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Original Articles

STILLBIRTHS AND NEONATAL DEATHS IN THE PHILIPPINE GENERAL HOSPITAL AFTER LIBERATION

(April 5, 1945, To April 4, 1946)

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The second World War has brought to our country far deeper changes than the mere vast losses of property, the wreckage of our homes, and the sacrifice of countless lives. As an aftermath, it has also brought changes in the make-up of our population of tomorrow. There are now noticeable changes in the color, weight, and appearance of the hair of a great proportion of our newborn babies who will constitute the Filipino citizens of tomorrow. Those of us who for some years have been in daily contact with the nursery, cannot but notice that there is considerable proportion of babies that are born heavier and with fairer skin. But also there is still greater proportion of darker babies with curly if not kinky hair. In other words new blood has been injected into our population.

Ophthalmia neonatorum which we seldom saw before the war has affected some of our half-breed babies. But what is most noticeable is the sharp rise of premature stillbirths caused by syphilis.

This paper is necessarily confined to the babies born in the obstetrical ward of the Philippine General Hospital for one year since it was reopened on April 5, 1945. The records of the past years when we had a far larger number of patients have been completely destroyed.

¹ Read before the 39th Annual Meeting of the Philippine Medical Association, held May 10, 1946.

TABLE 1.—Incidence of Births in the Philippine General Hospital
from April 5, 1945, to April 4, 1946

Full term births	895
Premature births (6 mos. to 8 mos.)	101
Total number of births	996
Incidence of prematurity	10.14 per cent

TABLE 2.—Incidence of Prematurity on Fetal Deaths

Total number of fetal deaths	100
Full term — 38 cases or 38 per cent	
Premature — 63 cases or 63 per cent	

TABLE 3.—Mortality of 895 Full Term Births

Stillbirths	28
Percentage of full term stillbirths	3.12 per cent
Neonatal deaths	9
Percentage of neonatal full term deaths	1 per cent
Percentage mortality of full term babies	4.13 per cent

TABLE 4.—Causes of 23 Fresh Full Term Stillbirths

Prolonged labor outside due to	
Cephalopelvic Disproportion	13 cases or 56.51 per cent
Craniotomy	3
Porro for uterine rupture	3
Hydrocephalus midforceps	1
Arrest-aftercoming head	6
Hydrocephalus	1
Double-headed monster	1
Ablatio placenta and chronic nephritis	2 cases
Placenta previa	2 "
Prolapse of cord	2 "
Microcephalus — mother preeclampsia	1 case
Severe eclampsia	1 "
Second twin delivered 4 hours after the first	1 "
Undetermined	1 "

TABLE 5.—Causes of 5 Full Term Macerated Stillbirths

Monster-chondrodystrophia	1 case
Prolonged labor with intrapartum infection 10 days outside	2 cases
Missed labor (amenorrhoea — 10 calendar months)	1 case
Undetermined	1 case

TABLE 6.—Causes of 9 Full Term Neonatal Deaths

Dystocia — Prolonged labor outside	6 cases
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(2 were delivered by midforceps aided by symphyseotomy)

Bronchopneumonia of baby	2 cases
(1 born from an eclamptic mother)	
Hemorrhagic disease of the newborn	1 case

TABLE 7.—*Mortality of 101 Premature Births*

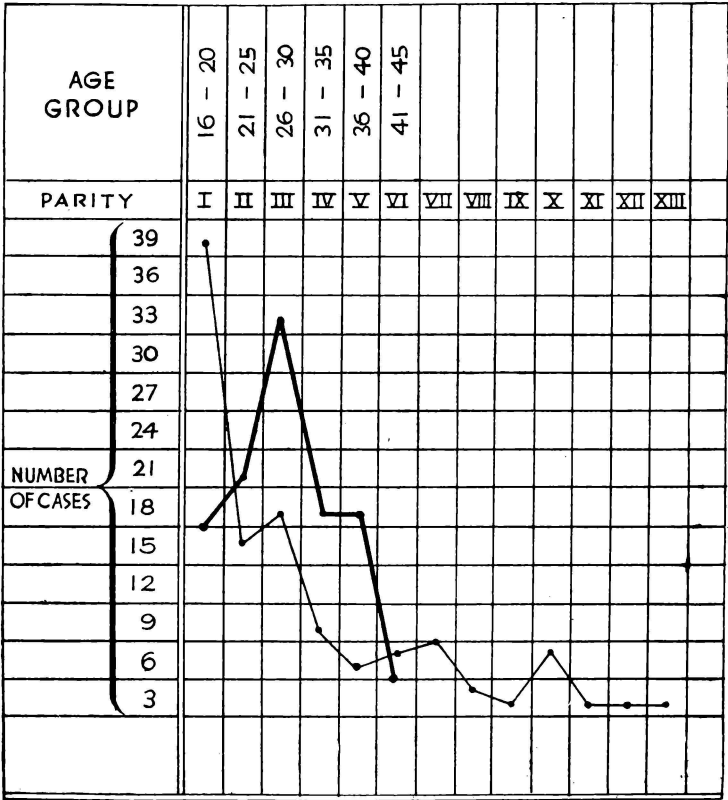
Six (6) months	17 cases — all died
Seven (7) months	45 " — 29 "
Eight (8) months	40 " — 17 "
Stillbirths, premature	42 "
Fresh stillbirths	
Fresh stillbirths	30 cases
Macerated stillbirths	12 "
Neonatal deaths, premature	21 cases
Total deaths, premature	63 "
Mortality, premature (7-8 mos.)	54.11 per cent

TABLE 8.—*Causes of 30 Premature Fresh Stillbirths*

Placenta previa	7
Chronic nephritis	5
Syphilis	4
Ablatio placenta and chronic nephritis	3
Eclampsia	3
Prolapse of cord	2
Malaria, acute	1
Pulmonary T. B., advanced	1
(postmortem Cesarean)	
Undetermined	4

TABLE 9.—*Causes of 12 Premature Macerated Stillbirths*

Syphilis	4 cases or 33.33 per cent
Chronic nephritis	2 cases
Influenza	1 case
Undetermined (Kahn negative)	5 cases



Incidence of Stillbirths According to Parity and Age

Note: Light curve— Incidence according to parity
 Heavy curve— Incidence according to age group.

Table 1 shows that the incidence of prematurity is 10.14 per cent. But this figure includes the stillbirths. If we confine ourselves to live births, excluding the stillbirths, the incidence of prematurity would be 6.37 per cent. This is similar to the figure given by Adair who reports that in the Chicago Lying-in Hospital, out of 9,775 live births, 664 infants or 6.79 per cent of the total were premature.

Table 2 shows that, of the 100 fetal deaths, prematurity was the cause in 63 per cent. Adair gives a similar figure. He states that, of 201 fetal deaths at the Chicago Lying-in Hospital, 63.2 per cent were premature.

Table 3 shows that of the 895 full-term births, 28 or 3.12 per cent were stillbirths. This is higher than the figure given by Adair who claims that, of 10,000 births, 2.25 per cent were stillbirths. There were 9 neonatal deaths constituting 1 per cent. The percentage of full-term mortality is 4.13.

Table 4 shows that, of the 23 fresh full-term stillbirths, cephalopelvic disproportion was the cause in 13 cases. Two of these were cases of hydrocephalus; and one, a double-headed monster. Excluding these 3 cases of fetal malformations, the incidence of cephalopelvic disproportion as a cause of stillbirth is 43.51 per cent. The mothers were brought to the hospital in the latter part of a prolonged second stage of labor when either the physician or the *hilot* had not been able to effect the delivery. Craniotomy had to be resorted to in 3 of the dead babies. Porro Cesarean had to be performed in 3 cases of rupture of the uterus. Ablatio placenta with chronic nephritis, placenta previa, or prolapse of the cord was respectively the cause in each 2 of 6 cases.

The neonatal mortality of full-term births was 1 per cent, and the gross fetal mortality of full-term births was 4.13 per cent.

Table 7 shows that there were 101 premature births: 16 of 6 months, 45 of 7 months, and 40 of 8 months. None of the 6-month fetuses survived. Forty-two premature births were stillborn, of whom 30 were fresh and 12 macerated. There were 21 neonatal premature births. Excluding the 6-month fetuses who were non-viable, the mortality of the premature babies is 54.11 per cent.

The causes of non-macerated premature stillbirths are shown in Table 8. Of the 30 fresh stillbirths, 7 were due to placenta previa, in which case, as a rule, we always try first to save the life of the mother. Even when extracted by Cesarean section, when the prematurity is only 7 months, their survival is very doubtful. Ablatio placenta or eclampsia was responsible for 3 stillbirths.

Three cases of stillbirths were due to chronic nephritis and 4 cases or 13.33 per cent were due to syphilis. Of the 12 macerated stillbirths shown in Table 9, four cases or 33.33 per cent were also caused by syphilis. Out of a total of 42 premature stillbirths, 8 cases or 19 per cent were due to syphilis. In these cases, either the mother was positive for Kahn's test or the father gave a positive history of syphilis. There were 5 premature macerated stillbirths whose cause could not be ascertained because the mother was Kahn negative. But does the negative reaction to Kahn's test necessarily mean freedom from syphilis?

Graph I shows that the incidence of stillbirths is greatest among primipara. It is also highest in the third decade of life. The reason perhaps that the figure of stillbirths is high during the third decade is that the incidence of deliveries is highest during this decade.

One cannot well compare our figures of scarcely 1000 births to Yerushalmy's 7 million. He found that the stillbirths rate is highest between 15 and 19 years, lowest between 20 and 24, but increases thereafter with the age of the mothers. He failed to mention, however, the influence of primiparity to stillbirth rate.

SUMMARY

1. The stillbirth rate for 895 full-term babies born at the Philippine General

Hospital during the first year after liberation is 3.12 per cent. The full-term neonatal deaths is 1 per cent. The gross full-term fetal mortality is 4.12 per cent.

2. Prematurity from seven to eight months has a gross fetal mortality rate of 53.57 per cent. This includes the stillbirths and neonatal deaths.

3. Cephalopelvic disproportion malformations are the outstanding causes of full-term stillbirths.

4. Placenta previa, chronic nephritis, syphilis, and eclampsia are the most frequent causes of premature stillbirths.

5. Syphilis and chronic nephritis are the most frequent causes of premature macerated stillbirths. Syphilis as a cause of stillbirth was a rare phenomenon before, but it has become prominent after the liberation.

REFERENCES

- Adair-Obstetrics and Gynecology, Lea and Fabiger, Philadelphia, 1940.
Yerushalmy J. Human Biology, May, 1945—cited J.A.M.A. Sept. 1, 1945, Vol. 29, No. 1, p. 72.

THE ADEQUACY OF POSTWAR DIET OF FILIPINO WAGE EARNERS IN THE CITY OF MANILA*

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There is now a growing recognition in this country of the intimate relation of food to health; but the effects of poor diet on health and their social implications as to the future of the race are very little appreciated, not only by the leaders of our government, but even by some of our health authorities.

It is a biological axiom that food is indispensable to all living things. Consequently, there is nothing so intimately linked with the welfare of the human race as food. How best to maintain the body in a condition of health and vigor, and how to establish the highest degree of efficiency both physical and mental, with the least expenditure of energy and money, are questions that should merit the closest attention of our government and leaders of thought.

Probably never before in the history of this country has there been a greater need for information concerning food consumption of the Filipinos of different economic levels throughout the country than at present. In the words of Stiebeling and Phipard (1).

"The uses of information on consumption are manifold. Quantitative data interpreted in the light of present knowledge of food values and nutritional needs are basic to programs designed to improve the general welfare. Such facts are needed by public and private agencies charged with the formulation of educational programs and the development of social policy. Such data are also indispensable in determining the foods to be included and the weight to be assigned to each in the pricing of food budgets and in the construction of food-cost indexes."

The desire for food is strong in primitive people, because their main purpose in life is to eat. Among civilized peoples, the expenditures for food in the family budget are generally high. In a study of the economic aspect of nutrition for the masses, the questions that need immediate answers are: What is their average income? What is the total expenditure, and what portion of this is for food? Do they get sufficient nourishment from the amount of money they spend for food? In other words, is the diet adequate? If it is found inadequate, improvements must be suggested.

SOURCES OF DATA

The data used in this study were obtained from the Bureau of Census and

* Read before the P. M. A. annual meeting, May 9, 1946 at Sto. Tomas University, Manila.

Statistics, through the kindness of the Assistant Director, Dr. H. Lava. The family budget of 100 families with their income and expenses for the whole month was analyzed. The consumption data used in this study refer to quantities of food brought into the kitchen for family consumption rather than to the quantities actually eaten. No account was taken of the average percentage of refuse in the different articles of food purchased. No deductions were made for kitchen or plate waste of edible foods. For this reason, the figures given in nutritive value are actually higher than the actual value of food intake. Since the primary object for which these data were collected is to study only the economic condition of the wage earners — and, incidentally, the nutritional aspect of the problem — the data obtained with reference to food expenses and consumption were not very satisfactory. In spite of all the deficiencies in the collection of data on food expenses, however, a study of them will, no doubt, furnish us with a rough estimate as to the postwar adequacy of the diet of Filipino wage-earners in the City of Manila.

NUTRITIVE VALUE OF THE AVERAGE DIET

In the study of the nutritive value of the diets of 100 families, four factors were considered: namely, total calories, protein, minerals, and vitamins. These factors were evaluated for each food by the item-by-item method, using such tables as those prepared by Concepcion (6); Santos and Adriano (7); Hermano (8); Adriano and De Guzman (9); Marañon (10); Aykroyd (11) the *Handbook of Philippine Agriculture* (12); Munsell (13); Ellis, Wilson, and Ray (14); Basu *et al* (15); De Leon and Gonzalez (16); Leong (17 & 18); the *Handbook of Nutrition* (19); Hawley and Carden (20), and Heinz's *Nutritional charts* (21).

The size of the family was reduced to adult male unit, using the scale recommended by the League of Nations Health Organization held at Bandoeng in August, 1937 (22), for Far Eastern Countries.

Scale of Average Caloric Requirements

	Coefficient
Adult male (over 14)	1
Adult female (over 14)	0.8
Child, 12-13 years	0.8
Child, 10-11 years	0.7
Child, 8-9 years	0.6
Child, 6-7 years	0.5
Child, 4-5 years	0.4
Child, 2-3 years	0.3
Child, 0-2 years	0.2

For proteins, the scale which is used in Japan and which has been adopted in India (Report of the Bandoeng Conference, Document A. 19, 1937 III p. 81) (23) has likewise been adopted in the present work—except that the amount has been raised from 65 gms. as recommended by the National Research Council of the Philippines to 80 gms.

Scales for minerals and vitamins have been prepared by the Bureau of Home Economics of the United States for the use in their dietary surveys. According to Bigwood (22), it is rather difficult at the present state of our knowledge to propose an international scale value for minerals. In the case of calcium, phosphorus, and

iron, estimates of per capita intake are at present, according to him, as satisfactory as those based on more detailed scales. The same can be said with regards to vitamins. In this study, Bigwood's suggestions with regards to minerals and vitamins have been followed.

AVERAGE INCOME AND EXPENDITURES

The average income and expenditures of the 100 families studied in this report, together with the composition of those families, are presented in Tables 1 and 2.

TABLE 1.—Average Age and Number of Members of Wage Earners' Families.

TOTAL NUMBER STUDIED		AVERAGE AGE	
Families	100	Male Adults	33.52
Adults (Male)	139	Female Adults	31.38
Adults (Female)	142	Children	7.97
Children	270		
Total 551 in 100 families.			

As early as 1914, Musgrave (2), in studying the cost of living in the Philippines, reached the conclusion that the income of the average Filipino family is below the minimum cost of living consistent with health and reasonable amount of pleasure and happiness. Concepcion (3), in 1931, also found in his studies that the income of married laborers in the City of Manila was less than their total expenses. He pointed out that, although from 64% to 76% of their earning was spent for food, their diet was still inadequate. One of the striking features of the expenses of our laborers, according to Mendinueto (4), is the disproportionate outlay for food, which is between 60 to 65 per cent of their total expenses.

Lava (5), in his study of post-war standard of living in the City of Manila, states: "Studies made before the war on standards of living of workers in the City and the rural areas underscored the fact that the income of workers were hardly sufficient for their daily consumption of rice and fish. There is no margin to allow for a greater variety of diet.... If pre-war wages were barely sufficient to meet expenses on standards of living which were considered of the lowest, how is it possible that wage earners today manage to live on real wage which are less than 1/3 of the prewar wages?"

In looking over Table 2, we notice one striking fact — namely, that the average monthly expenses are greater than the total income. Moreover, the average monthly food expenses constitute 82.5% of the total income, leaving only 17.5% for other living necessities, such as house rent, clothing, fuel, medicine, education, etc.

TABLE 2.—Monthly Average Income and Expenditures of 100 Wage Earners' Families.

Income Class	No. of Families	Average Income Pesos	Average Total Expenses Pesos	Food Expenses Pesos	Percent Food Expenses to Income
Under P 50	3	37.50	104.55	67.48	— 79.95
P 50 - 99	31	74.99	128.21	81.10	— 8.14
P100 - 149	33	121.84	164.32	105.32	86.42
P150 - 199	20	171.18	191.53	123.06	71.89
P200 - 249	8	206.97	236.40	145.10	70.11
P250 or above	5	288.44	256.64	180.37	63.71
TOTAL	100	129.79	167.15	107.15	82.53

FOOD ENERGY VALUE

The amount of heat necessary to meet the daily demand of our bodies, even at rest, is supplied by the food we eat each day. In approaching the question of energy requirement, one must bear in mind that energy expenditure is influenced by several factors — namely, age, sex, race, occupation, muscular activity, etc. Normal adults of similar age and physique require about the same amount of food energy when they are performing equivalent amounts of muscular work. Age and body-build affect requirements to some extent. With advancing age, requirements tend to decline. Food-energy allowances of children must cover the requirements for growth as well as for maintenance and activity. There is no reliable information, based on studies of individual food consumption, about the total energy requirement of Filipino children at different ages. Work of this nature is very badly needed in this country.

In the report of the Intergovernmental Conference of Far Eastern Countries on Rural Hygiene held at Bandoeng in August, 1937, under the auspices of the League of Nations Health Organization (23), two types of scales were recommended. The scale adopted in the southern part of India recommends 2,600 calories per adult male over 14 years, while the scale adopted in Japan recommends 2,400 calories per adult male from 15 to 60 years. The National Research Council of the Philippines, in its 1941 recommendations, adopted 2,600 calories per adult man doing moderate amount of work.

TABLE 3.—*Total Calories, Total Protein Intake, Cost per Capita per Day and Cost per 1,000 Calories of Food Taken.*

Total calories	2,297.28
Protein, gms.	81.34
Cost per capita per day, centavos	60.00
Cost per 1,000 calories, centavos	26.10

In looking over the foregoing table, we find that the caloric intake per adult male unit is only 2,297.28 calories. Comparing this figure with the one recommended by the National Research Council of the Philippines, it is 300 calories short. And, if we take into consideration that the figures given in this report represent, not food actually consumed, but as food purchased, it is obvious that the discrepancy is even greater. This finding, however, is higher than that by Gutierrez & Santos (24) in their studies of food consumption of 104 families in Paco district, Manila, in 1938, which is 2,107 (=40.87) calories; or that in my study on college students as shown in Table 4.

TABLE 4.—*Comparative Nutritive Value of Food Intake of Different Groups of People as Reported by Different Workers.*

	Total Calories	Total Protein gms.	Percent Total Calories per cent
Present study	2,297	81.34	14.11
College students (25)	2,216	79.8	14.40
Gutierrez & Santos (24)	2,107	63.0	11.96
Miller et al. (27)	2,817	76.0	10.7

PROTEIN REQUIREMENT

How much protein does an average Filipino need? To answer this question in the light of present-day knowledge, three points must be considered according to McLester (26). He enumerates:

"The quality of biologic value of the protein consumed;

"The distinction between the minimum and the optimum as applied to protein intake;

"The criteria by which 'health and vigor' are judged, whether by a sense of well-being with efficient accomplishment during limited periods or by the preservation of youthful vigor with comparative freedom from disease during an appreciable fraction of the person's life."

The food proteins differ greatly in their amino acid content, and consequently they may vary widely in their nutritive value. The main uses of protein in the body are (a) as a body-building material, and (b) as a source of energy. It is not possible to tell in advance how much of the protein will serve each purpose.

Although the protein requirement of an adult individual has been the subject of much controversy, it has been found that as low as 44 grams of proteins daily is sufficient to maintain nitrogen equilibrium. Hegsted *et al.* (44), in a study of nitrogen balance in 26 normal adults, using a low protein diet devoid of animal protein, found that the requirement for maintaining nitrogen balance was approximately 2.9 gm. of nitrogen (18 gm. conventional protein) per sq. m. of body surface. Thus, a man weighing 55 kilograms would require between 25-35 gm. of protein, depending upon his height. When the subjects were given the same diet with one-third of the protein replaced by meat, the requirement was only 2.4 gm. nitrogen (15 gm. conventional protein) per sq. m. of body surface. Protein requirement was thus 17% less in that diet than on the all-vegetable diet. In view of these findings, the recommended allowance of 80 gm. of protein by the National Research Council of the Philippines appears to be too generous and can be reduced to even 60 gm. per day, taking into consideration that protein is an expensive food, that amounts in excess of the actual requirement may be wasteful, and that the average weight of the Filipinos is much less than that of the Americans.

TABLE 5.—Comparison of the Average Nutritive Value of Food Intake of Wage Earners in Manila with Various Standards.

NUTRIENT	Nutritive Value Per Capita Per Day for Wage Earners in Manila	Recommended Daily Allowances, Nat. Research Council, Manila	Recommended Per Capita Allowances Nat. Res. Council Food & Nutrition Board, U.S.A.
Food energy, cal.	2,297.28	2,600	2,800
Protein, gms	81.34	80	66
Phosphorus, gms	1.16	0.80*	1.32
Calcium, gms	0.36	0.7	0.9
Iron, mg	14.02	12	12
Vitamin A, I. U.	2,001.14	4,000	4,700
Vitamin B ₁ , mg	0.59	1.6	1.6
Vitamin C, mg	17.01	60	70
Riboflavin, mg	0.68		2.3

* First recommendation of the National Research Council in 1939.

The protein intake per adult male unit as found in this survey is 81.34 gm. When this figure is compared with that recommended by the National Research Council of the Philippines (see Table 5) and with the protein scale adopted in Japan, we find that it does not tally with either one of the two. This is higher than the finding of Gutierrez and Santos (24) which is only 63 gms.

TABLE 6.—*Distribution of Protein According to Sources.*

Vegetable protein in percent of total protein	56.57
Rice protein in percent of vegetable protein	84.47
Rice protein in percent of vegetable total protein	48.14
Animal protein in percent of total protein	43.43

The percentage of vegetable protein in the total supply as found in this study is 56.57%; while the percentage of animal protein is only 43.43%. Of the total vegetable protein, 84.47% is derived from rice and only 15.53% is derived from sources other than rice. Gutierrez and Santos (24) found 55% and 45% respectively; but rice alone supplied 38% of the total protein, and 69% of the total vegetable proteins.

DISTRIBUTION OF CALORIES

In recent years, owing to the great significance and importance of protective foods, greater emphasis has been laid on the distribution of calories than on calories and proteins in the food. Concepcion (25), in studying the distribution of calories in the diet of boarders in college dormitories, found out that cereals and grain products contribute 61.6%; milk and dairy products, 1.5%; fruits and vegetables, 4.23%; meat, fish, and eggs no less than 24%. Gutierrez and Santos (24) found that cereals contribute 70.9%; milk, and dairy products 0.90%; fruits and vegetables, 7% meat, fish and eggs 11.3%; and sweet and fatty foods 9.9%. The distribution of calories in the present study, as shown in Table 7, is as follows: cereals and grains, 77.53%; milk and dairy products, 1.93%; vegetables and fruits, 5.58%; sugar and fats, 1.96%; meat, fish and eggs, 12.51%.

TABLE 7.—*Comparative Percentage Distribution of Calories in Different Surveys.*

Food Groups	Concepcion Wage Earners Manila, 1945	Gutierrez & Santos, Paco Manila, 1936- 1937	Concepcion Manila, Coll. Dormitories 1933	Miller et al Filipinos in Hawaii	(Wu) North Chinese
Cereals, %	77.53	70.90	61.6	71.5	72.0
Meat, fish, eggs %	12.51	11.30	24.0	6.9	6.8
Milk & dairy products %	1.93	0.90	1.5	4.2	0.06
Vegetables and fruits, %	5.58	7.00	4.23	5.4	8.7
Fats & Oils, and sweets, %	1.96	9.90	4.0	10.3	8.5
Miscellaneous %	0.49	4.61	1.7	4.1

One of the characteristics of the Filipino diet, in contrast to the Occidental diet — even with the low-cost American diet — is marked predominance of rice and cereal products and the very low consumption of milk, fruits and vegetables.

It is rather surprising to note that, although we live in a tropical country where vegetables and fruits abound, our consumption of these commodities is lower than that of the Northern Chinese, as reported by Wu (28).

MINERAL REQUIREMENTS

Calcium

Mineral salts play an important role in an adequate diet. Ten or more mineral elements are needed by the body, but only three of them are included in this survey; namely, calcium, phosphorus, and iron. Calcium and phosphorus are essential to the development of bones and teeth. Iron is necessary for the formation of hemoglobin. The human body is constantly losing minerals, and a proper diet is necessary to replace this loss and to supply the amount needed for growth; otherwise, health and development would be impaired. The current belief that a diet satisfactory in all other respects will furnish sufficient and necessary mineral elements is far from the truth.

TABLE 8.—*Mineral Intake of Wage Earners' Families Compared with Recommendations of the National Research Council, Manila.*

	CALCIUM		PHOSPHORUS		IRON	
	Amount gms.	Percent of Standard	Amount gms.	Percent of Standard	Amount mg.	Percent of Standard
N. R. C. recommendation	0.700	100	0.80*	100	12.00	100
Present study (1945)	0.360	51.43	1.16	145	14.02	166.83
College Students U. P. Women	0.495	70.71	1.55	193.75	22.50	187.50
Students, Jao, (1943)	0.48	68.57	2.00	250	27.3	227.5
Filipinos in Hawaii Miller et al. (1946)	0.246	32.2	1.13	141	13.4	111.6

* 1939 recommendation of the National Research Council of the Philippines.

In looking over the foregoing table, we find that the per capita calcium intake of Filipino wage earners is 0.36 gm. This is only 51.43% of the amount recommended by the National Research Council of the Philippines. This amount is greater than that found by Miller et al. (27) in their survey of 20 Filipino plantation families in Hawaii, but much smaller than the findings of Concepcion (25) on college students, and of Jao et al. (30) on university woman students. Since Sherman (35) believes that 0.44 gm. of calcium is sufficient to maintain calcium balance, it is evident that the calcium intake of Filipino wage earners is far from sufficient. However, Potgieter (29) has reported calcium balance on a Japanese subject on the high rice diet, with a low calcium intake of 0.091 gm. per day (0.0022 gm. per kilogram). This apparently low calcium requirement and the good utilization of the calcium present in the rice diet by the Japanese subject, according to the author, suggests the advisability of further study on a large number of subjects to determine the minimum calcium requirements of peoples accustomed for generations to a diet

low in calcium, and the relative utilization of the calcium of such a diet by Caucasians.

The very limited use of milk and dairy products in the diet of Filipinos and the insufficient intake of green vegetables explain the consistently low calcium findings in the diet of the Filipinos. It should be remembered in this connection that, in the case of adults, there may be a long continued loss of calcium without the appearance of symptoms of calcium deficiency, because the losses from the blood and soft tissues may be replaced by calcium withdrawn from the bone. Bauer and his associates (31) have postulated a hypothesis that the bone trabeculae may readily give up calcium to meet the needs of the body as a whole. If we add to this the effect of sunlight on the calcium mobilization, it is not strange that, even with a low calcium intake, Filipinos probably do not show the symptoms of calcium deficiency.

The insufficiency of calcium and vitamin A in the diet of Filipinos, as observed in all dietary surveys, may account for their susceptibility to respiratory diseases like tuberculosis and pneumonia.

Sherman and Hawley (32), in an extensive study of the rate of calcium retention in the body of a growing child, found that calcium derived from vegetables is not so well retained and stored as that derived from milk. The fact that, after one year, Filipino babies are fed only cereals and very little milk, if any, may also explain the high incidence of dental caries and low rate of growth after the first year. According to Miller *et al* (27), the low calcium intake of the Filipinos help to account for their short stature.

PHOSPHORUS

The average per capita intake of total phosphorus, as shown in the Table 8, is 1.16 gm. This is 100% more than the amount (0.80 gm.) first recommended by the National Research Council of the Philippines.

Plenty of evidence has accumulated to show that "phytin phosphorus", which constitutes half or more of the total phosphorus in white cereals, nuts, and legumes, is unavailable for nutrition, as shown by McCance and Widdowson (33). However, it has been shown by Potgieter (29), in her study of calcium and phosphorus balance on a high rice diet, that a positive phosphorus balance can be obtained on an average minimum requirement of 0.64 gm. a day or 15.6 mg. per kg. body weight. This shows that phosphorus in the high rice diet can well be utilized by the body.

IRON

The total iron intake per capita, as found in the present study, is 14.02 mg. This is more than the amount recommended by the National Council of the Philippines.

In recent years, it has been realized that the iron in the food may be divided into two classes; namely, organic and inorganic. The inorganic form is now considered the most suitable for nutrition. On the other hand, iron in the form of organic tetrapyrrole is a poor source of iron for the body. According to Widdowson and McCance (34), this form of iron passes through the intestine unchanged; and it does not benefit the body. It has been shown by Sherman *et al* (35) that

the rate of hemoglobin regeneration in rats is controlled by the amount of inorganic iron present in the food rather than by the amount of total iron in the diet. So far as the present author is aware, no study has yet been made in this country of the available inorganic iron in our foodstuffs.

VITAMIN REQUIREMENT

It can no longer be doubted that vitamins are indispensable. In the words of Prof. Sherman (36), "All nutrition work, to be worthy of our present knowledge and opportunity, must stand foursquare upon equal recognition of calories, protein, mineral elements, and vitamins."

Due to lack of sufficient data on the vitamin content of Filipino foods, only four vitamins will be reported on in the present study. They are vitamin A, thiamin hydrochloride, ascorbic acid, and riboflavin.

VITAMIN A

This vitamin is related to the yellow pigment carotene found in plants. There are at least three kinds of carotene that can produce vitamin A; namely, alpha, beta, and gamma carotene. The other precursor is the pigment found in yellow corn called cryptoxanthine, which is closely related to carotene. There is sufficient evidence that unit-for-unit of carotene is less effective in supporting normal dark adaptation than vitamin A from cod liver oil.

The per capita consumption of vitamin A in the present study is 2,001.14 I.U. This amount is only about 50% of that recommended by the National Research Council of the Philippines. Stiebeling and Phippard (1), in their studies of ordinary American diets, are of the opinion that from 58 to 64 I.U. of vitamin A per kg. of body weight are needed to cover average minimum requirements for maintaining optimal visual responses. They also claim that this amount "would not provide for the accumulation of a body reserve, nor would it cover minimal requirements for those whose needs are higher than the average."

TABLE 9—Comparison of Nutritive Value of Foods of Wage Earners and Diet of Women Student Dormitories to Recommended Allowance of National Res. Council of the Philippines.

NUTRIENT	Wage Earners Concepcion (1945)	Women Dormitories Jao (1943)	Recommended allowance
Vitamin A, I.U.	2,001.00	706.	4,000
Vitamin B ₁ , mg.	0.59	0.669	1.6
Vitamin C, mg.	17.01	6.5	60
Riboflavin, mg.	0.68	2*

* Recommended allowance by the National Research Council of America.

THIAMINE HYDROCHLORIDE

Thiamine hydrochloride or vitamin B₁ is regarded as an essential requirement for normal growth, appetite, and intestinal motility. One of the earliest symptoms of vitamin B₁ deficiency is anorexia, followed by lack of energy, muscular weakness, and heaviness of the legs. This is followed later on by tenderness of the calf muscle and burning sensation of the soles of the feet. It has been shown also that thiamin has

something to do with carbohydrate metabolism and tissue respiration, especially in the brain.

The per capita intake of thiamin hydrochloride, as shown in Table 9, is 0.59 mg. which is a little more than one-third of the amount recommended by the National Research Council of the Philippines.

The low thiamin intake of the Filipinos explains why beriberi is endemic in this country, and that infantile beriberi is still one of the causes of our high infant mortality.

The requirement of thiamin appears to be related to body size and energy metabolism. According to Williams (37), it is also related to the amount of non-fat calories in the diet. Cowgill (38), is of the opinion that a 70-kilo man, using about 3,000 calories a day, needs about 300 I. U. or 0.9 mg. of thiamin. According to him, this quantity will insure freedom from beriberi. But how wide a margin of safety it represents is not known. According to Macy and Williams (39), the amount of thiamin required in a good diet is 0.6 mg. per 1000 calories in the diet. This means that an average man who is ingesting 2,500 calories of food energy daily, should receive 1.5 mg. of thiamin each day. Macy and Williams further state that, if the energy metabolism of the body is increased as in hyperthyroidism; prolonged fever, growth and pregnancy, the thiamin intake should be correspondingly increased. It has been found recently that coconut oil, as a source of fat in the diet, is more satisfactory than other forms of fat in supplying thiamin to the body. This observation should be of interest to our dietitians, because coconut oil is abundant in this country.

RIBOFLAVIN

This vitamin may occur in three forms; namely, in natural materials as the free vitamin, as an ester with phosphoric acid, and in combination with protein. The latter is a specific enzyme which functions in cellular respiration, and riboflavin is an essential constituent of such systems.

Riboflavin is required for growth and for the maintenance of health in the rat and probably in mammals in general, including man. Although it has been associated mainly with growth, we are now beginning to recognize its relation to nerve degeneration. It is hinted by some authors that the nerve degeneration in beriberi is possibly due to riboflavin deficiency.

The fundamental disturbance of riboflavin deficiency is undoubtedly related to respiratory enzymes. Riboflavin is the active group of enzymes present in practically all living cells and tissues, and it is important in the proper metabolism of sugar. There are evidences that riboflavin is not synthesized by the animal cell; consequently it must be supplied by the diet. The collapse of animals depleted of riboflavin is, no doubt, due to cellular asphyxiation, resulting from the lack of a cellular oxidation catalyst.

The symptoms of riboflavin deficiency in man are: inflammation of the lips, fissures at the corner of the mouth (cheilosis), glossitis, dermatitis, and vascular keratitis. The ocular symptoms, first described by Sydenstricker *et al* (40), appear to be very constant and one of the early symptoms of riboflavin deficiency.

The per capita intake of riboflavin as shown in Table 9, is 0.68 mg. This is

less than one third of the amount (2 mg.) recommended by the National Research Council of America.

The Food and Drug Administration of America has accepted 2 mg. a day as the minimum daily requirement. It is believed that one serving of liver will meet the daily requirement, and that one serving of cheese or eggs will supply one fourth.

In 1943, Liboro and Navarro (41) reported 55 cases of a riboflavinosis in the city of Manila. According to them, all the characteristic symptoms, such as cheilosis, glossitis, and seborrheic dermatitis on the nasolabial fold were observed. The corneal vascularization could not be elicited, due to lack of slit lamp. They also reported that the patient's symptoms improved markedly with riboflavin therapy; and that the symptoms reappeared with the cessation of the vitamin administration but disappeared again as soon as the treatment was resumed.

ASCORBIC ACID

The most clearly established function of this vitamin is the regulation of the collagen found in all fibrous tissues and all non-epithelial cement substances, including the intercellular substances of the capillary wall, dentin, cartilage, and the matrices of bone. In the absence of this vitamin, the tissues are unable to manufacture intercellular material, resulting in changes in tooth structure and the appearance of symptoms of scurvy, such as hemorrhages, swelling of the joints, and fragility of the bones. It has also been suggested that ascorbic acid may function as a respiratory catalyst, aiding cellular respiration by acting as a hydrogen donor.

Inadequate intake or subclinical scurvy may be characterized by loss of appetite, vitality, and weight; irritability and apprehension; muscular weakness; joint pains; anemia; gastrointestinal disturbances; and predisposition to infection.

Although frank cases of scurvy were rare in this country before the war, the high incidence of dental caries among school children and the chronic course of some dermatological ulcers frequently met with during the last war, are strong evidences that ascorbic acid is really deficient in the diet of many Filipinos.

There is no store of ascorbic acid in the body comparable to the reserve of vitamin A in the liver, but ascorbic acid is widely distributed throughout the organism.

The ascorbic acid requirement is related both to the size of the body and to basal rate of metabolism. The National Research Council of the Philippines recommends a daily allowance of 60 mg. per adult individual. There is some evidence that the daily needs of young children are two-thirds to three-fourths as high as those of adults (42). In pregnancy and lactation, the woman's actual allowance should probably be doubled.

The per capita ascorbic acid intake, as shown in Table 9, is only 17.01 mg. This is less than one-third of the adult daily requirement, which is 60 mg. The small intake of fruits and raw green vegetables in the form of salad in the diet of the Filipinos, explains the low ascorbic acid content in their daily diet.

FOOD COST AND DISTRIBUTION OF EXPENSES

The cost of food per capita per adult male unit is sixty centavos per day. This amount is rather high compared with the finding of Gutierrez and Santos (24) in the Paco District which is only 17 centavos. But, when we take into consideration

that the buying power of the peso at the time of this survey was only 11.8 centavos, 60 centavos is equivalent to 7.08 centavos before the war.

Although no satisfactory standard for the distribution of expenses for various food groups can be stated with certainty because of the many factors involved, such as the habit of the individual, availability of supplies, market price, etc., yet it was suggested by Sherman that about 10-15 per cent of the food budget be spent for meat, fish, and eggs; 27-33 per cent for milk and dairy products; 10-15 per cent for fatty foods and sweets; 12-15 per cent for cereals and grains; and 15-18 per cent for fruits and vegetables.

In the following table is summarized the percentage of expenses for the different food groups as compared with some accepted standards.

TABLE 10.—*Distribution of Expenses in the Different Food Groups Compared With the Well-Known Standards.*

Source of Data	Cereals & grain per cent	Meat, fish, eggs, et. per cent	Milk & Dairy Products per cent	Vegetables & Fruits per cent	Fats, sweets & Miscellaneous per cent
Office of Home Economics	13	29	15	25	18
U. S. Dept. Agric. Thrift Leaflet, (1919)	20	20	20	20	20
Sherman std. of low-cost diet	12-15	10-15	27-33	15-18	10-15
Present study	36.9	41.5	1.1	11.7	8.8
Gutierrez & Santos Paco, Manila.	32.5	40.7	2.6	14.3	9.9

You will notice in this table that one of the most striking characteristics of the Filipino diet is the high amount of money spent for meat, fish, and eggs—in this case, 41.5 per cent of the total food expense—and only 36.9 per cent for cereals and grains. This agrees with the findings of Gutierrez and Santos (24). On the other hand, the amount spent for milk and dairy products is only about 1.1 per cent; and for vegetables and fruits, 11.7 per cent. Comparison of these data with the Sherman standard for low cost diet reveals that Filipino consumption of the different food groups is below par. Very little money is spent for milk, vegetables, and fruits, which are rich sources of vitamins and calcium.

SUMMARY AND RECOMMENDATIONS

1. As shown in Table 5, with the exception of protein, phosphorus, and iron, the nutritive value of the postwar diet of Filipino wage-earners in the city of Manila is much lower than the standards recommended by the National Research Council of the Philippines. It is low in calories, calcium, and vitamins. This is especially true of thiamine hydrochloride, ascorbic acid, and riboflavin.

2. The amount of vegetable protein in the diet constitutes 56.57% of the total protein, and rice protein makes up 84.47 per cent of the total vegetable protein. Animal protein constitutes only 43.43 per cent of the total protein.

3. In the distribution of calories, cereals and grains constitute 77.53 per cent

of the total calories; meat, fish, and eggs, 12.51 per cent; milk and dairy products, 1.93 per cent; sugar and sweets, 1.01 per cent; and miscellaneous, 0.49 per cent.

4. The money spent for meat, fish, and eggs is 41.5 per cent of the total cost of food per day. On the other hand, the amount spent for milk and dairy products is only 1.19 per cent—which is very little indeed. Although this is a tropical country where vegetables and fruits abound, the money spent for vegetables and fruits is only 11.7 per cent of the total food cost.

5. The calcium intake is only 51.4 per cent of the National Research Council allowance. The low milk and leafy vegetable intake of Filipinos explain the low calcium content of their diet. Milk and dairy products are the best protective foods, and they supply the deficiency of calcium and vitamins in any diet. Some of the green leafy vegetables which are found rich in calcium are ampalaya leaves, kolitis, pechay, Chinese mustard, lettuce, kangkong leaves—to mention only a few. The use of taro, as suggested by Prof. Miller of Hawaii, as a source of calcium deserves special consideration as to its applicability in the Filipino diet. Furthermore, the use of small fishes like anchovy (*dilis*, Tag.), fermented shrimp (*bagoong*) and small dried anchovy (*tuyong dilis* Tag.) should be encouraged.

6. Since beriberi is still an important problem in this country, and since it is a preventable disease caused by a deficiency in thiamin chloride, efforts should be made to include in the daily fare of our laborers dried beans such as mongo, paayap, soybean, as well as pork meat, glandular organs, nuts, green vegetables, and fruits. Inasmuch as the discontinuance of the use of polished rice is out of the question at the present time, the use of enriched rice or fortified rice as found feasible by the researches of Kirk (43) should be instituted in this country, as a beriberi-preventive measure.

7. The deficiency of vitamin A in the Filipino diet can be improved by the consumption of yellow colored vegetables and fruits grown in the Philippines such as yellow squash, carrots, yellow camotes, and green vegetables as well as fruits like papaya, mango, kasuy, etc. The use of fish liver oil and tikitiki oil as supplementary food for young children should be encouraged.

8. To supply the deficiency of vitamin C in the present diet, the use of fresh fruits like guava, papaya, calamansi, native oranges, pomelo, tomatoes, chico, should be popularized, because they are all rich sources of vitamin C. Among the native vegetables which are found rich in Vitamin C may be mentioned pechay, cabbages, Chinese mustard, kolitis, and sweet pepper. In order to get the full amount of their vitamin C content, they should be eaten raw in the form of salad.

9. The deficiency in riboflavin can be remedied by including in the diet some glandular organs like liver, kidney, pork meat, eggs, and yeast.

REFERENCES

1. Stiebeling, H. K. & Phippard, E. F.: U. S. Dept. of Agric., Washington, D. C., Circular No. 507, Jan., 1939.
2. Musgrave, W. E. et al: Report of the Gov't. Committee on the Investigation of Excessive Infant Mortality in the P. I. Manila, Bureau of Printing, 1914.
3. Concepcion, I.: Jour. P. I. M. A. v. 11:80, March 1931, No. 3.
4. Mendinueto, S. R.: Jour. of Com. & Industry, May, 1923.
5. Lava, H.: Bull. of Phil. Statistics, Manila, 1, No. 2, Dec. 1945.

6. Concepcion, I.: Composition and Nutritive Values of Phil. Food Materials, Manila, 1941.
7. Santos, F. O. and Adriano, F. T.: The Chemical Composition of Phil. Food Materials. Bureau of Printing, Manila, 1929.
8. Hermano, A. J.: Food Values. Bureau of Printing, Manila, 1934.
9. Adriano, F. T. and de Guzman, M. S.: Phil. Agriculturist, 20:580, 1932; also 20:530, 1932.
10. Marañon, J.: Phil. Jour. Sc. 58:317, 1935.
11. Aykroyd, W. R.: Health Bull. No. 23, Gov't. of India Press, 1937.
12. Handbook of Phil. Agric. Published by the Coll. of Agric., University of the Philippines, 1939.
13. Munsell, H. W.: Milbank Memorial Fund Quarterly, Oct. 1940.
14. Ellis, H., Wilson, C. and Ray, G. K.: Ind. Jour. Med. Res. 25:879, 1938.
15. Basu, K. P. Kai Sucar, B. C., and Sen Gupta, J. C.: Ind. Jour. Med. Res. 27:728, 1940.
16. De Leon, A. I. and Gonzalez, F. G.: Nat. and Applied Science Bull. 6:177 (Oct.), 1938.
17. Leong, P. C.: Jour. Malaya Branch, Brit. Med. Ass. 4:66, No. 1, 1940.
18. Ibid. 2:219, 1939.
19. Handbook of Nutrition. Published by the Am. Med. Ass. Chicago, Ill., 1943.
20. Hawley, E. E. and Carden, G.: The Art and Science of Nutrition. The C. V. Mosby Co., St. Louis, 1944.
21. Nutritional Charts. Prepared by the Res. Dept. of H. J. Heinz Co., Pittsburgh, Pa. Ninth Edition.
22. Cited by Bigwood, E. J., Guiding Principles for Studies on the Nutrition of Populations. League of Nations Health Org., Geneva, 1939. p. 105.
23. Ibid. p. 107.
24. Gutierrez, M. and Santos, F. O.: Phil. J. of Science, 66:397, 1938, No. 4.
25. Concepcion, I.: The Univ. Alumnus, 3:124, 1928.
26. McLester: Nutrition & Diet in Health & Disease. W. B. Saunders & Co., Philadelphia, 1927.
27. Miller, C. D. et al., Hawaii Agric. Exp. Sta. Bull. No. 98, 1946.
28. Wu, H.: Chinese Social and Political Science Review, 11:1, 1927.
29. Potgieter, M., J. Am. Dietetic Ass. 16:898, 1940.
30. Jao, S. et al: Read before the Conference on Medical Sciences Dec. 20-22, 1943, Manila.
31. Bauer, et al: J. Exp. Med. 49:145, 1929.
32. Sherman, H. C. & Hawley, E.: Cited by Rose. The Foundation of Nutrition, The Macmillan Co., New York. 1928.
33. McCance & Widdowson, E. M.: Biochem. J. 29:2694, 1935.
34. Widdowson, E. M. & McCance, R. A.: J. Hyg. 36:13, 1936.
35. Sherman, H. C. et al: J. Biol. Chem. 107:133, 1934.
36. Sherman, H. C.: The Red Cross Courier 4:7, 1925.
37. Williams, R. R.: J. Am. Ass. 110:727, 1938.
38. Cowgill, G. R.: The Vitamin B Requirement of Man. New Haven and London, 1934.
39. Macy, I. G. and Williams, H. H.: Hidden Hunger. Published by the Jaques Cattell Press. Lancaster, Penn., 1945.
40. Sydenstricker, et al: J. A. M. A. 114:2437, 1940.
41. Libro & Navarro: Paper read before the Conference on Medical Sciences, Dec. 20-22, 1943. Manila.
42. Widenbauer, F.: Cited by Stilbeling & Phippard. Loc. cit.
43. Kirk: Bull. of the N. R. C. No. 110 Washington, D. C.
44. Hegsted et al: J. of Lab. Clinical Med. 31:261, 1946.

TETRACHLORETHYLENE TREATMENT OF ANKYLOSTOMIASIS¹

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INTRODUCTION

For decades, carbon tetrachloride has been used in the mass treatment of hookworm disease in the Philippines. The superiority of this anthelmintic was established by C. Manalang¹ and others, but its toxicity can not be completely ignored. B. Caro² has reported some cases of poisoning from carbon tetrachloride in our country.

In 1925 M. C. Hall and Shillinger³ discovered tetrachlorethylene to be as effective and safe as carbon tetrachloride. Since then Soper⁴, Kendrick⁵, D. Manson⁶, Lambert⁷, Hare and Dutta⁸, and Faust⁹, have confirmed the observations of the discoverers. Lambert, who had given tetrachlorethylene to more than 46,000 cases without a death or untoward effect, considers it as the most satisfactory anthelmintic for ankylostomiasis. In order to verify these observations abroad, since 1938, tetrachlorethylene has been selected as the treatment for hookworm infestation in the senior author's medical service of the San Juan de Dios Hospital.

PHYSICAL AND CHEMICAL PROPERTIES

Tetrachlorethylene is an unsaturated aliphatic chlorohydro-carbon with the formula C_2Cl_4 . Its specific gravity is 1.6, boiling point 121°C. It is very insoluble in water (1:10,000 or less). Exposure to light causes deterioration of tetrachlorethylene, liberating phosgene¹⁰, a reaction which is easily prevented by keeping away the drug from air in a well stoppered amber colored bottle.

PHARMACOLOGY AND TOXICOLOGY

In general, the action of tetrachlorethylene is very similar to that of carbon tetrachloride. Lamson, Robbins and Ward¹¹ observed that tetrachlorethylene is very slightly absorbed when given orally. By inhalation the drug is easily absorbed and produces general anesthesia, without causing any pathological change. Unlike carbon tetrachloride, tetrachlorethylene does not produce any symptom or demonstrable pathological change in dogs, when given orally in the therapeutic dose, whether alone, with alcohol or in conditions of high or low calcium balance.

Practically, tetrachlorethylene has the same contraindications as carbon tetrachlo-

¹ Read at the 39th Annual Meeting, of the P. M. A. held May 10, 1946.

* Deceased.

ride; namely, *alcoholism, liver diseases, toxic condition, and other substances which facilitate the undue absorption of the drug.*

METHOD

At about 7:00 A.M. the patient *without taking his breakfast* is given 3-4 capsules, each containing 16 minims of tetrachlorethylene. *No change of dosage is made because of age or weight.* The capsules used are marketed by Parke-Davis & Co. under the trade mark "NEMA". The anthelmintic is immediately followed by a saline cathartic (15-30 gm. of magnesium sulphate or a dose of *Liquor Magnesii Citratis*). *No special dietetic precaution is taken either before or after the treatment.* The stools are examined several days after a treatment; and, if found positive for ankylostoma ova, another dose is given. If the stools are found negative, the examination is repeated after a dose of a cathartic and the concentration method is resorted to. The evaluation of the anthelmintic effect is not based, *solely on the repeated absence of ova in the feces, but also on the improvement of the clinical symptoms.*

RESULTS

Of 32 cases treated, 29 (90.6%) were rendered symptom-free; and their stools were negative for ankylostoma ova; 3 cases (9.4) were not cured. In the group that was made negative, 19 patients (65%) received only a single treatment; 9 cases (31%), two courses; 1 patient (4%), three courses. Of the 3 cases which were not cured, 1 left the hospital before the treatment could be repeated; 1 case received three courses; and the other, four courses.

Practically *no untoward effects* were noted. Only 2 patients complained of dizziness and slight *exhilaration* which subsided readily without any treatment. The drug has been administered *even to patients suffering from hepatic disease.* Two patients had parasitic cirrhosis of the liver due to schistosomiasis; 1 patient had malarial splenomegaly; 1 patient had catarrhal jaundice. The age of the patients ranged from 14 to 50.

COMMENT

There are various methods employed in the *assessment of the efficiency of an anthelmintic.* Chopra¹² and others compare the *proportion of the estimated total worm load with the results obtained from some standard anthelmintic.* This method is considered unsatisfactory by Hare and Dutta, who prefer to determine the *percentage of infested subjects that are rendered worm-free by one dose of the drug under test.* We adhere in principle to the latter method, despite some of its objectionable features, such as the difficulty of *ascertaining whether a person is worm-free.* We believe that *the mere absence of the worm or its ova in the stools is not a conclusive evidence of its eradication in the host.* *Pari passu,* the improvement of the clinical symptoms alone cannot be taken as a proof of absence of the parasites. Hence, the criteria we used in appraising the value of the anthelmintic were the *subsidence of the clinical phenomena plus the negative stools.* Undoubtedly, the efficacy test employed by C. Manalang¹³ is more satisfactory and conclusive. This Filipino investigator, following the same method used in dogs by M. C. Hall and others, compares

the number of worms removed by the anthelmintic with the number of worms recovered post-mortem.

Dizziness is a usual observation in carbon tetrachloride; whereas, with tetrachlorethylene, we observed it only in 6% of the cases. The infrequency of dizziness in tetrachlorethylene may be ascribed to the fact that it is poorly absorbed by the gastro-intestinal tract. In our method, the absorption is further impeded by the immediate administration of a cathartic. Sensation of warmth in the stomach and vomiting are not uncommon after carbon tetrachloride treatment; none of our patients complained of these symptoms, probably because tetrachlorethylene does not irritate the gastric mucosa.

Hepatic diseases constitute one of the serious contraindications to the use of carbon tetrachloride; but our hepatic patients tolerated tetrachlorethylene well. This tolerance is probably due to the non-absorption of the drug and partly to the fact that tetrachlorethylene does not produce pathological changes in the viscera even after absorption.

CONCLUSION

Although it may be reasonably inferred from our meager experience that tetrachlorethylene is a safe and efficacious anthelmintic, we do not hold that its effectiveness should not be further investigated.

REFERENCES

1. Manalang, C. "Ankylostomiasis. Comparative efficiency of Carbon Tetrachloride, Chenopodium, and Thymol in the Treatment of Hookworm Infection" Jour. Trop. Med. & Hygiene. 29:101, 1926.
2. Caro, B. "Hookworm in Bulacan" Monthly Bull. of Phil. Health Service. 3:305, 1923.
3. Hall, M. C. & Shillinger, J. E. "Tetrachlorethylene, a new Anthelmintic" Amer. J. of Trop. Med. 5:229, 1925.
4. Soper, F. L. "Tetrachlorethylene in the Treatment of Hookworm Disease" Amer. J. of Trop. Med. 6:451, 1926.
5. Kendrick, J. F. "The Treatment of Hookworm Disease with Tetrachlorethylene" Amer. J. of Trop. Med. 9:483, 1929.
6. Manson, D. N. "Comparative Record of Anthelmintic Treatment with Tetrachlorethylene and Oil of Chenopodium" Indian Med. Gazette. 69:500, 1934.
7. Lambert, S. M. "Hookworm Disease in the South Pacific" J. A. M. A. 100:247, 1932.
8. Hare, K. P. & Dutta, S. C. "The Comparative Value of Oil of Chenopodium and Tetrachlorethylene as Anthelmintic for Use in Mass Treatment" Indian Med. Gazette. 74:198, 1939.
9. Faust, E. C. "The Chemotherapy of Intestinal Parasite" J. A. M. A. 117:1331, 1941.
10. Gunewardene, S. R. "Decomposition of Tetrachlorethylene" J. Ceylon Branch of British Med. Ass. 37:4, 1940.
11. Lamson, P. D., Robbins, B. H. and Ward, C. B. "The Pharmacology and Toxicology of Tetrachlorethylene" Amer. Jour. of Hygiene. 9:430, 1929.
12. Chopra, Cited by Hare and Dutta.—*Ibid.*
13. Manalang, C. "Critical Tests of Hookworm Remedies on Man" Amer. J. of Trop. Med. 7:57, 1927.

SOME NEWER KNOWLEDGE IN PARASITOLOGY: A REVIEW¹

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INTRODUCTION

One of the unfortunate results of the spread of the war to the Pacific following the attack on Pearl Harbor and the consequent rupture of communications was the literal isolation of the Philippines from the rest of the scientific world. It became no longer possible for us to get in touch with the progress in the different branches of science going on in other countries. The various scientific journals and periodicals that we had always enjoyed could no longer reach us. We had to be patient while the "black out" lasted until the war was over and the "all clear" signal sounded.

But this lack of scientific literature was not the only factor that impaired the progress of research in this country during the three years of Japanese occupation. With the dislocation of almost all activities during that chaotic period, scientific investigation and research had perforce practically to cease, not only due to lack of facilities, but due to the fear that the Japanese might utilize our men and institutions in furthering their war efforts. What was worse, instead of bringing books, journals, and other references from their country, the Japanese took away many of our own references, especially those on tropical diseases. And to top it all, during the Battle of Manila, they burned and wiped out our scientific libraries south of the Pasig River—the Scientific Library of the Bureau of Science, the College of Medicine and Institute of Hygiene library, and the Main Library of the University of the Philippines. Except for the scattered individual libraries of the more fortunate members of the medical profession that were saved, nothing has been left. The hope of being able to resume our pre-war research activities once liberated has, therefore, been shattered. And we have had to start all over again almost from nothing.

On the other hand, the race among the scientists of the belligerent nations during those three years was in full swing under the stimulus of global conflict. The secret army of the United States top scientists, working on assigned jobs and coordinated by the Office of Scientific Research and Development, speeded up productive research. After perfecting radar, radio explosives, new missiles, and all sorts of new war weapons, these scientists worked day and night until they produced the atomic bomb that brought a sudden stop to World War II and victory to the Allied nations.

Hand in hand with these advances in weapons of war, came astounding progress in war medicine—most outstanding of which was the discovery of the wonder drug,

¹ Read at the 39th annual convention of the Philippine Medical Association held in Manila on May 7-11, 1946.

penicillin and the famous blood plasma. A vast wealth of knowledge kept on piling in other fields including parasitology and tropical medicine. Most of these advances were the product of extensive field observations in the different theaters of operations and investigations in the various laboratories in the United States under the Office of Scientific Research and Development.

With the abundant literature on these more recent advances which poured in with the Army of Liberation, we got an opportunity to catch up on what we had missed during those dark years of Japanese occupation. Through the generosity of many medical officers of some Army and Naval medical units, many scientific journals have been donated to the College of Medicine; and these now form the nucleus of its scientific library.

From these sources and aided by our observations after liberation in the various Army and civilian hospitals and laboratories, we are now endeavoring to review the new knowledge in our chosen field of parasitology. This review does not pretend to be exhaustive. It is only hoped to serve as a springboard, so to speak, for further studies and researches.

MATERIALS REVIEWED

For purposes of presentation, we shall discuss in this paper newer concepts and recent findings on (1) malaria, (2) schistosomiasis japonica, (3) filariasis, (4) amoebiasis, and (5) other parasitic diseases. Lengthy discussions of highly controversial points that are not yet definitely settled, especially on malaria, have purposely been omitted. At most, prevailing views on these points are merely mentioned.

MALARIA

The subject of malaria is probably the most widely covered and most extensively studied of all parasitic diseases. This is due to its importance in connection with the campaigns in the Southwest Pacific, where this disease is very prevalent. For the protection and security of the fighting men in these theaters, it was necessary to wage an equally strong war against malaria.

Atabrine in the treatment of malaria.—One of the striking changes notable at once as a result of the experience gained in the fight against malaria during this war was the increased dosage of atabrine in the treatment of clinical malaria and the definite preference of this drug to quinine in both suppressive and clinical treatments of the disease. Whereas before the war, it was difficult to state which drug should be preferred in the treatment of malaria, extensive experience gained by the American forces during the war has definitely favored atabrine, especially after the capture of Java by the enemy in 1942 which supplies 10/11 of the world's quinine. The reason is obvious, for there was no other known synthetic substitute for quinine except atabrine. It must be kept in mind, however, that there are some patients who are allergic to atabrine. These patients had better be treated with quinine. And *vice versa*.

The pre-war treatment of malaria with atabrine consisted only of one tablet (0.10 Gm) three times a day for 5 days or a total of 15 tablets. We learn for the first time of the marked increase in the dosage of atabrine for the clinical treatment of malaria in Army hospitals. This is in accordance with the War Department Tech-

nical Bulletin No. 72 dated July 10, 1944, which recommends 2 tablets (0.10 Gm. each) of atabrine with 1.0 Gm. Sodium bicarbonate in 200 to 300 cc of water as the first or initial dose in uncomplicated cases, to be repeated every 6 hours for 5 doses and later followed by 1 tablet (0.10 Gm.) three times a day after meals for 6 days — or a total of 28 tablets in 8 days. A revised bulletin (1945) has further increased this dosage — starting with 4 tablets (0.10 Gm. each) three times a day for the first day, 3 tablets three times a day on the second day, 2 tablets three times a day on the 3rd day, and then 1 tablet three times a day for 5 days more — or a total of 42 tablets for one course of treatment.

Napier (1945), in his analysis of the present status of anti-malarial drugs, explains that the dosage of atabrine has to be increased, because ordinary doses of one tablet three times a day do not attain the maximum plasma level of the drug for several days, 90% of the peak level being attained only at the end of the 4th day. Hence, the need for "loading" during the early hours of treatment. This was the direct result of the extensive study about the pharmacology of the drug, which was made possible by the accurate method of estimating the amount of atabrine in the body fluids and tissues and resulting in the better knowledge regarding the plasma level of the drug at different periods of the treatment.

Craig and Faust (1945), however, state that experience has demonstrated that a high atabrine blood level is not necessarily a guarantee of protection against clinical malaria, and a low blood level does not always mean lack of protection.

As to the suppressive treatment of malaria with atabrine, War Department Technical Bulletin No. 65, dated July 3, 1944, has recommended one tablet (0.10 Gm. each) everyday to be taken at the morning or evening meal even as early as 1 or 2 weeks before exposure and to be continued at least 4 weeks beyond the time of the last exposure. During actual combat, this bulletin recommends 2 tablets a day for short periods, or 5 tablets every 3 or 4 days in those troops who have been adjusted to ordinary small doses; and, if still in highly malarious combat area, 1 tablet (0.10 Gm. each) three times a day for 3 or 5 days followed by 1 tablet a day. It has been found that only a small percentage of individuals are allergic to atabrine. With this dosage, 1/2 of the maximum plasma level is reached after the first week; and it increases 50% per week, until maximum level is reached at the end of the 4th week of suppressive treatment. The decrease or descent of the level goes on after cessation of the drug at the same rate. On this basis, the Army requires their men returning home to the United States to continue taking atabrine for 4 weeks longer after last exposure. By this method, experience has shown complete cure in a considerable proportion of cases of suppressed infection including malignant tertian infection.

Penicillin and tyrothricin against malaria.—In this review of anti-malarial drugs, we have not overlooked such anti-biotics as the wonder drug penicillin and tyrothricin.

The remarkable therapeutic quality of penicillin, its potency in combating a wide variety of infections, has also led many authors to try it against malaria. Experiments conducted in the Boston Psychopathic Hospital by Hindle, Rose, Trevett, and Prout in 1944 on several neurosyphilitics wherein penicillin was administered in cases of inoculation or induced malaria, however, showed ineffectiveness of the drug

against the disease. Graphic charts have demonstrated the inability of penicillin to bring down the fever or the parasite count of active inoculation malaria. Likewise, it failed to prevent or postpone the development of fever or parasitemia when administered before or at the time of exposure to inoculation malaria. The authors claim that by analogy to known anti-malarial drugs, penicillin, having no therapeutic value on inoculation *Plasmodium vivax* malaria, would likewise be ineffective against other types of malaria, whether artificially induced or naturally acquired. The dosage and frequency of administration employed by the authors were such as to preclude the possibility of the drug's ineffectiveness as a result of inadequate dosage. Fifty thousand Oxford units were used at each intra-muscular injection every 2 hours, day and night, or a total of 3,000,000 units in 5 days in each case under study.

Tyrothricin is another anti-biotic; produced, not from fungi, but from bacteria (*Bacillus brevis*). It has recently aroused keen medical interest as a result of the glowing accounts of its therapeutic efficacy against pyogenic infections by local application. As a possible new anti-malarial drug, some authors attempted to find out its value against malaria. Results of the experiments conducted by Taliaferro, Coulston, and Silverman (1944) of the University of Chicago seem to indicate a markedly curative effect upon intravenous administration to chickens suffering from mosquito-borne *Plasmodium gallinaceum* infection, both in combination with quinine and when used alone. They claim that the 2 drugs possess an additive and possibly a synergistic anti-malarial action; but the curative effect of tyrothricin is accomplished only when given via the intravenous route, in contrast to quinine, since the dried powder has been found to be ineffective when given by mouth. While this experiment may tend to prove the value of this antibiotic against chicken malaria, it remains for future studies to prove its worth against the human malarial species.

Paludrine and SN 7618 as new anti-malarial drugs.—With quinine as our old time remedy against malaria, with atabrine as a better synthetic drug now more favored than quinine, and with more anti-biotics being discovered and tried on malaria, it seems evident from more recent announcements, although only in lay papers, that the search for better and more effective anti-malarial drugs has not yet ended. Paludrine was lauded by Lord Leverhulme at the annual meeting of the Liverpool School of Tropical Medicine on or about November 8, 1945, as a new and revolutionary anti-malaria drug; while SN 7618 was announced in Washington, D. C., by the Board for Coordination of Malaria Studies about the first week of January, 1946, to be even more powerful than quinine and atabrine. Paludrine was claimed to be a much simpler compound than any other anti-malarial drug hitherto known, but much more powerful than any other known specific. SN 7618, on the other hand, is believed to stop an attack of malaria in 24 hours even with a single dose of the drug. We are, therefore, watching with great interest the reports in medical journals regarding the truth of those new wonder drugs against malaria.

Newer sulfonamides on exo-erythrocytic stages of bird malaria.—Now that the exo-erythrocytic schizogonic theory of malarial parasite is steadily gaining acceptance, especially with the demonstration in man of the stages of its development and their possible relationship to the causation of malarial relapse, a problem has appeared

to challenge our attention, and attempts to discover drugs that would be able to reach these forms should be in order.

A review of the literature shows that not much headway has been accomplished so far, although Coggeshall, Porter, and Laird, in 1944, demonstrated that the exo-erythrocytic stages of *Plasmodium gallinaceum* in chicken can be eradicated with the use of the newer sulfonamides like sulfadiazine and sulfapyrazine.

In other feeding experiments on canaries previously infected with *Plasmodium elongatum*, Thompson (1945), using a mass diet containing sulfadiazine in one group and sulfapyrazine in the other, claimed to have found neither detectable damage to the exo-erythrocytic parasites nor a suppressive action on patent infections. However, he claimed that both drugs were able to cause a suppressive action when treatment was begun prior to or near the time of inoculation. This discrepancy in the activities of these drugs against different species of parasites and different species of hosts is due, according to Thompson, to the fact that different types of cells are infected by exo-erythrocytic stages of each species. Hence, the action of such drugs against the exo-erythrocytic stages of human malaria needs separate investigation.

Immunity and immunization in malaria.—It is now an accepted fact that there is certain small degree of immunity conferred on the host by malarial infection. Natural immunity is, however, a rare phenomenon, according to Craig and Faust, (1945) although most malariologists have observed many individuals residing continuously in hyper-endemic areas who have never developed clinical symptoms of the disease.

The exact mechanism of the production of immune bodies is still controversial. Several theories have been advanced, and the consensus of opinion seems to be that the phagocytic theory alone cannot sufficiently explain the immunity in malarial infection. It is most probably both phagocytosis of the plasmodia by macrophages, mononuclears, and polymorphonuclears and the action of anti-plasmodial and anti-toxic substances elaborated in the blood that produce the so-called immunity. Many malariologists, however, have made this distinction: (1) *true immunity* which implies refractoriness to re-inoculation of a homologous strain of the parasite after complete disappearance of the parasites in the peripheral blood from a previous infection, and (2) *premunition* which indicates failure to develop symptoms after reinfection with a homologous strain as a result of previous latent or chronic infection during which living parasites persist in the host.

There is, so far, no active immunization known in human malaria. Jacobs (1943), however, has attempted to develop a vaccine which he has found to protect ducklings from *Plasmodium lophurae*. He claims to have noticed the appearance of a certain amount of protective immunity with the use of plasmodial residues in normal saline solution given subcutaneously. This immunity, according to him, is further heightened if the plasmodial residues are mixed with *Staphylococcus toxoid* prior to injection. The role of the toxoid is considered to be entirely hypothetical, and its use is based only on observations by other authors that such substances when mixed with non-antigenic material serve to make the latter antigenic. Although this experiment is only preliminary in nature, it opens a new field. In fact, it is one of the earliest attempts in active immunization in malaria, and it may pave

the way for elaboration of a vaccine against human malaria. This will, of course, depend much on the successful cultivation of the human plasmodia, in order to produce enough quantities of plasmodial residues that could subsequently be treated accordingly to enhance its immunizing property.

Exo-erythrocytic cycle in human malaria.—We take exception to our previous statement that we would not present at length controversial points on some aspects of the newer knowledge we have reviewed, in order to include the subject of exo-erythrocytic cycle in human malaria. Though not yet universally accepted, this may have a profound effect on our fundamental knowledge of the life cycle of the malarial parasite and provide new explanations for latency and relapse in malaria, besides opening new vistas for research in chemotherapy against this disease.

Even before the outbreak of the war, we had already heard of exo-erythrocytic schizogony in connection with bird malaria. Further development in this field of research has extended the concept to human malaria. Our common knowledge of the life cycle of the malarial parasite, as universally accepted, which involves the schizogonic cycle in the red blood cell, the occurrence of gametogony in it and the sporogonic cycle in the insect vector leaves a gap — a gap which occurs in the life cycle of the parasite immediately upon the entrance of the infective sporozoite into the animal body until the first ring forms or until the young trophozoites are found in the red blood cell, usually about the seventh to the twelfth day after infection. This gap in the cycle during the so-called pre-patent period has heretofore been a question mark, and the acceptance of the exo-erythrocytic cycle of the avian, saurian, simian, and human plasmodia would fill in this gap very nicely once adequate and conclusive proofs are fully established in all these forms of malaria.

Since the exo-erythrocytic cycle is not yet universally accepted as applied to human plasmodia, and because the original papers about this work are not available to us, we shall quote Craig and Faust, who have reviewed and evaluated the papers of various authors on the subject and presented their conclusion in the latest edition (1945) of *Clinical Parasitology*, page 207, under the topic "Exo-erythrocytic cycle of development in man":

"Similar forms (exo-erythrocytic forms in bird malaria) of plasmodia have been observed in man by Raffaele (1937) and Casini (1939) in infections with *P. vivax* and *P. falciparum*, while Brug (1940) found exo-erythrocytic forms of *P. vivax* in a patient who died of this form of malaria. Kikuth and Mudrow (1941) claim to have observed forms in human infections with *P. vivax*, *P. malariae*, and *P. falciparum* in both the blood and bone-marrow. The junior author has learned on excellent authority that C. M. Africa in the Philippines has demonstrated exo-erythrocytic schizogony in the endothelial lining of the blood-vessels of human beings who died of cerebral malaria, thus adding confirmation to the earlier observations."

From the foregoing quotation, it seems most likely that the exo-erythrocytic cycle is also undergone by the human malarial parasite like the plasmodia of lower forms. Just what stages the sporozoite go through until it appears in the erythrocyte in the case of human malaria is still unknown. The work of Huff and Coulston (1944), however, with *Plasmodium gallinaceum* has definitely shown that sporozoites

enter the cells of the lympho-macrophage system within 30 minutes after inoculation into the skin of the chicken. These cells serve as host for all stages of the first generation of parasites called "cryptozoites", which grow to large schizonts and segmenters. This generation requires 36-48 hours to develop. The second generation of cryptozoites, which is also called the first generation of "metacryptozoites", is found likewise in the lymphoid-macrophage system and endothelial cells, undergoing segmentation in 70-84 hours. The first erythrocytic parasite is found 75 hours after massive intravenous inoculation of sporozoites. Thus, in this species of malarial parasites, although the results clearly indicate that blood parasitism must be preceded by tissue parasitism, it is considered unwarranted to assume, as yet, that same may be said about all human plasmodia. Furthermore, the kinds of tissue parasitism might possibly be very different in the various species of malarial parasites.

DDT in malaria control.—Many of us have already heard or read about and even used, DDT, the latest and most effective weapon against mosquitoes and other insects. It is considered the wonder insecticide of World War II. Its effectiveness in the malaria-ridden theaters of war in the Pacific Islands and its part in preventing the outbreak of typhus epidemic in Italy and similar places have catapulted it to fame. First synthesized in 1874, it was only in 1939 that its use as an insecticide was reported by a Swiss firm, J. R. Giegy. In the United States its value as an insecticide was further studied in 1942, as a part of the efforts of the Bureau of Entomology and Plant Quarantine to develop effective methods of controlling adult mosquitoes and to find a substitute for pyrethrum, supplies of which had become scarce.

DDT (dichloro-diphenyl-trichloroethane) was originally tested against lice; and, because it showed promising results, tests were made against mosquitoes. A white crystalline organic compound, DDT has been found useful when applied in dusts, solutions, emulsions, or suspensions, possessing the unusual feature of high toxicity and stability. A 5% petroleum oil solution is the most widely used preparation either for pouring or spraying.

Laboratory studies have shown that, as a colloidal solution from acetone or in aqueous emulsion, one part of DDT to 100 million parts of water, could completely wipe out *A. quadrimaculatus* larvae in 48 hours. As a comparison, phenothiazine in 1 part to 1 million parts of water produces only 79% mortality after 48 hours. DDT is 25 times as effective against *A. quadrimaculatus* larvae as paris green. It also has the advantage of being highly stable when applied to water surface. It remains effective for several weeks when undisturbed, and its non-wetting properties make it relatively resistant to rains. Finally, DDT has been found effective, not only against the larvae of the Anopheline mosquitoes, but also against various Culicine species. Studies by Maple (1945) indicate that larvicidal action is caused partly by its inherent toxicity to mosquito larvae and partly by its effect on the nervous system which keeps the larvae from remaining afloat. Its inability to coordinate movements results in suffocation at very low dosages.

In the control of adult mosquitoes, DDT has been found effective in liquified gas aerosols, especially when combined with pyrethrum. For this reason, its use in atomized sprays offers exceptional promise. The addition of DDT to pyrethrum aerosol also markedly increases its effectiveness against houseflies. Although aerosols have been considered primarily for use inside buildings or other confined spaces,

aerosol bombs released in heavily wooded areas have also effectively reduced the mosquito population.

The greatest promise for DDT in malaria control is through its use as a residual spray. Experiments have shown a very high and consistent reduction in the number of mosquitos in the treated buildings—the mortality rate reaching as high as 92% in 24 hours. It has also been found that treatment of resting places alone greatly reduce the larvae population. By providing continuous insect icidal action against adult mosquitos, therefore, residual spray may kill them before they have fed on subjects; or, if they have fed on disease carriers, before they become infective.

DDT sprays applied from aircraft has proven very effective both against larvae and against adult mosquitos. This method is especially useful, not only in connection with military operations, but also in mosquito control over large areas.

SCHISTOSOMIASIS JAPONICA

Laboratory method of diagnosis.—As a consequence of the landing of the American forces in Leyte in October 1944, schistosomiasis japonica appeared in the limelight; and no account about the Leyte campaign is considered complete without mention of the fight against it. This disease is highly endemic, especially in the eastern part of Leyte; but despite measures taken against it, many GI's fell victim to the disease, probably as an inevitable result of the difficulties arising during intense actual combat.

So far, there is no one single reliable method of confirming the diagnosis during the early stage; that is, during the incubation period of the disease. According to Craig and Faust (1945), high eosinophilia, a positive complement-fixation test, together with a clinical history and evidence that the patient has lived in the endemic area, strongly suggest schistosomiasis during the incubation period before eggs are recoverable in the feces. Apparently, the complement-fixation or the skin test is not very specific and is only relatively helpful. No evaluation of this test has been found so far in the literature reviewed. It has perhaps not been adequately studied, due to the difficulty of obtaining materials for the preparation of the antigen. This field, therefore, remains open for future study among early cases in endemic areas.

During the period of egg deposition and extrusion when there are dysenteric symptoms, the diagnosis can easily be established by demonstrating the eggs in the feces. During the later stage, however, the eggs become more scarce in the stool, probably because of the thick fibrosis of the intestinal wall imprisoning eggs laid by the living adults. Under this condition, it is very necessary that more than one examination be made. Different techniques may be used — starting with direct fecal smear and followed by the sedimentation method, occasionally the zinc sulphate centrifugal flotation loop method, egg-hatching technique of Faust and Meleny, and lastly the acid-ether technique.

Of these, only the acid-ether technique is considered new to us, and it is described here in detail as follows: One gram of the fecal matter (about the size of a pea) is thoroughly emulsified in 5 cc of 40% HCl in a small vial. The material is filtered through two layers of moist gauze stretched over the top of a 50 mm. funnel into a 15 cc centrifuge tube. An equal quantity of ether is added

and the tube is stoppered with a gloved finger and shaken thoroughly. It is then centrifuged for 1 minute at 1,500 r.p.m. On removal from the centrifuge, the debris floating at the acid-ether junction is loosened by ringing with a clean applicator, and the acid and ether layers are rapidly poured off and discarded. The same applicator is then used to stir the sediment in the few drops of the fluid remaining. Finally the sediment is transferred to a slide and examined under a cover slip.

Only preliminary studies have been made of this technique as applied to *Schistosoma japonicum* eggs, and no mention is made of its advantages over other technics. It is, therefore, worth giving it a fair trial.

Chlorination of infected waters to kill Schistosoma japonicum cercariae. — It must be admitted that the problem of controlling and preventing schistosomiasis japonica is so complicated that it will require a long-range and systematic program to include extensive chemotherapeusis, general anti-molluscan campaign, and education of the masses especially in proper sewage disposal and in the knowledge regarding transmission of the disease. Although this program will surely bear permanent results, it will take a long time; and temporary measures whereby infection can be minimized by killing the infective stage of the parasite may prove of great help for short emergency periods.

For this reason, the National Institute of Health has made studies on the *Schistosoma japonicum* cercariae from snails imported from the Philippines, and concentration of chlorine required to destroy these infective organisms was determined. The results of these studies proved to be comparable to those obtained with cercariae of *Schistosoma mansoni*. Application of sufficient chlorine to water used for bathing, drinking, and for laundry purposes — one part per million (1 P.P.M.) residual chlorine — affords protection from those cercariae in 30 minutes. It is, however, doubtful whether it would be practical to treat all infected streams, irrigation ditches, and canals with chlorine at this dosage.

It may be mentioned here that, in connection with the anti-molluscan campaign in the control of schistosomiasis mansoni, Jansen (1944) found that slake lime in 0.1 to 4% strength is effective in killing 90% of the *Australorbis glabratus*. This might be tried also against *Blanfordia quadrasi* in the Philippines, although these snails, due to their amphibious habits, may escape action of this chemical as it has survived copper sulphate solution of 1:80,000 to 100,000.

FILARIASIS

The Pacific theater of operations, because of the assignments of troops to garrison some Pacific Islands where filariasis bancrofti is endemic, afforded an excellent opportunity for the study of its early diagnosis and clinical manifestations. Previously, such large scale studies of the disease was limited to people who had been living in the endemic areas almost since birth and whose early manifestations had, therefore, escaped notice, so that only the chronic long-standing cases could be studied.

A report by B. G. King, (1944) covering 268 cases that developed in American troops who had lived an average of 4 months on a Pacific Island where filariasis is endemic, makes the following interesting observations:

The onset of the first clinical symptoms (incubation period) took place 8 to 16 months (when period of observation ended) after arrival in the island, the earliest onset recorded being after 3 months. The mode of onset of symptoms in most patients were largely local, consisting of pain, swelling or redness of an arm or leg, or pain and swelling in the scrotal region. In fact, the striking feature was the lack of severe constitutional symptoms.

The most common lesion observed was the inflammation of the spermatic cord, epididymis, testicle, or scrotum, or a combined involvement of more than one of the intra-scrotal structures (71.6% of cases). Some degree of lymph node enlargement was observed in 85.1%, with enlargement of the epitrochlear glands as the most common—53.3%. Lymphangitis was observed in 51.1% of cases with a predominance of arm lesions and with the unusual feature of its spread peripherally. The early syndrome observed, therefore, falls into three groups: 1. Lymphangitis of the extremity or trunk; 2. acute inflammation of the scrotum and its contents; and 3. lymph node enlargement.

Fever was present in only 19.7% of the cases. The relapsing nature of the symptoms were verified. Lymphangitis occurred as many as six times in one individual, and many cases had recurrences of either subcutaneous or genital inflammation one or more times. In general, acute local symptoms were of short duration, rarely persisting over ten days and often disappearing within two or three days.

In the cases reported, the following signs and symptoms were *not* found: arthritis, hip joint abscess, varicose groin or axillary glands, lymph scrotum, chyluria, elephantiasis, or chylous hydrocoele, chylous diarrhea, or chylous ascites.

The laboratory findings include a normal white cell count in 66% of the cases, significant leucocytosis in the rest, which is present even without fever. Eosinophilia was present in approximately 66% of cases.

What is probably the most important finding in these cases is that no microfilaria were found in all the patients even after repeated search; and, with blood smears taken at different times of the day and night, even in those cases where biopsy showed adult female filaria in lymphatic tissue. The significance of these findings in the interpretation of blood smear for microfilaria in early cases is obvious.

According to the author, diagnosis can be made clinically by a history of prolonged stay in endemic area, finding of lymphangitis of extremity, trunk, or genitalia coming on after an interval of at least 3 months, combined with adenopathy and eosinophilia. He stressed the importance of a positive intradermal reaction in most of these cases. The intradermal reaction mentioned, utilized an antigen of *Dirofilaria immitis* prepared as described by Fairley (1931). This is positive in 90.8% of filariasis patients and in 10.5% of a comparable number of controlled individuals. These findings on the control are the so-called false positives.

According to Craig and Faust, however, in their book *Clinical Parasitology* (1945), Bozicevich and Hutter (1944) have demonstrated conclusively that *Dirofilaria immitis* antigen (physiological saline extractions) in a dilution of 1:8,000 provides essentially a 100% positive intradermal reaction in suspected cases of *W. bancrofti* during the biological incubation period and gives no false positives. Michael (1944), who used

a similar diagnostic technic, had a positive reaction in 87.3% of 307 known cases of the disease.

AMOEBIASIS

Laboratory diagnosis of amoebiasis.—There is not much that is fundamentally new about the laboratory diagnosis of amoebiasis. We have included, however, the suggestion offered by Felsenfeld and Young (1945) about an improved method of examination whereby fresh fecal smears are fixed at the bedside from specimens just passed by the patient or from those taken by proctoscopic examination. After fixation these smears are sent to the laboratory for permanent staining. This method insures fresh material for examination and allows permanent filing of the stained slides for checking at any time. It requires, however, the fullest cooperation and team work between the ward and the laboratory.

Status of the complement-fixation test in amoebiasis.—The complement fixation test reported as early as 1929 by Craig has been more extensively tried in recent years; and evidences point to its being of some value, not only in diagnosis, but also as a control of the efficiency of treatment for the reaction becomes negative after elimination of the infection. Craig and Faust (1945) state that this reaction is highly specific and gives a positive result in about 90% of the infection, but that it requires much experience and training. And, because a standardized, stable, and potent antigen has not yet been perfected, it is not yet available for routine laboratory diagnosis. They advise that it be not employed except as a check when it is possible for the stools to be examined for amoeba.

Use of di-iodoquine in amoebiasis.—Di-iodoquine appeared on the market just before the war; and it was tried extensively by the Army, whose experience seem to have favored its use. It is, however, considered only as a supplementary treatment, especially in acute cases. In fact, it is often used at the same time with emetine. It is also used in chronic cases. Di-iodoquine or didoquin (5,7 di-iodo-8-hydroxy-quinoline) contains 63.9% iodine. It comes in tablet form (0.21 Gm. each). Ten to 12, tablets a day are given for 20 days in acute cases, unless toxic symptoms develop. For symptomless carriers, the dose is 6 to 9 tablets a day for 20 days. Like other anti-amebic drugs, however, didoquin has also failed in resistant cases. Due to the high percentage of iodine and its non-toxicity, Craig considers didoquin as a very excellent anti-amebic remedy. In efficiency it may equal chiniofon, which is Craig's first choice among all iodine and arsenical compounds used in the treatment of chronic amoebiasis.

Faust, D'Antoni, and Sawitz (1941) consider the efficacy of didoquin in the treatment of protozoan infections to be approximately 85 to 95%. They believe that its use is warranted when two full courses of chiniofon have failed. They admit, however, that it is a relatively new product and has not been thoroughly investigated.

It is rather hard to make an evaluation of the relative efficiency of various anti-amebic drugs, because of the lack of uniformity in the results obtained by different investigators, who generally prefer one drug to others for no other reason than personal equation. It would, therefore, be wise to postpone judgment regarding the true value of didoquin in acute and chronic cases of amoebiasis as well as in symptomless carriers until after years of observations and follow-up have been made by different unbiased investigators, especially of those cases resistant to various treatments.

Vaginitis due to Entamoeba histolytica.—May (1942) describes a case of inflammation of the vulva, with leucorrhoea of about 3 weeks duration in an Armenian woman 24 years of age. Microscopical examination of fresh coverslip preparation showed active *Entamoeba histolytica*. There was no history of amoebic dysentery and the origin of the infection could not be determined. The patient, however, recovered under treatment with emetine injections. Although this is the first report as far as we can ascertain of a vaginitis of an amoebic nature, it sounds reasonable to consider *Entamoeba histolytica* as a possible etiological factor in some inflammatory condition of this region.

OTHER PARASITIC DISEASES

Dientamoeba fragilis and its possible pathogenicity.—Although the question of pathogenicity of *Dientamoeba fragilis* is still in dispute, we are including in this report an additional evidence submitted by Knoll and Howell (1945) favoring the view that it can be pathogenic. They point out that no particular effort was made to study this organism because of the common belief that *Entamoeba histolytica* is the only pathogenic amoeba. This study confirms other reports by some protozoologists who have made previous observations that clinical symptoms like those in amoebiasis are due to *Dientamoeba fragilis*. This assertion is based chiefly on the fact that no other etiology could be demonstrated except the constant finding of this organism on repeated stool examination.

In the cases reported, the authors were able to cure the patients by treatment with carbarsone, causing a rapid disappearance of the symptoms and of the amoebae from the stools. Attempts to produce infection of *Dientamoeba fragilis* in kittens with organisms isolated from human beings, both given per orem and per rectum, failed to give positive results; but these authors believe that these negative findings don't entirely invalidate the possible pathogenicity of this organism for man. It may simply not have had the proper host or it may not have been in the infective stage of its life cycle.

Giardiasis with unusual radiologic findings.—The report in the literature by Welch (1944) on certain definite radiologic changes, functional and anatomical in the duodenum, duodenal cap, pylorus, and pre-pyloric area of the stomach in several cases of giardiasis is included here to awaken interest in the *Giardia lamblia* as a possible confusing factor in the diagnosis of doubtful peptic ulcer cases. Welch, in 2 reports (13 cases of Giardiasis in the first and 16 cases in the second), claims to have visualized such alterations in the peptic area in those cases, accompanied in majority of instances by an eosinophilia, ranging from 4-13%. He further claims that these radiological findings usually disappeared after atabrine treatment. It is, therefore, important to have these points in mind for the purpose of arriving at a correct diagnosis.

Toxoplasmosis as a disease in man.—The last topic that we have reviewed for this paper deals with a disease which has been recently recognized as a distinct entity in man. The specific etiology of this disease has been assigned to Genus *Toxoplasma* and placed, although tentatively, under Protozoa. The exact nature of this organism is not yet fully known; but the disease caused in man has been

described by several workers and reported both in adults and children, with more cases in the latter than in the former.

The first *Toxoplasma* was discovered by Nicolle and Manceaux (1909) in the *gondi* (*Ctenodactylus gundi*), a small rodent from North Africa, and was described and named as *Toxoplasma gondii*. The same kind of organism has been found in a large number of animal species, mostly mammals and birds in almost all parts of the world. Separate species have been found in different hosts—*T. ratti* in rats, *T. cuniculi* in rabbits, *T. canis* in dogs, *T. cavaiae* in guinea pigs, etc. It is doubtful, however if these could be considered distinct species, for they can hardly be distinguished from one another by morphology. Moreover, they can be transmitted, not only to the same hosts, but also to different hosts. Mammalian toxoplasma, in fact, can easily be transmitted to birds. That is why, for some time, it was confused with the non-pigmented exo-erythrocytic stages of the plasmodia, both organisms being present in mononuclears and endothelial cells. At present, the consensus of opinion is that they are distinct and separate from each other.

The morphology of *T. gondii* is the most thoroughly studied. Since the other species found in other animals and in man are very similar to it, this species will be described here briefly. It appears as an elongate organism, frequently crescentic, and measure from 4 to 6 micra in length by 2 to 6 micra in breadth. It has pointed ends, one more rounded than the other. With Giemsa or Wright stain, the cytoplasm stains blue; and the chromatin of the nucleus which appears nearer one end, red. No flagellate forms have been observed. In human infection, the organisms are found in smears of exudates in mononuclears and endothelial cells. They appear in granulomatous tissues either singly or in masses, extracellularly or intracellularly. The method of reproduction is by longitudinal division, although some workers claim that schizogony also occurs.

The method of transmission and portal of entry are still unknown. Experimental transmission of the disease however has been successfully made by feeding and by intranasal, intravenous, intracutaneous, intraperitoneal, subcutaneous, and intracerebral inoculation. In lower animals, the organism causes definite pathologic findings characterized by exudates in the pleural, peritoneal, and pericardial cavities; congestion and hepatization of the lungs; slight enlargement of the liver and spleen; and the presence of parasites in exudates, blood, and tissues of the other organs.

Human toxoplasmosis has been reported by several workers. According to W. W. Zuelzer (1944), Wolf, Cowen, and Paige (1939) were the first to prove the occurrence of toxoplasmosis in man, when they identified the parasites in a fatal case of encephalo-myelitis on the basis of the morphologic characteristics, successful transmission to animals, and demonstration of immunity against the human strain in rabbits and mice immune to a known strain of toxoplasma. Additional reports of other workers such as Pinkerton and Weinman (1940) and Steiner and Kaump (1944) have increased the total to 12 pathologically verified cases of infantile toxoplasmosis, with complete autopsy in 9 of these cases. Zuelzer (1944) added 3 more. This makes a total of 15 reported cases of infantile toxoplasmosis.

In 1941, Pinkerton and Henderson of St. Louis reported 2 fatal cases of toxoplasmosis in adults. The clinical feature was essentially that of an acute febrile exanthematic diseases with atypical pulmonary involvement remarkably similar to

Rocky Mountain spotted fever. Intracellular toxoplasma organisms were found in both cases. Pinkerton and Henderson admitted, however, that the first proved case of adult toxoplasmosis was that one reported by Pinkerton and Weinman (1940). W. J. Tomlison (1945) recorded a chronic case of human toxoplasmosis in the Canal Zone. The case, according to him, was asymptomatic, the patient dying from sickle cell anemia.

For convenience, Zuelzer (1944) describes four main types of human toxoplasmosis: (1) a congenital type, with onset in utero, manifesting itself chiefly as fetal or neonatal encephalomyelitis, often fatal within the first few weeks of life but sometimes asymptomatic until later infancy or early childhood, when the presence of residual lesions becomes apparent; (2) an acquired encephalitic type in older children; (3) an acute febrile type resembling typhus or spotted fever, occurring in adults; and (4) a latent infection recognized only by the presence of neutralizing anti-bodies in serum, occurring in adults (and probably also in children).

There seems to be much difficulty in making either a clinical or a laboratory diagnosis, due to the protean manifestation of the disease and to the difficulty of demonstrating and recognizing the organism. In fact, most of the cases reported in the literature were diagnosed only after a long period of study of stained materials obtained from the patient; and the laboratory report often came after the patient had died or recovered. We attribute, however, the rarity of this disease to another factor—namely, the general unawareness of it.

Toxoplasmosis should be suspected in cases manifesting meningo-encephalitic symptoms or in cases simulating atypical pneumonitis. In these two instances, recovery of the organism may be possible by cerebro-spinal fluid examination after sedimentation or by sputum examination, respectively. Blood examination for toxoplasma is almost useless, as the organisms occur in a very small number in the blood.

Exudates suspected to contain the organisms may be inoculated intraperitoneally into susceptible animals like the guinea-pig or mice for confirmatory tests. Care must be taken, however, to use animals that have been repeatedly examined and found free from natural infection; better still, laboratory-bred animals should be used. Cultivation in chick embryo has been tried and may be useful, but this has not yet been used extensively. Sabin and Olitsky (1937) and Sabin (1939) developed a protection test in rabbits, and they claim that it is very promising. Warren and Sabin (1942) devised a complement-fixation test, using a suspension of infected rabbit brain as antigen; and they found it to be of some value, although some persons, who observed protective anti-bodies in their blood serum, found it negative by this test.

Post-mortem diagnosis can be arrived at by the microscopic examination of stained materials either from tiny granulomatous and necrotic foci in organs like the brain, myocardium, lymph node, or from suspected exudates. With the further perfection of these laboratory procedures, or with the adoption of new and better ones, together with the general awareness of the existence of this disease, it is hoped that human toxoplasmosis can be more easily recognized in the future.

Further study of this disease may even throw more light on the etiology of some primary atypical pneumonias, of which we have no sufficient knowledge at present.

S U M M A R Y

A review of the literature on Parasitology, which we did not have the opportunity to get acquainted with during the Japanese occupation but which was made accessible to us after liberation, has disclosed a number of interesting facts and additional knowledge which are here presented for whatever benefit may be derived by the medical practitioners, medical students, and scientific investigators in this country. It includes new knowledge on: (1) the treatment of clinical malaria with bigger doses of atabrine—28 to 42 tablets of 0.10 Gm. for one course of 8 days instead of only 15 tablets in 5 days for adults; (2) the definite preference of the American forces for atabrine over quinine in both suppressive and clinical treatments of malaria; (3) the negative action of the wonder drug penicillin against induced or inoculation malaria in man; (4) the good effect of tyrothricin, another antibiotic, in experimental *Plasmodium gallinaceum* infection in chickens when given intravenously; (5) the most recently announced drugs such as Paludrine and SN 7618 against malaria; (6) the use of newer sulfonamides like sulfadiazine and sulfapyrazine in the eradication of the exo-erythrocytic stages of *Plasmodium gallinaceum* and the failure of the same drug against the same stages of *Plasmodium elongatum*; (7) the present status of immunity in malaria and its mechanism of production supporting the combined operation of the phagocytic and humoral theories; (8) the more recent attempt at active immunization of ducklings from *Plasmodium lophurae* infection with the use of plasmodial residues mixed with Staphylococcus toxoid, which may pave the way for the elaboration of a vaccine against human malaria; (9) the exo-erythrocytic cycle in malaria, with special emphasis on its present status as applied to the human species; (10) the use of DDT, the wonder insecticide of World War II, in malaria control; (11) the new acid-ether technic of fecal examination for *Schistosoma japonicum* eggs; (12) the effectiveness of one part per million (1 P. P. M.) residual chlorine against *Schistosoma japonicum* cercariae when applied to infected waters; (13) the early manifestations of filariasis bancrofti and the use of the intra-dermal test for early diagnosis; (14) the improvement suggested in enhancing the positive diagnosis of amoebiasis by fixation of fecal smears at the bedside and the permanent staining afterwards of the same in the laboratory; (15) the present status of complement-fixation test in the diagnosis of amoebiasis; (16) the use of diodoquin as an anti-amoebic drug; (17) a report of vaginitis of amoebic etiology; (18) the possible pathogenicity of *Dientamoeba fragilis*; (19) some unusual radiological findings in giardiasis which may prove confusing at times in the diagnosis of peptic ulcer; and (20) the previously unrecognized disease entity of man called human toxoplasmosis.

REFERENCES

1. Craig, C. F. and E. C. Faust: Clinical Parasitology, Lea and Febiger, Philadelphia, 1945.
2. Faust, E. C., J. S. D'Antoni, and W. Sawitz: The Diagnosis and Treatment of Common Parasitic Infections. (A compilation) From the Dept. of Trop. Med., Tulane Univ. School of Medicine, New Orleans, La. 1941.

3. Felsenfeld, O. and V. M. Young: An Improved Method of the Examination of Intestinal Protozoa. Amer. Jour. Clin. Path., Tech. Sect., 9: 47-49, May 1945.
4. Hindle, J. A., A. S. Rose, L. D. Trevett, and C. Prout: The Effect of Penicillin on Inoculation Malaria. New Eng. Jour. Med., 232: 133-136, Feb. 1, 1945.
5. Huff, C. G. and F. Coulston: The Development of *Plasmodium gallinaceum* from Sporozoite to Erythrocytic Trophozoite. Jour. Infect. Dis. 75: 231-249, Nov.-Dec., 1944.
6. Jacobs, H. R.: Immunization against Malaria. Increased Protection by Vaccination of Ducklings with Saline Insoluble Residues of *Plasmodium lophurae* Mixed with a Bacterial Toxin. Amer. Jour. Trop. Med. 23: 597-606, Nov., 1943.
7. King, B. G.: Early Filariasis: Diagnosis and Clinical Findings. A Report of 268 Cases in American Troops. Amer. Jour. Trop. Med., 24: 285-298, Sept., 1944.
8. Knipling, E. F.: The Development and Use of DDT for the Control of Mosquitoes. Jour. National Malaria Society, 4: 77-92, June, 1945.
9. Knoll, E. W. and K. M. Howell: Studies on *Dientamoeba fragilis*: Its Incidence and Possible Pathogenicity. Amer. Journal Clin. path. 15: 178-183, May, 1945.
10. Napier, L. E.: The Present Status of Antimalarial Drugs. New Eng. Jour. Med. 233: 39-43, July, 12, 1945.
11. Pinkerton, H., and R. G. Henderson: Adult Toxoplasmosis. Jour. Amer. Med. Assn. 116: 807, 1941.
12. Pinkerton, H. and D. Weinman: Toxoplasma Infection in Man. Arch. Path. 30: 374, 1940.
13. Sabin, A. B.: Toxoplasmic Encephalitis in Children. Jour. Amer. Med. Assn. 16: 801-807, March, 1941.
14. Sabin, A. B. and P. K. Olitsky: Toxoplasma and Obligate Intracellular Parasitism, Science, 85: 336, April 2, 1937.
15. Taliaferro, L. G., F. Coulston, and M. Silverman: The Antimalarial Activity of Tyrothricin against *Plasmodium gallinaceum*. Jour. Infect. Dis., 75: 179-211, Nov.-Dec., 1944.
16. Thompson, P. E.: The Effects of Sulfonamide Diets Upon Infections of *Plasmodium elongatum* in Canaries. Jour. Infect. Dis. 76: 15-19, Jan.-Feb., 1945.
17. Tomlison, W. J.: Human Chronic Toxoplasmosis. Amer. Jour. Clin. Path. 15: 123-127, April, 1945.
18. Warren, J. and A. B. Sabin: The Complement-fixation Reaction in Toxoplasmosis. Proc. Soc. Expt. Biol. and Med. 51: 11-14, 1943.
19. Welch, P. B.: Giardiasis with Unusual Findings. Gastro-enterology. 3: 98-102, Aug., 1944.
20. Wolf, A., D. Gowen, and B. H. Paige: Human Toxoplasmosis: Occurrence in Infants as an Encephalomyelitis: Verification by Transmission of Animals. Science, 89: 226, 1939.
21. Zuelzer, W. W.: Infantile Toxoplasmosis. Arch. Path. 38: 1-19, July, 1944.
22. Drug Suppressive Treatment of Malaria. From War Dept. Tech. Bull. No. 65, July 3, 1944.
23. Treatment of Clinical Malarial Parasitemia. From War Dept. Tech. Bull. No. 72, July 10, 1944.
24. SN 7618 for Malaria. Newsweek, p. 30-31, Jan. 14, 1946.
25. Paludrine, a New Anti-malarial Drug. Daily Pacifican, 1: No. 148, p. 4, Nov. 8, 1945.
26. Laboratory Diagnosis of Infection with *Schistosoma japonicum*. Bull. U. S. Army Med. Dept. No. 89: 73-75, June, 1945.
27. Chlorination of Water to Destroy *Schistosoma japonicum* Cercariae. Bull. U. S. Army Med. Dept. No. 89: 13, June, 1945.
28. "DDT" from a Report of the Committee on Medical Research, Office of Scientific Research and Development: Trop. Dis. Rep. No. 19, 1st revision. May 30, 1944.

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Editorial

THE NEED OF A NEW EDITION OF THE PHILIPPINES MEDICAL DIRECTORY

No one in the medical profession can gainsay the importance of the *Philippines Medical Directory*. For, among other things, it contains an alphabetical list of physicians and their addresses, another list by provinces also alphabetically arranged, a list of hospitals — both government and private — with their bed capacities and ownership, a list of medical socie-

ties and other health agencies, and several other items of information likely to be of interest to health workers.

The first edition of the *Directory* was compiled by the Secretary-Treasurer of the Association and published in 1928. Upon the recommendation of this official, the House of Delegates approved the publication of a new edition every two years. The sixth edition, the last to be published, came out in 1939.

Since the liberation, the Philippine Medical Association has received several requests for copies of the *Directory* from sources both here and abroad. But these requests have not been satisfied, for the simple reason that lack of reliable data — not to mention the confusion caused by the war — has prevented the Association from bringing the *Directory* up to date.

For one thing, since the publication of the sixth edition in 1939, many new physicians have been allowed to practice by the Board of Medical Examiners; and, during the occupation and the liberation, many physicians died or were killed. For another, there have been continuous changes of addresses, of which the Association has not been able to keep track. The war and the consequent dislocation of the normal pursuits of life only served to make this confusion worse confounded.

It is high time, however, that we exert all possible efforts to put out, as soon as possible, the latest edition of the Philippines Medical Directory — both to enable us to get in touch with one another and to let our colleagues abroad know of our activities in this little corner of earth. This undertaking, of course, would require, not only a great deal of expense, but also the combined efforts of all the members of the Association. It is suggested that every member get in touch with the headquarters of the association and provide all pertinent information as to his or her address and activities. The Board of Medical Examiners and the Bureau of Health have already given assurance of their help and cooperation. The rest is in our hands. — A.S.F.

Miscellaneous

ABSTRACTS FROM CURRENT LITERATURE

ABSTRACTORS.

Isabelo Concepcion, M. D.

Walfrido de Leon, M. D.

Felisa Nicolas-Fernando, M. D.

Carmelo Reyes, M. D.

The Subcutaneous Use of Heparin in Anticoagulation Therapy, by James, A. Evans, M.D. and Raymond J. Boller, M.D., *J.A.M.A.*, 131:879 (July 13th) 1946.

For the past three and a half years postoperative venous thrombosis has been treated at the Lahey Clinic largely by anticoagulation therapy. During this period of three years and ten months, only 133 cases of postoperative venous thrombosis occurred in approximately 20,000 major surgical procedures. During the same period approximately 40 patients died in whom the diagnosis had been sudden pulmonary embolism without warning, a group which offers our greatest present challenge and which will be the subject of further study.

Dicumarol takes from two to five days to show its characteristic effect on clotting, namely a drop in the prothrombin percentage. Loewe and Rosenblatt have described the preparation and use of heparin in Pitkin's menstruum administered subcutaneously. The authors summarized briefly their observations as follows: "Heparin/Pitkin is a gelatinous-based material that contains the heparin sodium salt with or without vasoconstrictors (epinephrine and ephedrine). It is available in 1 cc. and 2 cc. ampules containing 100 mg. and 200 mg. respectively and is administered subcutaneously.

"Patients of less than 150 pounds were given 200 mg.; those weighing more than 150 pounds, 300 gm. Nine patients received heparin/Pitkin without vasoconstrictors. In this group, the onset of effect, when measured on time, took place within one and a half hours. Nine patients were given part of their dose of heparin/Pitkin with vasoconstrictors. The onset of effect and maximal effects were similar to those obtained with the first group of patients.

"A case was encountered which demonstrated that heparin/Pitkin exerts an adequate anticoagulation effect in the latent period before Dicumarol is effective. The possible side effects from heparin/Pitkin are trivial."—F.N.F.

Relationship Between Anxiety Neurosis and Duodenal Ulcer, With Special Reference to X-Ray Findings and Treatment, by T. J. Cox and B. O. Junnila, *California and Western Medicine*, 64:240 (April) 1946.

Cox and Junnila treated 161 patients for duodenal ulcer. Eighty-three patients had a diagnosis of ulcer established by X-ray before entry. Seventy-eight of the group entered the hospital with a diagnosis of anxiety neurosis or combat or operational fatigue and were found to have concurrent duodenal ulcers. All the patients of both groups had a history of an acute anxiety state, plus epigastric complaints for usually several weeks or months preceding the time that the organic lesion could be demonstrated radiologically. These patients received treatment consisting essentially of bland diet and psychotherapy aimed at the cause of the anxiety. Rapid favorable response was observed.

It is suggested that an anxiety neurosis is a major factor in the etiology of duodenal ulcers. Stimuli due to emotional tension add strain transmitted through the hypothalamus and autonomic nervous system cause chronic pylorospasm, hyperacidity, and duodenal irritab-

ility. This undoubtedly lowers the resistance of the duodenal mucosa, with resulting erosion. It is realized that not all patients with an anxiety neurosis develop ulcers, many instead acquiring other somatic complaints, such as effort syndrome and hypertension.—F.N.F.

Postprandial Variation in Hemoglobin, by A. W. Branwood, *Edinburgh Medical Journal*, 53:125 (March) 1946.

According to Brandwood, the percentage of hemoglobin in the peripheral blood is not constant throughout the day. There is usually a five to ten per cent postprandial fall in hemoglobin. This fall is in proportion to the size of the meal—the larger the meal the greater the fall. There is also, presumably, a fall in the number of erythrocytes at this time. It is obvious that, when periodic hemoglobin values are required, they should not be estimated within three hours following a large meal or at the same time of day.

This decrease in hemoglobin is probably due to a redistribution of the cells from the periphery to the abdominal viscera, possibly also to slight changes in blood volume; and it can be prevented by exercise or by the administration of epinephrine. According to the author, cases of hypertension and hyperthyroidism do not share this postprandial decrease in hemoglobin.—F.N.F.

Toxicity of Streptomycin, (Editorial) *J.A.M.A.*, 131:745-746; June 29, 1946.

Hettig and his associates at the University of Michigan studied the possible toxic effect of parenteral administration of streptomycin on the renal, hepatic, and hematologic functions of man.

Nine patients ranging in age from 15 to 61 years served as their subjects. A total dosage of streptomycin of 1.8 million units was administered in divided doses over a period of 48 hours, or a dosage as high as 72 million units, over a period of fifty-six days. Renal and hepatic function tests were made just prior to administering the first dose and within ninety-six hours of the final dose. Two additional patients, both desperately ill of tuberculous meningitis, received 3 to 7 million units of streptomycin before death. Postmortem microscopic examination did not reveal any liver or kidney lesions that could be attributed to the action of streptomycin. Impairment of hepatic or renal function was not detected by the series of bromosulfate, cephalin cholesterol flocculation and urea clearance studies. Neither was a significant decrease of the hemoglobin or erythrocyte levels encountered in any case.

Although evidence of serious organic toxicity was not obtained, undesirable reactions were recorded with certain patients. These reactions were of two main varieties. The first (2 patients) was characterized by facial flushing, headache, and fall in blood pressure—a clinical picture resembling the classic response of histamine. The second reaction (4 patients) consisted of fever, accompanied at times with myalgias and arthralgias. Skin eruptions appeared in 2 patients. Three patients showed slight local reactions consisting of pain and tenderness at the site of intramuscular or subcutaneous injection. The local reactions were alleviated by the local application of heat. Most of the undesirable reactions were apparently related to the amount of impurities retained in the preparations, fewer symptoms being recorded with the later, more refined preparations of the antibiotic.

The purified streptomycin is apparently of such low toxicity as to be freely usable in human clinical medicine.—F.N.F.