,000	27,000
2	ディスポシリンジ，針なし　5㎖	テルモ	1,000	26	26,000
	〃　，〃　10㎖	〃	1,000	37	37,000
	〃　，〃　20㎖	〃	500	32	16,000
3	ディスポ針　23G×1／2″　100入	テルモ	10	870	8,700
4	安全ピペッター　池本2,118A	池本	2	1,300	2,600
5	オストワルドピペット　池本3,364　0.1㎖	池本	10	740	7,400
	〃　〃　0.2㎖	〃	10	740	7,400
	〃　〃　0.4㎖	〃	10	740	7,400
	〃　〃　0.5㎖	〃	10	640	6,400
6	アキュペンサー　池本2,124　10㎖	池本	2	24,000	48,000
7	ストップウォッチ	池本	2	13,500	27,000
8	数取器　池本2,055	池本	5	850	4,250
9	ピペット洗滌器　池本2,051	池本	1		17,000
10	顕微鏡　CHB213	松吉医科	5	165,000	825,000
11	超低温冷蔵庫　220V　50Hz	日本フリーザー	1		1,000,000
	−80℃　日本フリーザー　BF−310				
12	吊り下げ秤り　秤量　2,000g　オーハウス	池本	6	1,680	10,080
13	カーボイ(角)　ナルゲン2,320，2ガロン	ナルゲン	6	16,500	99,000
14	洗瓶　500㎖　ナルゲン2,402	ナルゲン	12	820	9,840
15	計測板	池本	1		13,000
16	ピンセット(先曲り)　K−6　13cm	池本	6	1,400	8,400
17	脚長ロート，100φ　6,180FNL	池本	12	1,200	14,400
	〃　，150φ	池本	6	1,400	8,400
18	ダイモラベルメーカー　井内8−041−01	井内	1		7,000
19	交換テープ，9㎜(赤)	井内	10	500	5,000
	〃　，〃　(青)	井内	10	500	5,000
	〃　，〃　(黒)	井内	10	500	5,000
	〃　，〃　(黄)	井内	10	500	5,000
20	トーマ氏血球計算器　トーマ	池本	6	17,800	106,800
21	ヘモカバーグラス　22×24㎜　10入	池本	3	1,300	3,900
22	ピューレット，10㎖　シバタ	シバタ	3	5,000	15,000

番号	品名及び仕様	メーカー名	数量	単価	金額
23	サンプルバイアル，ウィートン224884　8mℓ，144入	池本	2	11,400	22,800
24	バイアルラック　ウィートン225214	池本	3	820	2,460
25	フラスコ用ブラシ	池本	12	260	3,120
26	万能ブラシ	池本	12	440	5,280
27	テストチューブ用ブラシ(大)	池本	12	60	720
28	テストチューブ用ブラシ(小)	池本	12	50	600
29	メスピペット　0.5mℓ　シバタ2011	シバタ	50	420	21,000
	1 mℓ　〃	シバタ	50	250	12,500
	2 mℓ　〃	シバタ	50	260	13,000
	5 mℓ　〃	シバタ	100	320	32,000
	10 mℓ　〃	シバタ	100	400	40,000
30	ポリビーカー，1ℓ　ヤマトP31-07	ヤマト	10	320	3,200
	〃　，2ℓ　〃　P11-09	ヤマト	10	380	3,800
31	丸底フラスコ　シバタ　500mℓ	シバタ	10	770	7,700
32	パイエル試験管　シバタ　13×100	シバタ	500	30	15,000
	〃　〃　15×150	シバタ	500	40	20,000
33	広口試薬瓶　池本　250mℓ	池本	50	1,000	50,000
34	ポリ広口瓶　250mℓ	池本	50	80	4,000
35	クリーニングクロス　P51-83	池本	25	2,400	60,000
36	ウェス　T11-23　φ300㎜	池本	5	4,000	20,000
37	ステン試験管台，池本7076　13×100用 50穴	池本	5	1,800	9,000
38	ガスライター　井内KM型	井内	3	3,000	9,000
39	白金耳用ニクロム線　0.5φ㎜	池本	2m	1,200	2,400
40	ディスペンサー　20mℓ　ソコレックス	池本	2	37,000	74,000
41	無菌室用バーナー	池本	1		25,000
42	電子上皿天秤　メトラーPE-3600	メトラー	1		222,000
43	分光光度計，日立100-21　UV-VIS，オートフローセル　デジタルプリンター付	日立	1		2,180,000
44	振とう機　ヤマト　SA-31 分液ロートホルダー　4本 三角フラスコホルダー　1ケ付	ヤマト	1		221,000
45	マグミキサー　ヤマト　MD-21	ヤマト	2	36,000	72,000

番号	品名及び仕様	メーカー名	数量	単価	金額
46	ハンディアスピレーター ヤマト WP-45	ヤマト	1		85,000
47	ロータリーエバポレーター, ヤマト RE-46A	ヤマト	1		167,000
	アームジャッキ(JK-20) 水浴(BM-1)付				
48	エースホモジナイザー, 日本精機	日本精機	1式		215,000
49	分液ロート (50) シバタ 1421- 50A	シバタ	5	3,060	15,300
50	〃 (100) 〃 1421- 100A	シバタ	5	4,090	20,450
51	〃 (200) 〃 1421- 200A	シバタ	5	4,790	23,950
52	〃 (300) 〃 1421- 300A	シバタ	5	5,100	25,500
53	〃 (500) 〃 1421- 500A	シバタ	5	5,650	28,250
54	〃 (1,000) 〃 1421-1000A	シバタ	3	8,790	26,370
55	共栓メスフラスコ (50) シバタ 2306- 50A	シバタ	10	1,240	12,400
56	〃 (100) 〃 2306- 100A	シバタ	10	1,310	13,100
57	〃 (200) 〃 2306- 200A	シバタ	10	1,740	17,400
58	〃 (250) 〃 2306- 250A	シバタ	5	2,000	10,000
59	〃 (500) 〃 2306- 500A	シバタ	5	2,310	11,550
60	〃 (1,000) 〃 2306-1000A	シバタ	3	2,500	7,500
61	共栓三角フラスコ(200) 〃 1033- 200A	シバタ	10	1,050	10,500
62	(300) 〃 1033- 300A	シバタ	10	1,330	13,300
63	(500) 〃 1033- 500A	シバタ	5	1,560	7,800
64	(1,000) 〃 1033-1000A	シバタ	3	2,570	7,710
65	(2,000) 〃 1033-2000A	シバタ	3	4,100	12,300
66	吸引瓶 (1,000) 〃 1781-1,000A	シバタ	2	2,740	5,480
67	青筋ビューレット (25) 〃 2183-25	シバタ	3	8,090	24,270
68	褐色ビューレット (25) 〃 2132-25	シバタ	3	8,550	25,650
69	青筋自動ビューレット(10) 〃 2255-10	シバタ	2	30,600	61,200
70	褐色自動ビューレット(10) 〃 2253-10	シバタ	2	30,600	61,200
71	細口試薬瓶 (120) 〃 1703- 120A	シバタ	20	1,030	20,600
72	〃 (250) 〃 1703- 250A	シバタ	20	1,170	23,400
73	〃 (500) 〃 1703- 500A	シバタ	5	1,460	7,300
74	〃 (1,000) 〃 1703-1000A	シバタ	5	3,090	15,450
75	褐色試薬瓶 (120) 〃 1704- 120A	シバタ	20	1,250	25,000
76	〃 (250) 〃 1704- 250A	シバタ	20	1,420	28,400
77	〃 (500) 〃 1704- 500A	シバタ	5	1,770	8,850

番号	品名及び仕様	メーカー名	数量	単価	金額
78	褐色試薬瓶 (1000) シバタ 1704-1000A	シバタ	5	3,620	18,100
79	ビーカー (000) 〃 1002- 100A	シバタ	20	192	3,840
80	〃 (200) 〃 1002- 200A	シバタ	20	195	3,900
81	〃 (500) 〃 1002- 500A	シバタ	10	408	4,080
82	〃 (1000) 〃 1002-1000A	シバタ	5	768	3,840
83	〃 (2000) 〃 1002-2000A	シバタ	3	1,880	5,640
84	共栓試験管 (25) 〃 1228- 100A	シバタ	25	510	12,750
85	共栓メスシリンダー (100) 〃 2353- 100	シバタ	5	2,310	11,550
86	〃 (500) 〃 2353- 100	シバタ	5	5,240	26,200
87	〃 (1000) 〃 2353-1000	シバタ	2	7,940	15,880
88	共栓比色管 (50) 〃 0841- 51A	シバタ	15	1,180	17,700
89	〃 (100) 〃 0841- 101A	シバタ	15	1,500	22,500
90	全量ピペット (1) 〃 2040- 1A	シバタ	10	260	2,600
91	〃 (2) 〃 2040- 2A	シバタ	10	260	2,600
92	〃 (3) 〃 2040- 3A	シバタ	10	300	3,000
93	〃 (5) 〃 2040- 5A	シバタ	15	300	4,500
94	〃 (10) 〃 2040- 10A	シバタ	15	400	6,000
95	〃 (20) 〃 2040- 20A	シバタ	10	520	5,200
96	〃 (25) 〃 2040- 25A	シバタ	10	580	5,800
97	〃 (50) 〃 2040- 50A	シバタ	5	790	3,950
98	〃 (100) 〃 2040- 100A	シバタ	3	1,440	4,320
99	メスピペット (1) 〃 2010- 1A	シバタ	15	250	3,750
100	〃 (2) 〃 2010- 2A	シバタ	15	260	3,900
101	〃 (5) 〃 2010- 5A	シバタ	15	320	4,800
102	〃 (10) 〃 2010- 10A	シバタ	10	400	4,000
103	駒込ピペット (1) 〃 2051- 1A	シバタ	20	280	5,600
104	〃 (2) 〃 2051- 2A	シバタ	20	370	7,400
105	〃 (3) 〃 2051- 3A	シバタ	15	470	7,050
106	〃 (5) 〃 2051- 5A	シバタ	15	470	7,050
107	〃 (10) 〃 2051- 10A	シバタ	10	650	6,500
108	メスシリンダー (50) 〃 2351- 50A	シバタ	10	1,080	10,800
109	〃 (100) 〃 2351- 100A	シバタ	10	1,240	12,400
110	〃 (250) 〃 2351- 250	シバタ	5	1,660	8,300

番号	品名及び仕様	メーカー名	数量	単価	金額
111	メスシリンダー (500) シバタ 2351- 500	シバタ	3	2,890	8,670
112	〃 (1000) 〃 2351-1000	シバタ	2	6,160	12,320
113	筋目ロート (60) 〃 1535- 60A	シバタ	5	1,330	6,650
114	リービッヒ冷却器 (30) 〃 1404- 300	シバタ	3	6,270	18,810
115	吸引瓶 19 日本理化機 100×160㎜	日本理化機	2	12,500	25,000
116	色度用比色管 (100) シバタ 8052- 068	シバタ	10	2,120	21,200
117	pH測定用試験管(5) 東洋 5mℓ用	東洋	10	130	1,300
118	硝酸性窒素還元カラム 三立 GT-56 テフロンコック付	池本	3	15,800	47,400
119	蒸発皿 (100) シバタ 1228- 90A	シバタ	5	1,420	7,100
120	〃 (150) 〃 1228- 100A	シバタ	5	1,900	9,500
121	ソックスレー抽出器 〃 3208- 01 SPCセット	シバタ	3	19,000	57,000
122	ガラスろ過器 シバタ 1311- 302A	シバタ	5	1,560	7,800
123	〃 〃 1311- 303A	シバタ	5	1,560	7,800
124	〃 〃 1311- 304A	シバタ	5	1,560	7,800
125	秤量瓶 〃 1275-1830A	シバタ	4	825	3,300
126	クロマト用噴霧器 〃 4156- 0	シバタ	1式		19,000
127	薄層クロマト展開槽(丸) 50-B4171-1	シバタ	2	4,500	9,000
128	〃 (角) 200-B4171-2	シバタ	2	21,000	42,000
129	水蒸気蒸留装置(組) 日本理化機 JSF-1	日本理化機	1		70,000
130	亜硫酸定量器(組) 〃 157-SET	日本理化機	1		45,000
131	ペーパークロマト展開槽(組) 東洋 TU-1	東洋	1		25,000
132	マイクロシリンダーSGE, ガスクロ工業 10A-FN	ガスクロ工業	2	7,700	15,400
133	マイクロシリンダーSGE, ガスクロ工業 50A-FN	ガスクロ工業	2	7,700	15,400
134	ビュレット挟み, シバタ 4568- 2	シバタ	3	2,170	6,510
135	組立て式架台B型, 〃 4500- 02	シバタ	2	38,380	76,760
136	切欠きリング (50) 〃 4551- 50A	シバタ	10	800	8,000
137	〃 (72) 〃 4551- 72A	シバタ	10	900	9,000
138	〃 (115) 〃 4551- 115A	シバタ	10	980	9,800
139	角型クランプ, 〃 4531- 12A	シバタ	20	480	9,600

番号	品名及び仕様	メーカー名	数量	単価	金額
140	比色管立て, シバタ 4722-5010	シバタ	2	8,200	16,400
141	〃 〃 4722-10010	シバタ	2	8,600	17,200
142	試験管立て, 井内 6-253-15	井内	5	1,720	8,600
143	ロート架台, 〃 2-036-10	井内	2	2,100	4,200
144	ビューレット架台, 〃 6-286-01	井内	2	3,700	7,400
145	ピペットケース, サンコー 1028-01	サンコー	2	54,000	108,000
146	エージングボックス(A-3), 〃 1009-02	サンコー	2	38,000	76,000
147	計量カップ(2ℓ), 〃 3005-05	サンコー	10	750	7,500
148	噴射瓶, 〃 3011-03	サンコー	20	280	5,600
149	クロム硫酸槽, 〃 1065-01	サンコー	2	12,500	25,000
150	同上籠, 〃 1063-01	サンコー	2	5,000	10,000
151	ポリ瓶, 〃 2001-07	サンコー	20	400	8,000
152	〃 〃 2005-04	サンコー	5	2,000	10,000
153	〃 〃 2001-04	サンコー	50	70	3,500
154	S型クランプ, シバタ 4530-12 5ケ入	シバタ	1		3,200
155	両開きクランプ, 50㎜ 〃 4562-50 5ケ入	シバタ	1		5,500
156	両開きクランプ, 100㎜ 〃 4562-100 5ケ入	シバタ	1		8,600
157	3紙(100枚入) 東洋㏇5A 11㎝	東洋	1		1,000
158	3紙(100枚入) 東洋㏇5B 11㎝	東洋	1		1,000
159	3紙(100枚入) 東洋㏇5C 11㎝	東洋	1		1,000
160	3紙(100枚入) 東洋㏇5U 2×40㎝	東洋	1		500
161	ピペット洗浄器 井内 4-005-01 AB-1型	井内	1		5,400
162	安全ピペッター, 〃 6-260-02	井内	2	4,200	8,400
163	トングス, 〃 6-321-03	井内	2	1,890	3,780
164	分液ロート台, 〃 2-038-02 NBR-11	井内	1		12,500
165	分液ロート台, 〃 2-038-03 NBR-12	井内	1		13,000
166	分液ロート台, 〃 2-038-01	井内	1		13,000

番号	品名及び仕様	メーカー名	数量	単価	金額
	NBR－5				
167	磁製るつぼ，日本化学陶　SSA－S（50㎖）	池本	5	1,850	9,250
168	磁製蒸発皿，日本化学陶　丸底－2（120㎖）	池本	10	580	5,800
169	磁製蒸発皿，日本化学陶　丸底－5（250㎖）	池本	10	1,000	10,000
170	残留塩素測定器，　シバタ　8054-03	シバタ	1		9,900
	（オルトトリジン）				
171	同上比色管，　シバタ　8054-0214	シバタ	5	700	3,500
172	メノウ乳針，（棒）　井内　6-680-06	井内	1		19,000
173	B.C.P比色列，　東洋	東洋	1		4,500
174	pH測定セット，　東洋　№C	東洋	1		35,000
175	グラスウール，1㎏，（中）	池本	1		2,400
176	水質試験器，東洋　5号	東洋	1		36,000
177	円筒3紙，東洋　№84（25本入）	東洋	4	3,400	13,600
178	ポリアミド　TLCプレート，メルク	メルク	2	21,500	43,000
	20×20㎝（25入）				
179	シリカゲル　TLCプレート，メルク	メルク	2	12,000	24,000
	20×20㎝（25入）				
180	ホモジナイザーコップ，日本精機	日本精機	5	8,400	42,000
	AM－7（500㎖用）				
181	S型クランプ，シバタ　4530-12　5ケ入	シバタ	1		3,200
182	両開きクランプ，50㎜　シバタ　4562-50　5ケ入	シバタ	1		5,500
183	両開きクランプ，100㎜　シバタ　4562-100	シバタ	1		8,800
184	フラスコホルダー　NRK7.5㎝	池本	5	1,350	6,750
	〃　6㎝	池本	5	1,190	5,950
	〃　8.5㎝	池本	5	1,540	7,700
185	ボイリングストーン　500g入　カタヤマ	カタヤマ	4	2,400	9,600
186	円筒　紙　28×100㎜　25入　№84　東洋　紙	東洋	2	3,400	6,800
187	水素イオン濃度測定器，C号器	東洋	1		35,000
188	水素イオン濃度測定器用標準管	東洋	1		4,500
189	指示薬，30㎖，BCP	池本	1		500
190	比色用試験管	東洋	20	130	2,600
191	ポリ洗瓶，500㎖　サンコー　3011-03	サンコー	20	230	4,600
192	計量カップ，2ℓ　サンコー　3005-05	サンコー	10	750	7,500

番号	品名及び仕様	メーカー名	数量	単価	金額
193	デシケーター，A－3　サンコー　1009-02	サンコー	1		38,000
194	黒ゴム管，内径　4㍉　1㎏	池本理化	1		5,100
195	〃　，内径　7㍉　1㎏	池本理化	1		4,200
196	〃　，内径10㍉　1㎏	池本理化	1		4,200
197	アスベスト金網，18㎝角	池本理化	40	70	2,800
198	パラフィン溶融器，サクラPK－3	サクラ	1		560,000
199	〃　，タカシマT－19－TN－1	タカシマ	1		108,000
200	パラフィン溶融用デスク，タカシマT－20	タカシマ	1		240,000
201	ミクロトーム，US－113 ON	大和光機	1		373,000
202	ミクロトーム用刃及びホルダー　フェザー　№240W	フェザー	1		60,000
203	ミクロトーム用替刃，S－35　50入り	フェザー	1		8,500
204	パラフィン伸展器，T－71　タカシマ	タカシマ	1		46,000
205	トリミングナイフ，フェザー　№130	フェザー	2	7,500	15,000
206	同上用ハンドル，フェザー　F－130(直)	フェザー	2	2,500	5,000
207	解剖用刃，フェザー　F－170(5枚)	フェザー	2	1,400	2,800
208	同上用ハンドル，フェザー　F－100	フェザー	2	2,500	5,000
209	てんびん，斜面型上皿自動秤　秤量4㎏，最少目盛10㎎	池本	1		6,000
210	てんびん，自動上皿てんびん　秤量200㎎，最少目盛0.2㎎，イシダ品質管理用Ⅰ型	池本	1		20,000
211	カメラ		1		175,500
212	同上用レンズ		1		1,800
213	フォトデスク　コメット　CPM1500		1		642,000
214	カッティングボード，タカシマ　T－120－A	タカシマ	1		38,000
215	オブジェクト染色装置，タカシマ　T54	タカシマ	4	44,000	176,000
216	染色用ドーゼ，タカシマ　T－67－A	タカシマ	50	850	42,500
217	〃　，タカシマ　T－67－B	タカシマ	25	900	22,500
218	〃　，タカシマ　T－67－B，丸型	タカシマ	30	950	28,500
219	卓上遠心器，日立　OSP／21	日立	1		226,000
220	マルチタイマー，2H－2SB	日本サイエンス	1		57,000
221	ミクロトームクリオスタット(同上用アクセサリー)	池本	1式		2,189,260
	1) オブジェクト・ホルダー　1号		1doz		
	2) フレオンガス・ボンベ　日新EM		1		

番号	品名及び仕様	メーカー名	数量	単価	金額
	3) クリオモンド 2号		100枚		
	4) 〃 3号		100枚		
	5) OCTコンパウンドメディウム		12本		
	6) ミクロトーム用ナイフホルダー		1		
	7) 替 刃		50枚		
222	紙製マッペ，モリシタ，50枚用	モリシタ	25	900	22,500
223	〃 ，モリシタ，20枚用	モリシタ	25	680	17,000
224	標本整理器， 1型 プレパラート	スワン	1		24,000
	〃 ， 5型 スライド用	スワン	1		23,000
	〃 ，15型 ブロック用	スワン	1		32,000
	〃 ，10型 索引カード	スワン	1		23,000
225	染色カゴ，マツナミ 2C(B-20)	マツナミ	10	1,500	15,000
226	ホーロータンク，タカシマ T-91-F	タカシマ	3	4,000	12,000
227	筆，タカシマ T-70-3	タカシマ	5	620	3,100
228	封入剤用瓶，タカシマ T-68-B	タカシマ	3	1,000	3,000
229	木製標本整理箱，タカシマ T-83	タカシマ	10	1,100	11,000
230	パラフィン乞理組立枠 T-22-A	タカシマ	2	26,000	52,000
231	パラフィン乞理皿 T-23	タカシマ	2	680	1,360
232	切片ブロック，T-59(中)	タカシマ	1,000	26	26,000
233	カバーグラス，マツナミ №1	マツナミ			
	34×32	マツナミ	400	28	11,200
	24×40	マツナミ	400	18	7,200
	35×50	マツナミ	400	36	14,400
	合 計				13,600,000

61 年度　供与機材　(1)

番号	品名及び仕様	メーカー名	数量	単価	金額
1	自動蒸溜装置	池本	7式	150,000	1,050,000
	採水量：3L／h　ガス式	5003A-1			
2	高圧蒸気滅菌器	ヤマト	4式	425,000	1,700,000
	有効寸法：240φ×450㎜．乾燥装置付	SDA-24			
	標準附属器付，240V．50Hz．				
	特別附属品：				
	重ね金具付ラック（金網カゴ2ケ／1組）　2式				
3	フラン器	ヤマト	3式	180,000	540,000
	有効寸法：450×400×400㎜．	IC-42			
	使用温度範囲：室温＋5℃～60℃				
	標準附属品付，架台付　240V．50Hz．				
4	冷凍冷蔵庫，2ドア一式	サンヨー	17式	90,000	1,530,000
	有効内容積：131L．	SR-1751H			
	標準附属品付，240V．50Hz．				
6	可視分光光度計	日立	4式	660,000	2,640,000
	VIS：325～900㎚．	100-10			
	標準附属品付，240V．50Hz．				
	特別附属品：1．Wランプ　10ケ				
	2．D2ランプ　1ケ				
8	実習用双眼鏡筒顕微鏡	オリンパス	8式	200,000	1,600,000
	対物レンズ：EDAch 4×，10×，40×，100×（各1）	CHS-213E			
	接眼レンズ：CWHK 10×（2ケ）				
	標準附属品及び収納ケース付　240V．50Hz．				
	特別附属品：1.ランプ(6V．20W HAL)　6ケ				
9	ガス式乾熱滅菌器	池本	4式	330,000	1,320,000
	内寸法：60×50×50㎝．				
	熱源：プロパンガス				
	タナ板：2段2枚				
	標準附属品及びアングル架台付				
10	卓上小型遠心器	クボタ	4式	110,000	440,000
	標準附属品付，240V．50Hz．	KA-1000A			
	特別附属品：1．ガラス管，15㎖．　20本				

番号	品名及び仕様	メーカー名	数量	単価	金額
	2. ヒューズ 2ケ				
11	ヘマトクリット遠心器	トミー	4式	199,000	796,000
	標準附属品付，240V. 50Hz.	HC-12A			
	特別附属品：1. 毛細管 500本				
	2. 計測板 1ケ				
	3. カーボンブラシ 2組				
	4. ヒューズ 2ケ				
12	恒温水槽，アクリル水槽付	池本	3式	85,000	255,000
	標準附属品付，240V. 50Hz.	1841-A			
13	血球計算盤，トーマ氏	カヤガキ	2式	13,000	26,000
14	ピペット洗浄器	池本	4式	22,000	88,000
	16.5×60 *cm*．予備中カゴ付	411			
15	ピペックス，12型	井内	4式	38,000	152,000
16	ピペックス， 4型	井内	4式	12,500	50,000
17	オートデシケーター	サンプラテック	4式	62,000	248,000
	標準附属品付，トランス付	C－3			
18	アネロイド気圧計	いすず	2式	15,000	30,000
	150 *mm*.ϕ，標準附属品付	3-1050-01			
19	ルーブシネレーター	ヤマト	7式	50,000	350,000
	標準附属品付，トランス付	SL-21			
20	安全ピペッター，ゴム球50 *ml*	池本	10ケ	1,300	13,000
21	自動上皿天ビン	ヤマト ACE-300	6式	55,000	330,000
22	ガスコンロ，培地溶解用 1kW.	池本	5式	12,000	60,000
23	超音波殺菌手洗器	コヤマ	6式	70,000	420,000
	標準附属品付，トランス付	KUE-300			
24	比色反応プレート	日本理化 550-1230	5式	8,500	42,500
27	海水採水器（ハイロート採水器）	シバタ	2式	26,000	52,000
	1L用，滅菌カン付				
28	同上用1L．びん	シバタ	20ケ	3,700	74,000
29	プロペラ式転倒温度計	吉野計器 Y-301	1式		68,000
30	照明拡大鏡	オートライト	5式	40,000	200,000
	6倍型，補助レンズ付，トランス付	SKK-CL			
31	発電機	ホンダ	3式	370,000	1,110,000

番号	品　名　及　び　仕　様	メーカー名	数量	単　価	金　額
	出　力：5kVA.	EX-5500KI			
	240V. 50Hz.	U－タイプ			
34	血圧計（自動血圧計）	オムロン	13式	13,000	169,000
	乾電池　6ケ付	HEM-700C			
35	双眼実体顕微鏡	オリンパス	2式	62,000	124,000
	接眼レンズ：GWH10×（2ケ）	VMF-4S-W			
	総合倍率：40×　標準附属品付　特別附属品：				
	万能照明装置	オリンパス	2式	50,000	100,000
	標準附属品付，トランス付ランプ（TB-1）	LSD			
	6ケ付				
36	解剖器械セット，本箱入	松吉 7-17201	1式		240,000
37	ドライアイスメーカー	FRIGIMAT	6式	200,000	1,200,000
	内　訳：				
	1. 本　体（300×170×150㎜）　1台				
	2. シリンダー，450g，230g　各1ケ				
	3. 配管材（ポンベ－本体）　1.8m				
	特別附属品：1. Co2ポンベ，サイフオン付　1ケ				
38	マイクロピペット	池本	5式	35,000	175,000
	容量固定式　20 ul.	ドラモンド			
	スペアー交換毛細管　4箱付	ディスペンサー			
39	アスピレーター，水道ジャ口直結型	池本	14ケ	2,500	35,000
	（金属製，ゴムソケット及びバンド付）				
40	モーターバイク	ホンダ	11台	139,000	1,529,000
	エンジン：49cc. OHC4サイクル	C50Z2			
	馬　力：4.8PS，10,000rpm.				
42	薬品冷蔵庫	サンヨー	2式	220,000	440,000
	内容量：230L.	MPR-210			
	標準附属品付，240V. 50Hz.				
43	白血球分類器	クレイ	4式	70,000	280,000
	9ユニット	アダムス			
	（0～999キー ×8）（トータライザー ×1）				

番号	品名及び仕様	メーカー名	数量	単価	金額
	理化学検査				
	A. 備品				
1	ウオーターバス	ヤマト	1式		130,000
	標準附属品付, 240V. 50Hz.	BS-69			
2	紫外線ランプ(長短兼用型)	日本理化 UV-DX58	1式		70,000
	同上用スタンド	UV-STN	1台		17,000
3	ガス検知器(北川式)	シバタ 8067-02	1ケ		12,975
	B. 器具				
1	全量ピペット, 2.5㎖.	シバタ 2040-205A	5ケ	368	1,840
2	同上, 6.0㎖.	2040-6A	5ケ	480	2,400
3	同上, 7.0㎖.	2040-7A	5ケ	480	2,400
4	同上, 8.0㎖.	2040-8A	5ケ	480	2,400
5	同上, 9.0㎖.	2040-9A	5ケ	480	2,400
6	同上, 10㎖.	2040-10A	15ケ	485	7,275
7	デシケーター, ガラス	1743-250	5ケ	27,500	137,500
8	色度用比色管, 100㎖.	8052-068	25ケ	2,040	51,000
9	共栓メスフラスコ, 100㎖.	2306-100A	10ケ	1,350	13,500
10	細口試薬びん, 500㎖.	1703-500A	10ケ	1,535	15,350
11	同上, 1,000㎖.	1703-1000A	15ケ	3,000	45,000
12	カッ色試薬びん, 500㎖.	1704-500A	10ケ	1,870	18,700
13	同上, 1,000㎖.	1704-1000A	15ケ	3,800	57,000
14	共栓メスフラスコ, 1,000㎖.	2306-1000A	10ケ	2,880	28,800
15	共栓三角フラスコ, 300㎖.	1033-300A	10ケ	1,200	12,000
16	メスシリンダー, 500㎖.	2351-500A	5ケ	3,000	15,000
17	同上, 1,000㎖.	2351-1000A	5ケ	6,450	32,250
18	同上, 100㎖.	2351-100A	10ケ	1,290	12,900
19	青筋ビューレット, 25㎖.	2183-25	5ケ	9,000	45,000
20	カッ色ビューレット 25㎖.	2132-25	5ケ	9,500	47,500
21	蒸発皿, 100㎖.	1228-90A	10ケ	1,200	12,000
22	同上, 150㎖.	1228-100A	10ケ	1,700	17,000
23	共栓比色管, 50㎖.	0841-51A	25ケ	1,200	30,000
24	共栓メスシリンダー, 50㎖.	2353-50	10ケ	2,050	20,500
25	共栓試験管, 25㎖.	1228-100A	25ケ	640	16,000

番号	品名及び仕様	メーカー名	数量	単価	金額
26	硝酸性窒素還元カラム	三立	2ケ	13,000	26,000
	テフロンコック付	GT-56			
27	共栓比色管，100㎖.	シバタ 0841-101A	10ケ	1,500	15,000
28	ビューレット架台	井内 6-286-01	5ケ	3,500	17,500
29	ビューレットばさみ	シバタ 4568-2	5ケ	2,400	12,000
30	筋目ロート	1535-60A	5ケ	1,200	6,000
31	ポリびん，10L．細口	サンコー 2001-10	2ケ	1,200	2,400
32	スポイド，シリコン 1g用	井内 9-810-01	1袋		600
33	同 上， シリコン 2g用	9-810-02	1袋		800
34	同 上， シリコン 5g用	9-810-03	1袋		1,800
35	同 上， シリコン10g用	9-810-04	1袋		2,480
36	ブラシ，ビューレット用	4-051-01	10本	104	1,040
37	同 上，ピペット用	4-052-01	10本	104	1,040
38	同 上，細管用	4-053-01	10本	60	600
39	同 上，試験管用， 11本入	9-805-01	1袋		600
40	同 上，びん洗用 2号 〃	9-806-01	1袋		2,320
41	同 上，びん洗用 5号 〃	9-806-02	1袋		2,560
42	同 上，びん洗用10号 〃	9-806-03	1袋		3,040
43	同 上，注射器用小 〃	9-907-01	1袋		760
44	同 上， 〃 中 〃	9-807-02	1袋		1,080
45	同 上， 〃 大 〃	9-807-03	1袋		1,440
46	洗浄液，中性，無リン，20Kg.	4-076-02	1ケ		36,000
47	スパーテル，ステンレス，3本組	6-366-01	5組	200	1,000
48	ミクロスパーテル，ステンレス，180㎜.	6-373-01	5本	110	550
49	同 上，210㎜.	6-373-02	5本	200	1,000
50	ミクロスパーテル，240㎜. ステンレス	井内 6-373-04	5本	480	2,400
51	ガラス棒，5㎜.φ，268本入	イワキ ROD-5	1箱		25,000
52	同 上， 7㎜.φ，137本入	ROD-7	1箱		18,500
53	ガラス管，6㎜.φ，233本入	STD-6	1箱		13,600
54	同 上， 8㎜.φ，239本入	STD-8	1箱		18,500
55	ひょう量びん，30φ×30H	シバタ 1275-3030A	5ケ	920	4,600
56	同 上， 40φ×40H	1275-4040A	5ケ	1,160	5,800
57	水流ポンプ，金属製	井内 1-409-01	5ケ	2,080	10,400

番号	品名及び仕様	メーカー名	数量	単価	金額
58	ゴムソケット，水流ポンプ用	I-412-01	5ケ	160	800
59	棒状温度計，赤液，0～100℃	6-603-13	10ケ	240	2,400
60	同　上，　水銀，0～200℃	6-602-06	10ケ	850	8,500
61	同　上，　水銀，0～400℃	6-602-11	5ケ	1,280	6,400
62	タイマー，単3電池付	1-273-01	2ケ	2,550	5,100
63	ストップウオッチ	セイコー	1ケ		9,500
64	シリコンゴム栓，1号～15号　各種11ケ入	井内 9-825-01～15	1式		29,200
65	コルクボーラー，12本組	6-515-01	1組		2,500
66	共栓三角フラスコ，50㎖	シバタ 1033-50A	30ケ	880	26,400
67	同　上，　100㎖	1033-100A	20ケ	880	17,600
68	ナス型フラスコ，　50㎖	0537-1550	10ケ	1,360	13,600
69	同　上，　100㎖	0537-15100	10ケ	1,360	13,600
70	同　上，　200㎖	0537-29200	5ケ	2,560	12,800
71	同　上，　500㎖	0537-29500	5ケ	3,200	16,000
72	同　上，　1,000㎖	0537-291	3ケ	3,500	10,500
73	トラップ球，$15/25	0778-2980	1ケ		9,600
74	同　上，　$29/42	0778-2995	1ケ		11,100
75	平　栓，　$15/25	0175-1525	30ケ	370	11,100
76	同　上，　$29/42	シバタ 0175-2942	10ケ	768	7,680
77	径違い連結管	0701-1529	3ケ	2,400	7,200
78	同　上	0702-2915	3ケ	3,360	10,080
79	冷却器	0665-15200	2ケ	7,760	15,200
80	ひ素試験器	6313-02	5ケ	7,920	39,600
81	クロマトスプレー，30㎖	NSK HCG-30	3ケ	2,600	7,800
82	二連球スプレー	ARP-6	3ケ	1,600	4,800
83	模造クローム白金耳	PM-003	5ケ	300	1,500
84	真空用ゴム管，6×12	V-612	10m	950	9,500
85	同　上，　7.5×18	V-718	10m	1,500	15,000
86	乳ばち，乳棒付	630-120	5ケ	2,200	11,000
87	クロマト用ろ紙，40×40	東洋 1035044	1ケ		2,250
88	リトマス試験紙	1060307	2ケ	540	1,080
89	万能PH試験紙	1060143	5ケ	750	3,750
90	クルクミン試験試	1060316	1ケ		540

番号	品名及び仕様	メーカー名	数量	単価	金額
91	エタノール検知管，10本入	光明理化 104-SA	5組	1,400	7,000
92	透析膜，36／32	三光純薬	1ケ		6,400
93	クロマトグラフィー管	NRK 1020-15300	5ケ	8,800	44,000
94	ガラスペん	GSV-001	1ケ		4,000
95	ガラス切り	GSC-1A	1ケ		6,000
	合計				21,000,000

61年度　供与機材　(2)

番号	品名及び仕様	メーカー名	数量	単価	金額
	炎光光度計　内部標準形	日立製作所	1式		
(1)	日立炎光光度計　775A形		1		2,800,000
	内部標準法　自動測定タイプ				
	1φ 240V, 50Hz				
(2)	SC-62 サイレントエアコンプレッサ		1		271,000
	1φ 240V/100V オートトランス付				
(3)	減圧弁(プロパンガスボンベ用)		2	8,000	16,000
(4)	スペアパーツ				
①	S222307　プリンタチャート(10ケ入)		10	1,800	18,000
②	775-1388　リボンテープ		5	700	3,500
③	775-1301　フレームコントローラ		1		23,000
④	775-3070　希釈用チューブ(10本入)		2	10,000	20,000
⑤	775-3071　試料用チューブ(10本入)		2	9,000	18,000
⑥	205-1351　血清用標準液		20	1,000	20,000
	(3mℓアンプル 10本入)				
⑦	205-1353　尿用標準液		14	1,000	14,000
	(3mℓアンプル 10本入)				
⑧	775-1371　リテウム分析用標準液		7	1,500	10,500
	(3mℓアンプル 10本入)				
⑨	775-1373　希釈用リテウム標準液		16	8,000	128,000
	(100mℓボトル入, 6本組)				
⑩	775-1376　リンス液		3	6,000	18,000
	(500mℓボトル入, 6本組)				
					3,360,000
	合　計