

SOME RECORDS CONCERNING TRAUMATISM AND MALARIA IN CENTRAL AMERICA¹

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VISITORS to the Isthmus of Panama during the construction period of the Panama Canal frequently sought information concerning the leading causes of death and most of them were greatly surprised to learn that yellow fever, plague, and beriberi, were not among the leading causes of illness and death. It was less difficult to control these diseases than others, but the tragic part they played in the tropics before this period is still uppermost in the minds of many visitors.

I have arranged, in Table I, the various diseases commonly inquired about by visitors. These represent the causes of death determined at autopsy at Ancon, Canal Zone, from 1904 to 1919.

For comparison with this record I have arranged Table II to show the leading causes of death in the order of their incidence.

Autopsies were performed on 70 to 90 per cent of the bodies that passed through the Board of Health Laboratory each month so that I believe these autopsy records furnish a fair index of the relative incidence of the causes of death in the Canal Zone. It is thus shown that the chief causes of death were due to pneumonia and tuberculosis. Malaria is the only disease, commonly listed as a tropical disease, that ranks

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TABLE I.—CAUSES OF DEATH REVEALED
BY AUTOPSY

Year	N. A.	Y. F.	B.	A.	T.	I. D. C.	P.	S. P.	S. B.	C.	F.
1904	6
1905	269	12	7	7	2	..	1	..	..	..	..
1906	509	1	5	4	..	..	..	..	..	..	..
1907	496	..	1	2	1	..	..	..	..	..	..
1908	361	..	1	2	3	..	..	..	..	..	..
1909	295	2	..	..	..	..	1	..	..	..	..
1910	451	2	..	..	..	..	..	..	..	..	..
1911	508	..	1	1	1	..	1	..	..	..	..
1912	425	1	..	..	1	4	..	..	..	..	..
1913	460	..	..	2	3	1	..	..	..	..	..
1914	375	..	1	..	4	2	..	..	..	..	..
1915	328	3	1	..	2	1	..	..	..	..	..
1916	323	..	2	..	..	3	..	1	..	..	..
1917	330	..	7	..	1	2	..	..	..	..	..
1918	253	..	..	2	..	3	..	..	..	..	..
1919	324	2	..	..	..	3	..	..	..	..	..
Totals	5,713	23	26	20	18	19	3	1	..	..	..

N. A., Number of autopsies; Y. F., yellow fever; B., beriberi; A., ankylostomiasis; T., tetanus; I. D. C., infectious diseases of children; P., plague; S. P., small pox; S. B., snake bite; C., cholera; F., filariasis.

TABLE II.—CAUSES OF DEATH REVEALED
BY AUTOPSY

Year	N. A.	P.	T.	Trau.	M. & H. F.	N.
1904	6	1	1	..	..	..
1905	269	60	9	3	27	8
1906	509	191	22	24	50	23
1907	496	156	35	40	27	27
1908	361	59	63	26	46	25
1909	295	55	37	32	26	31
1910	451	50	91	30	52	37
1911	508	83	102	38	41	36
1912	425	53	79	37	23	27
1913	460	47	89	34	21	26
1914	375	36	78	38	6	12
1915	328	28	56	20	14	12
1916	323	25	81	17	8	20
1917	330	24	51	21	5	23
1918	253	38	68	6	6	12
1919	324	22	55	15	3	14
Totals	5,713	928	917	381	355	333

N. A., number autopsies; P., pneumonia; T., tuberculosis; Trau., traumatism; M. and H. F., malaria and hæmoglobinuria; N., nephritis-chronic fever.

TABLE III.—FIELD SURVEYS FOR MALARIA

Region	1928	1927	1926
Tela (Honduras)	18.6	24.3	23.9
Truxillo (Honduras)	35.0	33.5	21.0
Chiriqui (Panama)	35.6	26.7	....
Costa Rica	19.0	34.9	29.5
Columbia	15.2	21.3	21.0
Guatemala	27.6	....	40.1
Almirante (Panama)	22.9	21.9	27.1
Preston (Cuba) . . . . .	....	24.2	34.8
Banes (Cuba) . . . . .	....	24.3	35.9

among the first five causes of death in this series of cases, yet the combined forms of external violence exceeded the death rate of malaria. It is not surprising that the construction period of the Panama Canal should reveal many deaths due to violence. The fall in the number of deaths due to traumatism has not been as great during the period of operation and maintenance as one might think, because the automobile, the airplane, and shop machinery are taking their toll.

Mortality rates do not necessarily reflect the incidence of diseases of the greatest economic importance as can be shown in the case of malaria.

It has been my duty in recent years to conduct rather extensive surveys for malaria in the labor camps of a large agricultural organization operating along the mainland and in certain islands of the Caribbean Sea. These surveys were made on all the men, women, and children found in the labor camps at the time of my visit. A microscopic examination of a blood film from each individual was done. The method used was the thick-drop-film stained and laked in an aqueous solution of Gimsa's stain. Table III shows the results of these surveys.

The island of Haiti shows about the same rate as the mainland, while Jamaica, in its worst foci, usually showed a rate of about 15 per cent. These races of high tolerance for the disease seldom seek treatment in a dispensary or hospital yet the

TABLE IV.—HÆMOGLOBIN ESTIMATIONS
ON 5,501 PEOPLE

Individuals with hæmoglobin index of	Per cent
30 per cent.....	0.23
40 per cent.....	0.67
50 per cent.....	2.9
60 per cent.....	18.3
70 per cent.....	41.3
80 per cent.....	29.1
90 per cent.....	7.4
100 per cent.....	0.09

"labor efficiency" is lowered to an important degree. Table IV shows the hæmoglobin estimations conducted. (Tallquist scale employed.)

This shows that a large proportion of the laborers scale from 60 to 70 per cent in their hæmoglobin estimations. Their ability to do manual labor in a consecutive daily manner is pretty well reflected by these same figures. Malaria, malnutrition, and intestinal parasites all participate in producing these results, but in my opinion malaria outranks the other factors.

It is difficult to impress, even on the local medical profession, how much malaria remains untreated in the field and how many individuals there are who can carry the infection with little or no acute symptoms. In order to get some figures on this subject, I checked the field surveys in three large coastal plain areas against the hospital cases under treatment on the days I collected blood films from the field. There were 126 labor camps in these three areas which had under treatment for malaria in the hospitals just 26 cases. My survey covered only 24 of these labor camps. There were 555 individuals found positive for the parasites of malaria in these 24 camps and 137 of them were as heavily parasitized as the 26 hospital cases on the day of their admission for treatment. The individual resistance is great in these races with a high tolerance to the disease, but

malaria takes its toll to some extent in each infected individual. The course of traumatic surgery and obstetrics is frequently modified by an associated attack of malaria. The doctor must constantly keep in mind this disease as well as postoperative infection since many of our postoperative temperature rises are due to malaria. In spite of the tragic part played in our past history by epidemics of yellow fever and plague, I feel sure that malaria has been and is at present the great economic problem of the tropical coastal plains. The successful development of permanent industries in the coastal plains of our tropics must be paralleled with constant efforts in the control of malaria.

REFERENCES

1. CLARK, H. C. A chart representing the incidence of the more common causes of death on the Panama Canal as found at autopsy during the years 1904 to 1919, inclusive. M. R. 61596. Panama Canal Press, 1920.
2. Idem. Ann. Rep. M. Dept., United Fruit Company, 1928, p. 103, 246, 75.