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第17回 日本熱帯医学会総会講演抄録

期 日：昭和50年7月19日（土），20日（日）

会 場：高槻市大学町 大阪医科大学

会 長：大阪医科大学 岩田繁雄

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特別講演

1 血液型からみたアジア人種

松本 秀雄 (大阪医科大学法医学教室)

1901年 ABO 式にはじまる血液型の分類は、現在では赤血球にとどまらず、血漿タンパク、白血球、血球酵素などの血液の各成分について単純な遺伝をする多型性形質が数多く発見分類され、血液型はその内容を著しく豊富にし、生物学的な応用は広範多岐に亘っている。古くは、主として形態学的な、あるいは言語学的な特徴に拠った人類遺伝学も、血液多型性形質に基づいた特徴づけによる、新しい地理的なまた人種的な多様性が明らかにされるとともに、いろいろの人種集団の分化や人口移動について、新しい根拠が提出されつつある。

ここでは血液型、就中血漿タンパクの型である免疫グロブリンの遺伝標識所謂 Gm 型からアジア人種を考えてみた。この免疫グロブリンが担う遺伝標識は、1つの座位にある個々のアロタイプにみられる多型と、これら個々のアロタイプが密に連鎖して現われる Haplotype にみられる多型との、二重多型現象によって人類遺伝学的に特異な遺伝標識として役立っている。

これまでに、アジア地域の諸集団について Gm パターンに基づいたそれぞれの集団の特徴づけを、さらに蒙古系集団の分化の過程について考察を加えてきた。蒙古系集団では4つの Haplotype, $Gm^{a\bar{g}}$, $Gm^{a\bar{x}g}$, Gm^{ab^3st} 及び $Gm^{af\bar{b}^3}$ で説明できる9つの表現型が得られる。アイヌ集団では、この4つの遺伝子に加え、これまで世界の何れの集

団でも見出されていない標識遺伝子 $Gm^{x\bar{g}}$ が見られるものの、蒙古系に特徴的な Gm^{st} を高い頻度でもっているということは、その人種起源に議論の多いアイヌ民族は、白人種ではなく基本的には蒙古系に属することを示している。一方イラン人集団は、白人種に特徴的な Gm^{fb^3} を高い頻度でもつが、同時に蒙古系と共通の Gm^{ag} と Gm^{axg} を、さらに蒙古系に特徴的な Gm^{ab^3st} と $Gm^{af\bar{b}^3}$ をもっている。 Gm^{ab^3st} 遺伝子をめやすとした蒙古系との混血率は、およそ42%と推計される。このようにイラン人集団は基本的には白人種に属するが、蒙古系との高い混血率は、この集団の歴史的な、また地理的な考察と併せ示唆するところが多い。

蒙古系集団のみについてみると、 Gm^{ag} と $Gm^{af\bar{b}^3}$ 遺伝子の頻度に関し、明らかな地理的勾配が認められ、これを2つのグループに大別できる。 Gm^{ag} が高く、逆に $Gm^{af\bar{b}^3}$ が極めて低いことで特徴づけられる“北方型”というべきグループと、対照的に低い Gm^{ag} と極めて高い $Gm^{af\bar{b}^3}$ をもつことで特徴づけられる“南方型”というべきグループである。

このような知見に基づいて、南米ペルーのマクロ・アラワク・ケチュア語系のインディオ（紀元前1-2万年前にアジアから移住したと考えられる）を含めて蒙古系集団の分化の過程と Gm^{st} 遺伝子の進化の時期などについて述べた。

2 Recent Trend on Epidemiology, Diagnosis and Treatment for Amebiasis

Cho, Kee-Mok

(Department of Parasitology, Institute of Tropical Medicine, Yonsei University, Seoul, Korea)

3 日本の海外医療協力

小川 良治（長崎県保健部）

ベトナム戦争が終ってアジア太平洋情勢は新しい段階を迎えている。カンボジア、南ベトナム、ラオスとインドネシア半島の政治地図を全面的に塗り替えたこの事態は、直ちにアジア全体にさまざまな衝撃を与え世界各国に波紋は広がっている。ベトナム戦争後の新秩序が作られる過程で、アジア太平洋地域での日本の役割は当然重大であり、各国の平和を基本とする新秩序づくりへの協調は積極的に行うべき時期に直面している。同時に世界各国は、アジア太平洋地域で新秩序がいかにつくられるか大きな期待と深い懸念を有しながらも、その国の最大かつ重要な国際課題としてとりあげている実状にある。この険しいアジア太平洋地域の情勢の中で、日本の海外医療協力を省みることがは又意義深い事であり、演者が昭和41年10月京都で、東南アジア医学シンポジウムで発言し各大学、病院、研究所等医学関係専門家に医療協力を呼びかけて9年になる。その後の足どりについて講演する。日本の経済技術協力は歴史が浅い。それでも昭和29年ロンボ計画に加盟以来だから、20年たった事になる。その足どりはたどたどしくて、損失は必ずしも少なくない。なかには相手国に溶け込み住民の信頼をつかみ、大いに感謝されているものもある。そうでない損失の根本原因は、人と物と運営がぎこちなく時を逸して、現地での専門関係者の涙ぐましい努力にもかかわらず空転したことである。日本の国際協力は発展途上国に対し、社会開発、農林業鉱工業の開発に主として協力するために、資金と技術を提供しそれに関連する健康環境施設（病院、診療所、学校、研究所、宿舎

等）を整備する村づくりに、力を入れてきたのである。この発想は多年の経験現地の悩みにこたえたもので、感謝されている。しかし一方では国際協力の美名にかくれ、利潤一辺倒の輸出振興型だと誤解され、先年アジア各国で対日批判が高まり、憂慮すべき事態が発生した事すらある。また技術協力の中には、日本からの専門家から環境が悪すぎて動きがとれないと苦情が出て、協力が休眠状態で立往生に陥る例もあった。この障害を除くことも考えなければならないし、効率よく協力を前進させるには、現地の専門家関係者の声をストレートに日本側に聞く機構が望ましい。派遣した技術専門家が糸の切れたタコの如く、たびたび悲哀をかこったという事も聞くがこれも未然に防ぐ方法はないだろうか。

近年日本経済の巨大化と国際化が急テンポに進み、日本の国際協力に対する発展途上国の期待と要望が増大してきている。この時点にもう一度、日本の海外医療協力のあり方に注文してみたい。第一、協力は心の触れあいであり、協力とは人なりの真意に徹し、人材の確保に本腰を入れる。第二、目先の利害を超えて長期展望に立つこと。第三、各国から研修受け入れ施設制度の貧困を是正する。第四、プロジェクトの選定に二国間の均衡がとれないと損失が多い……等。

最後に米、ソ、中3大国の影響力の強い今日、日本の国際協力に対する誠意と努力をいかに結実させるか、その成否のかぎはつきつめれば、相手国民をいかにしてその心をつかむにかかっている事を強調した。

シンポジウム

熱帯各地の疾病その他について

1 ケニアに於ける住血吸虫症

片峰 大助

(長崎大・熱帯医研・寄生虫)

1974年から3年計画でケニア国 Taveta 地区のいくつかの部落を対象として住血吸虫症の研究を行っている。第1年度は特に住民の感染状況、中間宿主貝類の分布、自然感染、野鼠の自然感染の調査に重点をおいた。その結果、住民の虫卵陽性率は Jipe で *S. mansoni* 61.3% (176/287), *S. haematobium* 2.9% (7/244), Kivalwa では逆に *S. mansoni* は8.4% (20/237) で少なく, *S. haematobium* は67.6% (175/259) で優位がみられる。中間にある Eldoro でそれぞれ 41.3% (194/469), 53.0 (261/492) で両種の略平等の流行がみられる。*S. japonicum* VBS 抗原による皮内反応を行うとそれぞれ74.8%, 75.2%, 69.6%の高い陽性率が得られた。

Taveta の流行地一帯で採集された淡水貝は11種で、そのうち1,000個体以上の *Biomphalaria sudanica*, *B. pfeifferi*, *Bulinus globosus*, *Bulinus forskali*, *Bulinus tropicus* などが crushing, shedding 法で *Schistosoma* の自然感染が調べられたが, *Bulinus globosus* が Eldoro で12.0% (9/75), Kivalwa で8.0% (45/562), *S. haematobium* と思われる *Cercaria* 感染が証明された。しかし、この期間の調査では, *Biomphalaria sudanica*, *B. pfeifferi* に自然感染が見当らなかった。

この地区で *Pelomys* sp. *Dendromys* sp. *Thomomys* sp. *Arvicanthis* sp. *Rattus rattus*, *Elephantshrew* などの野鼠合計40匹が捕獲されたが、このうち Jipe 湖畔でとれた *Pleomys* sp. 27匹の44%に *S. mansoni* の自然感染がみられ、保虫宿主として重要なことが明らかになった。

尚、本年度の研究には片峰のほか、川島健治郎(九大・医短大)、中島康雄、今井淳一、野島尚武

(長崎大・熱帯医研)が参加した。

2 オンコセルカ症

多田 功 (金沢医大・医動物)

オンコセルカ症は *Onchocerca volvulus* がブユによってヒトに伝搬されて生ずる寄生虫線虫症である。本症を River blindness と称するのはこの伝搬ブユが発生する河川周辺で本症による失明が起こることを端的に表現している。全世界における患者数は3,000万人あるいはそれ以上と推定され、主分布地はサハラ以南のアフリカと中南米である。1974年より WHO が西アフリカ・ボルタ河流域 70万km² (推定人口1,000万人中罹患者100万人, 失明者7万人)におけるオンコセルカ防圧事業に乗り出し、本症に対する内外の関心は急速にたかまりつつある。その理由としては 1) 社会経済的観点; 罹患者の集団発生と疾病の重篤なため流行地の放棄や稼働年令層の激減が経済的損失をもたらすこと。2) 寄生虫病学的観点; 大規模な防圧対策を必要とするが、化学療法剤に決め手を欠き、伝搬ブユ対策にも未解決の問題があること。更に他種フィラリア、例えばバンクロフト、マレー糸状虫に関する研究・対策が現在一段落した事実、の2つが基本的に挙げられよう。本講演ではオンコセルカ症及びその対策に関する一般的な事柄を紹介し、個々の問題点についてもふれた。

1) オンコセルカ症とその伝搬。2) 生物学: 最近、マイクロフィラリア尿症が各地の流行地住民に高率に見出され、改めて寄生部位(成虫および幼虫)の問題が注目されている。さらにマイクロフィラリアの動態に関しては in vitro の taxis を含み皮膚における in vivo の密度(mfd)変動が検討されている。伝搬ブユの刺咬活動と mfd のたかまりとが一致するという報告があり、一方ではこのような有意の変動は無いとする成績も見られる。3) 化学療法及びブユ対策: 個々の患者の治療のため

にもまたブユ対策効果を上げるためにも流行地住民の化学療法は重要である。しかし、ジェチルカルバマジンの効力は疑問視され、スラミンを含む抗フィラリア剤の副作用、中毒作用が大きな問題である。比較的最近開発されたメトリフォネートにかなりの希望もたれている。一方、ブユ対策の観点からは DDT にかわるアベイト、メトキシクロール等が WHO の防圧の主体になろうとしているが、その効果的使用については今後の問題である。ブユ幼虫に寄生する *Mermis* を天敵として使用する方向も検討され始めている。中米、殊にグアテマラで40年間継続されて来た唯一の対策である腫瘍摘除が何ら積極的效果をあげ得なかった事実もあり、現在大規模なオンコセルカ防圧対策が必須であるとされている。WHO の西アフリカにおける防圧プロジェクトの開始はその活動の表われであり、各方面からの研究成績の総合化が強く望まれている。

3 遺伝的観点からみた熱帯病

山本 利雄 (天理病院・海外医療)

私達は1966年以来アフリカ・コンゴ・ブラザビルで、更に1970年からはラオス王国に於て、継続的或いは断続的に医療活動を続けてきた。その臨床経験から多くの遺伝学的疾患に遭遇したが、今回は G-6-PD 欠乏症と進行性筋萎縮症についてのべその意味を検討した。

G-6-PD 欠乏症についてラオス王国で行ったテストは297例である。297例中陽性例(欠損を示したものは52例17.2%であり、この中完全欠損は34例11.4%、中間型は18例6.1%であった。この中、男子に3例の中間型、女子に1例の完全欠損例があった。これらの成績を男女別、年令別に検討を加えると共に、陽性者例の初診時の臨床症状を検討した。更に3家系について追跡調査を行い、本因子の遺伝形式に検討を加えた。マラリアとの関係は、陰性例245例中にマラリア患者34例13.8%に発症をみたのに対して、完全欠損例34例中には1例2.7%、中間型をも含めた52例中には3例5.7%にマラリア発症をみたに過ぎなかった。このことは本症がマラリアに対して抵抗性を獲得し

ていることを示すものである。マラリア疾患と同じ分布を示す血液疾患に Hb-S や Hb-E の存在がある。Hb-S や Hb-E については既に本学会で発表してきたところである。これらは共にマラリアに対する抵抗性を示すことが知られており、遺伝形式は常染色体性優性遺伝である。一方 G-6-PD 欠乏症は伴性不完全優性遺伝形式をとっている。マラリアという広範囲にわたり重症で且つ人類が地球上に存在して以来、極めて長年月存在してきた疾患に対して、人類が、常染色体或いは性染色体、Hb のアミノ酸配列や赤血球内の酵素欠損等の種々多様な形をとって抵抗を示してきたことは、非常に興味ある問題であり、且つそれが突然変異、自然淘汰、適者生存の法則によって今日存在しているのが、これら数種類の疾患を個々別々に単独にとりあげるのではなくして、人類遺伝学的視野から相互に関連せしめて今後検討を加えてゆきたいと考えている。

次にラオス王国の一家系で近親結婚に由来する隔世遺伝形式をとると思われる伴性劣性遺伝の進行性筋萎縮症について報告した。それは11名の子供の中、女子3名は健康、男子8名の中、5名に本症が発現した。何れも幼児期は正常で7歳頃より発症し17歳乃至23歳で死亡する。発症した5名中4名はすでに死亡している。1名が現在進行中である。この家系について詳細に追跡調査して家系図をつくると共に数名について染色体検索を行い、更に腓腸筋の光顕並びに電顕所見を得たのでその成績を報告した。このような経験から個々の疾患に接する時、その疾患の現症にのみ目をうばわれることなく、その社会的背景に注意深い目を向ける必要を強調した。

4 西アフリカのガーナにおける感染症、特にウイルス性疾患について

大立目信六 (福島医大・細菌)

熱帯アフリカでは今なお多数の伝染性疾患が蔓延しており、最近の Lassa fever や Acute hemorrhagic conjunctivitis の発生に見られるように未知の感染症の存在する可能性もある。ここに1例として西アフリカ、ガーナの感染症の最近の動向

をウイルス性疾患を中心に紹介する。引用した数値はガーナ政府発表の届出伝染病（24種類）の集計資料を基にしている。1967年の統計によれば、確定死亡者の約30%が感染症であった。この比率は幼児では更に高く、死亡幼児の40%近くが各種の感染症によると推定されている。ウイルス性疾患の中では麻疹と水痘が最も多く発生しており、全ての届出感染症を含めて、1969年以来、1・2位を占めている。麻疹は1971年に異常な増加を示したが、以後は平衡状態になっている。毎年2月から4月にかけて多発し、33%は生後12カ月以内の幼児である。致死率は高く、日本の10倍以上に達し、小児の全死亡原因の中でも上位に入っている。流行性肝炎は発生率では5-6位であるが、死亡率では2-4位に入り、発生率で約20%、死亡率で10%内外ずつ、毎年確実に増加し続けている。1973年には死亡率が麻疹に次いで高い感染症となった。今後、大きな問題になりそうである。ポリオの発生数は少ないが、1973年まで少しずつ増加している。ガーナの都市部には野生型のウイルスが年中常在しており、将来、もし幼児の免疫レベルが低下する事態が起こればポリオが流行することもあり得るだろう。黄熱の発生届出数は極めて少数だが、媒介昆虫はガーナ全土に存在しているといわれ、ウイルスの侵入があればどこでも流行の起る可能性がある。現在は森林地帯での散発的発生であるが、届け出の他にも多数の患者が居ることは容易に想像される。この他、例数は少ないが、致命率の高い狂犬病は年中どこかで発生している。また発生数は多いが死亡者の少ない水痘が成人にも定型的に発生していることがあった。細菌性疾患の中では発生数の多いものはフランベシア、百日咳、結核であり、死亡率から見ると破傷風、腸チフス、結核が多い。この他、流行性髄膜炎は北部地方で2-3月の乾期に発生し、コレラは海岸地帯の一部に Endemic に定着している。赤痢とマラリアは届け出の対象ではないが、赤痢は広く蔓延しており、*Sh. dysenteriae* も見られる。マラリアはその数が多いため、これまで種々の対策が立てられながら、いずれも十分な効果を上げ得ないまま、中断され、現在では傍観されているよう

である。以上、ガーナにおいては麻疹や流行性肝炎などのウイルス性疾患、あるいは破傷風、腸チフス、結核などが毎年多数発生しており、今後、国民の保健対策の充実が必要であろう。

5 インドネシアおよび韓国における免疫グロブリン、特に IgE 値と疾病の関連性

荒木 恒治 (大阪医大・第二内科)

目的：韓国における寄生虫症（肺吸虫症・肝吸虫症・赤痢アメーバ症）およびインドネシア、セレベス島の東部、赤道直下のバーンガイ島の住民（Kendak, Lambako の2部落）、およびセレベス島、Manado 住民の血清 IgE 値を測定し、日本の現況と比較し、それらの疾病との関連性の検討を行った。

方法：IgE 測定は RIST (Radio immuno-sorbent test) によった。

成績：1) 血清 IgE 値について；日本人正常対照者16例平均134 (60~302) u/ml, 単独鉤虫症35例平均733 (258~2,084) u/ml, 単独回虫症14例で平均711 (333~1,522) u/ml, 単独鞭虫症30例で983 (464~2,085) u/ml, 単独横川吸虫症36例で平均628 (303~1,304) u/ml であった。一方韓国の肺吸虫症35例で平均645 (202~2,060) u/ml, 肝吸虫症15例では平均495 (119~2,065) u/ml, 赤痢アメーバ症23例で平均171 (43~686) u/ml, 非寄生虫感染韓国人対照35例で平均220 (109~445) u/ml, 又韓国在住アメリカ人18例では平均48 (30~77) u/ml で、寄生蠕虫感染で明らかに血清 IgE 値上昇を認めた。バーンガイ島住民では全76例平均3,777 (1,189~11,990) u/ml と非常に高値を示し、その中10,000 u/ml 以上を示すものが12例 (15.8%) もの多くに見られた。更に両部落に分けて見ても Kendak 部落22例では平均3,128 (1,144~8,553) u/ml, Lambako 部落40例では平均3,352 (1,025~10,950) u/ml で、両部落とも同じく高値を示し差異は認めなかった。又 Manado 住民14例では平均7,153 (2,455~20,840) u/ml で極めて高値を示した。その背景には好酸球増多があり、寄生虫感染を裏付けるべき免疫血清反応 (Ouchterlony 法および IEP 法) にて吸虫・線虫に対する沈降線

(特に 特異沈降帯) を証明した。又アメリカ人, 日本人, 韓国人, インドネシア人と対照比較でも人種差の存在する可能性も考えられる。2) 血清 IgE 値と IFA (Indirect Fluorescent Antibody Test) の関係; 韓国における寄生虫症について検討したが血清 IgE 値と抗 IgG 蛍光標識血清を用いての IFA titer の間の相関は認められず, 又 IgG 値とこの IFA titer の間の相関も明らかではなかった。3) マラリアの問題; バーンガイ島はマラリア感染地区であり, 血液塗抹標本76例中より8例 (10.5%) に *Plasmodium vivax* を証明し, マラリアの感染既往は77.8%の多くに推定される。又肝腫も21.1%脾腫が31.6%に触知されマラリア感染との関連性が充分裏付けられた。又血清 IgM 値が平均 511 (198~1,315)mg/dl と正常平均 131 (49~355)mg/dl と比較し, 明らかな高値を示しており更にマラリア感染との関連性において興味深い。4) 性病の問題; この IgM 値の上昇と性病, 特に梅毒の関連性において梅毒反応 (VDRL・TPHA) を行った結果, 両者陽性者47例 (62.7%) と恐るべき多数の陽性者を数え, 又 IgM 値との間に VDRL および TPHA 共に有意の関連性を認めた。5) 血圧: バーンガイ島住民では高血圧は殆んど認めなかった。

結語: 以上 IgE 値を中心として各人種における差異を考慮しながら, それらの背景の疾病との関連性について明らかにした。

6 東南アジア各地における邦人の下痢症状と飲料水について

○奥村 悦之, 豊田 秀三

(大阪医大・第二内科)

我々は, 熱帯地方に在留する邦人の健康調査を

行ってきたが, この度, 「生水を飲むと不痢を起こす」との風聞に接するに及び, 飲み水と下痢との関連性について調査する目的で, 東南アジア各地に在留する某電器産業会社の出向社員とその家族を対象とし, アンケート調査と水質分析研究を行った。調査地域はバンコク, クアラルンプール, シンガポール, それにインドの Nerrol および Baroda の計5地区, 計64家族, 138名に疾病罹患状況調査を, また任意に12家族を選んで日常使用している飲料水の水質分析を行った。

その結果, 当該国に着任して以来, 水道水よりの生水を飲用したもの106名, それが原因と思われる下痢症状をきたしたものは84名で, 79.2%であった。特にバンコクでは88.5%, インド各地区では100%であった。常時飲用している水の分析結果では, 特にインド各地では, 所謂 Taylor のいう, 中等度以上の硬水であり, また一般細菌数が異常に多い。すなわち硬度ではそのほとんどが200ppm以上であり, なかには360ppmの硬水も認められた。

更に一般細菌数では $4 \times 10^6/ml$ のものが認められた。下痢を起こした症例のうち, ほとんどが濾過, 煮沸することにより改善されるという報告より推論すれば一般細菌 (*E. coli* など) による細菌性下痢のほか, Mg^{++} や Ca^{++} の多い硬水による機械的刺戟による大, 小腸のカタル性病変によるものと思われた。このことは飲料水の煮沸試験の結果, ほとんどが硬度低下を示した事により証明しうる。

いずれにしても下痢症状は, 上記の2因子によるものも考えられ, 特に熱帯地方で生活するにおいて, 飲料水の吟味は必要欠くべからざる条件の1つである。

一般講演

1 冬期における八重山諸島の蚊相について

上村 清 (富山県衛研)

八重山における冬期の蚊の調査はほとんどなされていらない。演者は1974年12月28日から1月4日にかけて西表島で、12月28日と1月5、6日には石垣島、1月7日に黒島で蚊幼虫の調査を行い、西表島では大原宿舎軒先においてライトトラップによる蚊幼虫の捕集も行った。

蚊発生が最も少ない時期にもかかわらず、今回の調査だけで30種類もの蚊が採集でき、その盛期における蔓延ぶりがうかがえた。とりわけ、コガタハマダラカが真冬の西表島で成虫、蛹、幼虫共に採集でき、石垣島でも得られたことは、マラリア流行の危険性が決して低くないとの印象をもった。西表島には凹地溜が多く、そこにはシナハマダラカ、コガタイエカ、カラツイエカが普通に生息し、前2種はライトトラップにも多く捕集された。また、オオツル型の卵型や蛹も得られ、オオツルハマダラカの存在が確認できた。同島には樹洞溜も多く、オキナワヤブカ、ヒトスジシマカ、キンパラナガハシカ、ハマダラナガスネカ、クロツノフサカ、ワタセヤブカ、ダウンスシマカ、リバーシマカ、フタクロホシチビカ、ヤエヤマオオカなどの生息を多数認めた。汚水溜にはネッタイエカ、オオクロヤブカ、トラフカクイカが多く、河床岩溜にはヤマトヤブカ、コガタクロウスカ、フトシマフサカが、さらに海岸岩溜にはトウゴウヤブカが生息していた。またクワズイモ葉腋にはオキナワカキカとダウンスシマカが、カニ穴にはシロオビカニアナチビカとカニアナツノフサカが得られ、その他キンイロヤブカ、アシマダラヌマカ、ミナミハマダライエカ、クロフクシヒゲカなども採集できた。

2 インドネシアの疾病媒介蚊の採集成績

栗原 毅 (帝京大・医・寄生虫)

1973年11-12月の間、インドネシア各地で、蚊の採集をおこなった。採集、調査した蚊の中で、

ネッタイエカは、いずれの都市、町でも、最も一般的に見られる種類であった。同様にヒトスジシマカは、都市部のみならず、山村でも、普通にみられ、かつ激しく人を刺す蚊で、発生源も家屋内の汲みおき水、山野の竹の切り株、ヤシの果実の殻など、きわめて多岐にわたった。これに対して、ネッタイシマカの分布は、偏よりをしめした。たとえば、南セレベス地域では、どこの家でも汲みおき水の中に発生していたが、北セレベス、フローレス、セラムなどでは、なかなか見出し難い蚊であった。マラリア媒介者であるハマダラカは、*Anopheles sundaicus* がフローレス島で発生していることを確認した。また、*An. punctulatus* と *An. farauti* が、セラム、アンボンにて多数採集できた。

3 *Aedes (Stegomyia) pseudalbopictus* の研究

I. 台湾産本種とマレーシア産 *A. (S.) albopictus*

○松尾喜久男、久納 巖
(京府医大・医動物)

Aedes (Stegomyia) pseudalbopictus (= *A. pa.*) は Dengue 熱媒介蚊 *A. (S.) albopictus* (= *A. a.*) と形態的に非常によく似ており発生場所も竹株などの微陸水域である。従って両種の形態ならびに生態的比較研究は疫学上極めて重要である。このような見地から今回は台湾産 *A. pa.* とマレーシア産 *A. a.* の形態を光学顕微鏡及び走査電子顕微鏡で比較検討した。両種の顕著な差異は Barraud ら (1934) が雄外部生殖器にあることをすでに述べている。今回の両種においても明瞭な差異がみられる。即ち *clasper* の *apical claw* は *A. a.* では *clasper* の先端近くから出ているが、*A. pa.* では先端から少し基部よりの所から出ている。この差異は顕微鏡下で十分認められるが走査電顕下ではさらに明瞭にして立体的に違いを認めることが出来る。第9背板は *A. a.* では中央部が鋭く後方に突出し、両側部も突出する。*A. pa.* では中央部がや

やふくらみをみせる程度で、両側部は中央部より強く後方にふくらみが見られる。その他 basal lobe, paramere, 第10腹板にも特に走査電顕下で特徴ある形態が認められる。なお標本によっては生殖器を切断、解剖しなくても clasper の apical claw が観察可能であるが、この場合 *A. pa.* と *A. flavopictus* を混同する危険性が多分にある。生殖器以外では雌雄成虫の翅根部前方の明色斑紋に差異がみられる。*A. a.* では銀白色で各 scale は銀白色で幅が広く密集している。*A. pa.* では銀色で各 scale は *A. a.* より暗色で幅はせまく笹の葉状ないし狭曲状である。しかし時に *A. a.* のような比較的幅の広い scale の混在することがある。この斑紋は新鮮な標本では scale の脱落がなく両種の鑑別に利用出来る。幼虫については Ramalingam (1974) がジャワ産について *A. pa.* は siphon acus を有することで *A. a.* と区別出来ると報告しているが、今回の標本では acus は何れの種にも認められない。卵については既報(松尾ら, 1974)の如く卵表面像では両種の区別は不可能である。

4 本邦における犬糸状虫の媒介蚊について

末永 敏

(長崎大・熱帯医研・寄生虫)

演者は数年来、本邦における普通蚊の犬糸状虫に対する感受性を実験的に調べると共に、高浸淫地の野外で採集した雌蚊の自然感染の実態を調べ、主要媒介蚊を明らかにすることができたのでその結果について報告する。日本産蚊族の中で犬糸状虫に感受性のある種としてトウゴウヤブカ、ヒトスジシマカ、アカイエカ、コガタアカイエカ、ネッタイエカ、アシマダラヌマカ、カラツイエカ及びヨツホシイエカの8種が報告されていたが、演者はこれらの中前4種についてその感受性を再確認すると共に、更にシナハマダラカ、キンイロヤブカ及びチカイエカの3種を追加したので、実験的に感染可能なことがわかった蚊種は11種となった。これらの中でトウゴウヤブカは感受性が最も高いことから従来自然界における主媒介蚊であろうと考える人が多かった。ところが、演者が長崎地方の高浸淫地で色々な方法によって蚊を採集

して調べた結果、調査場所により6~14種の蚊が採れたが、その中にトウゴウヤブカは全く発見されなかった。採集蚊の中で自然感染をうけていたのはアカイエカ、ヒトスジシマカ、コガタアカイエカ、キンイロヤブカ及びシナハマダラカの5種であったが、その中でアカイエカは採集個体数及び感染個体数が最も多く、ヒトスジシマカは採集個体数はやや少なかつたが感染個体数は2番目に多かった。その他の蚊種では採集個体数がかなり多いものでも感染個体数は極めて少なかつた。以上の調査結果と従来の知見とを考え合せると、本邦における犬糸状虫の主要媒介蚊はアカイエカであり、ヒトスジシマカも副次的役割を果しているが、その他の蚊種は媒介者となる可能性が少なかつたと思われる。

5 *Cimex hemipterus* の低温に対する

感受性

大森南三郎 (帝京大・医・寄生虫)

近年、日本に於ける住宅の建築様式の改良と保温或いは暖房設備の改善など生活様式の近代化は、熱帯或いは亜熱帯性の室内害虫の日本への侵入土着を可能にするのではないかと心配される。この意味に於て、演者はネッタイトコジラミを材料として各種低温度に曝した時の生存期間を測定しているが、0℃以上の各温度下での生存日数については既に報告(大森, 1941)しているので、今回は0℃以下の各温度に成虫或いは5令幼虫を接触させた場合の実験結果について報告する。(1) -20℃に接触させると僅かに40分以内に完全に死滅する。(2) -5℃では48時間以内に死亡する。(3) -3℃でも約48時間で死亡する。(4) -1.5℃では10日以内(実験継続中)には全滅するものと思われる。(5) 0℃では7日以内に死亡する(大森, 1941)。(6) 交代温度: -1.5℃に16時間と+20℃に8時間に毎日交代接触させる温度条件下では22日以内に死亡する。(7) 交代温度: -1.5℃に8時間と+20℃に16時間に毎日交代接触させると81日以上、恐らく90~100日で死亡すると思われる。最後の(6)及び(7)の温度条件は、寒冷期に於ける北海道での中産階級の住宅で暖房を使

用する場合の毎日の温度変化をモデルとしたものである。以上の実験結果から、本種の恒低温に極めて抵抗性の弱いことは、沖縄を除く日本各地で、寒冷期の暖房保温が更に改良されなければ、その分布は困難であろうことを思わしめる。

6 徳之島に於けるハブ咬傷の疫学

○高井 録二 (徳之島保健所)

武原 安行

(徳之島地区ハブ対策協議会)

細菌性、寄生虫性感染症には減少傾向がみられるのに反し、徳之島ではハブ咬傷の発生数、発生率がともに漸増しつつあり、きわめて深刻な保健問題を提起している。このような状況のもとに昭和49年、徳之島地区ハブ対策協議会の設定をみ、有効かつ実現の可能性のある対策の樹立をめざして各種のハブ咬傷に関する研究が行われるようになった。演者らはハブ咬傷の疫学的研究、特にその性差、年齢差についての結果を報告した。

研究材料と方法：最近5年間（昭和45-49年）のハブ咬傷患者930名の届出票の記載内容を分析した。

結果ならびに結論：1. 男の咬傷例数ならびに発生率（608例、人口10万対679.5人年）は女（322例、人口10万対313.9人年）に比し非常に多かった。2. 咬傷例数の年齢分布は2峰性で40-49歳にきわめて高い峰を、また10-19歳にもう1つの小峰を示していた。これは人口の年齢構成によって起こった現象であって、発生率の年齢曲線はむしろ単峰性で40-49歳にピークをもっていた。3. 症例の最大多数は農地で咬傷をうけていた。しかし、屋敷内や大小道路上での咬傷例も無視できない数であり、特に女性や若年層ではそうであった。4. 草刈、除草はもっとも重要な咬傷動機であった。5. 就寝中に咬傷をうけた者の数は大きくはないが、この5年間に増加しているのは注目すべきである。6. 有効かつ現実的対策樹立のための研究的結論にはなお一層の研究が必要である。

7 ハプトキシイドの野外接種（第2報）

○福島 英雄, 古賀 繁喜, 東 勝観

鳥人 佳輝(鹿児島大・医・熱帯医研)

村田 良介, 近藤 了, 貞弘 省二

(予研・細菌二)

厚生省科学研究費によるハプトキシイド研究班並びに鹿児島県ハプトキシイド研究協議会において開発された精製ハプトキシイド、アルコール沈殿トキシイドを昭和45年以降、奄美の住民に接種している。今回はトキシイド接種者の抗毒素価と副作用について主に述べる。昭和49年度の接種者数930名を加えると、今までに計5,651名に接種している。免疫原性が高く、副作用の少ない接種方法をみいだそうとして、色々条件を変えて検討を行った。血中抗毒素価（抗出血1価、抗出血2価）は近藤らによる兔皮内注射法により全接種者中約620名について測定した。使用したトキシイドは精製トキシイド（Mixed Td）としては Lot 12, 13, 14, 15, 18 とアルコール沈殿トキシイド（APF Td）としては Lot 1 で、これを1群30-40名あて、各トキシイドを0.1mlあるいは0.5mlあて、基礎免疫は2-3回にわけ、その後、年1回、追加免疫を行い、計4-5回接種している。基礎免疫は接種間隔を2回接種と3回接種にわけ、2回接種は更に2群にわけ 1) 4週, 2) 1カ月とし、3回接種も4群にわけ、第1回と第2回、第2回と第3回の間隔をそれぞれ 3) 1週と4週, 4) 10日と4週, 5) 10日と1カ月, 6) 4週と4週とした。このうち基礎免疫終了時に好成绩（有効な血中抗毒素価）がえられたのは、昭和50年度の Mixed Td Lot 12 接種群 {接種量は0.1ml, 0.5ml, 接種間隔は1) 4週} 昭和47年度の Mixed Td Lot 13, 14, 15 接種群 {接種量0.5ml, 間隔は1) 4週, 4) 10日, 4週, 6) 4週, 4週} 及び昭和48年度の Mixed Td Lot 15 接種群 {接種量0.5ml, 接種間隔1) 4週, 3) 1週, 4週群} であった。副作用は接種部位の疼痛、腫張、搔痒、発赤、硬結などの局所反応と発熱(?), 頭痛、蕁麻疹などのアレルギー反応、臥床などの全身反応がみとめられた。なお追加免疫（4-5回接種）により腫

張の増加した者もあるが、現在までのところ、著明なアレルギー反応をおこした者はみとめられていない。昭和45年来使用してきたトキシイドは免疫原性、副作用の点から充分使用にたえる。

8 マウス体内に於ける *Brugia pahangi* の発育について (II)

○坂本 信, 青木 克己, 片峰 大助
(長崎大・熱帯医研・寄生虫)

ICR 系マウスを用い *Brugia pahangi* の感染幼虫を鼠径部皮下と腹腔内に接種し、その発育成長を観察した。鼠径部皮下接種では75日目、腹腔内接種では60日目まで虫体の生存が確認された。その虫体の寄生部位をみると鼠径部皮下接種では種々の部位より虫体が得られるが特に筋肉、皮膚、鼠径部脂肪、腎周囲脂肪等から多く回収された。又1個体マウスよりの回収率は13日目までは約20%であるが、その後75日目まででは10%以下と低下する。尚マウスの性別でみると15日目までは全てのマウスより虫体が得られたのに比べてその後75日目までは雄マウスより高率に虫体が得られた。これに対して腹腔内接種ではその寄生部位がほとんど腹腔内に限局し、1個体マウスよりの虫体回収率も60日目を除いて約40%位で中には75%にも昇る高い回収率を示すものもあった。次に虫体の発育成長をみると、第1回脱皮は両接種時共7-9日目に起こり、いずれの場合にも雄の方が早い。第2回脱皮は雄の場合は両接種時共30日目位に起こり、雌の場合は鼠径部皮下接種時には45日目位から始まるが、腹腔内接種時には第2回脱皮を終えたと思われる虫体は得られなかった。虫体長は両接種時の雌雄共大差ないが鼠径部皮下接種の45日目の雌で第2回脱皮を終えたものは19.0-28.3mm、終えてないものは6.5-9.3mm、とその長さにかかなりの違いがみられる。腹腔内接種の45日目以後虫体長は雌の場合 7.0-8.9mm と小さい。尚鼠径部皮下接種では200日、腹腔接種で60日までの観察で、末梢血中、腹腔内にマイクロフィラリアはみられなかった。

9 奄美 (北部)、沖縄 (南部) における最近のバンクロフト糸状虫症の分布

○福島 英雄, 水上 惟文, 鳥入 佳輝
山下 正策, 東 勝観, 香月 恭史
川畑 英機, 坂本 宗春, 幸地 昭二
(鹿児島大・医・熱帯医研)

以前から濃厚な浸淫地の1つとして知られていた鹿児島県奄美においては、昭和37年-44年に厚生省、鹿児島県より、また45年-46年は鹿児島県により、フィラリア撲滅対策が実施され、我々もその一端を分担してきた。ところが対策終了時、僅少乍ら仔虫保有者が残存していた。その後、3-4年たって、同地の糸状虫症の浸淫状態が如何に変化するかということは対策上重要な問題である。我々は大島本島北部の笠利町において、宇宿、城間、和野、節田、用安、万屋の一般住民について、昭和49年8月と50年7月(万屋部落のみ)午後10時以降、0.06mlの耳朶血中の仔虫の有無を検査した。その結果、宇宿は被検者92名中仔虫保有者0(部落の検診率26.4%)、城間は92名中0(65.7%)、和野は99名中0(46.9%)、節田は327名中3名(仔虫陽性率0.9%)(検診率54.2%)、用安は79名中0(20.6%)、万屋は94名中0(48.2%)となり、これら6部落783名中仔虫保有者3名(仔虫陽性率0.4%)である。この3名は2家族に属し、13歳♀と15歳♂は同一家族で、Mfはそれぞれ6, 3隻で、37-42年の検診では陰性で、49年に始めて陽性となっている。この家族では父と兄が37, 39, 41年にMf(+)である。他の1人は58歳♀でMf13隻で、この人は37年に10隻で、38-41年、44年は陰性であるが、49年に再度陽性となっている。この家族では主人が37, 44年に、三男が37年に仔虫陽性である。新感染が低率乍ら進行しているのだろうか。依然として仔虫保有者は存在するが、増えた傾向は認められない。

沖縄本島南部、糸満市三和地区も以前から濃厚な浸淫地の1つと考えられ、我々は42, 43年に三和地区の中学生及び真栄平部落民に集団検診、集団治療を行った。その後、7年経過した本年3月、三和地区の中学生を中心とした一般住民について

最近の浸淫の実態を明らかにしようと考えて調査した。中学生は139名中仔虫保有者0、一般住民も992名中仔虫保有者1名（仔虫検出率0.1%）となっている。この人は摩文仁（仔虫陽性率3.7%、27名中仔虫保有者1名）の人で、54歳、♀でMf1隻である。当地方も仔虫保有者は激減していると考えられる。

10 Filarial periodicity の機序に関する研究 (III)

梶屋 富一

(琉球大学・附属病院・内科)

目的：前2回に亙り microfilaria の自家蛍光顆粒の密度と仔虫の定期出現性の型との間に一定の相関があり、ポルフィリン症例の蛍光赤血球、日光溶血、皮膚の日光過敏症を参照して、光物理学物質説を提唱した。本報では走査電子顕微鏡により自家蛍光顆粒を捕捉し得るや否やを検討し、成し得れば電子 microanalysis による物質の同定に資せんと企てた。すなわち走査電顕により (JSM 50A JEOL) 単に仔虫の体表のみならず、凍結破断法を加えて仔虫断面を観察し蛍光顆粒の電顕的存在を考察した。

成績と考案：電顕下中等数の蛍光顆粒を示す *Dirofilaria immitis* 仔虫の断面には相当数の球状顆粒を検出した。*Dipetalonema reconditum* 仔虫には蛍光顆粒をもつものとこれを全く欠くものがあるが、電顕的にも球状顆粒を示すものとこれを全く欠くものとがあった。犬心内の *Dirofilaria immitis* 母虫の子宮より圧出した胎児は蛍光顆粒を全く有しない。母虫の子宮断面を電顕で見ると蜂の巣状を呈し多数の胎児を容れている。その圧出した胎児の断面には、犬の末梢血中の *immitis* 仔虫と異なり、蛍光顆粒、電顕的球状顆粒を全て有しない。さらに種例を重ねて検討を要するが、今日までの所見からは、走査電顕下検出される球状顆粒が蛍光顕微鏡下の蛍光顆粒と関連あるものと解せられる。

11 特発性巨大十二指腸空腸症に合併した 糞線虫症の1例

○高田 季久, 井関 基弘, 宇仁 茂彦
木俣 勲 (大阪市大・医・医動物)
北 陸平, 仲川 恵三
(湯川胃腸病院)

患者は47歳の男子で昭和39年まで福岡県の炭坑労務者であったが、39年以後は大阪市内に在住していた。49年3月頃から食欲不振、腹部膨満、心窩部痛があり、10月頃に吐血及びタール様便を排出し、約1カ月の間に5kg以上の体重減少が見られた。49年12月末から湯川病院において諸検査の結果、小腸腫瘍の疑いのもとに開腹手術を行ったところ、腫瘍及び特別な狭窄部がないにもかかわらず、十二指腸及び空腸上部約1m余にわたって著明な拡張を示していた。そこで本症を特発性巨大十二指腸空腸症と考え、腸壁の病理変化を精査した上で再手術を行うこととし、拡張部、移行部、正常部の空腸の一部を試験的に切除した。患者は術後一時良好に経過したが、26日目に突然失血ショック様症状を示して死亡した。死因は腸出血と推定されたが剖検は許されなかったため詳細は不明である。

手術時に採取した組織標本の腸腺窩中に多数の線虫幼虫、成虫、虫卵が認められ、特に拡張部に多かったため、残余のホルマリン固定組織を破碎し、得られた成虫、幼虫、虫卵を観察した結果、形態的特徴から糞線虫と考えられた。なお患者家族母子3名について糞便検査を実施したところ配偶者(40歳)から糞線虫のR型幼虫が検出されている。空腸拡張部の組織所見では、虫体侵入部の粘膜固有層及び粘膜下層にかなり著明な壊死巣、出血巣、炎症像の見られる部分があり、筋肉層が全般的にやや肥厚していたが、筋神経叢はやや節細胞の減少が見られる程度であった。

剖検が出来なかったため以上の限られた所見から断定し難いが、長期にわたる糞線虫の濃厚寄生のため、部分的に腸の蠕動その他に異常が生じ後天的な巨大十二指腸空腸症を誘発した可能性が考えられる。なお糞線虫幼虫は本例の如く、厚層塗

抹法や集卵法のみでは見逃されることが多いので、日常の糞便検査には培養法の実施がのぞまれる。

12 糞線虫の体外発育に関する研究

V. 培養温度の影響

有菌 直樹 (京府医大・医動物)

Strongyloides planiceps の寄生世代の雌から産出される虫卵には2種類あって、1つはその後自由生活雄成虫 (M) にのみ発育するが、他の1つは自由生活雌成虫 (F) または感染幼虫 (f) へ発育してゆく (これを potential female と称する)。そして F と f への分化は培地便の濃度や虫体のこみあい状態などを変化させる事によってコントロールされる事を報告してきた。今回は培養温度の影響を検討した。培養法は前報と同じく、0.2g の健康犬便を塗布した濾紙上に一定数 (200~300 個の間) の虫卵を滴下し、試験管濾紙培養を行った。培養温度は 12, 16, 20, 24, 28, 32, 36 C の 7 段階で、培養時間は初代の自由生活成虫が出現するまで、即ち温度に応じて 9 日 - 1 日であった。各温度毎に 3~5 本の培養を行い、その回収総数について M, F, f の出現比を調べた。5 回の実験を反復し、回収率は 70-90% であったが、36 C 下では発育不良で回収率も不安定であった。M の出現比は各実験間で異なり、5 回の実験でそれぞれ平均 7, 18, 23, 28, 29% であったが、各実験とも温度変化に対しては 3~4% の変動範囲で、安定した出現を示した。一方 F と f は培養温度に影響され、両者の出現は相補的に変動した。即ち 12 C と 16 C では f-rate $\{ \frac{f}{F+f} \times 100 \}$ が 90-100% であったが、温度が高くなるに従って低下し、36 C では 0-28% となった。したがって低温下では potential female の大部分が f となり、温度が高くなるにつれて f が減少して F が増加し、高温域では大部分が F となる。温度が F と f への分化決定にあずかる作用機序については尚不明であるが、培地便濃度や虫体密度もまた分化決定にあずかる要因である事から、温度が幼虫の feeding activity に変化を与える事によって、栄養という要因を介して分化決定に関与する可能性もある。

13 ペルー国ティンゴマリアでの肺吸虫研究

宮崎 一郎 (福岡大・医・寄生虫)

Miyazaki, Arellano and Grados (1972, Jap. J. Parasit. 21, 168-172) によって、この町にすむ 36 歳の男の肺から、肺吸虫の 2 成虫が報告された。これはペルーで人からえられた最初の虫であったが、術前に用いられたビチオノールのために、生殖器の変形著しく、同定不可能であった。それ以来、演者は 3 回現地を訪れ、Grandos and Uyema (Instituto de Salud Pública, Lima) 及び Mazabel (Universidad Nacional Agraria de la Selva, Tingo Maria) の 3 氏とともに、哺乳動物から成虫を、またカニからメタセルカリアを集めるよう努力してきた。その結果、9 中 1 *Philander opossum* から 2 虫を、5 中 2 *Chironectes minimus* から計 6 虫を (以上フクロネズミ科)、そして *Felis yagouaroundi*, *F. concolor*, *F. pardalis*, *F. catus* (以上ネコ科) および *Eira barbara* (イタチ科) の各 1 頭から、それぞれ、1, 1, 8, 3, 6 の肺吸虫をみつけた。*Didelphis marsupialis* すなわち common opossum は 6 頭しらべたが、すべて陰性であった。これまでに得た 27 の肺吸虫は形態上、2 群にわけられたが、どちらも未記録種であった。フクロネズミ科からの 8 虫については、すでにアマゾン肺吸虫 *Paragonimus amazonicus* Miyazaki, Grados et Uyema, 1973 (Jap. J. Parasit. 22, 48-54) として報告し、ネコ科およびイタチ科からのものは、他の新種として、近く発表の予定である {Miyazaki, I. et al. (1975): Studies on the lung fluke in Tingo Maria, Peru, with special reference to the description of *Paragonimus inca* sp. n., Med. Bull. Fukuoka Univ., 2 (4), 303-311}。しかし、どちらの種類も、前述のヒトからえられたものとは一致しなかった。一方、カニからの幼虫検出は成績わるく、わずかに一匹のチリーサワガニから、1 幼虫をえただけであった。しかし、形態上、未知のものであって、採集地点を同じくする点で、ネコからえられた未記録種に属するのではないかと考えている。

14 宮崎肺吸虫症患者の血清 IgE 並びに胸水 IgE の上昇について

横川 宗雄, ○小島 莊明, 荒木 国興
(千葉大・医・寄生虫)

富岡 玖夫 (千葉大・医・二内科)

寄生蠕虫症において血清 IgE 濃度の上昇することは, Johansson *et al.* (1968) によりはじめて報告されたが, われわれもすでに日本住血吸虫症, 肝蛭症, 鉤虫症及び肺吸虫症などの患者血清について, IgE 値の上昇することを報告した (Kojima *et al.*, 1972)。今回は, 最近関東地区において多発した宮崎肺吸虫症患者の血清並びに胸水について, IgE 濃度を radioimmunosorbent test により測定したところ, 次のような結果を得た。1) 宮崎肺吸虫 VBS 抗原による皮内反応, 補体結合反応 (CFT) 共に陽性の群 (13例) の平均 IgE 値は 3,462.3U/ml であった。一方, 対照群 (皮内反応陰性・無症状の 13例) の平均値は, 1,026.6U/ml であった。2) 血清 IgE 濃度が 840~6,400U/ml であった宮崎肺吸虫症患者 4例より, 採血後 2 週間以内に得られた胸水についてその IgE 濃度を測定したところ, 4,200~10,000U/ml といずれも血清 IgE 値より著しく高い値を示した。ウェステルマン肺吸虫症患者の胸水 (1例) についても同様の結果を得た。これらの胸水中には, サルにおける Prausnitz-Küstner 反応によって IgE 抗体の存在することが証明された。3) Bitin による治療後, 経過を追うことのできた 8例の患者のうち, 治療後 IgE 値の減少したものは 5例, 増加または不変例は 3例であった。

15 エチオピアにおける住血吸虫症の疫学の特徴

安羅岡一男 (筑波大・医・医生物)

WHO の短期顧問として, 1972年 9月-12月にエチオピアにおける住血吸虫症の媒介貝を調査し, いくつかの興味ある知見を得た。

Addis Ababa の近郊に源を発する全長 1,200km の Awash 河は, エチオピア平原の北東部に約 70,000km² の Awash 溪谷を形成している。この

溪谷一帯は外国資本によってすでに 6,000 ヘクタールのサトウキビ畑が完成し, 一方エチオピア政府による 1,500km² にわたる農業開発が進められている。したがって, 灌漑溝の拡大ともなって *Biomphalaria* 貝の分布が拡大しつつあり, また職を求めて他のマンソン住血吸虫症流行地から本症の carrier があいついで移住し, この地域一帯に急速にマンソン住血吸虫が蔓延しつつある。

現在, エチオピアのビルハルツ住血吸虫症は, Awash 河中流の Gewani を中心とした地域にのみ局限し, その媒介貝は *Bulinus abyssinicus* である。この国のほとんどの河川, 湖沼にはひろく *Bulinus truncatus* が分布しているが, 上記のエチオピア系のビルハルツ住血吸虫にはまったく感受性を示さず, したがって本症は今のところではこの国にひろく蔓延していない。この国の *B. truncatus* は, おそらくエジプト, スーダン系と考えられるので, もしこれらの国から carrier が流入すれば, エチオピアに本症が急速にひろがるおそれがある。この点は油断なく監視する必要がある。

この国の河川, 湖沼の水の pH はすこぶる変異に富み, pH 5.0-9.0 のいずれにも *Biomphalaria*, *Bulinus* の棲息がみとめられた。したがってエチオピアでは水の pH が媒介貝の棲息の制限要因にはなっていない。

16 レイテ島に於ける *Oncomelania bupensis quadrasi* の分布及び感染率について (予報)

○岩永 襄 (広島大・医・寄生虫)

Manual S. Santos (SCPP, Philippines)

調査は, Palo 地区 21カ所, Santafe 地区 11カ所, Pastrana 地区 14カ所, Tanauan 地区 8カ所の合計 4 地区 54カ所について行った。貝の分布状況では, 各地区の最も高密度を示したのが, Tibak-depression (Palo) が 1m² 当り 827.5 個, Maslog-lumbia (Santafe) 667.5 個, Cancalohas leoncio-jerica (Pastrana) 1,090個, そして Batang stream (Tanauan) 555個であった。地区別では, Pastrana 地区が, 他の 3 地区に比べ高かった。又住血吸虫の感染率では, Palo 地区で Naliwatan stream

が20.9%で最も高く、Santafe 地区では Tayong stream が4.8%を示した他は、1%内外であった。Pastrana 地区でも、Santafe 地区と同様に Socsocon の4.4%が最も高く、又 Tanauan 地区も Batang stream で9.5%みられた他は Santafe, Pastrana 地区と類似していた。即ち、感染率では、Palo 地区が他の3地区に比べ高率を示した。又、Naliwatan stream (Palo) で11月中旬から3月中旬迄の4カ月間、毎月上旬、中旬の2回感染率の推移について調査したところ、12月上旬(30.0%)が最も高率を示し次いで同じ月の中旬(23.8%)となり、一般に降雨量が少なくなるにしたがい感染率の減少が見られた。このことから、上述した4地区の感染率の結果は、降雨量の増減によりかなりの変動が見られるものと考えられる。

17 生検材料から検出された日本住血吸虫卵の臓器分布と組織所見

○横山 宏, 仲田けい子, 小宮山 進
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当院における過去13年間(1962年—1974年)の生検材料の病理組織検査24,620件中から本虫卵を認めたものは255例(約1%)で男性が女性の約1.4倍を示し年令層は40-60歳に多かった。年度別検出率ではまだ減少傾向は認められなかった。臓器別検出率は肝30.6%, 腸間膜40%, 盲腸30%, 虫垂28%で、別に本症が疑われた患者204例の直腸生検で68.6%に虫卵を検出したが、その36%に本症の既往歴を認めなかった。これら組織内には虫卵多数群在し、直接産卵と考えられ、虫卵数多数の程局所変化が著しい傾向を認めた。肝に虫卵を認めた102例中本症による肝硬変は12例(約12%)、種々の程度の肝線維症68例(約67%)、虫卵が介在しても反応の全く認められないものが2例、肝硬変像としては特有な線維化と肝大結節、偽胆管形成のないことが特徴で、その発生には感染回数、介在虫卵数が関係していると考えられたが、さらに個体の免疫反応、種々肝障害因子等の関与により複雑な病変を呈したものもあった。なお本症による肝硬変12例中1例に肝細胞癌の合併を認めたが本症が肝癌発生の積極的因子とは考えられない。

胃では258例中の約3%に虫卵の介在を認め、粘膜下であり局所の反応の少ないものが多かった。胃癌29例、胃潰瘍16例が合併し、潰瘍底に虫卵を認めたもの2例。過去4年間の胃手術例1,307件中421例の胃癌の約4%に虫卵を認め、非胃癌例では約2%に虫卵を認めたのみであったが組織所見では明確な関係を認めなかった。直腸では180例中約10%に虫卵を認めたが直腸癌発生との関連性はないと考えられた。卵巣嚢腫、子宮筋腫各1例の外膜に虫卵結節を認めたがそれぞれの疾患との因果関係はないと考えられた。生検材料の小組織片からでは決定的なことは言えないが、発癌との因果関係は個々の症例ではあるかもしれないが本症は積極的因子ではない。

18 Local response of mast cells to antigen in *Clonorchis sinensis* infected rats

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19 潰瘍性大腸炎患者血清の寄生蠕虫抗原による沈降反応

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望月 孝規 (駒込病院)
池永 達雄 (虎の門病院)

潰瘍性大腸炎症例の患者血清の中には寄生蠕虫類抗原と沈降反応陽性を呈するものがあることは既に1972年秋の日本寄生虫学会西日本支部大会で報告したが、今回はこの点を更に追究する目的で厚生省研究班員の方々に依頼して患者血清の送付を受け ouchterlony 法及び免疫電気泳動法による検査を行った。検査血清は15機関よりの60例であるが、そのうち何らかの蠕虫抗原で陽性であったのは21例(35%)であった。線虫類抗原ではその21例すべてに1~4本の沈降帯が認められ、吸虫類抗原では60例中5例(8%)に1~2本、条虫類抗原では60例中9例(15%)に同じく1~2本の沈降帯が認められた。各抗原での成績の内訳は、

豚回虫雌抗原で60例中17例，豚回虫雄抗原で57例中15例，人回虫雌抗原で3例中2例，犬回虫抗原で59例中14例，猫回虫抗原で16例中2例，馬回虫雌抗原で18例中9例，広東住血線虫抗原で8例中2例，犬糸状虫抗原で60例中8例，アニサキス抗原で60例中13例，肝蛭抗原で60例中5例，双口吸虫抗原で59例中0，広節裂頭条虫抗原で60例中9例，瓜実条虫抗原で60例中2例，無鉤条虫抗原で23例中2例が陽性であった。これらの陽性症例での免疫電気泳動の沈降帯は各抗原とも特異帯は認められず，類属反応的に出現したものと判断される。尚，参考的に行った大腸クローン病症例でも3例中2例が数種線虫類抗原で陽性であった。潰瘍性大腸炎は主として粘膜をおかし，屢々びらんや潰瘍を形成する大腸の原因不明のびまん性非特異性炎症と定義されて居る如くその原因は不明とされている。この大腸炎症例の中に蠕虫抗原殊に線虫類との間に類属反応的な沈降帯が30-40%に出現することは，或る種の線虫類が auto-immune diseases の trigger の1つとして関与していることも考えられ，又単に共通抗原物質の存在と云うことも考えられるので検討を行う所存である。

20 国外で罹患した条虫症

亀谷 了 (目黒寄生虫館)

外国との交流が激しくなるにつれて，外国で罹患した条虫症が漸増の傾向にある。当館であつかった症例の中で，外国で罹患したものをあげてみると，昭和38年1(その年の全症例は4例であった，以下これに準ず)40年0(1)，41年0(4)，42年1(5)，43年1(4)，44年1(4)，45年1(3)，46年4(8)，47年0(2)，48年2(6)，49年4(9)となって非常に増加してきた。条虫の種類は，無鉤条虫11例，有鉤条虫2例，広節裂頭条虫1例，合計14例である。職業別にみると，商社関係5例，学生ら3例，海外関係公社2例，カメラマン，作家，スチュワーデス，学者各1例となっている。罹患地はアフリカ3例，中近東1例，東南アジア5例，中国2例，韓国2例，中南米1例となっており，Pawlowski(1972)の指摘した世界の流行地に大部分が含まれている。海外

旅行者に対する啓蒙活動の必要性を痛感する。特に有鉤条虫の2例はいずれも脳症を起こしている。治療はアテブリンを使用した。即ち，第1日の午後4時に硫苦30gをコップ1杯の水に溶かしてのみ，直後にコップ2杯の水をのむ。夕食は重湯程度，午後10時に同様にして硫苦15gをのむ。第2日目の午前7時からアテブリンを2錠ずつ5分毎に5回のむ。午前9時に硫苦を前回同様にしてのむ。これによって頭部を具備した虫体を出したものの9例，頭部はないが成功したもの3例，つまり全例で駆虫に成功した。残りの2例は脳症を訴えた有鉤囊虫症であった。採集した虫体は14条(1人で3条出したものがある)である。アテブリンで出した虫体は殆んどちぎれるということがなく，しかも動いているのが少なくない。まれに硫苦を吐く人があるが，繰り返せば成功する。最大の難点はアテブリンの輸入が途絶していることである。

21 *Toxoplasma gondii* についての抗原分析

矢野 健一 (阪大・微研・原虫)

Toxoplasma gondii, Rh 株の抗原分析については，Chordi(1964)，高柳ら(1970)が研究し，6-7種の抗原が，*T. gondii* 感染マウスの腹水中に証明されている。Chordiの正常マウス血清で吸収した抗トキソプラズマ血清と反応する γ -globulin よりも，おそい移動度の No.1 抗原は，正常マウスを流動パラフィンで処理して集めた腹腔細胞中にも認められた。No.1 抗原を，硫安分画，DEAE セルロースにより精製し，それで家兎を免疫し，特異抗血清を得た。この特異抗血清は，肝臓，胸腺，脾臓をそれぞれ均質化した粗抗原と反応し，脳，血中の白血球の粗抗原とは反応しなかった。故に Chordi のいう No.1 抗原は，*T. gondii* 由来のものでなく，脾臓の粗抗原と，特に強く反応するところから，脾の組織抗原と関係があるものと考えられる。

T. gondii を感染マウスの腹水中より集め凍結融解したトキソプラズマ粗抗原で，家兎を免疫し，抗トキソプラズマ血清を得た。この抗血清と，抗原の間に，正常血清にはない prealbumin 領域の

沈降線を認めた。この prealbumin 領域の抗原 (EA) を zonal electrophoresis で分離し、家兎を免疫し、EA に対する特異抗血清を得た。この抗血清は、実験的に *T. gondii* に感染したハムスター、モルモット、ラットの腹水中にあるものと反応し沈降線を生じた。また、*T. gondii* を L 細胞で培養した培養上清中にも、この抗血清と反応するものを認めた。正常の腹腔細胞の粗抗原は、血清よりも多量の prealbumin を有するが、この抗 EA 血清とは反応しなかった。この EA は 2/3 飽和 硫酸で沈殿を生じ、Sephadex G-200 での gel filtration では、4 S peak に認められた。

22 *Trypanosoma cruzi* の fibroblast cells への侵入に関する 走査電子顕微鏡的研究

○Pongpan Kongtong, 猪木 正三
(阪大・微研・原虫)

37°C で培養した Balb-C fibroblast cell へ *Trypanosoma cruzi* (Tulahuen 株) の trypomastigote 及び epimastigote を加え、経時的に標本をとって、これらの原虫の細胞への侵入の様式、侵入後の細胞内での発育などを走査電子顕微鏡で調べた。trypomastigote は鞭毛運動によって、鞭毛の遊離端から細胞内へ侵入した。fibroblast cell に原虫を加えた後、9 時間目から原虫は細胞内に見出され、3 日目には細胞を破壊して出てきた trypomastigote が観察された。epimastigote は trypomastigote と異なり、phagocytosis によって細胞にとり込まれるように思われる。

23 *Trypanosoma gambiense* の “surface coat” 構成成分の精製と特性に関する研究

○尾崎 文雄, 岡 好万, 伊藤 義博
古谷 正人 (徳島大・医・寄生虫)

Trypanosoma brucei subgroup の “surface coat” (SC) が、抗原型変異及び凝集反応並びに感染防御に重要な役割を演じる可能性について近年幾つかの報告が見られる。我々も *Trypanosoma gambiense* の SC が、感染防御抗原として重要な役割を演じ、その構成成分が熱に非常に不安定で

ある点と、細胞内小胞体で形成される可能性について報告してきた。

今回はこの構成成分の特性について更に追究し、以下の結果を得た。1) 2% formaldehyde 又は 2% glutaraldehyde 処理によって SC の防御抗原性は変性したが、0.5% formaldehyde 又は 0.1% glutaraldehyde 処理では防御抗原活性が保持された。2) SC 構成成分は酸性多糖類を含む糖タンパク複合体であることが ruthenium red 染色法を用いた電子顕微鏡観察で確認された。3) SC は 0.25% trypsin あるいは 0.25% amylase 処理により原虫細胞膜から除去されたが 10mM 2Na-EDTA を含む溶液での 6 回洗浄では除去されなかった。trypsin によって細胞膜から除去された SC 構成成分には免疫拡散法で抗原性が認められなかった。4) Brij-58 で細胞膜を可溶化した homogenate からの 144,000×g supernatant を基に、SC 構成成分の精製を等電点カラム分離法で試みた。主成分は等電点 5.6 で得られ、この画分から防御抗原性を保持する 144,000×g sediment 抗原と共通する沈降線が得られた。

24 アンケート調査による 輸入マラリアの実態

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(長崎大・熱帯医研・疫学)

石崎 達, 大友 弘士

(予研・寄生虫)

海老沢 功

(東大・医科研・熱帯疫学)

近年、海外渡航者の激増に伴って、輸入マラリア症例の増加が警告されてきた。このアンケート調査は、過去 3 カ年間 (昭和 47-49 年) のマラリア発生の実態を把握する目的で、国内の主要病院を対象に実施されたものである。報告された患者総数は 155 人 (47 年, 34 人; 48 年, 50 人; 49 年, 60 人; 詳細不明, 11 人) で、東南アジアにおける感染は三日熱が多い (78.6%) のに対し、アフリカでの感染は熱帯熱が多数 (71.7%) を占めた。年令別では 20, 30 歳台が約 75% を占め、また、女性は 3 人にすぎなかった。渡航者の現地での職務、

旅行目的別に区分すると、東南アジアでは林業関係者が最多で、研究、調査目的の渡航者、一般旅行者の順に多かった。アフリカでは漁業従事者の感染が多いことが注目された。来日外国人14人に患者が見出されたことは、マラリアのみならず、今後の輸入伝染病対策のあり方に注意をうながすものといえる。熱帯熱患者は、帰国途中を含めて、帰国後1カ月以内に、三日熱患者は6カ月以内に、その大部分が発症していることから、これらの期間が要注意の対象と見なされてよいであろう。報告された患者の中には、かなりの数の再発（再燃）例が含まれていた。このことは、完全な治療と、治療後のフォローアップの必要を強調するものであった。熱帯熱患者中、6人の死亡例が報告されたことから、早期診断、適切な治療の必要性が痛感された。2人の国内感染例（熱帯熱1死、三日熱1治）があったことは、マラリアへの関心を喚起するものである。患者の約半数は、予防内服をしていなかった。内服群といえども、その内容は不規則、不完全なことが察知された。患者の半数は東京都圏内で観察されている。残りは全国各地に散在していることを知った。以上の結果から、輸入マラリアに対する防疫態勢の再吟味が強く要望されるとともに、患者に対する治療剤の確保が緊急に必要なことが結論づけられた。

25 京都における 輸入三日熱マラリア 2 症例

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(京府医大・医動物)

米田 道正, ○猪飼 剛

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加藤 孝和 (京府医大・三内科)

昭和50年のはじめに我々は京都で輸入三日熱マラリア2症例を経験した。2例共、感染の機会があつてから、かなりの長期間潜伏したのち発症している。

第1例：小○晴○, 26歳, 男, 会社員, 昭和47年7月(当時学生)から49年3月まで, 約21カ月間中部インドに留学, その期間中, マラリアの予防内服を全く行っていないが発熱したことはない。帰国後も約9カ月間, 無症状に経過したが, 49年

12月4日に突然悪感発熱 39 C, 以後ほぼ隔日に発熱をみた。その後1カ月間近医により風邪として治療されたが治らず50年1月8日京都市立病院入院, *Plasmodium vivax* 検出。入院時, ほぼ毎夕刻発熱 39-40 C, 脾3横指, 肝2横指触知, 赤血球 301-412 万, Ht 25-35.5%, Hb 8.8-11.4g/dl, 単球10-14%, LDH, γ -gl, CRP の増加がみられた。治療はMP錠のみで行うこととした。初日3錠(1錠中 Sulfamonomethoxine 500mg+Pyrimethamine 25mg 含有), 翌日1錠投与で以後 Primaquine 等与えなかった。熱は翌日から平熱となった。parasite count は治療前, 5,700-8,400/ μ l, 投薬第0日5,700-6,700, 第1日2,200, 第2日150, 第3日0, となり以後6カ月の現在まで再発なく, 原虫も陰性。脾腫, 肝腫消退。臨床検査所見も正常値に復した。

第2例：溝○秀○, 24歳, 男, 学生, 昭和48年7月から同年11月までインドネシア, マレーシア, タイを探検旅行。期間中ならびに帰国後1カ月間, レゾヒン2錠を週1回服用したという。帰国後15カ月間無病, 50年2月発熱, 隔日に発熱し, 時に40 C を越えたが, 近医により風邪として治療され, 抗生物質を服用, 3月28日, 京都府立医大附属病院入院, *Pl. vivax* が発見されたが 400/ μ l と少なく, 発熱をみない。赤血球は303-366万, Hb 9.8-12.0g/dl, Ht 29.6-35.9%, 単球と γ -gl の増加あり, 本例も初日MP2錠, 翌日1錠で治療を打ち切り観察中であるが, 2カ月経過の現在, 再発なく原虫陰性である。

26 熱帯熱, 三日熱マラリアの混合感染症例

○大友 弘士 (岐阜大・医・寄生虫)

細川 禎正, 野口 享秀, 小沢 尚俊

小林 瑞穂 (岐阜市民病院・内科)

最近, 演者らは岐阜市において熱帯熱, 三日熱マラリアの混合感染症例を経験した。患者は58歳主婦で昭和49年10月9日から19日までスリランカに観光旅行し, 帰国後約1週間で発病し特異な臨床経過を示した例である。すなわち, 旅行期間および帰国後発病するまでは何ら異常を認めず, マラリア予防薬は服用していなかったが, 10月25日,

突然食欲不振, 全身倦怠感を訴え臥床安静にしていた。翌日午後, 悪感戦慄と共に 39 C の発熱を来し, 以後連日の発熱に加え上記自覚症状増強し, 精査のため31日入院した。入院時所見は軽度貧血のほか生化学的検査において T.P. 4.8g/dl, A/G 1.0, S-GOT 110, S-GPT 62, Ch-E 0.5 Δ pH, LDH806 など中等度の肝機能障害が認められたが, 患者の意識は清明であった。しかるに入院後病状は漸次増悪し, 第2病日から全身浮腫を呈し, 尿量減少, 比重上昇, 顕微鏡的血尿, 蛋白尿を来し, 沈渣に尿細管上皮細胞, 白血球を認め第3病日に至って収縮期血圧 50mmHg と血圧低下の持続と共に5日間に亙る傾眠ないし昏睡状態に陥った。第5病日に末梢血, 骨髓から得た標本についてマラリア原虫の検索を実施し, 両者に熱帯熱原虫の輪状体, 三日熱原虫の輪状体, アメーバ体, 分裂体を認めた。治療は輸血, 電解質補正, 浮腫に対する対症療法を併用しながらクロロキンを投与し, 無性生殖環原虫の駆除と共に急性期症状を消退させ, ついでプリマキン 15mg を連続14日間投与して根治療法を行った。その結果, 退院時には諸検査の異常値は, ほぼ正常値に復し, 退院後5カ月間の観察では再燃, 再発ともに見られず根治したものと思われる。

27 最近経験した輸入マラリアについて

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(桃山病院・感染症センター)

当院では過去3年間に3例の輸入マラリアを経験した。成績は以下の如くである。1) 3人とも男子であり, 1人はインドネシア, 他の2人はニューギニアに仕事の為に渡航し, いずれもマラリア汚染区域へ滞在した。2) 予防内服としてリン酸クロロキン 250mg 1週間1回服用していた。3) 他覚的所見として, 2人に貧血, 1人に脾腫を認めた他, 特記すべきものを認めなかった。4) インドネシア渡航者は三日熱マラリア原虫, ニューギニア渡航者は熱帯熱マラリア原虫のいずれも Ring form を検出した。5) 三日熱マラリアに対してはキニーネ, アテブリン, リン酸クロロキンの併用療法, 熱帯熱マラリアに対してはリン酸ク

ロロキン単独投与にて軽快した。6) 抗マラリア療法の副作用は3人とも認められなかった。

28 マレーシア, テメンゴールダム 建設地労務者の健康管理

○武藤 達吉, 海老沢 功
(東大・医科研・熱帯疫学)
三井 源蔵 (熱帯医学協会)

マレーシア, テメンゴールダム建設現場に日本人が100人以上, 現地人が数百人働いている。さきにラオスのナムグムダム建設現場でマラリア, 肝炎などが多発した経験があるのでその対策をいくつか試みると同時に, 日本人, 現地人, その家族などにつき種々血液検査を行った。

日本人にはマラリア予防に Fansidar を毎週1回1錠内服, 現地人にはクロロキン塩基 300mg とピリメサミン 25mg の合剤 Darachlor を毎週1回1錠内服させている。現在マラリアは両群で抑えられているが, 現地人では薬剤内服前に三日熱マラリア3人, 熱帯熱マラリア2人の患者があった。前者では生殖母体があり蚊に対する伝染の可能性があったが, 後者では生殖母体がなく, 新鮮感染例と思われた。三日熱マラリアの根治療法と関係のある G-6-PD 欠亡症はマレー人に7% (59人中4人) にみられた。

末梢血では現地人労務者は赤血球数 (RBC) 正常, 血色素 (Hb) 低く, 色素係数 (CI) が低く, 白血球数 (WBC) が多い傾向がある。これに比べ日本人は RBC 少なく, Hb, CI, WBC はほぼ正常の傾向がみられた。また Fansidar 内服による WBC の減少は今回の調査では3, 6, 9カ月目の検査で確認できなかった。日本人女性は現地人女性に比べ貧血の傾向があり, WBC はやはり現地人の方が多かった。

日本人に1名急性 A 型肝炎が発生し, 慢性活動性肝炎に移行し, 帰国, 半年以上の入院を余儀なくされた者がある。日本人全体として現地到着1月以内では GOT, GPT とも現地人より低値を示したが, 3カ月目になるとその値が高くなり現地人と同じ値を示すようになった。ただし正常値を越えるものの頻度は両群ともほぼ同率であった

が、日本人では現地到着3カ月目にGPTの異常値を示すものが多かった。衛生状態があまりよくないので、多くの日本人がA型肝炎の感染にさらされた可能性がある。また高温多湿の環境とGOT, GPTの変動も将来考慮する必要がある。

29 *Salmonella paratyphi* A の輸入例について

○相原 雅典, 丹治 汪, 高橋 浩
天野 博之, 山本 利雄 (天理病院)

1974年7月より9月まで、インドネシア、ジャワ、バンドンへ短期旅行した学生21名中3名より、*Salmonella paratyphi* A (S.P.A) を分離した。3症例中2例(症例1, 3)は現地において発熱(38-39°C), 軟便もしくは水様下痢を経験したが、特に抗生剤の服用もなく寛解し帰国した。症例2は、現地においてなんらの自・他覚的異常所見を認めなかったが、帰国後約10日目に発熱(39°C), 咳嗽を主訴として夜間我々の病院を訪れたが、適切な検査を行えず確定診断に至らなかった。その後、現地発症例中症例1に発熱、水様下痢等の再燃を認め当院に受診し血液よりS.P.Aを検出した。この症例の診断確定後、旅行に同行した他の20名について、その血液、便等の細菌学的検索を行い2名(症例2, 3)より本菌を検出した。これ等3症例の臨床検査成績は、回復期における好酸球の軽度増加, GOT, GPTの軽度上昇, α_1 -globulinの軽度増加, CRP反応陽性, Widal反応は、A-Oに対し80-160倍の上昇を認めた。本菌の主要生化学的性状は、Bergey, Edwardらの記載のそれと一致するが、Barsiekow培地におけるMannitolとSorbitolの分解性に異なる点を認めた。薬剤感受性試験は、トリディスク“栄研”を用いて行ったが、SM, KM, CL, TC, CP, CER, ABPcに対し感受性であった。フェージ型はすべて4型であった。最近わが国への赤痢、腸チフス症の輸入症例は比較的多く報告されているが、S.P.Aの報告は稀であり、インドネシアにおける本症についての近況も知り得なかった。またわれわれの経験よりも本症が比較的軽症に経過する事から、余程マークしていない限り見過ごしてしま

う危険性が大きい様と考えた。今後、海外への渡航者および入国者の年次的増加に伴い、この種の病原体の持ち込みによる国内発症または伝播が増加する事も憂慮され、防疫体制の一層の充実が望まれる。

30 熱帯におけるエンテロウイルスの生態についての一考察

大立目信六 (福島医大・細菌)

熱帯地方においてはエンテロウイルスが1年中流行しているといわれてきたが、具体的なデータは乏しかった。そこで、西アフリカのガーナではどんな型のウイルスが、どう伝播して行くかを知る目的で、本研究を行った。1971年から1973年にかけて、アクラ市内の幼児の腸管系ウイルスを継続的に調べた結果、平均43.8%からウイルスを分離したが、乾期と雨期の差は見られなかった。ウイルスはPolioの各型, Echoの多くの型などが分離同定されたが、ある型は毎回のよう分離されたもの(Echo 6型, 7型, 11型など)もあるし、一度に多数分離されたもの(Echo 19型)もあった。全般的に多くの型のウイルスが継続的な循環を繰り返していると思われた。

村落部では雨期と乾期の2回の調査であったが、2回とも都市部の分離率よりも低かった。孤立したある部落では2回とも、分離ウイルスの大部分が単一の型のウイルスによって占められていた。即ち、第1回目の雨期に分離されたウイルスは75%がEcho 20型であり、2回目の乾期には78%がPolio 2型であった。別の部落では水道の布設前と後とで腸管系ウイルスの分離率に著明な差が見られた。全体の平均ウイルス分離率は21%であり、学校に通うようになる5歳以上の子供から多くのウイルスが分離された。

村落部の飲料水の調査を行ったところ、約30%の飲料水より腸管系ウイルスを含む各種のウイルスが分離され、これがウイルスの伝播に重要な働きをしていることが示唆された。

以上、熱帯アフリカにおいては腸管系ウイルスの生態に都市型と村落型があるのではないかと考えている。即ち、多種類の型のウイルスが継続的

に流行している都市型と、単一の型のウイルスが不連続的に流行を繰り返す村落型とに分けられるのではないかと想定している。

31 痘そうウイルスに対する消毒薬の研究

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供試ウイルスは variola ウイルス (Bandung 株) で、比較のために variola ウイルス (Harvey 株) および vaccinia ウイルス (池田株) を用いた。培養系はサル腎細胞 (Jinet 株) の microplate culture で、圧着フィルムで密閉し、35C で培養した。消毒薬としてはアルコール、塩素剤、ホルマリン、フェノール、クレゾール、界面活性剤、ヨードホルムおよびクロールベンゾールを供試した。薬剤を適当な濃度に希釈してウイルス液を混合し、1分、3分、5分および10分間接触させた後にさらに希釈し、培養細胞に接種した後、35 C、6日間培養しクリスタルバイオレット溶液で染色した後、顕微鏡により CPE を観察して薬剤の効果を判定した。また methyl cellulose overlay medium による plaque 形成をも併せ行った。

Bandung 株ウイルスの接触時間 1分における各薬剤の最小有効濃度は、エチルアルコール50%、イソプロピールアルコール40%、次亜塩素酸ソーダ0.1%、ホルマリン1%、フェノール2%、クレゾール石けん液1%、ヨードホルム0.1%、ジクロールベンゾール製剤1~2%であった。界面活性剤はその種類により0.25~2%の範囲にわたった。また microplate による plaque 形成実験に成功し再現性のあることを確かめた。比較のために用いた Harvey 株および池田株ウイルスについてもほぼ同様な成績を得た。

32 Microplate culture 法による黄熱ウイルスの plaque 形成と中和試験

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藤田 宣哉 (神戸大・医・微生物)

黄熱ウイルス (17D 株) の定量および中和反応について微量法の開発を試みた。

Microplate (Micro Test II Tissue Culture Pl-

ate, Falcon 又は、フラットマイクロプレート、豊島製作所) に培養された BHK-21 細胞上に、黄熱 (YF) ウイルスのプラーク形成が可能であった。plaque はウイルス接種後5~6日目に直径約0.5~1mm のものとして明瞭に認められた。重層培養液は、1% methylcellulose 2% 仔牛血清加 Eagle's MEM を用いた。

さらに transfer-plate (Cooke Engineering Co.) の併用により、Microplate 法によるウイルス微量中和試験が可能であった。抗体は原株ウイルスを注射した Ehrlich sarcoma 接種のマウス腹水を用いた。50% plaque reduction 法により、中和抗体の力価を測定した。この微量法で得られたウイルス力価ならびに中和抗体価は、プラーク瓶で行う従来の方法で得られたものと比較してほぼ同様であった。

本微量法は、Plate sealer (Cooke Engineering Co.) を用いることにより、炭酸ガスふ卵器を用いることなく、通常のふ卵器で実施が可能であった。そこで黄熱ウイルスの定量ならびに中和抗体の測定に簡便迅速性を与え YF の診断ならびに疫学調査に有用な手段を提供するものと考えられる。

33 イランの医療事情

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我々は1974年1月と8月、イランを訪問し、医療事情を調査する機会があった。

イランはアジア大陸の南西部に位置し、面積は日本の約4.5倍で、国土の8割は砂漠地帯であり、北部カスピ海沿岸は亜熱帯に属して温暖であるが、中部高原地帯は大陸性気候で寒暖の差が甚だしく雨量も少ない。南部ペルシア湾地方は、酷暑地帯で夏季には50Cを越える事も稀ではない。人口は約3,000万で、宗教はイスラム教が大半であるが、宗教的戒律はそれ程厳しくない。1971年度のイラン厚生省の発表した死因統計によると、循環疾患が28.3%で最も高く、次いで呼吸器疾患(18.3%)、感染症及び寄生虫性疾患(17.8%)の順で、感染症がかなり上位を占めている。

感染症としては、チフス、パラチフス、赤痢、ジフテリア、猩紅熱、マラリア、ポリオ、発疹チフス、種々の腸管寄生虫、住血吸虫、皮膚リーシュマニア、フィラリア等が報告されている。コレラ、痘瘡については厚生省の報告はされていないが、現地での話では散発的な流行がみられるとの事であった。

医療施設については、テヘラン等の都会では、完備された病院が多く、かなり充実していると思われるが、僻地、砂漠地帯では医療施設の整備はかなり遅れている。大学卒業後2-4年の衛生部隊勤務が義務づけられているが、これらの青年医師達の地方住民への医療、保健、衛生活動がこの国の僻地医療に大きく貢献している。

ペルシア湾沿岸地帯の夏季の暑さは想像以上で、これらの酷暑地帯で生活する日本人は、単に疾病予防を心がけるだけではなく、生活環境や自然環境に順応する事が重要であると考えられる。

34 ラオスの異常ヘモグロビンについて

—電気泳動法によるスクリーニング—

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1974年12月-1975年3月に、ラオス国タゴン保健センターにて、電気泳動法による異常ヘモグロビンのスクリーニングを行った。検査材料：ラオス学童血液117件（ナポック難民部落小学校32件、ドンノン小中学校60件、タゴン小学校25件）タゴン保健センター患者血液27件（タゴン村17件、その他10件）、対照は在ラオス日本人協力者血液29件。検査方法：pH8.6 トリス・EDTA・ホウ酸緩衝液を用いたセルロースアセテート膜による電気泳動法。染色にはボンソー 3R を使用。結果：対照例はすべて、HbA+A₂ の正常バンドを示すが、ラオス人144例中では、(1) HbA+(HbA₂ 位に異常バンド) 40例 (27.8%) (2) HbA₂ 位に異常バンドのみを証明する6例 (4.2%) の2種の異常を見た。東南アジア地域ということ、異常バンドの

泳動位置が、HbA₂ 位に合致すること、及び、この部のみに異常バンドを示す例があることにより、この異常ヘモグロビンは、HbE の可能性が一番強いと推測し、仮に、(1) はヘテロ型、(2) はホモ型とした。β-Thalassemia 及び Thalassemia-E 症の混在を、完全には否定出来ないが、持ち帰り得た検体について、さらに詳しく検策中である。この異常ヘモグロビンの出現頻度に関して、年令的には差がなく、性別では、ヘテロ型には差がなく、ホモ型は、男性1例、女性5例であった。地域別では、ジャール平原よりの難民部落、ナポックと、ビエンチャン平原のドンノンには差がない。マラリアとの関係では、正常例に3例 (3.8%) ヘテロ例に2例 (6.5%) の熱帯熱マラリアを発見した。Hb 濃度で、WHO の規準以下の貧血症が、正常ヘモグロビン例75例中14例、18.7%に対し、ヘテロ型で29例中3例、10.3%、ホモ型で、3例中1例であった。この異常ヘモグロビン例の病態についてのさらに詳しい検討は今後の研究としたい。なお、本報告のデータの一部は、新潟大ラオス学術調査団との共同研究による。

35 インドネシア、セレベスの離島、バーンガイ島に働く出向日本人の健康調査及び生活環境調査について

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中里 秀男, 荒木 恒治
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1974年我々は、インドネシアのセレベス島近くのバーンガイ島で伐採に従事する14人の日本人の健康調査と、周囲の環境調査を行った。血清蛋白、S-GOT、S-GPT、RA-test、梅毒反応、血液像、血圧、尿、糞便中の虫卵について検査した。血清蛋白はほぼ正常であったが、S-GOT、S-GPTは、14人中6人が高値を示した (42.9%)。彼らは、熱帯地方における労働とアルコールの多飲により、肝障害を引き起こしたと考えられる。又、彼らの内の9人 (64.3%) は、マラリアの既往があり、2人 (14.3%) が梅毒反応陽性であった。血圧の管理、マラリアや肝障害の予防及び治療が重要である。

次に彼らは日々の生活に近くの川の水を使用しているので、水の分析が1つの重要な問題であった。彼らは飲料水は煮沸して使用していたが、食器を洗ったり、食料品を洗う水は煮沸していなかった。故に下痢を起こしたり、水浴した後、受

傷部位に膿瘍を形成したり、又化膿性リンパ腺腫を起こしたりしていた。我々は細菌の検出と水の分析を行った結果、*E. coli* グループやアンモニア窒素を認めた。以上の事より、我々は早急に衛生環境の改善が必要な事を痛感した。

PROCEEDINGS OF XVII ANNUAL MEETING OF
JAPANESE SOCIETY OF TROPICAL MEDICINE

19-20 July 1975 Takatsuki, Japan

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PROCEEDINGS OF XVII ANNUAL MEETING OF JAPANESE SOCIETY OF TROPICAL MEDICINE

Special lecture

1 THE ASIAN POPULATIONS ON THE ASPECT OF BLOOD GROUPS

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The discovery of the ABO blood groups of human red cells by K. Landsteiner, in 1901, opened up the field of blood groups. And the discovery of further systems of blood group followed that of the ABO. A new and exciting phase in the history of blood groups began when O. Smithies, in 1955, introduced the technique of starch gel electrophoresis into the field of blood groups and the technique was extended to the study of cellular enzyme, which provide a fruitful source of genetic markers. It has now been firmly established that the genetic markers of blood components provide plenty of application to human biology because of the simple Mendelian inheritance and polymorphism.

For example, when tests for the blood groups usually used are combined, the probability that the blood of any two random individuals of Japanese population will have identical phenotypes is now about one in 1,445,000.

Formerly morphological traits and linguistic features mostly have been used for the anthropological study. However, blood groups which exhibit heritable variation sufficient to be classified as genetic polymorphism had now entered the field of human population genetics as useful markers.

I would like to speak especially of the genetic markers of immunoglobulins, Gm, as one of the blood groups today. Of most importance is that the immunoglobulin systems provide unique markers for the study of population studies, especially in regard to gene flow and genetic drift, because of double polymorphism, i. e. Polymorphism of allotypes at one locus and polymorphism of haplotypes. The Gm allotypes occur with markedly different frequencies and are transmitted in complexes referred to as haplotypes which show different patterns from race to race in man. They contribute to the characterization of a certain population and provide clues to population movements and differentiation.

On the basis of the Gm patterns found among the Asian populations thus far investigated, discussion has been made of the characterization and the process of differentiation of these populations.

Nine to six Gm phenotypes which can be explained by the four haplotypes, Gm^{ag}, Gm^{axg}, Gm^{ab³st} and Gm^{afb¹b³}, were usually observed among Mongoloid

populations. From the Gm point of view, the finding supports the theory that the genetic origin of the Ainu population was not Caucasoid but was originally Mongoloid because of the remarkable similarity to Japanese in the Gm phenotype frequencies and high incidence of Gm(ab³st), characteristic of Mongoloids, even considering the relatively high rate of admixture with Japanese, except for the Gm^{xg} haplotype, which is absent in Japanese and which has not been detected in any race of the world. On the other hand, ten Gm phenotypes found in the Iranian populations can be explained by five phenotypes which consist of the three Gm haplotypes, Gm^{ag}, Gm^{xg}, and Gm^{fb¹b³}, characteristic for Caucasian populations, and the two Gm haplotypes, Gm^{ab³st} and Gm^{afb¹b³}, from the four haplotypes characteristic for Mongoloid populations. Even the frequencies of the Gm^{afb¹b³} and Gm^{ab³st} have relatively high values. The conclusion from these results is that the Iranian populations are of basically Caucasian origin, but admixed with Mongoloids in a relatively high proportion. It will be quite interesting to compare this data with historical and geographical studies in Iran.

Discussing only on the Mongoloid populations in Asia and the North and South America thus far investigated, a striking aspect of the Gm data is a clear geographical cline of Gm^{ag} and Gm^{afb¹b³} genes and a moderately high frequency of haplotype Gm^{ag}, and a very low frequency of Gm^{afb¹b³} among the Japanese, Koreans, Okinawans, Ainu (supposed to be proto Mongoloid), and North and South American Indians (considered to be prepaleo Mongoloid). On the contrary, Taiwanese, Takasagos and Indonesians have a remarkably high frequency of Gm^{afb¹b³} and a lower frequency of Gm^{ag}. Thus, on the basis of the Gm data, Asians related to Mongoloids can be divided into two groups; one is a northerner group, which is characterized by high frequency of Gm^{ag}, Gm^{xg}, and Gm^{ab³st} and a very low frequency of Gm^{afb¹b³}, and the other is a southerner group which is characterized by a remarkably high frequency of Gm^{afb¹b³} and lower frequencies of the Gm^{ag}, Gm^{xg}, and Gm^{ab³st}.

The resemblances in languages are of considerable historical significance since they indicate a common origin in the past followed by subsequent differentiation. The latter is the product of historical forces that tend to isolate, particularly population movements or migrations. Cultures of migrating groups tend to change rapidly as they adapt to new natural and social environment, but languages are much more resistant to changes. Analysis of language relationships, therefore, provides clues to prehistoric population movements. Linguistically, the Northerner groups, above mentioned, correspond to the Ural-Altai language group which is the mounted nomads known as Timour and Huns. The Southerner groups correspond to the Sinitic and Austronesian language group.

The American Indians from Peru are considered linguistically to be the descendants from the Macro Arawakan Quechuan phylum which is supposed to have migrated into South America from Northern Asia over 10,000 B. C. as one of the two earliest waves of population movement. The Gm patterns of the people show that of northerner group, as it should be, except for low incidence of Gmst gene. Coincidentally, the Peruvian Indians said to be less specialized Mongoloids have a extremely low incidence of Gmst, characteristic for Mongoloid populations. This suggests

that the Peruvian Indians may not have the Gmst gene originally and it has been introduced by the much more specialized Mongoloids (Eskimos and Na-Dene speakers) arrived much later from Siberia. It may also give a suggestion of the time when Gm gene gave rise to the Gmst gene.

2 RECENT TREND ON EPIDEMIOLOGY, DIAGNOSIS AND TREATMENT FOR AMEBIASIS

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Epidemiology:

With the steady improvement in education, economic status and public and private sanitation in Korea, I believe that amebiasis is less prevalent than it was a decade ago and that it will continue to decline. A bit of concrete evidence of this is that in Cheju Island, our survey data have shown that the prevalence of *Entamoeba histolytica* among the inhabitants were 24.3% in 1965, 12.0% in 1969 and 5.3% in 1972. In the meantime, this community had been furnished with pipe-water system instead of rain-water pool and more sanitary privies, and the introduction of orange growing had improved the economic status. Nevertheless, amebic hepatitis and liver abscess are still serious health hazards among the island dwellers. The present report refers to the several intriguing problems on factors enhancing tissue-invasiveness of this parasite which has not been easily explained until present.

Diagnosis:

It is well known that diagnosis of amebiasis by examination of feces or pus in abscess to demonstrate cyst or trophozoite of *Entamoeba histolytica* is frequently unsatisfactory in hepatic and other extraintestinal forms of amebiasis. Until recently immunodiagnosis for amebiasis has not been widely used because of a lack of reproducibility and uniformity in results, but now, with the advent of newer serologic techniques and success in producing axenic *Entamoeba histolytica* antigens, attempts to contrive simpler and more reliable test are being reported. Among those are: immobilization test, complement fixation test, indirect fluorescent antibody test, soluble antigen fluorescent antibody test, gel-diffusion precipitin test, immunoelectrophoresis, indirect hemagglutination test, intradermal test, bentonite flocculation test, latex agglutination test and counterimmunoelectrophoresis. Comparison of those serologic tests were also reported by many authors. Our results indicated that 1) serum samples with positive reactions by more than three immunodiagnostic methods would support the disease is amebic origin, 2) only one method positive or more than three methods negative serum might be clinically not significant, and 3) the two methods positive serum would need clinical findings for reliable diagnosis.

Treatment:

The ideal amebicidal drug should be nontoxic and should effectively kill amebiae in any tissue as well as in the intestine when administered orally. Since Powell *et al.* (1966) introduced the nitroimidazole derivative metronidazole (Flagyl) for the treatment of amebiasis, there have been numerous reports on the usefulness of metronidazole in the treatment of intestinal and extraintestinal amebiasis. The drug is well tolerated, and its lack of toxicity and satisfactory range of activity in various forms of amebiasis have resulted in wide usage. Recently, several new metronidazole derivatives are also reported. The effectiveness on the comparison of those drugs presented.

3 THE MEDICAL CO-OPERATION OF JAPAN

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Since the Vietnam War ended, Asian and Pacific situations changed to a new stage. The map of Indo-China Peninsula, which includes Cambodia, South Vietnam and Laos, was repainted entirely, and the various impacts were felt in all Asia, and the ripples are now involving the whole world. In the course of establishing a new order after the Vietnam War, it is needless to say that Japan's role in the Asian and Pacific area has become greater and it is the time we should help building up new peaceful relations in these countries. The countries in the world are watching the new situations in the Asian and Pacific Area with much expectations and primary concerns, taking great interests in the international problems. In this tense Asian and Pacific situations, it is mandatory to reevaluate Japan's Overseas Medical Co-operation. It is already 9 years since I have appealed the medical co-operation in South-east Asia to universities, hospitals, research institutes and medical experts at the South-East Asian Medical Symposium held in Kyoto, October, 1966.

We say Japan's history of the economic and technical co-operation system is rather short, but it is already 22 years since Japan joined the Colombo Plan in 1954. Our activities have been unsteady and the failure was not always few, though in some cases they were adapted to the countries and welcomed by the people. The cause of the failure was the disintegration of the staff, things, and management between countries and consequently we have wasted good opportunities. Even if the Japanese technicians made their every effort, it was often fruitless.

The Japanese international co-operations toward developing countries were to extend into their societies, and to their home industries of agriculture and forestry, offering the fund and technics, and to the communities which are healthy and have necessary facilities including hospitals, clinics, schools, institutes and dormitories. Japanese international co-operation system is misunderstood as the export-promotion-pattern just to earn the profit in the name of the international co-operation, as illustrat-

ed by the regrettable affairs broken out in the Asian countries some years ago. On the other hand, complaints were voiced among Japanese technicians that it was very inconvenient to take active parts because of their poor surroundings, and as the result the co-operation was suspended and dormant. We have to overcome those problems, and in order to advance the co-operation effectively, we had better to have an organization to hear the voices of native technicians and others. Sometimes technicians sent from Japan feel miserable and desolate just as a kite whose string is cut. These results must be prevented.

Recently the expectation of developing countries toward Japanese international co-operation has been increased in accordance with the striking growth and international scale of her economy. At this point I would like to suggest how the Japanese overseas co-operation should be.

1. Co-operation depends on mutual respect and love and we have to make every effort to find men of talent and heart.
2. It is important to have a long-term view, not to think only of the present.
3. The facilities and systems of the acceptance of the trainees must be improved.
4. To prevent the failure, both participating countries must aim well-balanced plans when they select projects, etc.

Lastly, I would like to emphasize that the success of the co-operation, depend on how to win the hearts of the people there at the present time. This can be achieved by constant efforts and sincerity, as other influential countries such as America, Russia and China are trying.

Symposium Some diseases in the tropics

1 AN EPIDEMIOLOGICAL STUDY OF SCHISTOSOMIASIS IN KENYA

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Investigations were carried out into the epidemiology of schistosomiasis in some of villages around Taveta Town, Taita-Taveta District, Coastal Province. Particular attentions were paid to the local prevalence of human infection with *Schistosoma mansoni* and *S. haematobium*, distribution and natural infection rate of the intermediate snails, and infection rate of wild rodents.

The results of the investigations were summarized as follows:

Local prevalence of human infection: The prevalence of human infection with *S. mansoni* and *S. haematobium* was estimated on fecal and urine samples obtained from the persons of the villages, Lake Jipe, Eldoro and Kivalwa. The results revealed that 61.3% (176/287) of those examined in Lake Jipe Village are positive for *S. mansoni* and 2.9% (7/244) only for *S. haematobium*. In Eldoro Village, positive rate of *S. mansoni* and *S. haematobium* are 41.3% (194/469) and 53.0% (261/492), respectively. In Kivalwa, while *S. mansoni* ova are found in 20 persons out of 237 (8.4%), 175 out of 259 are positive for *S. haematobium* (67.6%). Simultaneously, the skin test was carried out with VBS antigen among the same villagers. The positive rates were 74.8% (226/302) in Lake Jipe, 69.6% (369/530) in Eldoro, and 75.2% (200/266) in Kivalwa.

Distribution and natural infection rate of the intermediate snails: The snail surveys were carried out in drains, streams, ponds and lakes of the area where epidemiological investigation was carried out. Snails collected were *Biomphalaria sudanica*, *B. pfeifferi*, *Bulinus globosus*, *B. tropicus*, *B. forskali*, *Lymnaea natalensis*, *Ceratophallus natalensis*, *Segmentorbis angustus*, *Gyraulus costulatus*, *Melanoides tuberculatus* and *Bellamya unicolor*. More than 1,000 snails of *Biomphalaria* and *Bulinus* were examined by crushing and/or shedding methods for *Schistosoma* infection. Among them, *Bulinus globosus* tends to be infected with *S. haematobium* larvae and the infection rates of the snails in Eldoro and Kivalwa were 12.0% (9/75) and 8.0% (45/562), respectively. However, *B. tropicus* and *B. forskali* were negative for *S. haematobium*. During the course of this investigation, *Biomphalaria sudanica* and *B. pfeifferi* were not proved to be infected with *S. mansoni* larvae.

Infection rate of wild rodents: Fourty rodents were collected in Lake Jipe shore. Names and numbers of the rodents collected were 1) *Pelomys* sp. 27), 2) *Dendromus* sp. 6, 3) *Thamomys* sp. 3, 4) *Arvicanthis* sp. 2, 5) *Rattus rattus* 1, 6) *Elephantshrew* 1. Among them *Pelomys* sp. was proved to be infected with *S. mansoni* (infection rate: 44%).

2 ONCHOCERCIASIS

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Onchocerciasis is the disease by a parasitic nematode, *Onchocerca volvulus*, transmitted by the infected black fly of the genus *Simulium*. The ultimate and typical symptom is expressed by the term "river blindness" which indicates clear relation between "river", breeding places for the vector black flies, and the resulting "blindness" among the inhabitants bitten by the infected *Simulium*. The estimated number of the infected is 30 million or more in the world distributing in Africa and Latin America. Since the launching of Onchocerciasis Control Program by WHO in Volta River basin starting from 1974, this disease is attracting the interests of various fields. This could be explained by the following reasons:

1) Socio-economic: Socio-economic loss is very serious in heavily infected areas due to the increase of blind adults and therefore vast farming lands are already abandoned especially in West Africa.

2) Medical: There are difficulties in the application of chemotherapy and the elimination measure of vector black flies.

In this paper, general aspects of onchocerciasis and the current topics on several problems are briefly reported.

1) Onchocerciasis: Its transmission, symptomatology, diagnosis and treatment.

2) Biology: Recently microfilaruria has been frequently found among the infected and this phenomenon indicates the importance to carry out further study on the location of adult and larval parasites. The behavior of microfilariae in the skin is also discussed by several researchers and no final conclusions are obtained whether there is periodic undulation of microfilarial density in the skin.

3) Chemotherapy: Although mass drug treatment is very important during the control program, both diethylcarbamazine and suramin have shortages in their efficacy and cause adverse reactions. Instead, Metrifonate is the most promising drug and is recommended to be investigated.

4) Vector control: WHO is applying Abate and Methoxychlor as larvicides in West Africa. Biological control of the vector is also considered.

5) In Guatemala, denodulization operation has been undertaken for about 40 years in endemic areas and this failed to reduce the prevalence at all. Based on this fact, the launching of a large-scale control program is quite desirable at the present.

3 SOME GENETIC DISEASES IN THE TROPICAL AREA

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Since 1966, we have continued the medical service activities in Congo-Brazzaville and Laos Kingdom. We have found the various genetic diseases in these areas. In this report, the following two genetic diseases are described. One of them is Glucose-6-phosphate dehydrogenase (G-6-PD) deficiency and the other is progressive muscle dystrophy manifested only in the male.

The G-6-PD deficiency is the congenital anomaly of glutathione metabolism in the red blood cell. The patient of G-6-PD deficiency is genetically determined as sex linked dominance (incomplete) and induces hemolysis by the administration of antimalarial drugs but has the acquired resistance against malarial attack.

Two hundred and ninety seven Laotians at Ban Keun district were examined in regard to G-6-PD by brilliant cresyl blue reduction test using the Kit of Sigma & Co., Ltd. The G-6-PD deficiency was found in 52 cases, or 17.5%, among which the reactors were 34 cases (11.4%) and the intermediates were 18 cases (6.1%). Among 154 cases of male, there were 33 cases of the reactors and 3 cases of the intermediates. Among 143 cases of female, the intermediates were found in 15 cases and the reactors only in one case. Among 245 cases of non affected individuals, 34 cases of malaria, or 13.8%, were found. There were 26 cases of *Plasmodium falciparum* and 8 of *Plasmodium vivax*. However, only 3 cases of malaria, or 5.7%, were found in 52 cases of the G-6-PD deficiency. From the above results, it is recognized that the individuals affected by G-6-PD deficiency have the resistance against malaria. Moreover, the clinical findings, and family data were investigated, and the mode of inheritance was discussed. The relationship of G-6-PD deficiency and malaria in Asia and Hb-S and malaria in Africa are the important problems of the human genetics.

A family of eleven children of whom eight were male and three were female, was reported. The five children among eight male, were afflicted by the muscle dystrophy. A healthy boy, the age of 7-8 years, suddenly fell down at play. All have shown progressive muscular atrophy of the lower extremities gradually going up to the neck and upper extremities so that at the age of adolescence, they becomes crippled. The afflicted boys die when they become seventeen to twenty-three years old. It is presumed that this disease is sex-linked and heredo-familiar revealed in the closed society of the developing country. The family data, the chromosome, and the histological finding (microscopic and electron-microscopic) of a muscle biopsy (*M. gastrocnemius*) were discussed.

4 INFECTIOUS DISEASES IN GHANA, WEST AFRICA

Recent trend of viral disease

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In the tropical zone of Africa, various communicable diseases are prevailing currently. Furthermore, there is a possibility of outbreaks of unknown infectious disease such as Lassa fever or acute hemorrhagic conjunctivitis. The recent trends of infectious diseases in Ghana were presented here with special references to viral diseases. The data employed were cited from medical statistics of communicable diseases released from the Government of Ghana.

It was reported in 1967 that almost 30% of certified deaths carried the diagnosis of communicable diseases, and the rate was higher among children under five years of age.

Viral Disease: Since 1969, numbers of notified cases of measles and chickenpox in Ghana were markedly higher than other communicable diseases. There was a significant rise in the number of reported measles cases from about 46,000 in 1970 to 95,000 of 1971, and stood a plateau since then. The figure of measles cases according to the seasonal distribution showed a peak around February to April. The figure also indicated that 33% of the cases occurred in infants under one year of age. Average fatality rate of measles was about 0.3 percent.

Infective hepatitis was becoming one of the serious diseases in Ghana, with increasing morbidity and mortality rate since 1970. Infective hepatitis was increasing considerably every year. Medical statistics in 1973 showed that hepatitis had the second highest mortality rate. The average fatality rate of infective hepatitis was about 1.8% in 1969–1973.

Though the number of cases were not so many, notified cases of poliomyelitis were increasing slowly but steadily up to 1973. It was confirmed that the wild type of polioviruses were prevalent in the urban community throughout the year. There still remains a risk of poliomyelitis outbreak in Ghana.

Notified cases of yellow fever is rare. However, vector mosquitos were found everywhere in the country, so that epidemics can occur whenever virus was introduced into the community. At present, sporadic cases of yellow fever were reported from isolated forest areas, and it is suspected that there might be many unreported cases.

Rabies were not so many but a few cases were reported continuously somewhere in the country. A large number of chickenpox cases were reported during the dry season with only a few fatal cases.

Bacterial Disease and Others: A large number of infectious yaws, pertussis and tuberculosis cases were reported every year. Tetanus, enteric fever and tuberculosis were major problems in Ghana because of their higher mortality in all ages. Shigellosis was prevailing widely in the towns and villages, though it is not reported. Cerebrospinal meningitis cases were reported in the northern part of

Ghana during the dry season. Cholera cases were found around the coastal area, and it seems to become endemic in Ghana. Eradication of malaria in Ghana has been abandoned at present, as it was realized that infrastructural system of basic health service was a necessary condition for the eradication. Several projects of malaria eradication were attempted during the past decade, but most of them did not succeed.

Hence, it may be summarized that, in Ghana, various kinds of communicable diseases such as measles, infective hepatitis, tetanus, tuberculosis and enteric fever are prevailing endemically throughout the year. It is suggested to improve the public and personal health service and to take an effective measures for the eradication of these diseases.

5 THE RELATIONSHIPS BETWEEN SERUM IMMUNOGLOBULINS, ESPECIALLY IgE AND VARIOUS DISEASES IN INDONESIA AND KOREA

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Immunological studies were performed by measuring serum IgE levels (RIST) of those Indonesians (Celebes, Banggai Island, Kendak- and Lambako- villages) and Koreans suffering from parasitic diseases (clonorchiasis, paragonimiasis and hepatic amebiasis). And these serum IgE levels were compared with those of helminthic diseases (ancylostomiasis, ascariasis and trichuriasis) in Japan.

1) In 16 Japanese controls serum IgE level was mean 134 (60–302) U/ml {mean showed arithmetical mean get from logarithm transformation and () showed \pm S. D.}. In 35 cases of ancylostomiasis serum IgE level was mean 733 (258–2,084) U/ml, in 14 of ascariasis was mean 711 (333–1,522) U/ml, in 30 of trichuriasis was mean 983 (464–2,085) U/ml and 36 of metagonimiasis was mean 628 (303–1,304) U/ml in Japan. In these parasitic diseases serum IgE levels elevated more than normal controls statistically ($p < 0.05$).

2) In 35 cases of paragonimiasis serum IgE level was mean 645 (202–2,060) U/ml, in 15 of clonorchiasis was mean 459 (119–2,065) U/ml and in 23 of hepatic amebiasis was 171 (43–686) U/ml in Korea. On the other hand serum IgE level was almost normal value of mean 220 (109–445) U/ml in 37 Korean controls and was normal value of mean 48 (30–77) U/ml in 18 American controls living in Korea. From the comparison with these IgE levels it was confirmed clearly that serum IgE level in these helminthic diseases elevated statistically ($P < 0.05$).

3) Serum IgE level was mean 3,777 (1,189–11,990) U/ml in 76 Indonesian of Banggai inhabitants, showing a higher level than Japanese statistically. Twelve cases of them (15.8%) showed serum IgE levels of over 10,000 U/ml. In 22 cases from Kendak-village, serum IgE level was mean 3,128 (1,144–8,553) U/ml and in 40 of Lambako-village 3,352 (1,025–10,950) U/ml. Both showed similarly high

levels. In 14 cases of Menado area, serum IgE level elevated especially higher than the Indonesians of both villages showing mean 7,153 (2,455–20,840) U/ml. Eosinophilia was found in nearly all of them and parasitic infections were indicated from the fact that specific bands against nematodes, trematodes and cestodes were proved by using ouchterlony and IEP methods.

4) From the comparative study of the American, Japanese, Korean and Indonesian controls in serum IgE level it was assumed that there were a significant racial difference.

5) Neither the relationship between serum IgE levels and IFA (Indirect Fluorescent Antibody Test) nor the correlation between serum IgG levels and IFA was significant statistically.

6) Problem of malaria: On our investigation *Plasmodium vivax* in the blood smear was proved in 8 cases (10.5%) of 76 inhabitants. History of malaria infection was founding many inhabitants (77.8%) and hepatomegalia in 21.1% of inhabitants, and splenomegalia were proved in 31.6%. Therefore, in these areas of Banggai island, the possibility of malaria infection was assumed. Besides, serum IgM level in those inhabitants was mean 511 (198–1,315) mg/dl, and elevated, significantly higher than normal controls who revealed mean 131 (49–355) mg/dl. It was interesting that the relationship between malaria infection and serum IgM level, was recognized.

7) Problem of venereal diseases: In serological reactions of syphilis (VDRL and TPHA), 47 positive cases (62.7%) among 75 inhabitants were found. And the relationships between serum IgM level and VDRL or TPHA were significant statistically ($p < 0.05$). Therefore the importance of venereal disease in these areas is to be emphasized.

6 A RESEARCH ON LOOSE BOWEL SEEMINGLY CAUSED BY DRINKING WATER IN TROPICAL AREA

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We have been studying the health condition of the Japanese people living in the tropics. They say that drinking supplied water without boiling causes loose bowels. In order to study the relation between their drinking water and loose bowels, we gave a questionnaire to the office workers of some electric industrial company and their families living together in Southeast Asia, and also analyzed their drinking water.

The research was done with 64 families living in 5 areas; Bangkok, Kuala Lumpur, Singapore, and Nerrol and Baroda in India. Twelve families were picked out at random for their water analysis, and 138 people were examined about their diseases.

As the result, it was found that the water they drink seems to have caused loose

bowels to 84 people (79.2%) out of 106 people who had been drinking it since their arrival in these countries. Especially in Bangkok, 88.4% of people, and 100% of people in 4 districts in India were also found in same case.

According to the water analysis, it was found that in some districts in India, people drink hard water of, what Taylor calls, beyond moderate degree, containing extraordinary large number of germs. That is, hardness of most of the water was more than 200 ppm, and even 360 ppm in some districts. Besides, $4 \times 10^6/ml$ of germs were also found in the water.

Infering from the fact that most of the loose bowels can be prevented by filtering and boiling water, it seems that these bowels are caused by general germs (especially by *E. coli*) and inflammation of bowels by physical and chemical stimulation of hard water containing much Mg^{++} , Ca^{++} .

This can be proved by the fact that hardness of the water decreased after boiling test. At any rate, it seems that loose bowels are caused by the above mentioned two factors. So drinking water should be carefully examined for the people living in the tropics.

General presentation

1 MOSQUITO FAUNA IN WINTER, YAEYAMA ISLANDS

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Since there has been no report on winter distribution of mosquitoes in Yaeyama Islands, a survey was done on larvae of mosquitoes from December 28, 1974 to January 7, 1975, in Iriomote, Ishigaki and Kuro-shima. Adult mosquitoes were also collected with a light trap in front of the lodge at Iriomote. Thirty species were identified during such a short period of survey in winter, implicating a wide-spread distribution at the peak season. The fact that adults as well as larvae or pupae of *Anopheles minimus* were found in both islands implies the possibility that the endemics of malaria could occur at any time. There were many ground pools in Iriomote, where pupae and larvae of *An. sinensis*, *Culex tritaeniorhynchus*, and *C. bitaeniorhynchus* were ordinarily captured, adults of the former two species being captured with the light trap. In addition, eggs and pupae of *lesteri* type were found there, indicating the presence of *An. lesteri*. In the tree holes in these islands, the presence on many *Aedes aureostriatus*, *Ae. albopictus*, *Tripteroides bambusa*, *Orthopodomyia anopheloides*, *C. minor*, *Ae. watasei*, *Ae. flavopictus downsi*, *Ae. riversi*, *Uranotaenia bimaculata* and *Toxorhynchites yamadae* were confirmed. *C. fatigans*, *Armigeres subalbatus* and *C. halifaxii* were present in the polluted pools, *Ae. japonicus*, *C. hayashii* and *C. infantulus* in the rock pools of stream beds, and *Ae. togoi* in the tide pools of seashore. *Malaya genurostris* and *Ae. f. downsi* were captured from the axils of taro plants, and *U. ohamai* and *C. tubercis* from crab holes. Others identified in my survey include *Ae. vexans nipponii*, *Mansonia uniformis*, *C. mimeticus* and *C. nigropunctatus*.

2 A SURVEY OF MOSQUITOES IN INDONESIA

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A short period survey of mosquitoes was carried out at various places in Indonesia, such as Java, Bali, North and South Celebes, Flores, Ceram and Ambon, from November till December, 1973.

Culex pipiens fatigans were found in all the urban areas as far as the areas examined. *Aedes albopictus* was found everywhere, in the urban as well as rural areas. It breeds in variety of situations, such as domestic water tank, bamboo stump and coconut shells. Distribution of *Aedes aegypti* is rather irregular; it was easily found in rain

water cisterns of the houses in South Celebes but rarely in North Celebes, Flores and Ceram.

Anopheles sundaicus was found in a lagoon in Flores Island. *Anopheles punctulatus* and *A. farauti* appeared in Ceram and Ambon Islands.

Helpful cooperation of the Health Authority of the National Institute of Health Research in Indonesia enabled us to carry out this survey.

3 STUDIES ON *Aedes (Stegomyia) pseudalbopictus*

I. Morphological characters of *A. (S.) pseudalbopictus* from Taiwan and *A. (S.) albopictus* from Malaysia

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A. (S.) pseudalbopictus mosquito is morphologically very similar to *A. (S.) albopictus* which is a main vector of dengue. Because of the similarity, it is epidemiologically very important to distinguish both species exactly and to study their behavior. From this viewpoint, we are carrying out morphologically and ecologically comparative studies on both species. In this paper, the morphological differences between *A. pseudalbopictus* from Taiwan and *A. albopictus* from Malaysia observed with both a conventional light microscope and a scanning electron microscope are summarized.

Adults — Male genitalia: In *A. pseudalbopictus*, apical claw of clasper inserted subapically; ninth tergite slightly rounded in the middle, with a hairy nodular lobe on each side. In *A. albopictus*, apical claw of clasper inserted apically; clasper slightly swollen near tip; ninth tergite extremely conical in the middle, with a hairy conical lobe on each side. Thorax of both sexes: In *A. pseudalbopictus*, silver patch is present just in front of base of wing. This patch is composed of narrow silver curved, sometimes flat, scales. In *A. albopictus*, white silver patch is present just in front of base of wing. This patch is composed of flat white silver scales.

Larvae — Ramalingam (1974) reported that in specimens from Java *A. pseudalbopictus* could be distinguished from *A. albopictus* by having a siphon acus. But in the present study the acus is absent in both species.

Eggs — As already reported (Matsuo *et al.*, 1974), the surface structure of the eggs of both species are almost identical.

4 ON THE VECTOR MOSQUITOES OF *Dirofilaria immitis* IN JAPAN

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To investigate the vector mosquitoes of *Dirofilaria immitis* in Japan, experi-

mental study and field survey were made in the Nagasaki area of Western Japan for several years. As the potential vectors of canine heartworm eight species of mosquitoes, *Aedes togoi*, *Ae. albopictus*, *Culex pipiens pallens*, *C. tritaeniorhynchus summorosus*, *C. fatigans*, *C. bitaeniorhynchus*, *C. sitiens* and *Mansonia uniformis*, have been reported previously. In the present study, the author reconfirmed the former four species of them and added three more species, *Aedes vexans nipponii*, *Culex pipiens molestus* and *Anopheles sinensis*, as the potential vectors of the parasite. Of these eleven susceptible mosquitoes, the highest infection rate has been observed in *Ae. togoi*. The natural infections in mosquitoes which were collected by dog-bait-traps, human-bait-traps and light traps were observed at several endemic areas in Nagasaki Prefecture. Out of 14 species of mosquitoes collected, *C. p. pallens* was the most predominant, *Ae. albopictus* was also numerous. Natural infections were found in five species, *C. p. pallens*, *Ae. albopictus*, *C. t. summorosus*, *Ae. v. nipponii* and *An. sinensis*. High infection rates were observed in both of *C. p. pallens* and *Ae. albopictus*. From the results of the present study, *C. p. pallens* would be the most important vector of the canine heartworm in Nagasaki area. *Ae. albopictus* may be the secondary important vector in this area. *Ae. togoi*, which is highly susceptible to the parasite, seems to have no relation to the actual transmission of the disease at least in the Nagasaki area, because this mosquito is very scarce in the endemic areas in the Prefecture. In Japan, either in towns or cities other than Nagasaki, *C. p. pallens* is probably the most important vector of this parasite, because this mosquito is a most abundant species around houses everywhere in Japan.

5 SUSCEPTIBILITY OF THE TROPICAL BED BUG TO LOW TEMPERATURES

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Improved construction of dwelling houses and heating system in recent years in Japan may induce the settlement of tropical or subtropical household pest insects in northern parts of Japan. It is the object of this experiment to determine the longevity in days of the tropical bed bug exposed to various low temperatures under zero, because the longevity of the bug at temperatures above zero had been examined already in Formosa (Omori, 1941). In this experiment, unfed or once fed adults or the last instar larvae were exposed to low temperatures with the results as follows. (1) At -20°C the bug could survive only 40 minutes or less. (2) At -5°C the bug survived 48 hours or less. (3) At -3°C it did about 48 hours. (4) At -1.5°C it would survive probably less than 10 days (now under experiment). (5) At 0°C it did less than 7 days (Omori, 1941). (6) At daily alternating temperatures of -1.5°C for 16 hours and $+20^{\circ}\text{C}$ for 8 hours, it did less than 22 days. (7) At daily alternating temperatures of -1.5°C for 8 hours and $+20^{\circ}\text{C}$ for 16 hours it did longer than 81 days and probably will survive 90 or 100 days. The last two daily alternating

temperatures were modeled after those shown in dwelling houses of middle class in cold seasons in Hokkaido, Japan. Its distribution in Japan excluding the Okinawa's seems impossible unless air conditioning in cold seasons in dwelling houses of rather lower class could be improved more, because the bug is remarkably vulnerable to low constant temperatures.

6 EPIDEMIOLOGY OF HABU-SNAKE BITE INJURY IN RECENT FIVE YEARS IN TOKUNOSHIMA ISLAND

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In spite of decreasing tendency of the bacterial, parasitic diseases, the incidence of Habu-snake bite injury in Tokunoshima Island have gradually increased, raising a serious health problem. Because of this situation, the Tokunoshima Anti-Habu Cooperation was established in 1974. Various kinds of investigations have been tried out for the purpose to establish an effective and realistic control programme. The authors have reported the results of the epidemiological investigation, especially about sex and age variations of the recently bitten cases.

Material and method: The records of the reporting cards of the 930 cases of Habu-bite injury during the last five years (1970-1974) have been analysed.

Results and conclusions:

1. Number and rate of male cases (608 cases, 679.5 persons per 100,000 population per year) is prevalent in comparison with the female cases (322 cases, 313.9 persons per 100,000 population per year).
2. The age distribution of the cases was bimodal showing a very high peak at the age of 40-49 and another small peak at the age of 10-19. But, the age specific curve of the incidence rate was rather unimodal with a peak at the age of 40-49.
3. The largest number of the cases have been bitten in the farm fields. But, the number of the cases bitten in the dwelling area and on a road and a street could not be disregarded, especially among female and younger generations.
4. Farm work such as mowing and weeding was the most important cause of the bite injury.
5. The number of the cases bitten in the bed during sleep was not so many but has increased in the past five years.

7 FIELD INOCULATION OF HABU TOXOIDS (REPORT 2)

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Habu toxoid, mixed toxoid and alcohol-precipitated toxoid (APF. Td.), all of which had been exploited jointly by Habu Toxoid Research Team, financially sponsored by the Ministry of Health and Welfare grant, and by Kagoshima Prefectural Habu Toxoid Studing Council, have been inoculated since 1970 among people in Amami island. Anti-toxin levels and side reactions in the toxoid-inoculated people are described here. The number of inoculated people totals 5, 651 so far when those 930 inoculated in 1974 are added. Several investigation on different conditions were made in an attempt to find the inoculation method which might result in higher immunity and less side reactions. Serum anti-toxoid levels (Anti HR-1 titer, Anti HR-2 titer) were measured in about 620 selected out of whole inoculated people by employing a technique of intradermal injection in rabbits introduced by Kondo, *et al.* Lots 12, 13, 14, 15 and 18 of mixed toxoid and a lot 1 of APF. Td. were used. The subjects were divided into several groups, each consisted of about 30-40 people, and 0.1 or 0.5 ml of the toxoids were inoculated in them. For the purpose of fundamental immunization the quantities of the toxoids stated above were divided and given twice or three times, followed by booster inoculation once a year for 4 or 5 years thereafter. On giving the inoculation for fundamental immunization, two groups, one inoculated on 2 occasions and the other on 3 occasions, were formed and the former was further divided into two subgroups— one inoculated at 4 weeks interval and other at a month interval— and the latter into 4 subgroups— subgroup 1 were inoculated at intervals of a week between first and second inoculation and of 4 weeks between second and third, while subgroup 2 at intervals of 10 days and 4 weeks, subgroup 3 at intervals of 10 days and a month and subgroup 4 at same intervals of 4 weeks and 4 weeks. On completing fundamental immunization favorable results (effective serum anti-toxin levels) were obtained in the following groups;

- 1) The group inoculated with Lot 12 of mixed toxoid — 0.1 and 0.5 ml was inoculated at an interval of 4 weeks — in 1970.
- 2) The group given Lots 13, 14 and 15 of mixed toxoid — 0.5 ml at intervals of 4 weeks; 10 days and 4 weeks; 4 weeks and 4 weeks — in 1972.
- 3) The group given Lot 15 of mixed toxoid — 0.5 ml at intervals of 4 weeks; a weeks and 4 weeks — in 1973.

Side reactions included such local reactions as pain, swelling, itching, redness and induration in addition to allergic reactions of urticaria. Bed rest as a sign of a systemic reaction was also required. Increased swelling was seen in some of the subjects given booster inoculation 4 or 5 times. However, no any remarkable

allergic reactions have so far been found among them.

The toxoids which have been in use since 1970 are believed to be fully effective from the view point of immunity and side reactions.

8 FURTHER OBSERVATIONS ON THE DEVELOPMENT OF *BRUGIA PAHANGI* IN MICE

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Observations were made on the growth and development of the infective-stage larvae of *B. pahangi* inoculated into either the inguinal region or the peritoneal cavity of ICR mice. The survivals of worms were detected up to 75 days after the inguinal inoculation and 60 days after the intraperitoneal inoculation. As to the inguinal inoculation, the worms were obtained from various parts of the body, although many of them were recovered from the carcass, pelt, inguinal adipose tissue and perirenal adipose tissue: the recovery rate of worms per mouse was 20 % until the 13th day and then decreased, lower than 10%, up to the 75th day: All mice harbored worms until the 15th day, and then the male mice were more wormpositive than the female mice up to the 75th day after inoculation. On the contrary, the worms were recovered almost exclusively from the peritoneal cavity of the mice which had been inoculated intraperitoneally: The recovery rate of worms per mouse was about 40%, except on the 60th day, the highest being 75 percent. The third molt occurred from the 7th to the 9th day and male worms molted earlier than female worms in both inoculations. The fourth molt of the males occurred in about 30 days in both inoculations. The fourth molt of the females began about 45 days after the inguinal inoculation. The mice inoculated intraperitoneally harbored no female worms that appeared to have finished the fourth molt. Body lengths did not differ much in both sexes at the same stage of development. On the 45th day after the inguinal inoculation, however, the females which had finished the fourth molt measured 19.0 to 28.3 mm long and the females before the ecdysis measured 6.5 to 9.3 mm long, the body lengths differing much depending on the stages. After 45 days on the females inoculated intraperitoneally were short with the lengths of 7.0 to 8.9 mm. No microfilaria was detected in the peripheral blood and peritoneal cavity up to 200 days after the inguinal inoculation nor 60 days after the intraperitoneal inoculation.

9 CURRENT DISTRIBUTION OF BANCROFTIAN FILARIASIS IN THE NORTHERN AMAMI ISLAND KAGOSHIMA PREFECTURE AND SOUTHERN OKINAWA

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In Amami island, Kagoshima prefecture, which had been known to be heavily infested with Bancroftian filariasis, filariasis eradication program were sponsored jointly by the Ministry of Health and Welfare and Kagoshima prefecture during 1962–1969 and later during 1970–1971 by Kagoshima prefecture, and we have participated in this program.

After completing the program, however, some microfilaria carriers were left untreated. Change of prevalence situation of filariasis 3 or 4 years after completion of eradication measures are important for the eradication program to be taken up. In August, 1974 and in July, 1975 (Manya villagers only) we have examined blood samples, taken after 10:00 p.m., from the earlobes of the inhabitants in Kasari-cho which consists of six villages of Ushuku, Shiroma, Wano, Setta, Yoan and Manya (quantity of blood sample taken was 0.06 ml per person). The results of the examination showed that there was no any microfilaria carrier among 92 persons examined (0/92) at Ushuku (26.4% of the whole villagers came out for examination), while it was 0/92 at Shiroma (65.7%), 0/99 at Wano (46.9%), 3/327 at Setta (54.2%) (microfilaria positive rate 0.9%), 0/79 at Yoan (20.6%) and 0/94 at Manya (48.2%) respectively. That is, 3 microfilaria carriers were detected among 783 inhabitants living in the abovementioned villages (microfilaria positive rate 0.4%). These 3 microfilaria-positive persons belonged to two families. A girl (13 years old) and a boy (15 years old), in each of them 6 and 3 microfilariae were found in their blood respectively, belonged to a family. They were found to be microfilaria (mf)-negative in examination performed during 1962–1967 and later in 1974 turned out to be mf-positive for the first time. In this family, father and a brother were mf-positive in examinations performed in 1962, 1964 and in 1966. Another mf-positive was a female, 58 years old, and 13 microfilariae were detected in her blood sample. She had been found to have 10 microfilariae in an examination carried out in 1962. However, she has been mf-negative during 1963–1966 and in 1969. Later in 1974 she turned to be mf-positive again. Among her families, husband was found to be mf-positive in 1962 and 1969 and the thirds on in 1962. Is new infection of the disease developing, though at lower rate, among people there once again? Microfilaria positive persons still exist, but there is no tendency of increase of mf-positive persons.

Miwa, Itoman city, southern Okinawa, also had been thought to be heavily infested with Bancroftian filariasis. In 1967 and 1968 we made mass examinations

and treatment on junior high school students in Miwa and villagers in Maehira. After 7 years, in March, 1975, we reexamined people, mainly junior high school students, of Miwa in order to clarify recent prevalence of the disease among them. As a result, mf-positive rate was 0/193 for junior high school students and 1/992 for other inhabitants (mf detection rate 0.1%). The only mf-positive person was a female, 54 years old living in Mabuni (1/27, mf-positive rate 3.7% in this village) and one microfilaria was found in her blood sample. It is likely that mf carriers have decreased in number in this district.

10 STUDIES ON THE MECHANISM OF FILARIAL PERIODICITY

III. A scanning electronmicroscopic study

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Purpose: In the previous two reports, a definite relationship has been proved, between the pattern of periodicity and the density of fluorescent granules in the microfilariae. Referring to the presence of fluorescent red cells, photohemolysis and photosensitivity of the skin in the cases of erythropoietic porphyria, the photodynamic substance theory was proposed to explain mechanism of periodicity. The purpose of the present report is to search for the possible scanning electronmicroscopic findings of those fluorescent granules, and, if possible, to apply electron microanalysis, using electron beams directed, to those granules.

Method: The larvae with different density of the autofluorescent granules, were examined under scanning electronmicroscope (JSM 50A-JEOL), after gold coating, not only the outer body surface but the fractured (internal) surface, by means of frozen fracture procedure.

Results and Discussion: Scanning electronmicroscopy revealed a considerable number of spherical granules in the fractured surface of *Mf. immitis*, which showed more or less numerous granules under fluorescence microscope. In some larvae of *Dipetalonema reconditum* were seen fluorescent granules and electronmicroscopic granules, and in the others was detected no granule by any method. In the intra-uterine embryos of *Dirofilaria immitis*, no fluorescent granules has been detected. The fractured surface of the uterus of the canine heartworm showed somewhat beehive-like appearance with many embryos. In those intrauterine embryos was detected no spherical granule under scanning electronmicroscope. Thus, it seems that, the electronmicroscopic spherical granules would correspond to the autofluorescent granules, although further studies must be done.

11 A CASE OF STRONGYLOIDIASIS ASSOCIATED WITH MEGADUODENO-JEJUNUM

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A 47-year-old man, a resident of Osaka City, was admitted to Yukawa Hospital on January 7, 1975 with complaints of anorexia, epigastric pain, abdominal distention and loss of weight. His complaints had been continued for about 10 months and had a hematemesis with tarry stool 3 months before admission. He was a collier and had lived in Fukuoka Prefecture till 1964.

After the various examinations, laparotomy was performed under the suspicion of intestinal tumor on January 17. However, neither tumor nor stenosis was found in the abdomen but the duodenum and upper part of the jejunum showed one meter long marked dilatation with normal color. From these findings, an ideopathic megaduodenojejenum was suspected. The operation was discontinued after removal of small tissue specimen from three parts of the jejunum for further pathological examination. The patient died of shock, probably caused by intestinal bleeding, 26 days after the laparotomy. The autopsy was not allowed.

Three biopsy tissues of the jejunum were found to be filled with a large number of nematodes in the crypts of Lieberkühn, especially in the dilated jejunum. After through examinations of the adult parasites, larvae and eggs carefully removed from the formalized tissues, the parasite was identified as the *Strongyloides stercoralis*. The rhabditiform larvae of *S. stercoralis* were also found from his wife by fecal examination.

On the histopathological examinations of the dilated jejunum, various grade of hemorrhagic, necrotic and inflammatory foci were found in the lamina propria and submucosa, and edematous hypertrophy of the muscle layer was also observed but the pathologic changes observed in the myenteric plexuses were slight. These pathological findings suggest that the megaduodeno-jejenum in this case was probably caused by the long severe infection with *S. stercoralis*.

12 STUDIES ON THE FREE-LIVING GENERATIONS OF STRONGYLOIDES

V. Effect of temperature

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As previously reported, two kinds of eggs are produced by parasitic females of *Strongyloides planiceps* — one which develops only to free-living adult male while

the other may develop to either free-living adult female or infective larva, depending upon the degree of dilution of feces which were used as culture media or crowding condition of worms. In this report an effect of temperature on the course of development of *S. planiceps* outside the host was studied. Eggs of known number (200–300) produced by the parasitic females were placed on the filter paper coated with 0.2 g dog feces, and cultivated in test tube (Harada-Mori method) under various thermoconditions. In each temperature, three to five test tubes were incubated. The cultures were removed from incubator after 9 days in 12 C, 5 days in 16 C, 60 hours in 20 C, 40 hours in 24 C and 24–30 hours in 28, 32 and 36 C. Through five times of experiments, total recovery rates were between 70 and 90%, although only in 36 C, lower recovery rates were obtained because of the poor development. The free-living adult males were produced constantly about one fifth or one fourth of the total regardless of the temperature. On the other hand, free-living adult females and infective larvae were obviously influenced by the temperature, and they were produced in reciprocal way. Namely, the percentage of infective larvae to the whole potential females (free-living adult females plus infective larvae) were nearly 100% in 12–16 C, and they decreased as the temperature was elevated and 0–28% in 36 C. In other words, almost all potential female larvae developed into the infective larvae in 12–16 C, while in higher temperatures large number of free-living adult females developed from the potential female larvae. In these experiments temperature was also defined as one of the factors which determine the course of development of potential female, that is to free-living adult female or to infective larva.

13 PARAGONIMUS RESEARCH IN TINGO MARIA, PERU

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Miyazaki, Arellano and Grados (1972, Jap. J. Parasit. 21, 168–172) reported the first demonstration of *Paragonimus* adults from a man in Peru, who lived in a small town, Tingo Maria. Since then, the author has been continuing the research at the same locality in collaboration with Grados and Uyema of the “Instituto de Salud Pública, Lima”, and Mazabel of the “Universidad Nacional Agraria de la Selva, Tingo Maria”. Results so far obtained were as follows: Two worms were obtained from one of nine four-eyed opossums, *Philander opossum*, and six worms from two of five water opossums, *Chironectes minimus*, both mammals belonging to the family Didelphidae, but six common opossums, *Didelphis marsupialis*, were all negative. Each of the single jaguarundi, *Felis yagouaroundi*, puma, *Felis concolor*, “tigrillo”, *Felis pardalis*, and house cat, *Felis catus* (Felidae), as well as *Eira barbara* (Mustelidae) harbored 1, 1, 8, 3, and 6 worms, respectively.

* Miyazaki, I. *et al.* (1975): Studies on the lung fluke in Tingo Maria, Peru, with special reference to the description of *Paragonimus inca* sp. n., Med. Bull. Fukuoka Univ., 2(4), 303–311

Twenty-seven worms obtained were morphologically divided into two species: Eight worms from the Didelphidae were identified as *Paragonimus amazonicus* Miyazaki, Grados et Uyema, 1973 (Jap. J. Parasit. 22, 48-54), and the remainder were regarded as new to science.* On the other hand, a single *Paragonimus* metacercaria of unknown species was found in a freshwater crab, *Pseudothelphusa chilensis*. It is likely that the larva belongs to the new species obtained from the house cat, because the crab and the cat were captured at the same place.

14 IMMUNOGLOBULIN E: ELEVATION IN THE SERUM AND PLEURAL EXSUDATE OF PARAGONIMIASIS MIYAZAKII PATIENTS

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Serum IgE concentrations of paragonimiasis miyazakii patients were determined by a radioimmunosorbent test. The mean concentration was 3,462.3 U/ml in a group of thirteen cases in which patients showed clinical symptoms and/or positivity of immunological diagnostic tests, while it was 1,026.6 U/ml in a control group of thirteen individuals who had taken uncooked fresh water crabs, *Potamon dehaani*, but had been diagnosed as free from the infection. It was found that the IgE concentration of the pleural exsudates obtained from four patients within 14 days after, or on the same day of bleeding was significantly higher than that of their sera, ranging between 4,200 U/ml and 10,000 U/ml. The pleural exsudates contained IgE antibodies specific to *Paragonimus* antigens. This was confirmed by the Prausnitz-Küstner reaction in the monkey and by immunoadsorption technique. Follow-up studies revealed that in five out of eight cases serum IgE levels decreased two to five months after the treatment with bithionol.

15 SOME EPIDEMIOLOGICAL CHARACTERISTICS OF SCHISTOSOMIASIS IN ETHIOPIA

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The present author, as a Short-Term Consultant of World Health Organization, carried out a survey of the snail vectors of schistosomiasis in Ethiopia from September to December in 1972.

Schistosoma mansoni infection has now rapidly spreading along the Awash Valley,

where the big sugar plantation comprises 6,000 hectares and the Ethiopian Government started a project to develop over 1,500 km² of the irrigated land. The irrigation canals and drains infested with the vector snails are used by the laborers for bathing and washing every day. It is apparent that people from other endemic areas of *S. mansoni* are introducing the disease to the Valley. Future plans for agricultural and industrial developments of the country, including irrigation construction of the paved highway and others, require urgently the control of schistosomiasis to be started as soon as possible.

Schistosoma haematobium infection as well as the vector snail, *Bulinus abyssinicus*, is restricted to the Middle and Lower Awash Valley. However, there is a great possibility of introducing *S. haematobium* to the Ethiopian plateau from the north, such as Egypt, Sudan and Arabia, because members of the *B. truncatus* group are widely and densely distributed on the plateau. A continuous surveillance is therefore essential in this respect.

In the present survey, the intermediate hosts of *S. mansoni* and *S. haematobium* have been found in natural bodies of water in which the pH ranges from as low as 5.0 to as high as 9.0, and within these limits, variation of this factor seems to have no effect on the density of snail host populations. The hydrogen-ion concentration is probably not a limiting factor in the distribution of the snail in Ethiopia.

16 POPULATIONS OF *O. H. QUADRASI* AND THE INFECTION RATE WITH *S. JAPONICUM* OF SNAILS IN LEYTE, PHILIPPINES

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Population of *O. h. quadrasi* and the infection rate with *S. japonicum* of snails in Palo (21 places), Santafe (11 places), Pastrana (14 places) and Tanauan (8 places) district were surveyed.

The highest population of snails in each district were: Tibak-depression in Palo (827.5/m²), Maslog lumbia in Santafe (667.5/m²), Candalohas leonciojerica in Pastrana (1,090.0/m²) and Batang stream in Tanauan (554.0/m²). Pastrana district revealed the highest population among all districts.

In the infection rate with *S. japonicum* of snails, the highest rate was observed in Naliwatan stream of Palo (20.9%), followed by Batang stream in Tanauan (9.5%), Tayong stream in Santafe (4.8%) and Socsocon in Pastrana (4.4%). In general, Palo district had the highest infection rate in our survey. The change of the infection rate with *S. japonicum* cercariae of snails were investigated in Naliwatan stream of Palo, twice per month during four months from the middle of November, 1974 to the middle of March, 1975. The peak of infection rate was observed at the beginning of December, 1975 (30.0%), and the second peak was the middle of this month.

It seemed that the population of snails and the rate of infection were closely correlated with the rainfall.

17 THE ORGAN DISTRIBUTION AND HISTOLOGICAL PROSPECT OF SCHISTOSOMAL EGGS WHICH WERE FOUND AMONG THE BIOPSIED MATERIALS

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At our hospital, schistosomal eggs were found in about 1.0% (255 materials) of 24,620 biopsied materials in the past 13 years. The sex ratio of males to females was about 1.4:1.0, and the incidence of schistosomiasis was slightly higher among males. And the highest incidence was from the fourth to sixth decades of the age. There was found no tendency to decrease of schistosomiasis. The incidence of infection with eggs among the various organs was as follows, the liver 30.6%, the mesenterium 40%, the cecum 30%, the appendix 28 percent.

Beside these cases, schistosomal eggs were found in 68.6% of the rectal biopsy of 204 individuals in whom schistosomiasis japonica, was suspected, but there was found no past history of schistosomiasis in 36% of these positive cases. Crowded schistosomal eggs in these specimens suggest direct egg production in the rectum. And the more eggs were found, the higher were the grade of changes.

There were 12 liver cirrhosis among 102 cases (12%) in which were found schistosomal eggs in the liver. Various liver fibrosis were found in 68 cases (67%) and in 2 cases were found no histological change of the liver. The specific changes of the liver cirrhosis due to schistosomiasis japonica were characteristic fibrosis and absence of nodular regeneration or pseudo bile duct formation. And it was suspected that the cirrhotic change was related to the frequency of infection and the number of schistosomal eggs. But in some cases, the changes were recognized as an immune reaction or due to various causes of hepatic lesions. Complication of liver cell carcinoma was found in one of 12 cases which had liver cirrhosis due to schistosomiasis japonica, but it is unlikely that schistosomiasis japonica was the direct cause of liver cell carcinoma.

In the stomach, schistosomal eggs were found 3% in 258 cases and many of them were under the mucosa. Carcinoma of the stomach was complicated in 29 cases and ulcer in 16 cases, but schistosomal eggs were found at the floor of ulceration in 2 cases. In 1,307 cases of stomach operation in the past 4 years, schistosomal eggs were found in 4% of stomach carcinoma and in 2% of other carcinoma. But in the histological view point, there was found no clear relation.

In the rectum, schistosomal eggs were found in 10% of 180 cases but it was not regarded as the cause of rectum carcinoma.

Schistosomal eggs were found in the tunica externa of ovarial cyst and myoma uteri but neither case was to be blamed on schistosomiasis japonica.

It is premature to conclude from these small biopsy tissues, but the relation between carcinoma and schistosomiasis japonica, is undeniable, yet schistosomiasis can not be the direct cause of carcinoma.

18 LOCAL RESPONSE OF MAST CELLS TO ANTIGEN IN RATS INFECTED WITH *CLONORCHIS SINENSIS*

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Degranulation of mast cells in the mesenteric and connective tissues was studied the using rats infected with *Clonorchis sinensis* and the mice sensitized with *Clonorchis* antigen.

In the *Clonorchis* infected rats, the number of mast cells increased significantly as compared with the number in normal rats ($P < 0.05$). When *Clonorchis* infected rats were challenged subcutaneously with the homologous antigen, degranulation of the mast cells occurred in 87.7% after 15 minutes in the local connective tissue, whereas only 35.2% was calculated in uninfected rats. Marked degranulation and disruption of the mast cells were 61.9% in infected rats whereas 7.2% in uninfected rats, and 67.2% in sensitized mice and 6.1% in unsensitized mice.

By direct challenge (*in vivo*) with *Clonorchis* antigen into the mesentery of the rats, degranulation of the mast cells occurred in 99.6% in the infected rats after 15 minutes, 9.9% in the unchallenged control, and 17.0% in the infected rats to which saline was injected instead of antigen.

Similar results were observed in the *in vitro* test using Tyrode's solution. By the challenge with heterogeneous (*Paragonimus*) antigen into the mesentery of the infected rats in Tyrode's solution, no difference of the reaction was observed among those of unchallenged group.

The results in the present study suggest that, when the homologous antigen of *Clonorchis sinensis* is inoculated into the infected or sensitized animal, the antigen may combine with the specific antibody and subsequently lead degranulation of the mast cells.

19 AGAR-GEL DIFFUSION TESTS ON THE SERA OF ULCERATIVE COLITIS CASES BY HELMINTHIC ANTIGENS

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Sixty cases of ulcerative colitis and 3 cases of Crohn's diseases were tested with Ouchterlony and immunoelectrophoresis.

Twenty-one out of 60 cases (35%) in ulcerative colitis demonstrated precipitations with several nematode antigens, and precipitin bands were also found in 5 cases (8%) with trematode antigens and 9 cases (15%) with cestodes antigens.

Namely, 17 out of 60 with *Ascaris suum* female, 15 out of 57 with *Ascaris suum* male, 2 out of 3 with *Ascaris lumbricoides* female, 14 out of 59 with *Toxocara canis*, 2 out of 16 with *Parascaris equorum*, 2 out of 8 with *Angiostrongylus cantonensis*, 8 out of 60 with *Diriofilaria immitis*, 13 out of 60 with *Anisakis*, 5 out of 60 with *Fasciola hepatica*, none out of 59 with *Fischoederius elongatus*, 9 out of 60 with *Diphyllobothrium latum*, 2 out of 60 with *Dipylidium caninum* and 2 out of 23 with *Taenia saginata* antigens were demonstrated precipitin bands.

Two out of 3 cases in Crohn's disease also showed precipitating antibodies with nematodes antigens.

All of these positive cases, however, did not show the specific band of each antigens. Therefore these precipitin bands must be cross reactive precipitation.

The reasons for these results are not yet clear, but some nematodes which were used as antigens in this time, free-living nematodes for example, would be responsible to the intestinal auto-immune disease as a trigger in about 30 or 40% of ulcerative colitis cases.

20 THE TAPEWORM DISEASES INFECTED IN THE FOREIGN COUNTRIES

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The cases of tapeworm infection among Japanese tend to increase in number in accordance with increased opportunities for the Japanese to visit foreign countries in the recent years. The following are the total cases treated in the Meguro Parasitological Museum in the past twelve years: 1963, 1 (3), i.e. in 1963, 1 cases treated was infected outside our country (while 3 additional cases treated were infected in Japan); 1965, 0 (1); 1966, 0 (4); 1967, 1 (4); 1968, 1 (3); 1969, 1 (3); 1970, 1 (3); 1971, 4 (4); 1972, 0 (2); 1973, 2 (4); and 1974, 4 (5). Total of 14 cases were those

infected outside our country and were classified as follows: taeniasis saginata (11), taeniasis solium (2) and diphyllbothriasis latum (1). The professions of these patients were: business-men (5), students (3), government officials (2), cameraman, novelist, stewardess, and scholar (1) respectively. The regions where they were infected were: Africa (3), Near East (1), South East Asia (5), Far East (4), and South America (1). They were treated with atebrin 1.0 g and magnesium sulfate and discharged entire worm with scolex in every case.

21 ANALYSIS OF *TOXOPLASMA GONDII* ANTIGENS

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Antigens of *Toxoplasma gondii*, RH strain, have been well studied by Chordi *et al.* (1964), Takayanagi *et al.* (1970) and others. They found 6-7 precipitating antigens of *T. gondii* by serologic means. Chordi named No. 1 antigen to a line run slower than γ globulin (IgG) in his paper. I have purified No. 1 antigen by using ammonium sulfate fractionation and DEAE-cellulose, and also obtained the antisera from rabbits. No. 1 antigen was not found in the sera of normal mice as Chordi had described, although it did exist in the extract of the peritoneal cells gathered from the mice inoculated with liquid paraffin (1 ml) instead of *T. gondii*. Crude antigens from homogenized spleen, liver and thymus of normal mice made a precipitin line with anti-No. 1 sera. Spleen homogenate showed especially a strong line with anti-No. 1 sera. No. 1 antigen was not identified in the brain tissue and the white blood cells separated by Conray-Ficoll method. No. 1 antigen of Chordi is not one of the antigens from *T. gondii* but one of the tissue antigens from mouse spleen. The antiserum was obtained from a rabbit immunized with the crude antigens of *T. gondii* (RH strain) which was harvested from ascites of the mice infected experimentally and killed by freezing and thawing twice. A precipitin line (EA) to this antiserum is seen at the prealbumin area with the crude toxoplasma antigens, but not with normal mouse sera. The EA antigen is purified by zonal electrophoresis on agar gel. Rabbits were immunized with Freund's complete adjuvant by the purified EA antigen. These anti EA sera make only a line at the prealbumin area with the crude toxoplasma antigens. By double diffusion technique with the specific antisera, it makes clear that the EA exists in the peritoneal fluid of the golden hamsters, guinea pigs and young rats infected experimentally with RH strain of *T. gondii*. The EA was also found in the concentrated medium in which *T. gondii* had been cultured on L-cells.

The extracts from the normal peritoneal cells show rich prealbumin protein but does not react to anti-EA sera. The EA is truly one of the antigens from *T. gondii*. The anti-EA sera make a stronger line with the HA antigens of *T. gondii* by Jacobs-Lunde's method than the crude antigen by freezing and thawing of *T. gondii*. The EA is precipitated by 2/3 saturated ammonium sulfate and detected

at 4 S peak by gel filtration through Sephadex G-200.

22 SCANNING ELECTRON MICROSCOPIC STUDIES ON PENETRATION OF *TRYPANOSOMA CRUZI* INTO FIBROBLAST CELLS

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Trypomastigotes and epimastigotes of *Trypanosoma cruzi* (Tulahuen strain) were inoculated into Balb-C fibroblast cell cultures at 37 C and sampled at intervals in order to examine the method of entry into the host cells and subsequent intracellular development by scanning electron microscope. The trypomastigote penetrates into the fibroblast cell by flagellar movement. Intracellular forms can be observed within the infected cells beginning from the 9th hour after inoculation, then on the 3rd day, they emerged as trypomastigotes. Epimastigotes seem to enter the fibroblast cells by aid of phagocytosis.

23 ON THE PROPERTIES OF "SURFACE COAT" AND PURIFICATION OF ITS COMPONENTS IN *TRYPANOSOMA GAMBIENSE*

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Indubitable evidences have recently been presented for the possible involvement of the "surface coat" (SC) of *Trypanosoma brucei* subgroup in the variation of their antigenic types, agglutination reaction and protection against infections of the parasites. In our previous studies in experimental trypanosomiasis in mice, it has also been confirmed that the SC of *Trypanosoma gambiense* played an important role as a protective antigen in protecting the animals from the infection and that its components were extremely heat labile and were likely to form in the endoplasmic reticula of the cells. This present report is of further characterization of the components. (1) By fixing with 0.5% formaldehyde or 0.1% glutaraldehyde, the protective antigenicity of the SC was fully maintained but when treated with respective 2% formaldehyde and glutaraldehyde, the activity has vanished. (2) By the use of electron microscope on the ruthenium red stained preparations, the SC was found to be a glycoprotein complex containing acid polysaccharides. (3) Treatment with respective 0.25% trypsin and amylase deprived the limiting membrane of the SC while even six washes with buffered solution containing 10 mM 2Na-EDTA failed to remove

it from the membrane. The antigenicity was no longer demonstrable by immunodiffusion technique in the components of the SC removed by the treatment with trypsin. (4) Purification of the components was carried out by applying isoelectric focusing column to the $144,000 \times g$ supernatant of the homogenate in which cell membranes were solubilized with Brij-58. The main peak was fractionated at the electric point 5.6 and this fraction contained a common precipitin antigen with the $144,000 \times g$ sediment retaining the protective action against the infection.

24 ENQUETE INVESTIGATION ON IMPORTED MALARIA IN JAPAN

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Increase in imported malaria has already become a serious problem in Japan for several years. Enquête papers were sent to 604 hospitals to inquire of malaria patients who were dealt with in the past 3 years (1972 to 1974). Answers were returned from 155 patients (34 in 1972, 50 in 1973, 60 in 1974, and unclassified 11), of whom 98 were infected in Southeast Asia and 46 in Africa. Vivax infection was mostly (78.6%) in Southeast Asia, while falciparum infection was prominent (71.7%) in Africa. Approximately 75% of patients were 20's and 30's ages. Female patients were only 3, and 14 foreigners were included. Grouping of patients by occupation and aims of the travel showed that, the largest number of patients in Southeast Asia were found among persons engaged in forestry and, high incidence among persons engaged in fishery were observed in Africa. From the fact that most of falciparum patients had malaria onset within 1 month after their return to Japan and most of vivax patients had it within 6 months, these periods were assumed to be the necessary periods for the surveillance of malaria infection. Since a considerable number of relapse (recrudescence) cases were found, the radical therapy as well as the follow-up observation after cure were found to be mandatory. It should be noticed that there were 6 fatal cases among falciparum patients and 2 cases who probably gained malaria infection in Japan. The enquête reports showed that about a half of patients did not take any prophylaxis against malaria and even in the other half who took it, the irregular or incomplete prophylactic measure was taken. More than half of these patients were treated in Tokyo area and others were found in every prefecture of Japan. From the data obtained in this enquête investigation, urgent reevaluation of the quarantine measures to imported malaria, and establishment of an efficient supply system of antimalarials were strongly recommended.

25 TWO CASES OF IMPORTED VIVAX MALARIA IN KYOTO

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At the beginning of 1975, we have found two cases of imported vivax malaria in Kyoto.

Case 1. H. K., 26 y.o., male. He lived 21 months in middle India (July, 1972 to March, 1974), without taking any anti-malarial suppressive. Although he has been in good health for nine months after coming home, attacks of high fever began on Dec. 4, 1974. The pyrexia appeared on alternate days, and rose to 40 C. After a conservative treatment for common cold by a practitioner for a month, he was finally hospitalized. On admission, pyrexia occurred almost every evening, and tender hepatomegaly (2QFB), splenomegaly (3QFB) and anemia (RBC $301-412 \times 10^4$, Ht 25-35.5%, Hb 8.8-11.4 g/dl) were found. Increase of LDH, γ -Globulin and CRP, and monocytosis (10-14%) were also reported. Single use of MP tablet (1 tablet contains 500 mg of sulfamonomethoxine and 25 mg of pyrimethamine) was used for the treatment. Three tablets were administered on the first day, and one tablet on the second day. No other drugs such as primaquine were given. Parasite count showed 5,700-8,400/ μ l before the treatment, 5,700-6,700 on the first day of medication, 2,200 on the second day, 150 on the third day, and 0 on and after the fourth day. Pyrexia disappeared on the second day. Now no parasite and no pyrexia were observed in the follow-up period of six months.

Case 2. H. M., 24 y.o., male. He has traveled around the Southeast Asia (Indonesia, Malaysia and Thailand) for about five months (July, 1973 to September, 1973). He has taken 2 tablets of resochin once a week during the period of travel and for a month after the travel. No attack of fever was seen for 15 months after leaving the endemic areas. Although the pyrexia started on February 20, 1975, he was treated with antipyretica and antibiotics as a common cold by a practitioner for a month, then admitted to our hospital. A small amount of *P. vivax* infected red blood cells were found (400/ μ l). Slight anemia (RBC $303-366 \times 10^4$, Ht 29.6-35.9%, Hb 9.8-12.0 g/dl), and increase of monocyte and γ -globulin were seen. The treatment was carried out in the same manner as mentioned in case 1 except that two tablets were used on the first day in case 2. No relapse was seen as far as two months of follow-up study is concerned.

26 A CASE OF IMPORTED MALARIA FOUND IN GIFU, JAPAN

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It is of vital importance that malaria is still now prevailing in the tropical countries. Sporadic cases of imported malaria have been reported in Japan. Recently we have experienced a case of imported malaria infected with *Plasmodium falciparum* and *P. vivax*. A 58-year-old woman had traveled for 9 days in Sri Lanka from the 10th to 19th of October, 1974. The patient had been well for 6 days since she returned to Japan. On October 26, she began to feel fever and chilly sensation associated with loss of appetite and general fatigue, and the temperature often rose up to 39 C daily. On October 31, she was admitted to the Gifu City Hospital complaining of intermittent fever. When she entered the hospital, the liver was palpable one fingerbreadth at the right costal margin, but splenomegaly could not be found. Mild anemia and icterus were observed hematologically. Serum protein levels were 4.8 g per 100 ml, of which 2.4 g was albumin. The value for each immunoglobulin was IgG: 2,150, IgM: 510 and IgA: 260 mg per dl. Other biochemical values were as follows; S-GOT 110, S-GPT 62, Al-P 9, Ch-E 0.54 pH, LDH 806, BUN 16, creatinin 1.1 and CRP was positive (5+). On the third hospital day, the systolic blood pressure remarkably dropped to 50 mmHg, then she lapsed into somnolence for the next 5 days. On November 5, peripheral blood thin smears stained with Giemsa's solution revealed the asexual forms of *Plasmodium falciparum* and *P. vivax*. The malaria parasite was also found in the blood taken from the bone marrow at same time. Based on these findings, the disease was diagnosed as malaria. Treatment with Resochin, initial dose 1,000 mg, followed in 6 hrs by 500 mg, then this dosage was continued for the next 5 days, and after that Primaquine was given at a 15 mg base daily for two successive weeks. The malaria parasites in the peripheral blood disappeared on the 4th day after the beginning of the administration. The patient was treated with antimalarial medication and by the fifth hospital day there was subjective improvement in her condition. Abnormalities in levels of biochemical and physical examination were also improved before discharge. During the follow-up-period of 5 months after discharge from the hospital, the patient has shown no sign of relapse. It is suggested that the result of treatment was satisfactory.

27 THREE CASES OF IMPORTED MALARIA

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We had experienced three cases of imported malaria in the past three years. The results were summarized as follows:

- (1) All patients were male. One went to Indonesia on business, and the other two went to New Guinea for the same reason.
- (2) All patients had taken orally chloroquine phosphate once a week for prevention.
- (3) Anemia was found in two patients, and splenomegaly was observed in one.
- (4) *Plasmodium vivax* was found in a patient, and *Plasmodium immaculatum* in two others.
- (5) Quinine, Atebrin and chloroquine phosphate were given to a patient of malaria tertiana, and chloroquine phosphate was given to two patients of malaria immaculatum.
- (6) No side effect with antimalarial drugs was observed in any patient.

28 BLOOD CELL COMPONENTS, SERUM ENZYMES AND MALARIA OF JAPANESE AND LOCAL WORKERS AT THE TEMENGOR DAM CONSTRUCTION SITE IN MALAYSIA

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Three cases of vivax and two cases of falciparum malaria were among the local workers ($n=ca$ 800) before malaria suppressive regimen with 300 mg of chloroquine base and 25 mg of pyrimethamine weekly was started. There were no gametocytes in the blood of falciparum malaria patients indicating that the infection was the recent one. No malaria case developed after the above mentioned regimen was started. About 100 Japanese workers were placed on a regimen of one SP tablet (500 mg of sulfadoxine and 25 mg of pyrimethamine) weekly from the beginning and no case of malaria developed during the period of one and a half years. The G-6-PD deficiency was found in 4 of 59 Malaysians (7%), but in none of 20 cases each of Chinese and Indians.

The blood of local workers was characterized by a tendency to hypochromic anemia (low hemoglobin values and normal erythrocyte count) and leucocytosis (average 9,700/ μ l). The Japanese had a tendency of low erythrocyte count, normal level of hemoglobin and white blood cell counts. No case of leucopenia developed

during 3 to 9 months of medication with SP tablets.

The serum transaminase (GPT, GOT) levels were above the upper normal limit in about 10 percent of the Japanese and local workers. The average of the GOT and GPT levels rose to the level of the local workers three months after the Japanese workers came to the construction site. One case of acute hepatitis which progressed to chronic active hepatitis (confirmed by liver biopsy) developed about four months after the patient arrived at the camp.

29 CASE OF IMPORTED *SALMONELLA PARATYPHI A*

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Salmonella paratyphi A was isolated from the blood and faeces in three of the twenty-one students who travelled to Bandon and Java in Indonesia for three months from July to September, 1974. Two (Cases 1 and 3) of the three patients suffered from fever, loose faeces or diarrhea, but they recovered without taking antibiotics and returned to Japan. The other (Case 2) had been asymptomatic until he was advised to visit our hospital, complaining fever and cough at night on the tenth day after returning home. We could not examine the patient properly and could not diagnose correctly. *Salmonella paratyphi A* was detected from the blood sample of case 1 after recurrence of fever and diarrhea. We carried out bacteriological examination for blood and faeces of the other travellers, and isolated *Salmonella paratyphi A* from two patients (Cases 2 and 3).

The positive Widal test to A-O antigen (80-160×) were found in all three cases. Laboratory examination of these cases showed eosinophilia on blood smear and increase in GOT and GPT, α_1 -globulin fraction of serum protein, positive CRP test.

These *Salmonella paratyphi A* were found unusual in biochemical character especially in fermentation of mannitol and sorbitol on Barsiekow medium, although the other characters agreed with the description by Bergey and Edward. Sensitivity test using "Tri-disk" revealed sensitive for SM, KM, CL, TC, CP, CER, AB-Pc. The phage type of isolated strains was determined as Type 4.

Recently, reports of the imported cases of *Salmonella paratyphi A* are rare in comparison with those of dysentery and typhoid, and we have little information about the present epidemiology of *Salmonella paratyphi A* in Indonesia. More-over, these cases showed mild or atypical symptoms. Therefore, unnoticed case of *Salmonella paratyphi A* may be a hazard. It must be considered that yearly increased travellers to and from abroad may bring in such pathogenic organisms and spread it in our country.

30 A PROPOSITION ON THE ECOLOGY OF ENTEROVIRUSES IN THE TROPICS

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In the tropics, enteroviruses appear to be endemically prevalent throughout the year. In West Africa, however, little is known of the enterovirus infection in general population. From October 1971, a continuous survey has been set out to obtain basic data on the enterovirus infection among healthy infants in Ghana.

In the urban community, the overall isolation rate of enterovirus was approximately 44%, and there was no seasonal difference between the rainy and dry season. All three types of Poliovirus, many types of Echovirus were isolated during the course of the study. Noticeable changes were observed in the prevalence pattern of certain types. For example, Echovirus type 19 has had a high peak at a time and Echovirus types 6, 7 and 11 showed a low plateau lasting for a few months. In general, many types of enterovirus were circulating in the urban community.

In the rural area, faecal specimens were collected from the children in the three villages in rainy and dry seasons. Results of both sampling indicated that the virus isolation rates in rural areas were significantly lower than that in urban area, but no seasonal difference of virus isolation was observed in rural area too. The children over 5 years of age showed higher rate of virus isolation. In an isolated village, most of viruses isolated in the rainy season were identified as Echovirus type 20, and in the dry season most of them were poliovirus type 2. In another village, the virus isolation rates differ significantly before and after the construction of water pipe in the village.

The result of virus isolation from water in Ghana indicated that 30% of drinking water in the rural area was contaminated with viruses including enterovirus. It was suggested that the drinking water in the rural area plays an important role in the spread of enteroviruses.

From the results reported here, the following proposition was presented on the ecology of enterovirus in tropics. In the urban area, many types of enteroviruses have been circulating continuously, while in the rural area single type of enterovirus spread over the community, and the epidemic did not continue for a long period.

31 STUDIES ON DISINFECTANTS APPLICABLE TO SMALLPOX VIRUS

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Variola virus Bandung strain, in the form of an infected monkey kidney cell culture fluid, was employed; and variola virus Harvey strain and vaccinia Ikeda strain were tested for comparison. A cynomolgus monkey kidney cell line, Jinet strain, cultivated either in microculture plates or in 3 oz bottles was used as cellular substrate. Disinfectants used for test were: alcohol, chlorite, formalin, phenol, cresol, active surface detergents, iodophor and chlorbenzol. The chemicals diluted in distilled water at suitable concentrations were mixed with the virus suspensions, and 1, 3, 5 and 10 min. thereafter they were further diluted with Eagle's MEM and then inoculated into the microplate cultures. The inoculated microplates were closely sealed with a plate sealer and inoculated further at 35 C in an ordinary incubator. After 6 days of incubation, the cultures were stained with crystal violet solution, and the CPE was observed under a microscope. In additional experiments, plaque formation was examined using the cultures grown under the methylcellulose overlay medium. Minimum effective concentration of each of the test disinfectants were ethylalcohol (50%), iso-propylalcohol (40%), sodium hypochlorite (0.1%), formalin (1%), phenol (2%), cresol soap (1%), iodophor (0.1%), chlorbenzol (1-2%) and active surface detergents (0.25-2%). Essentially the same results were obtained as for the variola virus Harvey strain and vaccinia virus Ikeda strain.

32 YELLOW FEVER VIRUS PLAQUE FORMATION AND NEUTRALIZATION ON MICROPLATE CULTURES

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Yellow fever (YF) virus detection and neutralization were performed by a microculture method previously described for dengue type 1 virus (Fujita, N. *et al.* Proc. Soc. Exp. Biol. & Med., 148, 472-475, 1975). The YF 17D strain virus was inoculated into BHK-21 cells cultivated in a microculture plate (Micro Test II Tissue Culture Plate, Falcon, or Flat Microplate, Toyoshima Seisakusho Co.) which was then incubated at 37 C with an overlay medium consisting of 1% methylcellulose, 2% heat inactivated calf serum and Eagle's minimum essential medium. Easily countable plaques (about 0.5-1.0 mm in diameter) were produced 5-6 days after the virus

inoculation. The incubation of cultures could be done in an ordinary incubator without CO₂ aeration device by using a microtiter plate sealer (Cooke Engineering Co.) instead of a plastic lid. The technique combined with the use of piggy-back transfer-plate (Cooke Engineering Co.) could also be applied to the virus neutralization (NT) tests. In experiments using ascitic fluid from the mice receiving the virus and Ehrlich sarcoma, 50% plaque reduction NT titers obtained by the above-described method well paralleled titers determined by the conventional method by use of 3 oz bottles as well as hemagglutination-inhibition titers of the same samples. The microculture plaque technique described here is easy to perform and can be utilized as a rapid method for detection and neutralization of YF virus.

33 HEALTH PROBLEMS IN IRAN

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In January and August, 1974, we had the opportunities of visiting Iran to investigate medical situation in that country. Iran, which has an area of about 4.5 times that of Japan, lies in the southwestern part of the Asian Continent. About eighty percent of its territory is a desert area and the Caspian Sea area in the north is situated in the subtropical zone with mild climate, while there is a continental climate with little rain and severer extremes of temperature in the central highlands of the country. A coastal area on the Persian gulf in the south lies in the torrid heat zone where temperature often exceeds fifty degrees centigrade during summer season. Iran has a population of about thirty million and most of them are Moslems, although requirements of the religion in this country are not strict.

According to the statistics made open to the public in 1971 by the Ministry of Health, the Government of Iran, Circulatory system diseases were ranked at the top as the cause of death (28.3%) among Iranians, followed by respiratory (18.3%) and infectious and parasitic (17.8%) diseases, which facts indicate that infectious diseases are yet relatively prevalent in Iran. The infectious diseases included typhus, typhoid, paratyphoid, dysentery, diphtheria, scarlet fever, malaria, poliomyelitis, miscellaneous intestinal parasitic diseases, schistosomiasis, dermal leishmaniasis and filariasis, etc. The statistic report by the Iranian Government did not mention anything about cholera and small pox, although local informations we have obtained showed sporadic prevalence of these diseases.

In Teheran, capital city of Iran, medical establishments are well up to the standard of those in the advanced countries. But the situation in the local or desert districts are far below the standard in Tehran. All medical graduates are under an obligation to join medical corps for two to four years. Medical, health and hygienic activities by these medical graduates in the medical corps contribute greatly to the local medicine in Iran.

Hot weather in the Persian gulf area during summer season is beyond imagination for us Japanese. It is important that Japanese living in that area, therefore, should not only be prepared for prevention of the diseases stated above, but adapt themselves to life and natural environment of this country.

34 A STUDY OF ABNORMAL HEMOGLOBIN IN LAOS

Results of screening test using electrophoresis

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Screening tests for abnormal hemoglobin using electrophoresis were carried out at Tha Ngon health center, Laos, from December 1974 to march 1975.

Materials: 117 blood samples of Laotian pupils (32 samples in Na Phock refugee village, 60 samples in Don Noun primary and secondary school, 25 samples in Tha Ngon primary school), 27 blood samples of patients coming to Tha Ngon health center (17 samples in Tha Ngon village, 10 samples in others), and as control, 29 samples of Japanese volunteers in Laos.

Method: Cellulose acetate membrane electrophoresis with pH 8.6 Tris-EDTA-borate buffer was used. For staining, ponceau 3R was used.

Results: All control cases showed the migration of normal Hb A+A₂ stripes in the electrophoretic pattern. On the other hand, in 114 cases of Laotian, two groups of cases having the abnormal migration were detected as follows; (1) 40 abnormal hemoglobin cases (27.8%) whose electrophoretic pattern showed the slow moving stripe having the same migration as Hb A₂ in addition to normal Hb A, and (2) 6 cases (4.2%) whose electrophoretic pattern showed only slow moving stripe having the same migration as Hb A₂. It was highly suggestible that these abnormal hemoglobin were Hb E because of the samples in south-east Asia, electrophoretic migration as same as Hb A₂ and the existence of cases having only the stripe migrating as same as Hb A₂. And for the present, cases of (1) and (2) were considered as heterozygous type and homozygous type respectively. Now further examinations are being carried out for the samples brought back to Japan, although blending of β -thalasemia of thalassemia-Hb E is not possible to rule out completely.

No significant difference was found in the frequency of this abnormal hemoglobin between the ages. In the frequency of heterozygous type, there was no difference between males and females, but homozygous cases were one male and five females. No significant difference in the frequency of this abnormal hemoglobin was found between those cases of Na Phock refugee village who came from Sieng Khoang and those cases of Don Noun village, Vientian district. Three cases (3.8%) in normal hemoglobin cases and 2 cases (6.5%) in heterozygous cases were detected *Plasmodium*

falciparum malaria. As to the Hb concentration level, these cases met the criteria of anemia proposed by WHO in 75 normal hemoglobin cases, 29 heterozygous cases and 3 homozygous cases were seen 14 cases (18.7%), 3 cases (10.3%), 1 case (33.3%) respectively. Further studies of these abnormal hemoglobin cases are being carried out.

35 THE MEDICAL AND THE ENVIRONMENTAL EXAMINATIONS OF JAPANESE WHO MANAGED WOODCUTTERS AT BANGGAI ISLAND IN INDONESIA

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On August 1974, medical and environmental examinations at Banggai Island were performed for fourteen Japanese who supervised woodcutters there.

Serum protein, S-GOT, S-GPT, RA-test, serological tests for syphilis (VDRL and TPHA), blood analysis, blood pressure, urine analysis and parasitic examination on stool were examined. All serum protein and fractions were normal. S-GOT and S-GPT were elevated in six of fourteen subjects (42.9%). They were considered to have hepatitis because of working in the tropics and drinking much alcohol. And 64.3% of them had suffered malaria and 14.3% were positive on serological tests for syphilis. Therefore control of blood pressure, prevention and therapy of malaria and hepatitis are important.

The water of a nearby river was used for their daily life, therefore the water analysis is another important measure. Although the drinking water was boiled, the water to wash their dishes or foods was not boiled. Consequently many of them had diarrhoea, abscess-formation after a cold bath in the river and suppurative lymphadenitis. Suspecting of water contamination, bacterial and chemical analysis of water were conducted, and *E. coli*-group and ammoniac nitrogen were detected.

As mentioned above we feel that the immediate improvement of environmental sanitation is urgently required.

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