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CANCER IN INDIA, PERSIA AND CEYLON

BY

FREDERICK L. HOFFMAN

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A review of the present cancer situation in India involves no end of practical difficulties. At the same time it is doubtful if anywhere in the world are there better opportunities for a comprehensive study of cancer variations in their relation to geographical and ethnological ^{differences} ~~difficulties~~ of the local populations in the Indian Empire, including Ceylon, and possibly, for purpose of comparison or contrast, British Malaya and the Dutch East Indies. India has an area of about 1,800,000 square miles and had a population in 1931 of 353,000,000, increasing at an annual rate of 1.1% or 10.6% for the decade preceding 1931, amounting actually to about 34,000,000. The country is divided into 27 chief political divisions, of which 11 are provinces and the remainder native states or agencies under the British Government. The latter have a collective population of about 63,000,000, regarding which, naturally, the information on all medical and related matters is much less extended and trustworthy. There are seventeen cities with more than 200,000 population, of which Calcutta is most important with a population of almost 1,500,000, followed by Bombay with a little more than 1,000,000 population and Madras with 647,000.

1. POPULATION

The decennial census reports of India furnish a wealth of useful basic information, particularly with reference to the age distribution of the people, as well as its racial distribution. The urban population is about 11% of the total and gradually increasing. Of the whole population of India, about 66% are engaged in agriculture while a trifle less than 10% are employed in industry. A population study of the people of India is immensely complicated, but increased

For additional observations and statistics on cancer in India, see my Cancer Mortality Throughout the World, Newark, 1915, pages 122, 137, 138, 177.

in interest, by the prevailing caste system which is deeply rooted in peculiar customs and usages. The same conclusion applies to religious variations, of which the Hindus are the most important with 63% of the total, followed by the Muslims with 22%, Buddhists 3.6%, Tribal Religions 2.4%, Christians 1.8% and others 1.8% also.

The total number of Europeans in India is 168,000, and of Anglo-Indians 138,000. Considered by ages it appears that of the total population in 1931, 17,000,000 males and 16,000,000 females were fifty years of age and over. When these figures are applied to the corresponding totals of males and females, or respectively 182,000,000 males and 171,000,000 females, the respective percentages of ages fifty and over are 9.4% for males and 9.4% for females, or 9.4% for both sexes combined. These compare with the corresponding percentages for the United States in 1930 as follows: males 17.3%, females 16.9%, both sexes combined 17.2%.

2. AGE DISTRIBUTION

As far back as 1913, Mr. T. G. Ackland, Actuary, published a Report on the Estimated Age-distribution of the Indian Population as Recorded at the Census of 1911 and the Rates of Mortality Deduced from a Comparison of the Census Returns for 1901 and 1911. The report brings out the extreme difficulties of accurate population analyses by age while at the same time presents intrinsic evidence of value for certain areas and large cities. On the basis of the 1911 data, it was shown by Mr. Ackland that the expectation of life in the Bengal Presidency, for example, was only 21.47 years, that of the Bombay Presidency 22.52 years, and that of the Madras Presidency 25.92 years. It was much better in Burma or 31.48 years, but for all India it was only 25.59 years which compares with an expectation of 46.04 years in England and Wales in 1911.

3. GENERAL DEATH RATE

Since cancer is peculiarly a disease of advanced adult life, the abnormal age distribution unquestionably bears directly upon the question of the relative frequency of the disease. The local death rates throughout India are considerably above the normal for European countries and a few illustrations will suffice for the present purpose. For the Province of Madras in 1929, the death rate was 25.3 per 1,000; that of the Province of Bombay, 30.63; Bengal 23.5; United Provinces 24.3; Punjab 28.8; Burma 22.1. The total for all India in 1931 was 35.95 per 1,000.

4. INDIAN LIFE RISKS

Indian vital statistics on the whole are far from satisfactory, the causes of death being generally vague and limited to a few outstanding epidemic or transmissible diseases, chiefly cholera, smallpox, plague, malaria, dysentery, and diseases of the respiratory organs including pulmonary tuberculosis. Probably the most trustworthy returns on causes of death in India are presented in the annual statements of the Oriental Life Insurance Company of Bombay, which, of course, are limited to the superior type of Indians, or the well-to-do classes. The medical director of the organization, Dr. J.J. Cursetji has published some interesting observations on disease liability of Indians in a guide to Medical Life Assurance, which may be consulted to advantage. He calls attention to the varying constitutional and physical condition and vitality of different races in India, concluding that:

"Hence, taken as a whole, the Indians are considered by several insurance companies somewhat inferior risks than Europeans, with some exceptions. For example the Parsees, who are the direct descendants of the ancient Persians and who were obliged to flee before the Arab invasion of Persia thirteen hundred years ago from the colder and more bracing climate of their motherland to the warmer regions of India, have yet so adapted themselves to

European conditions of life and living and health surroundings, that they have been able to show a considerably lower mortality and a somewhat higher birth-rate than most Indian races, and at times a lower mortality than even that of the European residents of India. Mohammedans again, as a race generally speaking, have a somewhat better build and more enduring stamina than their Hindu brethren as a whole, excepting the Sikhs, the Punjabs and the Malayans. So also the races resident on the northern borders of the North-Western Frontier Provinces, as well as the Punjabis, Sikhs, Sindhis and Bengalis are generally speaking superior in physique and stamina to some of the races of the Central, Southern and Western provinces of India. But there are of course many notable exceptions to the rule. For instance, the Telugus, Tamils, Singhalese and Burmans, although residents of further south, show many men of good physique and good family longevity. The residents of the Federated States of Malaya, and Kuala Lumpur in particular, have been found to be exceptionally good lives from an insurance point of view, and almost invariably show an excellent physique and a good personal and family history. In the Bombay Presidency, the Marathas from the Western Ghats are found to be a strong and wiry race owing to their rural life, hardy habits, residence in a dry and open atmosphere, and active occupation and mode of life, though their more intellectual urban classes cannot be said to be up to that average. But the Indian Christians of Salsette and the Portuguese territories nearby, as well as the Gujeratis of Gujerat, such as the Banias and the Jains, are generally speaking of poor physique and compare very unfavorably with their Mahratha and other Deccani neighbours, though residing under almost the same climatic conditions".

The foregoing observations touch but the fringe of a wide range of question depending upon race, caste, religion, economic well being and occupation bearing directly upon the local frequency of malignant disease.

5. INDIAN MEDICAL RESEARCH

The most important question demanding prior consideration is the wide range of differences in local habits and customs particularly dietary and nutritional, which have received the attention of some outstanding scientists, but nowhere more so than in the reports and reviews issued by the Pasteur Institute of South India at Coonoor, under the direction of Col. Robert McCarrison. Unfortunately cancer has thus far not attracted the required attention, emphasis being given

to obvious nutritional disorders such as beri-beri, goitre, stone in the bladder, etc. But the excellent public health organizations in all parts of India in charge of highly qualified medical men and others, supported here and there at least by laboratories and institutes for special medical research, offer opportunities for far reaching possibilities once that a comprehensive cancer survey of India is organized. The very infrequency with which cancer is discussed in various Indian medical publications is self-evident that the disease as yet has not attracted the attention that would have been forthcoming if cancer were anywhere near as frequent in British India as in European countries. But the negative aspects of the problem, or the reason why cancer, apparently at least, should be so rare in India, are fully as worthy of consideration as the positive aspects or excessive incidence in particular localities. Thus, for example, in the annual review on the Moral and Material Progress and Condition of India which have been issued annually for at least the last sixty-five years, the subject of cancer receives no attention whatever. Nor is the subject dealt with in the annual reports of the Public Health Commissioner with the Government of India, although these publications otherwise are of the greatest instructive value. It is also comparatively rare to find a discussion of cancer and its complications in the current issues of the Indian Medical Journal, so that trustworthy discussions of the disease by authorities are practically limited to the local health reports of the several provinces and larger cities. Among the agencies which promise in the future to be of great value in connection with studies of cancer in India is first of all the Indian Research Fund Association where there is the necessary equipment for a fundamental study of malignant disease and all its variations as met with in current Indian medical practice. Furthermore there is the Public Health Institute at Calcutta, and the Medical Research Institute at Dheradum partly supported by grants from the Rockefeller Foundation.

6. CANCER IN CALCUTTA

A study of cancer in the principal public hospitals throughout India should be organized and carried on under the direction of the Inspector General of Civil Hospitals, which represent the best results in Indian medical service under the control of the British Government. Aside from the foregoing, the leading universities of India, in Bombay, Calcutta, Lucknow, Madras and Punjab could, no doubt, be induced to designate some one competent for the purpose to report upon the situation and aid in the development of better statistics and observations in the light of local experience.

The first report to which I shall draw attention is that of the Health Officer of Calcutta, Dr. T. N. Majumdar, the latest issue thus far received being for the year 1930. I will limit myself to the last three annual reports which will be sufficient for the present purpose.

Recorded Deaths from Cancer in Calcutta, India, 1928 - 1930

	<u>Deaths from All Causes</u>	<u>Death Rate per 1,000</u>	<u>Deaths from Cancer</u>	<u>PerCent of Total Mortality</u>
1928	34,119	31.6	156	0.45
1929	32,981	30.6	151	0.43
1930	<u>31,135</u>	<u>28.9</u>	<u>153</u>	<u>0.49</u>
1928-1930	98,235	30.4	460	0.47

The distribution of this totally insignificant cancer mortality considering the size of Greater Calcutta, is shown in the table below, according to religious affiliation.

Distribution of Cancer Deaths in Calcutta, India, 1928

	<u>Hindus</u>	<u>Mahomme- dans</u>	<u>Non-Asiatics & Anglo-Indians</u>	<u>Native Christians</u>	<u>Other Classes</u>	<u>Total</u>
Alimentary Canal, etc.	86	4	11	1	-	102
Female Genital Organ	39	4	-	-	1	44
Breast	8	1	1	-	-	10
Others	53	12	8	2	-	75

Distribution of Cancer Deaths in Calcutta, India, 1929

	<u>Hindus</u>	<u>Mahomme- dans</u>	<u>Non-Asiatics & Anglo-Indians</u>	<u>Native Christians</u>	<u>Other Classes</u>	<u>Total</u>
limentary Canal, etc.	14	17	6	12	-	49
emale Genital Organs	36	5	3	2	-	46
reast	6	-	-	-	-	6
thers	41	8	6	3	-	58
<u>1930</u>						
limentary Canal, etc.	60	33	2	5	1	101
emale Genital Organs	32	4	-	3	1	40
reast	8	3	-	1	-	12
thers	43	9	4	1	-	57

The classification of cancer by types is unsatisfactory and excludes some of the most important forms of cancer in India, that of cancer of the buccal cavity to which attention will later on be drawn in discussing cancer in Ceylon.

The annual reports for Calcutta give the ages at death for specific forms of Cancer and these have been as follows, differentiating males and females and types of the disease.

Cancer Deaths in Calcutta, India, 1928-30, By Age

	<u>1928</u>		<u>1929</u>		<u>1930</u>			
	<u>Under 40</u>	<u>40 - 50</u>	<u>40 - 50</u>	<u>50 - 60</u>	<u>50 - 60</u>	<u>60 & Over</u>	<u>60 & Over</u>	
	<u>M.</u>	<u>F.</u>	<u>M.</u>	<u>F.</u>	<u>M.</u>	<u>F.</u>	<u>M.</u>	<u>F.</u>
limentary Canal, etc.	2	5	11	13	23	11	21	16
emale Genital Organs		9		13		11		11
reast		2		3		3		2
thers	17	14	12	12	4	8	6	2
limentary Canal, etc.	7	4	16	16	22	8	15	11
emale Genital Organs		10		13		12		11
reast		1		1		2		2
thers	14	10	10	8	4	4	6	2
limentary Canal, etc.	8	4	9	12	10	10	33	15
emale Genital Organs				10		18		12
reast				3		6		3
thers	13	16		5	12	8	2	1

Through the courtesy of the Health Officer of Calcutta, I have been furnished with supplementary statistics for the years 1920-1929, and the death rates per 100,000 of population, apparently for cancer all forms, but if there should be omissions they will be verified in the meantime. I give the number of deaths and the rate which requires some correction on the basis of the census for 1931.

Cancer Deaths in the City of Calcutta, India, 1886-1929

Rate per 100,000

	<u>Rate</u>		<u>Deaths</u>	<u>Rate</u>		<u>Deaths</u>	<u>Rate</u>
1886-90	9.4	1920	124	13.8	1925	150	13.9
1891-95	9.7	1921	128	14.1	1926	181	16.8
1896-00	8.1	1922	134	14.8	1927	175	16.2
1901-05	10.3	1923	120	13.2	1928	156	14.5
1906-10	11.1	1924	146	13.6	1929	151	14.0

7. CANCER IN BOMBAY

For Bombay I have statistics for the three years 1929-1931 and fortunately the returns are given in more detail, although in this case as in Calcutta, the number of deaths from cancer is relatively small.

Cancer Deaths in the City of Bombay, India, 1929-1931

	<u>1929</u>	<u>1930</u>	<u>1931</u>	<u>1929- 1931</u>	<u>Per- Cent</u>
Buccal Cavity	16	14	24	54	9.6
Pharynx, oesophagus, stomach, liver and annexa	36	45	55	136	24.2
Peritoneum, intestines and rectum	21	15	19	55	9.8
Female genital organs	15	12	21	48	8.5
Breast	16	7	11	34	6.0
Skin	2	6	5	13	2.3
Other or unspecified organs	65	78	79	222	39.5
	<u>171</u>	<u>177</u>	<u>214</u>	<u>562</u>	<u>100.0</u>

For Bombay I am also able to give the deaths from all forms of cancer by castes and according to sex as follows:

Cancer Deaths in the City of Bombay, India, 1926-1931

	1926		1927		1928		1929		1930		1931	
	M	F	M	F	M	F	M	F	M	F	M	F
Jains	3	1	4	2	8	1	7	3	2	1	6	-
Brahmins	5	4	1	2	4	7	5	2	10	2	8	2
Lingayats	-	-	-	-	-	-	-	-	-	-	-	1
Bhatias	2	-	-	-	1	1	2	-	-	1	-	-
Banias	4	1	2	-	6	-	5	-	2	1	7	-
Hindus, other castes	16	12	21	11	23	22	31	18	35	17	54	15
Hindus, low caste	2	-	5	2	2	1	3	3	6	2	3	1
Mussulmans	8	8	18	9	17	3	16	9	28	3	36	11
Parsees	11	14	9	13	9	12	8	25	4	1	7	16
Jews	-	-	1	-	-	3	-	3	1	2	-	-
Indian Christians	3	4	6	12	7	3	11	7	7	8	2	3
Anglo-Indians	2	3	1	2	3	2	4	1	1	-	-	-
Europeans	9	5	1	1	-	5	8	-	-	1	-	1
Negro-Africans	-	-	-	-	-	-	-	-	-	-	-	-
Buddhists	-	1	-	-	1	-	-	-	-	-	-	-
Other & unknown castes	-	-	-	-	-	-	-	-	-	-	-	-
All Races	65	53	69	54	86	61	100	71	90	94	41	31

Through the courtesy of the Medical Officer of Health of Bombay, I have been furnished with the returns for 1919-1930, giving the number of deaths from cancer and the rates per 100,000, not corrected, however, on the basis of the census of 1931, which will be done later.

Cancer Deaths in the City of Bombay, India, 1919-1930

<u>Year</u>	<u>Deaths</u>	<u>Rate per 100,000</u>	<u>Year</u>	<u>Deaths</u>	<u>Rate per 100,000</u>
1919	85	8.7	1925	104	8.3
1920	85	8.7	1926	118	9.2
1921	87	7.4	1927	123	9.5
1922	90	7.5	1928	147	11.3
1923	87	7.1	1929	171	13.2
1924	100	8.1	1930	184	17.1

The statistics for Calcutta and Bombay are probably the best available returns for localities in India and fairly well in conformity to each other. For the year 1929 the cancer death rate for Calcutta was 14.0, and that for Bombay 13.2 per 100,000, or almost the same. These low rates are in very marked contrast to the corresponding rates for European and American states and cities which usually tend to approach 100 per 100,000 and they often go far above this figure.

It, of course, is fully realized that the accurate certification of causes of death in India is a matter of extreme difficulty in view of caste customs and habits particularly as they apply to the female population. Autopsies are seldom performed, especially upon women and no doubt the diagnosis in many cases is superficial. But these conclusions would hardly be applicable to cancer of the breast shown to be extremely rare both in Calcutta and Bombay, so rare in fact that the returns for this form of cancer are entirely of negligible importance.

8. CANCER IN MADRAS.

For the Presidency of Madras I have the annual report for 1929 in which there is a brief reference to cancer, reading as follows: "The death-rate from cancer was 0.08 per 1,000, which is about one-twelfth of the rate in western countries. It is very difficult to say how far this low rate is due to defective registration and how far to low prevalence of cancer".

The report includes a special return for fourteen municipalities(x) differentiating certain types of cancer as follows for 1929: alimentary canal 3, genito-urinary tract 5, breast 2, other organs and parts 64. The equivalent death rates for each were .003 per 1,000 for the alimentary canal, .005 for the genito-urinary tract, .002 for the breast and .07 for other organs and parts. Here again is evidence of the extreme rarity of cancer of the breast supported by other returns

(x)exclusive of the city of Madras.

for India and corresponding returns for Japan.

More conclusive are the returns for the city of Madras which are available for 1931.

Cancer Deaths in the City of Madras, India, 1931

	<u>Number</u>	<u>Percent</u>
Buccal Cavity	23	19.8
Pharynx, Liver, Stomach & Annexa	12	10.3
Intestine & Rectum	4	3.4
Female Genital Organs	28	24.1
Breast	9	7.8
Other or unspecified organs	<u>40</u>	<u>34.5</u>
TOTAL	116	100.0

Through the kindness of the Medical Officer of Health of Madras, I have obtained a table showing the annual recorded deaths from cancer for the period 1921-1930, which is highly suggestive of an improvement in local methods of treatment and diagnosis. The death rate has increased from a minimum of 6.2 per 100,000 in 1926 to a maximum of 35.0 in 1929. This is probably as near to the true cancer death rate as has yet been secured by any Indian community of which I have knowledge. In other words there are reasons for believing that the general cancer death rate in South India is higher than in Central and North India on account of the greater frequency of cancer of the buccal cavity, which in Madras constitutes 19.8% of the total deaths from cancer. This is fully confirmed by statistics for Ceylon to which I shall next draw attention.

Cancer Deaths in Madras, India, 1921-1930

<u>Year</u>	<u>Deaths</u>	<u>Rate per 100,000</u>	<u>Year</u>	<u>Deaths</u>	<u>Rate per 100,000</u>
1921	56	10.6	1926	33	6.2
1922	45	8.5	1927	77	14.4
1923	40	7.6	1928	79	14.8
1924	71	13.4	1929	188	35.0
1925	38	7.1	1930	166	30.8

9. CANCER IN COLOMBO

Among the most important cancer statistics for India and Ceylon are the returns for the latter Island which have been published for many years, particularly for the Municipality of Colombo, although they are also available for the Island as a whole. For the year 1931 the returns for Colombo show a total of 122 deaths from cancer, all forms, or 1.7% of the total mortality. These figures vary little from year to year, so I shall limit myself to the year 1931 for the present purpose giving in the table below deaths for the different races, according to organs and parts.

Cancer Deaths in the Municipality of Colombo, 1931

	<u>All Races</u>	<u>Europeans</u>	<u>Burg- hers</u>	<u>Sinha- lese</u>	<u>Tamils</u>	<u>Moors</u>	<u>Malays</u>	<u>Others</u>
Buccal Cavity	28	-	1	18	7	1	-	1
Stomach, Liver	16	-	1	12	-	2	-	1
Pleuro-pneumonia, Intestines and Rectum	3	-	-	3	-	-	-	-
Female Genital Organs	17	1	1	11	2	2	-	-
Breast	7	-	-	7	-	-	-	-
Skin	-	-	-	-	-	-	-	-
Other or unspecified organs	51	2	4	33	6	3	-	3
	<u>122</u>	<u>3</u>	<u>7</u>	<u>84</u>	<u>15</u>	<u>8</u>	<u>-</u>	<u>5</u>

It is fully realized that even these statistics for a long established community suffer from inherent inaccuracies of diagnosis as well as from incompleteness but they are among the best available and certainly unmistakably indicate the preponderance of cancer of the buccal cavity in Southern India, supported as they are by the statistics for Madras. To indicate the relative position of Ceylon, give the following comparison representing results for a number of countries.

Percentage of Deaths from Cancer of the Buccal Cavity to all
Forms of Cancer for different countries-Male Population Only.

Egypt	2.5%	Barbados	8.5%
Japan	3.4%	Cuban, colored	12.7%
Hawaii	3.7%	Mexico	13.8%
Singapore	5.1%	Cuba, white	14.8%
U.S.A. Negroes	5.6%	Philippine Islands	22.9%
U.S.A. Indians	5.6%	Ceylon	50.4%

For females the results have been as follows for the same countries:

Hawaii	0.6%	U.S.A. Indians	1.5%
Mexico	0.6%	Singapore	3.8%
Egypt	1.0%	Cuba, white	5.1%
Barbados	1.3%	Cuba, colored	6.3%
Japan	1.3%	Philippine Islands	13.6%
U.S.A. Negroes	1.3%	Ceylon	25.3%

These

~~Such~~ statistics are quite consistent and may be relied upon as conclusive.

10. CANCER IN CEYLON

I am able to amplify these observations with a table showing deaths and death rates for Ceylon for the period 1921-1930 furnished by the Medical Officer of Health, with the rates per 100,000 for the period 1886-1909, derived from the report of the Registrar General.

Cancer Mortality in Ceylon - 1886-1930

<u>Year</u>	<u>Rate per 100,000</u>	<u>Year</u>	<u>Deaths</u>	<u>Rate per 100,000</u>	<u>Year</u>	<u>Deaths</u>	<u>Rate per 100,000</u>
1886-90	4.2	1921	433	9.6	1926	509	10.0
1891-95	6.2	1922	461	9.9	1927	540	10.3
1896-1900	5.3	1923	434	9.1	1928	551	10.3
1901-05	5.6	1924	473	9.7	1929	451	8.3
1906-09	4.7	1925	406	8.1	1930	460	8.7

This table is reasonably consistent and compares with the corresponding mortality for Madras, suggestive of a relatively low mortality from cancer, one half of which is due to a specific form of cancer rather uncommon in other tropical countries with the exception of the Philippine Islands. Cancer of the buccal cavity in Ceylon is ~~also~~ primarily the result of betel nut chewing. As far as I

am informed, cancer affecting the interior of the cheek and cancer of the tongue and lip are relatively rare. While cancer of the buccal cavity is exceedingly common in Ceylon and Colombo, gastric cancers are very rare. The percentage of deaths from cancer of the stomach, liver, etc., is 22.5% as compared with 49.7% for American Negroes and 83.4% for Japan. These statistics have reference to the male population only. In the combined mortality from cancer in the Island of Ceylon during the years 1918-22, there were 2,293 deaths from all forms, 767 buccal cavity, 393 stomach and liver, and 330 intestines, peritoneum and rectum.

11. BETEL NUT CANCER

In the British Medical Journal of April 19, 1924, there is a brief letter on betel chewers in India and cancer by Dr. James L. Maxwell of Shanghai. He quotes from a report of the Far Eastern Association of Tropical Medicine the question: "Why is cancer of the buccal cavity so frequent in Travancore or Siam and probably much rarer in Tonkin and the Dutch Indies, though betel chewing is common in all these countries"? To which he replies as follows:

"With my own experience I should put it much more strongly. For nearly twenty years I had a large surgical practice in South Formosa, where many of the inhabitants chew betel nut. The mixture chewed seems to be exactly the same as in India - namely, the nut, lime, and usually a small piece of catechu, the whole wrapped in the leaf of a vine. The only point on which I am uncertain is whether the leaf in which the plug is wrapped would be the same. It is certainly not betel leaf, and I do not understand how such a hard leaf could be used for wrapping. Despite this, and among a people who are very ready to undergo surgical treatment for new growths, buccal cancer is a comparative rarity".

In a letter dated October 30, 1923, the late Dr. Archibald Leitch refers to a previous letter by Dr. R. L. Spittel as follows:

"The letter of Mr. R. L. Spittel on the relationship between betel chewing and cancer of the cheek (British Medical Journal, October 6th, p. 632) is both valuable and welcome. Hitherto the data necessary for establishing a casual relationship between them have been disappointingly meagre. As far as my reading goes, no estimate of the prevalence of this cancer has yet been offered, and in spite of repeated interrogation of medical friends who might have a first-hand knowledge of its

occurrence I have failed to elicit good evidence. For all we know to the contrary epithelioma of the inside of the cheek might be no commoner in betel chewers than in other populations not addicted to the practice. And for that reason I ventured to advise caution in accepting a proposition which, personally, I was far from denying.

Mr. Spittel's rough estimate of its frequency dispels that hesitation. May I respectfully urge him to communicate at greater length his experience of betel-chewer's cancer? The age incidence, its frequency as disclosed by hospital or other records, its latent period, its precancerous forms, and its course are some of the important points on which he can speak with unquestionable authority."

In the British Medical Journal of October 20, 1923, there is an extended article by Dr. James Davidson of Selhurst calling attention to the extreme frequency of buccal cavity cancer, apparently due to betel chewing, in Travancore, a native state in the extreme south of India. He refers to notes of Mr. A. Fells in the British Medical Journal of June 6, 1908, on 377 cases of epithelial cancer seen in two years at Neyoor Hospital, the head station of the Medical Mission of the London Missionary Society, 91.5% of which were in the region of the buccal cavity. He also gave an analysis of 209 operations for buccal cancer. Dr. Davidson next quotes Mr. Bentall of Southport, who in the British Medical Journal of November 7, 1908, gave an analysis of 1,700 cases of cancer in South India, according to which the incidence of buccal cancer, including that of lips, tongue and jaws, showed the remarkable percentage of 70.6 of the whole series. He also gave an analysis of 190 cases operated on at Neyoor Hospital.

He mentions his record of 222 cases of buccal cancer, operated upon during a period of about seven years while he was in charge of the same hospital. Then he observes that:

"The quid so largely used by Indians consist of areca nut, betel leaf, slaked lime, and tobacco leaf. In Travancore, where so many cases of buccal cancer have been seen and operated upon, the universal custom is to use a tobacco leaf which has been steeped in a thick black syrup prepared from crude sugar. The leaves so treated are spread

on mats by the roadside, and soon become a sticky mass - an excellent culture ground for various organisms, I should imagine. I am inclined to agree with Dr. J. Campbell that probably in addition to irritation some infection is necessary for cancer production. In the chewing of such infected tobacco both are provided.

I was surprised to find that among the Brahmin community, who lived in the same parts and who chewed freely, few, if any, cases of buccal cancer were observed; and I was inclined to deduce from this that, as they were strictly vegetarian in their diet, such a diet might have some inhibiting action on cancer growth, as has been repeatedly suggested.

I should like to know whether the quid chewed by the high caste Indian people differs in any material degree from that so commonly used by the patients we operated on, and who were for the most part not strict vegetarians.

It is practically impossible in the case of a village population such as one has to deal with in India, to frame anything like accurate statistics. The majority of the patients are not seen again after they leave the hospital, but quite a number were seen three to five years after operation, still in good health".

There is also in the same issue a letter by Dr. Percy E. Turner of London, confirming the observations of Mr. Spittel in Colombo, with reference to the habits of Travancoreans in the matter of betel chewing and concluding that:

"I may say that while cases of this form of cancer are common amongst chewers of betel, there is in Travancore, and I suppose in Ceylon, a minority of people who do not chew; I have never seen a case of the kind in a non-chewer".

The original article by Dr. Spittel, Surgeon, General Hospital, Colombo, appeared in the British Medical Journal of January 28, 1924. It does not admit of being abbreviated but should be consulted in the original, being one of the most interesting contributions of its kind on the cancer question.

12. CANCER IN SOUTH INDIA

In connection with the foregoing observations reference may be made to the discussion on cancer in South India by the Indian correspondent of the London Lancet in the issue of October 4, 1930. He refers first to an article in the Indian Medical Gazette on the use of radium in cancer by Lieut. Colonel Bradfield,

H.M.S., senior surgeon to the Madras General Hospital, making some interesting observations on the incidence of malignant disease in India. He states in part that:

"From a consideration of the larger number of cases which is now available for observation, Colonel Bradfield deduces that the incidence of malignant disease in South India, contrary to what has hitherto been the general impression, is much the same as in other parts of the world. Analysis of the 411 cases admitted during 1929 leads him to revise preconceived opinions. Cancer of the breast, for instance, was supposed to be comparatively rare, but this it seems was due to women concealing the disease; in this series there are 42 cases. Far the largest single item in the list is carcinoma of the cheek and jaw; 143 cases would appear excessive in comparison with European practice, and the tongue furnishes an additional 44. How far these large figures may be due to betel-chewing is not discussed. In the treatment of cancer of the tongue, radium has entirely displaced operation in this hospital. Carcinoma of the rectum and penis account for 25 and 27 cases, respectively. Gynaecological cases are not included in the series, being mostly treated in the women's hospital".

It would be extremely interesting and well worth while to subject these views and statistics to a critical analysis and gather data for India on a large scale. Nothing is more dangerous than to allow any one particular correspondent or observer to over shadow the opinions of others who have not been heard from. The tendency to discredit existing data too often reveals prejudice rather than knowledge.

13. CANCER IN KASHMIR

It would be extremely valuable also if a comparison could be made between the hospital experience of cancer in the extreme south of India and the extreme North. Unfortunately for the northern section data are very difficult to secure and no exhaustive study with regard to the geographical distribution of cancer has been made. One of the most useful sources of information are the annual reports of the Kashmir Mission Hospital, of which I have available the reports for

the last three years. In the 1930 report there is a table of major operations numbering 983, of which 329 were tumors, innocent and malignant. In the 1931 report the number of major operations for tumors was 430, and in 1932, 332. I give below in tabular form the various types of tumors operated upon for convenient reference.

Major Operations for Tumors, Kashmir Mission Hospital-1930-1932

	<u>1930</u>	<u>1931</u>	<u>1932</u>
Epithelioma	74	62	48
Carcinoma	2	4	4
Sarcoma	15	12	5
Fatty	7	3	7
Goitre	6	19	11
Tuberculous Glands	120	233	152
Haemorrhoids	46	55	34
Other Tumours	<u>59</u>	<u>42</u>	<u>71</u>
	329	430	332

Medical and surgical observations on tumours are not extended. There is a brief reference in the report for 1930 reading as follows: "There were 74 cases of Kangri burn cancer, which is of special interest in connection with the causation of cancer". Reference is then made to an article by Dr. Ernest F. Neve, foremost authority on Kangri cancer, contributed to the Practitioner of June, 1929, and also a paper contributed to the Indian Science Congress, January 1930.

14. KANGRI CANCER

In the 1931 report Dr. Neve, in a two-line reference, mentions that the most important tumours under review during the year were Kangri-burn cancer with 62 cases, and sarcomata. There are no observations, either medical or surgical, on cancer in the report for 1932. It would carry me too far to enlarge upon the peculiarities of kangri cancer, which, however, represents an aspect of the disease of profound and far reaching importance. It is a malignant tumour developed on the external abdomen as the result of burns produced by use of the

kangri stove which is a charcoal basket containing hot coals to protect the natives from the extreme cold in high altitudes. Cause and effect in this matter are so thoroughly understood that there is no questioning the fact that kangri cancer is a direct result of kangri burns. But how far this factor is related to bodily condition is not known. In fact most of the references to kangri cancer in the literature of the subject are fragmentary and vague.

15. CANCER IN PERSIA

Much valuable information may also be secured from an extended study of the experience of the American Christian Hospital at Meshed, Persia. This great institution publishes annual reports, of which I have the fifteenth covering the experience for the fiscal year ending June 30, 1930. It contains statistics of in-patients, showing a total of 855, of which the following were from cancer or other malignant tumours; epithelioma of eyelid 1; uterine cancer 1; carcinoma of liver 4; carcinomatosis 1; carcinoma of stomach 1; epithelioma of face 2; carcinoma of breast 1; carcinoma of hand, foot and neck 6; sarcoma 4; carcinoma of testicle 1; total 22. Unfortunately there are no medical or surgical observations of value in the report useful for the present purpose. Considering the large number of cases treated, malignant tumours would appear to be relatively rare in this part of Persia.

16. SIR LEONARD ROGERS ON CANCER IN BENGAL

Possibly the most ambitious attempt to discuss the cancer situation in India on the basis of exact data is the address of Sir Leonard Rogers on Pathological Evidence Bearing on Disease Incidence in Calcutta, published in the Glasgow Medical Journal of January-February, 1925. This paper attempts to contradict my own conclusion advanced in an address on Cancer and Civilization read before the Belgian Cancer Congress in 1923 in which I make the statement that the cancer

death rate is eight times as high among the 500 millions of civilized races as among the 1,200 millions of uncivilized races, including the 300 millions of India. Sir Leonard Rogers' experience includes 1,600 post-mortems, and microscopical examinations of 1,190 tumours, for comparison with which he analyzed 1,000 post-mortems and 1,000 reports of microscopical examinations at St. Mary's Hospital, London. But Sir Leonard Rogers made a fundamental mistake in assuming that the rate of incidence could be determined by a percentage distribution of different types of tumours derived from hospital experience, however exact, and otherwise of interest and value. Nothing is more misleading than a single hospital experience, however large and exact the collective data may be concerning various disease occurrences. Every hospital, to a certain extent, is a specialized institution, and with regard to cancer attracts certain types of malignant disease more than others on account of special facilities for treatment. The paper by Sir Leonard Rogers is nevertheless of profound interest and cannot be ignored by any student of the situation in India. It proves without question that all types of tumours occur in India, however much the different proportions may vary from those of a large European medical institution.

Unquestionably the different age distribution of the populations of India and Europe is one of the governing factors which explains the relatively lower incidence of malignant tumours in Bengal and other parts of India, but this by no means answers the whole question. The effect of a specialized institution on the cancer mortality is emphasized by Sir Leonard Rogers but not to any particular purpose. He remarks with reference to cancer of the ovaries and uterus that: A part of this very great excess in Calcutta must be attributed to the larger number of gynaecological beds in Calcutta Medical College Hospital as compared with St. Mary's Hospital in London, but after making allowance for that factor a great excess still remains, and that, too, although the age factor balances the

hospital accommodation one, so the excess must be regarded as a real one requiring explanation". This is all mere assumption and not entitled to be accepted as conclusive. Hospital autopsy records never adequately reflect the local tumour distribution from all forms of malignant disease no matter how carefully the facts may be dealt with, for variations in highly specialized conditions of treatment cannot possibly be allowed for with accuracy in a statistical survey.

I however entirely agree with Sir Leonard Rogers that: "Where the exciting cause is present, there will cancer result in primitive tropical people of the cancerous age at least as readily, if not more so, than in the civilized races of temperate climates". But the absence or presence of these factors responsible for cancerous growth in different localities has not been determined except in a few striking instances in India, and this would be necessary before the question can be dealt with in a final sense. It goes without saying that if identical habits are followed in India, compared or contrasted with those of Europe and America, cancer will occur to much the same degree in that country as elsewhere, as long as European populations do not indulge in the habit of betel-nut chewing, the death rate from cancer of the buccal cavity will not reach the proportion it does in Ceylon and Southern India, and as long as European or American populations do not adopt the reckless method of the use of the kangri stove for protection against climatic rigors, cancer of the external abdomen will remain unknown, as it is at the present time.

17. LIMITED VALUE OF PATHOLOGICAL STUDIES

Most of the important conclusions of Sir Leonard Rogers are not supported by the facts presented. It is a serious error to maintain that at the present time: "Malignant tumours, including both connective tissue and epithelial types, are about equally common in Bengal and England, with a slight excess in the tropical country". For support of this statement no evidence is advanced entitled

to credit. Furthermore there is a statement that: "The slightly lower incidence in Bengal of the malignant epithelial tumours or carcinomata is fully explained by the age factor, as the higher rate in London is more than accounted for by the great excess of persons of the cancer age of over 40 or 50 years in England as compared with Bengal". This is possibly true but the data provided do not support the conclusion. Finally, "Cancers of the tongue, oesophagus, stomach, large intestine, and breast show considerable excess in the London pathological examinations, while those of the skin, penis, both the cervix and body of the uterus, liver and gall bladder are in excess in India, nearly all of which are explainable on the known laws of long-continued irritation being the most important predisposing or exciting cause of cancer". This conclusion is probably in conformity to the facts but not supported by exact comparative statistics taking into account both the actual population and the actual number of cases or deaths from cancer for different organs and parts. Furthermore: "The three-fold excess of cancer of the uterus in Bengal is probably related to early menstruation, child-bearing, and menopause in the Bengali race leading to earlier and more frequent development of cancer in them as compared with European females". This is possibly true but also not supported by exact data necessary for the purpose.

In other words, Sir Leonard Rogers relies entirely upon pathological data which, standing alone, are not of relative importance. Sir Leonard Rogers does not give the total number of autopsy records from which the post-mortem records of malignant disease were derived in a manner conforming to accepted methods of statistical practice. Thus, for example, a more useful address on "The Prevalence of Cancer as Revealed by Mortality Returns and at Autopsy" by Professor W. M. deVries of Amsterdam, contributed to the Lake Mohonk Conference on Cancer Control, illustrates the method of statistical practice used for the purpose to much better advantage. The Amsterdam data show, for example, 5,027 autopsies for males in

that city, 822 of which or 16.2%, were due to carcinoma. No such corresponding statistics are furnished by Sir Leonard Rogers either for London or Bengal. In brief, then, it is my own conviction that Sir Leonard Rogers' address, while containing many important observations of considerable value, leaves the question of the relative incidence of malignant disease in India as much in doubt as before.

I cannot, however, pass over one more observation by Sir Leonard Rogers, when he points out that: "With one noteworthy exception, the remaining forms of cancer, namely, those of the kidney and suprarenals, of the prostate and testicle and other miscellaneous varieties furnish very similar figures in the two countries dealt with, so that when the age factor is taken into account they are rather more prevalent among the vitamine-consuming more primitive Indian race". On several other occasions Sir Leonard Rogers discredits my conception of the dietary importance of cancer causation in so-called civilized countries as compared or contrasted with so-called uncivilized or more primitive countries such as the Indian Empire. To this question I shall now give some further attention.

18. NUTRITION OF THE INDIAN POPULATION

In Nutrition Abstracts and Reviews for July 1932, Colonel R. McCarrison, Director of the Pasteur Institute at Coonoor, South India, presents a mass of extremely interesting observations proving conclusively the relation of diet in India to certain affections, not however, including malignant tumours which apparently do not fall within the province of Colonel McCarrison's investigations.

"Throughout the whole of India", Colonel McCarrison observes, "the staple article of diet of the masses is a cereal grain of one kind or another--wheat, barley, millet, maize, rice - sometimes a mixture of two or more of them. Most of these grains are eaten whole; these are not subjected to any milling or refining process before use. The outer layers of the grain and embryo, containing valuable dietary constituents, are thus consumed with the endosperm. Rice is the single exception to this rule; though within recent years the use of white flour and white bread is spreading in the larger towns and cities. Rice is always subjected to some form of refining process".

The foregoing is followed by extended observations on variations in the nutritive quality of rice grown under different soil conditions, in different seasons and under different climatic conditions. As to this it is pointed out that:

"In the north of India - - North-West Frontier Provinces, Punjab, Baluchistan and United Provinces - wheat is the principal cereal grown; though some rice, barley, maize or millet is also grown. Generally speaking, the races resident in these areas - Pathans (Afridis, Waziris, Bajauris), Punjabis, Sikhs, Baluchis, Rajputs and Paharis - are wheat eaters. Wheat is the staple article of their dietaries; the other cereals mentioned being merely adjuncts to it."

And furthermore:

"A large amount of wheat is also grown in parts of Central India, Bombay, and the Deccan; but in general the races resident in these localities, such as the Maharattas, use a diet of mixed cereals - usually wheat and rice. Towards the East, through Bihar to the coast of Bengal, all down the east and west coasts and throughout the Madras Presidency rice is the principal cereal grown; though in parts of these regions millet is also a considerable crop. But for the most part, the races resident in these areas are rice-eaters".

I regret that I cannot deal more extensively with these interesting observations but I must limit myself to point out that according to Col. McCarrison,

"The Pathans are meat-eaters; the flesh and fat of sheep and goats forming a principal constituent of their dietaries. They also use milk freely, chiefly in the form of buttermilk, curds and butter of ghee. The Sikhs are large users of milk and the products of milk; meat being only an occasional addition to their diet. The Maharattas also make free use of milk and milk-products; an additional source of animal protein being eggs and fish. The Bengalis, Kanarese and Madrassis, on the other hand, are for the most part vegetarians; and although some of them do eat mutton or fish, millions do not, while milk and milk-products are, in general, less extensively used by them than by northern races. It so happens, therefore, that as the nutritive values of the cereal grains diminish there is also a diminution in the amount of animal protein ingested and in the level of protein metabolism attained by races concerned. There is,

too, a precipitate fall in the amount of vitamins A and B ingested by the races of the south as compared with those of the north. Legumes (dhals), vegetables and fruit enter into all the national dietaries of India; but it is only amongst the better classes that a sufficiency of these is eaten".

The foregoing remarks will be sufficient for the purpose of emphasizing the nutritive aspects of certain disease problems in India, although how far these bear upon the question of the local incidence of malignant tumours cannot at the present time be stated. But considering, for illustration, the Sikh diet, mentioned as the most nutritious of those examined, being "made up of freshly ground whole wheat made into cakes of unleavened bread, milk, and the products of milk - butter, ghee, curds, butter-milk-dhal (legume) vegetables (fresh carrots and cabbage), tomatoes, root vegetables, fresh meat with bone and fat once a week and water". There is here a starting point from which to proceed to the Madrassi diet, referred to as the least nutritious of those examined and made up of "washed polished rice, dhal (legume), fresh vegetables, condiments, vegetable oil, coffee with sugar and a little milk, a little butter-milk, ghee (sparingly), cocoanut, betel-nut and water". These different diets explain, to a large extent, the general physique which varies enormously in the North and South of India, as to which considerable material is available through local anthropological studies. Colonel Carrison observes with regard to the question as to what diet is most likely to maintain physical efficiency and health that:

"It is a diet composed of any whole cereal grain or mixture of cereal grains, milk, the products of milk--butter, curds and butter milk,--legumes, green leafy vegetables, root vegetables, fruit and water, with meat occasionally".

In other words meat is eliminated to a point of minor importance while vegetable factors hold first place. This, in my judgment, is precisely the diet least likely to favor the development of malignant new growths in the light of such investigations as I have thus far been able to make and while they are evidently

inconclusive for the time being, it is quite reasonable to expect evidence to be forthcoming showing that races on a vegetable diet are less liable to malignant tumors than those who follow a predominating meat diet.

19. HIMALAYAN RESEARCH INSTITUTE, PUNJAB

It does not fall within the province of this discussion to enlarge upon the technical details of dietary aspects in their relation to cancer, but the disease, itself, should be investigated in India with special reference to the incidence of malignant tumours among the various racial or caste types throughout the Indian Empire, or at least in the extreme north of India and the extreme South. The outlook for such a study has been considerably improved by the establishment of the Himalayan Research Institute of the Roerich Museum at Urusvati in the Punjab. It is proposed to establish a biochemical laboratory along thoroughly modern lines and equipment which, under proper direction, would be able to advance rapidly a practical study of malignant disease in a region in which cancer is practically limited to a single clearly differentiated type, that of kangri cancer on the external abdomen. Various reports made in this region all seem to be to the effect that malignant tumours otherwise are extremely rare in the extreme north of India. The chief causative factor for this anomaly may possibly be found in peculiar dietary customs of the people which as yet have been but very imperfectly described. In any event it would seem well worth while to undertake an investigation locally, as well as generally, throughout India, but I am absolutely convinced that no future data will set aside the present conclusion that malignant tumours throughout India are decidedly less common than in European countries and that this immense difference has its origin in dietary and nutritional variations among the Indian types of people as compared or contrasted with Europeans and Americans.

20. CANCER IN THE PUNJAB

Supplementary to the foregoing statistical information, all derived from

official sources, I addressed a questionnaire to the medical directors of the principal mission hospitals throughout India and Persia which yielded some exceptionally interesting and valuable results briefly summarized as follows: By way of introduction I will give first some extracts from a qualified discussion of Malignant Disease in the Punjab by Drs. Vishwa Nath, Jiwan Lall and Jagat Singh, all of the Department of Pathology, King Edward Medical College, Lahore, and published in the Indian Medical Gazette of March, 1933. It is unquestionably the best discussion which has yet appeared on cancer in India and should be consulted by all who wish to grasp the true significance of the disease in that country.

It is stated that the literature published in India on malignant disease is meagre and reference is made to Neve's paper on a Decade of tumour surgery in Kashmir Mission Hospital, in which he brought out the importance of long-continued irritation caused by kangri burns in the etiology of kangri cancer. Reference is next made to Sutherland's paper published in 1904 on Statistics of Malignant Disease admitted to the Mayo Hospital, Lahore, from 1892-1903, in which he shows that of 3,412 cases admitted to the hospital during those twelve years, 792 were cases of malignant disease, which he classified as follows: - Carcinoma 400; sarcoma 334; abdominal growths 35 and malignant growths 23. In more detail the authors remark:

"Amongst the cancer cases 58 were epitheliomas and 35 rodent ulcers. He attributed scalp cancer amongst Mohammedans to the irritation from blunt razors used in shaving their heads. Amongst recent contributions dealing with cancer in India are two papers concerned with the examination of material from Pathology museums in Madras (Basu and Vasudevan, 1929) and Bombay (Gharpure, 1927) medical colleges, and Sir Leonard Rogers' Lettsonian Lectures in 1925, giving an analysis of 1,190 cases examined in Calcutta, 579 of which were malignant and 421 non-malignant. Certain annual reports also occasionally bring out facts regarding prevalence of malignant disease. For instance the "Annual Report and statistics, Government General Hospital, Madras for 1927" showed that 13,158 patients were admitted to the hospital that year. Six thousand three hundred and forty-six out of this number were admitted to the surgical ward and of these 258 suffered from malignant disease - 177 from cancer and 24 from sarcomas".

They next refer to a questionnaire to all civil surgeons in medical charge of districts in India by Megaw and Gupta, "as an attempt, not to obtain statistical information which would have failed, but just to know whether particular diseases were "common", "rare" or "unknown" in different districts. Information obtained regarding distribution of cancer through this questionnaire was valuable, although replies of some of the medical officers who returned certain types of cancer as "unknown" in their districts must either have been casual or their opportunities of seeing patients limited. Information was called for in respect of cancer of the breast, uterus, stomach, mouth and skin. From the Punjab 21 medical officers answered the questionnaire and of these as many as eight affirmed that cancer of the skin was "unknown" in their districts - a statement very difficult to believe. On the other hand the statement that cancer of the stomach was "unknown" in as many as 15 districts, "rare" in six and "common" in none is not incredible, knowing as we do how rarely do surgeons and pathologists meet with this lesion in the Punjab".

They then remark:

"In India not only are the basic records on which vital statistics based poor, but any better view which could be obtained of the causation of death, through post-mortem examinations, is also unattainable. So great is the prejudice on the part of relations to submitting the dead to a post-mortem examination, that post-mortem pathological investigation is possible only to stray unclaimed bodies".

21. KING EDWARD MEDICAL COLLEGE, LAHORE

They next discuss the experience of the King Edward Medical College at Lahore in which during 1921-1931 only 329 post-mortems were carried out and of this number malignant disease was diagnosed in only 14 cases. In an appended table they compare the percentage proportion of malignant disease to the autopsies recorded shown to have been 4.25% for the Punjab, 5.83% for Porto Rico, 3.43% for Ceylon, 2.5% for Java and 2.6% for Manila, all fairly consistent results.

Reference is made to a paper by Sir Leonard Rogers and a table is introduced showing the proportion of malignant growths to all new growths. In different countries of the Far East and also in Mexico as follows: The proportion for the Punjab was 57.9%; Saigon 35.9%, Cholon 27.4% and Java 50.7%. The ratio of carcinoma to sarcoma was 3 to 1 in the Punjab; 3.5 to 1 in Saigon; 4 to 1 in Cholon; 1.58 to 1 in Tonking; 2.15 to 1 in Java and 3.3 to 1 in Mexico.

They next give an elaborate table dividing carcinomata and sarcomata according to race, sex and age. The total number of malignancies considered was 692 of which 543 were carcinomata and 149 sarcomata. The sex distribution in carcinomata was practically identical while for sarcomata the males considerably outnumber the females.

A table is presented showing malignant disease for three organs or parts, breast, uterus and cervix, and penis on the basis of percentage distribution. For the Punjab 14.8% of the cancer were breast cases, 8.9% uterus and cervix, and 4.1% penis. The corresponding statistics for Manila, 1927, were 11.2% breast, 9.9% uterus and cervix, and 5.2% penis. This comparison is fairly consistent for the two regions compared but requires more extended statistics to justify unconditional acceptance. I quote the more extended observations, however, as given.

"The heaviest incidence of malignancy is on the breast 14.8 percent. Skin cancers including rodent ulcer and cancer of the tongue constitute about 13 per cent. of the total. Female reproductive organs come next. Malignant growths of the liver and digestive tract together account for 4.8%. The penis comes next with 4.14 per cent. Of 93 senile prostates examined 16 were cancerous. Nine tumours of the thyroid were found to be malignant. Of benign tumours uterine fibroid accounted for 8 per cent. In the Mayo Hospital, Lahore, which is attached for teaching purposes to the King Edward Medical College, Lahore, 2,775 cases of malignant disease were treated in the wards and outpatients' departments from 1923 to 1931. Out of this number histological confirmation of the clinical diagnosis was obtained in 523 cases. The opportunities for utilizing the

services of the pathology department of the college are exceptional so far as the Mayo Hospital is concerned, although the mofussil hospitals also use it in degree varying with the enthusiasm of the medical officers in charge. The proportion, therefore, of histologically-verified cases of malignancy to the total number of cases clinically diagnosed, i.e., 1.85, may be of interest when studying the figures of malignant disease as furnished by Government hospitals from all over the province. Table (V) compiled from the reports of the Inspector General of Civil Hospitals, Punjab, from 1923 to 1931 gives the number of cases of malignant disease treated in the Government hospitals of each district. This mortality must not be taken, however, as representing either the total fatalities from this cause or the percentage of inoperable cases which come for relief to these hospitals. If it represents anything at all, it represents mortality under operation and the very small margin of accommodation available in State hospitals for incurable and moribund cases".

In conclusion certain statistics are given for cancer deaths in the hospital experience for indoor and outdoor patients, all suggestive of the relative rarity of the disease in actual practice. The results of the study are summarized as follows:

"The material contained in this paper can afford no information as to the exact position of malignant disease in the vital statistics of this province. It can, however, testify to the definite presence of malignant disease in the province and its not insignificant role as a cause of mortality and morbidity. Although the autopsy and biopsy figures handled are small, the inference is not unjustifiable that the incidence of carcinoma in the two sexes is about equal, that the age period for highest incidence of cancer is from 40 to 50, and not from 50 to 60, as is the case in Japan, most European countries and the United States of America, and that cancer of the breast and reproductive organs is commonest among females and of surface epithelium in the male. The figure for cancer of the penis is not as high as in some other countries, and cancer of the gastro-intestinal tract and liver is not so common as in the Far East, the Dutch Indies and probably in Southern India. The proportion of carcinomata to sarcomata is, as in some other countries, about 3:1. The maximum incidence of sarcomata is, as in the Chinese and Europeans, at a younger period (20 to 30). The incidence is not, more or less equally, distributed over all age periods, as is said to be the case among the Javanese".

Obviously much remains to be done to establish the existing information on cancer in India on a satisfactory basis. Opinions vary widely and are rarely

supported by adequate statistics from trustworthy sources.

22. PRESBYTERIAN MISSION HOSPITAL, MIRAJ, BOMBAY

Of considerable value in this connection are the views and conclusions of the medical personnel of the Mission Hospitals in close and continuous contact with the population of India in its different parts. I quote first from a letter from Dr. Theodore Frank, Superintendent of the Radium Institute of the Presbyterian Mission Hospital, Miraj, S.M.C. (x), India, dated April 1, 1933.

"I have noted your questionnaire and am now prepared to answer many of your questions but there are still several that will require much more delving to secure accurate answers. I am writing to tell you that I am at work upon these questions and you may expect to hear from me again sometime within about one month after you receive this letter. For your immediate information I may say that at this hospital which is probably the largest under the Presbyterian Board of Foreign Missions anywhere in the world, we see patients from all over India so that our population is a very variable quantity. We see much cancer here and the most frequent type is certainly cancer of the cervix uteri, with the oral cavity running it a fairly close second. The details of the actual number of cases admitted under a diagnosis of malignancy will have to wait until my present investigations are completed but I would guess that we have 300 or more in a year. Of these we probably treat some hundred by surgery alone and the other two hundred by either radium alone or radium plus surgery. I repeat that I am going through the books and charts getting this information for ourselves and when it is available I will send you the exact figures.

Constipation is very common among all the people but especially the poorer classes for what can you expect from a diet, the calories of which are derived almost entirely from grain. The nutrition is usually deficient. The main stay of the people for 50-100 miles around here is a rough coarse grain which is ground up and made into an unleavened bread. The grain is known locally as zonderla (that is as near as I can transliterate it into English characters) and is rather similar to what is known as Kaffir corn in the west of the U.S. and the South. The vast majority of our patients have never tasted meat, either from religious scruples or because the cost is too great for them. As to table salt, they use enough to make things tasty to our palates. It is a very dirty coarse crystal, to the best of my knowledge, no more no less than the salts left by the evaporated sea water. Vegetarianism is found in almost 90% of our patients. As to betel nut cancer, that is a big question, we see an astonishing amount

x)Province of Bombay

of oral cancer, yet a very, very high proportion of the people who come to us chew the betel leaf and areca nut which is usually called betel nut, and the majority of these people naturally do not get oral cancer. Yet we can't help but feel that this may be a factor. For further information on this question I suggest that you write to Dr. Ian Orr, Neyoor, Travancore, India. He has developed a theory of sea shell lime, and rank tobacco (which is often mixed with the leaf and nut) as against rock lime and better grade tobaccos. But I'll let him speak for himself. We do not have facilities for pathological examinations of our tissues but as the whole hospital is completely self-supporting and must be, there is not sufficient money to spend in the laboratory, hence our examinations are not carried out to the wish of the surgeon or radium man, but according to the dictates of the budget. We can't have all we want, in other words.

Sarcomas seem to be rarer than carcinomas but that is simply an impression. I don't know the actual proportion here and I've never looked it up in the U.S.A. There is undoubtedly tremendous numbers of cases of completely neglected, absolutely ignored cancer in the women of India. We in this hospital see much of it because this hospital has been popular for 40 years and the women who come have learned to expect vaginal exams if necessary and the kind that won't allow it just don't come. We do see much of it but there must be much of it we don't see. Also what we do see is so far advanced, usually so far as to be quite hopeless when we first see it and if the people will neglect it so long it indicates that they are not sufficiently educated to bring their women while they have a chance for life, and if that is true it follows that many more, less educated, very probably don't bring them at all".

The gradual accumulation of evidence like the foregoing will go far to clarify the present situation, which should be amplified by a qualified study of the statistical data of leading medical institutions in India, to throw new light upon unsolved questions.

23. JUMNA DISPENSARY, BOMBAY

From Mrs. W. Brewster Hayes, M.D., of the Jumna Dispensary, Naini, India, have been favored with a reply to my questionnaire in part as follows: The estimated population of the community reported upon is 180,000, the predominating racial types being two-thirds Hindus of all castes and one-third Mohammedans. Dr. Hayes has been in practice in the locality for five years. The total number of

patients treated annually is about 10,000 with no operations, there being no surgical facilities. There were fifteen cases of cancer during 1932, of which fourteen were cancer of the female genital organs and one cancer of the buccal cavity. Constipation is reported as rare. Nutrition is deficient. Meat eating is common among Mohammedans and relatively so among Hindus. Table salt consumption is common but not excessive. Vegetarianism is practiced by about two-thirds of the patients. There were no cases of betel nut or kangri burn cancer in the local practice. Facilities are available for pathological examination of tissues. The Doctor is of the opinion there is not much neglected cancer in the locality but the cases seen are too far advanced to be hopeful operation cases.

24. REPORT FROM VENGURLA, PROVINCE OF BOMBAY

I also have a report from St. Luke's Hospital, Vengurla, India (x) replied to by Dr. R. H. H. Goheen. The questionnaire states that the population of the town itself is 10,000, and that of the district about 1,000,000. The predominating types are Hindus and Portuguese Indians. The Doctor has been 25 years in local practice. He states that constipation is rather common. Nutrition is normal or deficient and with reference to native diet the preference is for strong curries and highly spiced foods. Meat eating is common. Table salt consumption is apparently excessive. Vegetarianism is practiced by a small circle of high caste Brahmins. The Doctor has seen a few betel nut cancers but no Kangri burn cancer. They have facilities for pathological examination of tissues. Sarcomas are relatively rare and the Doctor is of the opinion there is much neglected cancer, particularly among the Hindus. These observations are amplified by a paper on The Incidence of Carinoma in Western India, read at the April Meeting of the Vengurla Medical Society, and re-read at the Kodaikanal Conference, in May 1928. I quote this paper in full. It contains some highly suggestive statistics, about as good as any that have been furnished for any part of India, being based on 288 cases (x) Province of Bombay

having reference, of course, exclusively to Western India.

"The subject of cancer has received wide attention in the West for some time past. Investigations as to its prevalence in America have shown a steady increase, so that now on an average one woman in eight, and one man in twelve, succumbs to this dread disease. This has stimulated research studies in many quarters as to the cause. The names associated with this field of effort are many; but one must, in passing, respectfully mention a few that have given direction to the advance in the knowledge that is now commonly possessed: Sir James Paget, Rous, Gye, and Maude Slye. This line of thought is too vast to follow further.

What, then, as to cancer in India? Is there not a general impression that cancer is not very common outside of Europe and America? Is this impression correct for Western India? These are some of the questions that led to a review of the material passing through the clinics of St. Luke's Hospital at Vengurla. With very little time at our disposal, it has seemed best to confine our study to the records of the last 10,000 patients treated in the hospital. Here men, women and children are admitted. They come from the Hindu, Muslim and Christian communities of the surrounding country (which is the coastal strip known as the Konkan).

The figures arrived at do not, of course, indicate the actual incidence of cancer among the general public. They might more nearly serve as some sort of an index, could I offer for comparison like figures for the hospitals of London, Paris, Berlin, New York, etc. I regret that I am not able to do so. Among the people of a district such as ours there are hundreds of patients with serious diseases that never seek hospital aid. At the same time, when compared with the numbers who do seek relief from other conditions some light is thrown on the relative frequency of cancer.

While the relationship between benign and malignant tumours is a subject still wrapt in the mist of mere speculation, I have thought that it would not complicate matters unduly to indicate briefly (in a table) the relative numbers of the various benign and malignant growths we have treated.

TABLE I

<u>Of 10,000 patients</u>	<u>Numbers</u>	<u>Per Cent</u>
Carcinoma -	288	40.22
Sarcoma -	34	4.74
Benign Tumours	<u>394</u>	<u>55.04</u>
	<u>716</u>	<u>100.00</u>

The incidence for all tumours is, therefore 7.16 per cent.

The organs affected by carcinoma are indicated in Table 2. This is of interest and importance particularly in the case of the mouth. The people of our district are only moderately addicted to betel-nut chewing. They seldom, if ever, carry a large bolus of pan in the cheek, as is so commonly seen in larger areas to the south, notably in Travancore. In this connection, also, I must mention the fact that Christians - Roman Catholics from Goa (Portuguese India) and elsewhere - furnish the largest community of our patients. These people are meat-eaters and suffer correspondingly frequently from pyorrhea and caries of the teeth.

TABLE 2
Primary Sites of Carcinoma

<u>Organ</u>	<u>Number</u>	<u>PerCent</u>
Eye and Orbit	3	1.06
Ear	1	0.35
Nose	2	0.70
Lip	1	0.35
Cheek and Jaw	24	8.50
Tongue	16	5.70
Palate	2	0.70
Pharynx	7	2.50
Oesophagus	3	1.06
Larynx	2	0.70
Parotid Gland	1	0.35
Cervical Glanglion	1	0.35
Lung	1	0.35
Breast	52	17.83
Liver	4	1.37
Pancreas	4	1.37
Stomach	54	18.55
Cecum	3	1.06
Colon	5	1.75
Rectum	15	5.28
Prostate Gland	2	0.70
Penis	15	5.18
Cervix and Uterus	51	17.49
Ovary	8	2.85
Vulva	1	0.35
Back	1	0.35
Hand	2	0.70
Leg or foot	<u>7</u>	<u>2.50</u>
TOTAL	288	100.00

These figures place the incidence of carcinoma among our patients at 2.88 per cent.

A word as to treatment may be permissible as partially explanatory. It has been the policy of the hospital to admit practically every tumor patient for observation and, if possible, for operation. There have been a few, perhaps one per cent. though the exact number is not ascertained, who were moribund and who were not admitted.

Carcinoma patients are notably poor surgical risks for a prolonged operation under general anesthesia.

Operability has been determined by the gross appearance of the lesion and also, to some extent, by the general condition of the patient. The general condition, apart from lung findings, has been studied by the aid of the blood pressure, pulse rate, hemoglobin index, and the blood sedimentation test. When the systolic blood pressure is below 100 millimetres, the pulse pressure below 30 millimetres, the pulse rate when resting over 100 or the blood sedimentation reading above 60, the case has been deemed inoperable. Rest in bed with digitalization has improved certain cases that would otherwise have been refused operation. Even so post-operative mortality remains high, cardiac failure usually occurring in spite of continued proctoclysis, hypodermoclysis, intravenous injections and supportive hypodermics.

Radical operations have always been performed where possible as in the case of breast tumours, when, with the breast, both pectoral muscles and all glands and fat in the axilla are removed.

X-ray treatments before and after operation have been used only occasionally, because our X-ray apparatus is designed for diagnosis rather than for treatment.

Some five years ago the use of emetine, as tried out in a clinic in Chicago, was experimented with. The theory was that carcinoma cells, being primitive in nature like amoebae, might be destroyed by emetine. Large doses, up to 5 grains once a week by hypodermic or intravenous injection, were used, but, with the exception of one lesion in the mouth, there was no apparent benefit.

Lately the use of lead by intravenous injection has been tried but has led to no encouragement.

SUMMARY AND CONCLUSIONS

"While this is an inadequate study of the prevalence of carcinoma on the coast strip of Western India, the fact does emerge that 2.88 per cent of the last 10,000 patients admitted to our hospital suffer from this disease.

Of this number the regions found to be most affected are the stomach, with 54 cases; the breast with 52; the uterus with 51; and the mouth, with 50 (including lip, cheek, tongue and pharynx); which means, roughly, 18 percent for each of these sites".

Reference is made in the paper to "Disease Incidence in Bombay" by P. V. Arpore published in the Indian Medical Gazette for May 1927, which unfortunately I have not seen.

25. REPORT FROM TABRIZ, PERSIA

My returns for Persia are much more extended and of even greater interest and importance. The first return to which I will call attention is from the American Hospital at Tabriz, dated February 16, 1933, made by Dr. Charles W. Lamme, who has been in practice here since 1913. He states the population of the area under review is 250,000, the predominating racial types being Persians and Armenians. The approximate number of patients treated annually is 10,000 with 200 major and 300 minor operations. Approximately 200 cases of cancer occurred during 1932 the prevailing types being stomach and liver, female genital organs, breast, skin and other organs and parts. Constipation is common in the native population. Nutrition is apparently normal to the point of being generous among those who can afford it. The daily diet for poor people is whole wheat bread and cheese, and for the better class, rice and all other food products. Meat eating is common, especially mutton and chicken. Table salt consumption is about the same as in the United States. Vegetarianism is not practiced. There are no facilities for pathological examination of tissues. Cancer is not considered rare in the Doctor's opinion and there is much neglected cancer both of the internal and external organs.

26. REPORT FROM DAULATABAD, PERSIA

The next letter is from Dr. Mary A. Zoekler, Daulatabad, Persia. Daulatabad is a city of approximately 10,000 population, with a population of unknown extent in the surrounding country. The population resembles Southern Europeans in its complexion. The Doctor has been in local practice twenty years, treating from one to five thousand patients a year but does no surgery. The number of cancer cases occurring in 1932 was 4, 1 stomach and liver, 2 female genital organs and 1 of the orbit. Constipation is not common except among those who practice the opium habit. Nutrition is normal. The poorer class eat whole wheat bread, cheese,

fruits in season and meat soup, while the well-to-do add rice and a large amount of meat. Meat eating is considered common likewise salt consumption. Vegetarianism is not practiced. There are no facilities for pathological examination of tissues. The Doctor is of the opinion that cancer is less common in Persia than in America, not as a matter of theory but as a matter of fact. She does not think there is much neglected cancer in the locality. The foregoing information is amplified by an extended letter from which I quote in part as follows:

"My impression would be that cancer is considerably less common than it is in America, though by no means non-existent. As far as my own practice is concerned I have no accurate record of the first years but I doubt if I have seen more than 30 or 40 in the 20 years of practice here. Of these the great majority have been cancers of the uterus, either cervical or of the body of the uterus. As a large part of my practice is gynecological this is perhaps not surprising. I have never seen a cancer of the buccal cavity, have seen perhaps two of the oesophagus, several of the stomach, two or three involving the peritoneum and intestines, one of the rectum, several rodent ulcers, two peri-orbital and one sarcoma of the eye, two or three breast cancers. Your paper brings up the question of long continued irritation by clothing or other factors in connection with the underlying causes of cancer. The Persian women wear generally non-constricting clothing. Although they are now very generally adopting European dress they have not adopted either corsets or brassieres. They bear children early and late and in general have very poor obstetric care with no attention paid to repair of torn tissues. In no part of Persia with which I am familiar is the Betel Nut or any similar preparation used, though it is possible that it may be found near the Eastern border. Smoking is universal, both among men and women, but a short-stemmed pipe is never used. Cigarettes are common and either the water pipe or a long stemmed pipe with a large stem which is not put into the mouth. Until recent years syphilis has not been common but it is now increasing by leaps and bounds. In general nutrition is good. The upper classes may possibly be overnourished, the lower classes slightly undernourished, but I doubt if any considerable proportion of the population ever suffers from hunger. Native foods are abundant and cheap. Good whole wheat bread is the staple diet for all. Fruit and a few vegetables are extremely abundant in their season. Sunshine is the rule, rain and clouds the exception. Most people are very distinctly tanned, apart from the rather naturally dark complexion".

27. REPORT FROM REZAYEH, NORTHWEST PERSIA

From Northwest Persia I have a report from Rezayeh made by Dr. Laura B. Muller who states the local population is about 60,000 consisting of Aryans, Assyrians, Armenians, Persians, Jews and Kurds. She has been in local practice for 22 years. She expresses no opinion as to cancer frequency except that it is relatively rare in the community. Constipation is not common in the local population and nutrition is deficient, consisting chiefly of whole wheat bread, cheese and milk products, fruits in season and rice. Table salt consumption is common and vegetarianism is not practiced.

28. REPORT FROM HAMADAN, PERSIA

From Hamadan, Persia, I have a report from Dr. J. A. Funk of the Lily Reid Holt Memorial Hospital containing the following information. The estimated population of the area is about 500,000, the population consisting of Aryans with a mixture of Arab and Turanians. The Doctor has been 30 years in local practice. The annual number of patients treated is about 4,000 with about 500 operations. The number of cancer cases in 1932 was 39, the prevailing types being buccal cavity, stomach and liver, intestines, female genital organs, breast and other organs and parts. Skin cancer is rare. There were six operations for cancer in 1932. Constipation is quite prevalent. Nutrition is both excessive and deficient according to the type of population. Meat eating is common among the better classes, the poorer classes eating it sparingly. Table salt consumption is common. Vegetarianism is not practiced. No betel-nut or kangri burn cancer have been seen in the community, and there are no facilities for pathological examination of tissue. Most cases are seen too late for favorable results of treatment.

29. REPORT FROM RESHT, PERSIA

The most valuable report of the series made to me is by Dr. J. Davidson Frame, American Hospital, Resht, Persia. Writing under date of February 17, 1933, Dr. Frame says:

"It has always seemed to me that cancer was less common here than the attention paid to it in the literature would indicate as prevailing at home but one must allow for its position as an unsolved problem which makes it more a matter of discussion. My colleague who had several years experience in the Univ. of Mich. Hosp. at Ann Arbor says that cancer is certainly less common here but that hospital would not reflect the community condition at home".

The letter then continues as follows:

"As I said to him in discussing your query, I have seen all types (clinically) from a rodent ulcer on the scalp to a sarcoma on the big toe. My opinion is that uterine and stomach cancers are probably as common as anywhere; breast cancers seem to me very few and the figures given probably give too high a presentation as we have just had an unusual "run" of cases. Cancers of the mouth seem to me uncommon. I would be inclined to say that I had seen as many chancres of the tongue as cancers. This might be due to the fact that the Persian does not hold his pipe between the teeth but against the lips or in the lips temporarily but almost invariably passes it around the circle. As to nutrition, the Persians use polished rice but there is no Beri-beri nor much obvious rickets, perhaps because the poor collect greens in the fields for a dressing, use greens as freely as possible and commonly have a little meat. The rich and even middle class have sufficient meat (perhaps more than needed) and love raw greens. Some years ago I went over the hospital diets as to calories and protein content and I found the ordinary Persian mess of rice and a dressing on it gave a very scientifically balanced diet. They do not use much high seasoning but do start their dressing often by browning onion in the pot and use a sort of soupcon and they use garlic freely. The poor people say it gives the most flavor for the least money! The Persians eat with their hands, tend to bolt their rice and some of the common people have a habit of squeezing it into a semi-ball before putting it into their mouth. I think this covers the points of your letter and questionnaire. It should be recalled that in our dispensary we have every sort of case including large numbers for worms and favus, etc. so that the figures do not represent the incidence of cancer among the serious or surgical diseases of the community. There are doubtless many women still who refuse to consult a male physician but the number is constantly diminishing. Again one must note that these common diseases come more from city people while the serious conditions come rather from villagers, all these types of cancer appear among villagers as well as city dwellers".

The letter is amplified by certain statistics, of which I quote the following.

REPORT ON AVAILABLE CANCER STATISTICS.Inpatients

Hospitals; - 30 beds

578 inpatients, 1932 -

341 surgical cases
253 major operations

A friend makes pathological examinations of tissues for us. Where available these diagnoses are added:

Cancer of the rectum: - Clinical diagnosis - Colostomy

Cancer of stomach : - Well advanced adenocarcinoma of stomach. The appearance are of ulcerating carcinoma.

Cancer of stomach: - exploratory diagnosis

Cancer of larynx: - Clinical diagnosis; tracheotomy for palliation

Cancer of bladder: - Medullary carcinoma, malignant papilloma of bladder

Cancer of stomach: - exploratory diagnosis

Cancer of stomach :- " "

Nasal Polyp: - true neoplastic polyp, fibroma durum, locally malignant

Cancer of cervix ; - inoperable because of bladder involvment

Tumor of breast ; - Medullary Carcinoma

Tumor of breast: - Fibroid nodule, radical operation, report not yet at hand

Sarcoma: - Testes, malignant teratoma of adenocarcinoma type

Perforating mass in intestine: - Lymphoblastoma, large celled type, reticulocytoblastoma.

Hypernephroma: - Clinical diagnosis: operation refused

Sarcoma (?) Neck report not received

Sarcoma: - Retroperitoneal Lymphosarcoma, infiltrating adipose tissue

Sarcoma: - Retroperitoneal, exploratory diagnosis

Sarcoma of broad ligament(?) report not received.

Outpatient Diagnosis of Carcinoma

A large general outpatient clinic covering all classes of work.

Diagnosis generally obvious or doubtful as patients generally fail to follow up.

In stomach cases our diagnosis are superficial for the same reason and also because we have only recently installed a fluoroscope. We offer a limited number of patients the opportunity of coming into the hospital for study.

All cancers of the cervix were too advanced to hope for operative cure. We tried one but found it impossible to free the bladder. Below I list all stomach diagnosis which range from classic pictures of ulcer through all sorts of vagueness to obvious cancer.

Dr. Frame, Pay Clinic Men and Women 1000 cases	Dr. Frame, Free Women and Children 3000	Dr. Brinkman, Free Men 1000
Rodent Ulcer	1	
Stomach (mass) 1	1	
Stomach		4 ?
Tongue	1	
Cervix	8 & 1	
Rectum 1		
Breast 1	1	
Abdominal malignancy	1	1
Melanosarcoma		?

In addition to the above there were stomach cases, most incompletely diagnosed as follows:

u	69	41
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The questionnaire appended to the letter gives the following results. The population in 1932 was from 50,000 to 70,000 mostly Persians. Dr. Frame^e has been 27 years in local practice and Dr. Brinkman, his assistant, 1 1/2 years. The number of inpatients treated in 1932 was 578 and outpatients, 9,000. There were eleven carcinomas and seven sarcomas among inpatients during 1932, the prevailing types being stomach and liver and female genital organs. The ordinary diet consists of rice with plenty of greens and some meat. Table salt consumption is normal. Vegetarianism is not practiced.

Dr. Frame was good enough to write me an additional letter under date of April 7th, but the foregoing covers all the essential points of his experience.

I received an additional letter from Tabriz from Dr. W. S. Vanneman who has been in local practice for 42 years. He does not think there is any prevailing types of cancer but there are a few of all types. Constipation is very common, almost universal. Nutrition is deficient in most of the people. Meat eating is common and table salt consumption is not excessive. Vegetarianism is not practiced. He expresses the opinion that cancer is much rarer in Persia than in America and

he attributes this partly to the wholesome nutrition of the local population, the diet consisting chiefly of whole wheat bread and fruits with their skins on so that no vitamins are lost.

30. REPORT FROM MESHED, PERSIA

My last letter from Persia is from Dr. H. A. Lichtwardt of the American Hospital, Meshed, dated February 11, 1933, from which I quote as follows:

"After working in this corner of the world since 1919, it is my distinct impression, also shared by my colleagues, that we are definitely seeing more cancer than we did a decade ago. Our outpatient statistics are not published in our reports, but every year, out of an outpatient clinic averaging from 6,000 to 10,000 new outpatients, we see from 6 to 10 cases of cancer of the breast, and an equal number of cases of cancer of the lip, and cancer of the bone, all of which are too far advanced for operation and so we do not admit them to the hospital. Those who would be benefited by deep X-ray therapy are recommended to go to Teheran, the only place in Persia where this is done but unfortunately few are economically able to do this. No radium for cancer therapy is available in Persia as yet.

It has only been three years that we have had a woman physician in our hospital, but since that time we have recorded many more cases of malignancy of the cervix and generative organs - as the women feel freer to come to a woman physician for examination. Unfortunately we do not have access to a pathological laboratory, so our diagnoses are made on clinical symptoms and gross pathology alone.

However it is my opinion, and I think it is also that of most doctors working in this land, that there is definitely less cancer here than in higher civilized countries, with more varied (and more indigestible), diet. It is only recently, that we have had proper X-ray and fluoroscopic facilities, that we are discovering carcinoma of the gastro-intestinal tract. In our last report you will note that we record eight cases of general abdominal carcinoma, all but one of which, were in Persians. After working hard here for thirteen years, trying to treat thousands of patients, most of whom have preventable diseases, I am fully convinced that we should lay much more emphasis on preventive medicine, hygiene and sanitation and get at the source of the great amount of disease we see in this country. To that end I hope to be able to do some studying in Public Health Work this next year when we return home on furlough. If you have any suggestions regarding places to study - courses to take, etc., I would be very glad to receive suggestions and advice.

One studying the subject of cancer as thoroughly and continuously as you have, must be impressed, as we all are, with the comparatively little progress we are making in eradicating the disease. It is one of the ancient scourges against which modern medicine has made but little progress. The Persians use the ancient term-"seratahn" for cancer, which is their word for "crab" and also for the corresponding sign of the zodiac. One of their old writers-Joseph - writing a book on therapy in Herat in 1511 A.D. makes this comment on cancer:

Should a person have cancer, 'tis a cause for much sorrow,
 They'll have trouble today, they'll have trouble tomorrow,
 Of complete disappearance there is not much hope,
 But an enema daily, will curtail its growth."

31. CANCER AND DISEASES OF INDIA /

An extended discussion of cancer in India appears in a volume entitled A Commentary on the Diseases of India by Norman Chevers, M.D., Deputy Surgeon-General of the Indian Army, London, 1886. This work confirms the general impression as regards the rarity of cancer in India wherever the subject has been inquired into by fairly qualified methods. It is pointed out that fibroid tumours and most other non-malignant growths are not rare in India and it is claimed that much larger fatty tumours were met with in Bengal than in England. It is stated that, "Only too many cases of malignant disease present themselves in India, especially in the large city hospitals". But it is said, "We must, I think, consider that the diseases of this class are by no means remarkably prevalent in India". With reference to scirrhous cancer it is felt that this type is undoubtedly rare in Lower Bengal, and is not in India, the scourge of Englishwomen as it is at home.

Epithelial cancers are the most prevalent form of malignant disease in India and is probably quite as common there as it is in England, attacking the conjunctiva, skin, lip, tongue, uterus and penis. The writer remarks he had never seen a case of rodent ulcer in India, and that while he was on the lookout for colloid cancer, especially of the mesentery, he had never seen a case of this type in his own practice.

32. OBSERVATIONS BY DR. ERNEST F. NEVE

Another paper of outstanding merit on cancer in India is by Dr. Ernest F. Neve, published in the Practitioner, London 1929. It is particularly valuable for its reference to kangri burn cancer, there having been since 1881, - 2,629 operations for epithelioma, at the Kashmir Mission Hospital, of which approximately 80% were for kangri burn cancer. I cannot omit the following interesting quotation.

"In India, the extreme rarity of cancer amongst Hindus, who also enjoy a wonderful immunity from uterine fibroids and hypertrophy of the prostate, is interesting and may have some bearing on this subject. Hindus are vegetarians. Does undue consumption of animal food tend to stimulate certain endocrines or other bio-chemical action which sets up irritation?"

Dr. Neve quotes freely from a paper on The Cancer Problem by the late C. E. Green of Edinburgh, highly suggestive of explanations that have received inadequate attention.

33. ADDITIONAL STATISTICS FOR MADRAS AND AHMEDABAD

Since the foregoing paper was completed, I have received some additional statistics from India which are herewith included. The cancer mortality of Madras, 1927-31 is represented by 571 deaths distributed by organs and parts in the following order: buccal cavity 13.8%; stomach and liver 14%; intestines and rectum 20.7%; female genital organs 13.5%; breast 6.7% and other organs and parts 28.4%. The average death rate per 100,000 of population for the five years under review was 20.4 or respectively 3.4 per 100,000 for buccal cavity; 2.9 for stomach and liver; 4.2 for intestines and rectum; 2.8 for female genital organs; 1.4 for breast and 5.8 for other organs and parts. Cancer of the skin is not mentioned.

I have also returns for Ahmedabad for which the general cancer death rate for the period 1926-32 was 7.7 per 100,000, or respectively 9.1 for males and 5.7 for females. This extremely low rate naturally raises the question of accuracy and completeness but I give the figures as they have been furnished me by the health officer of the Municipal Borough of Ahmedabad, Dr. A. M. Seervai.

I also have a return for Bangalore, India, limited to 16 deaths from cancer in an average population of about 120,000. No details are given as to the different organs and parts of the body affected.

34. CANCER IN RANGOON

Finally as regards India, I am able to give an extended report on the cancer mortality of Rangoon, Burma, for the period 1926-1932. In these seven years there have been 296 deaths from cancer which I give by organs and parts for the period under review with the rate per 100,000. The percentage distribution by organs and parts has been as follows: buccal cavity 17.6%; stomach and liver 32.1%; intestines and rectum 5.4%; female genital organs 20.6%, breast 12.8% and other organs and parts 11.5%.

CANCER MORTALITY IN RANGOON, INDIA, 1926-1932 Rate per 100,000

	<u>Deaths</u>	<u>Rate</u>		<u>Deaths</u>	<u>Rate</u>
Cheek	2	0.1	Vulva	1	0.04
Jaw	20	0.7	Breast	38	1.4
Lips	2	0.1	Bladder	1	0.04
Mouth	6	0.2	Kidneys	1	0.04
Tongue	22	0.8	Larynx	4	0.1
Liver	41	1.5	Lungs	1	0.04
Oesophagus	4	0.1	Neck	4	0.1
Stomach	40	1.4	Pancreas	1	0.04
Throat	10	0.4	Parotid	1	0.04
Intestines	5	0.2	Penis	2	0.1
Rectum	11	0.4	Scrotum	1	0.04
Uterus	60	2.1	Not specified	18	0.6

A summary of the rates per 100,000 of population for the seven conventional divisions for Rangoon, 1926-1932 is as follows: buccal cavity 1.9; stomach and liver 3.4; intestines and rectum 0.6; female genital organs 2.2; breast 1.4, and other organs and parts 1.2, total 10.6.

35. SUMMARY

It is fully realized that the foregoing discussion is quite inadequate and in some respects inconclusive. But for myself I cannot escape the conviction that

cancer in its different forms is unquestionably relatively very rare throughout India and that the average cancer mortality rate for the whole of India will probably not exceed 20 or 25 per 100,000. Unquestionably diligent research would improve the statistics considerably for there are certain difficulties which arise from the caste system and the seclusion of women who seldom can be subjected to a thorough examination. At the same time post mortems in India are difficult to secure in view of the opposition of the native populations. But India offers extraordinary opportunities for inquiries into the etiology of cancer, particularly in its possible relation to diet and nutrition. The dietary habits are unusually restricted and every possible encouragement for further research should be given.

The peculiar nature of betel nut and kangri burn cancer likewise entitle these two extraordinary afflictions to more extended study than has thus far materialized. Indications are very promising of valuable results to be forthcoming in the near future in view of the ^{more} ~~most~~ scientific attention which is being given to the disease throughout India at the present time. In the meantime it is to be hoped that the foregoing extended discussion will serve a useful purpose and prove of assistance to research workers not only throughout India but elsewhere, and particularly to the study of cancer in primitive races.

Note on Cancer in India:

Since the foregoing paper was complete in receipt of additional information contained in the Trienn the Working of Hospitals and Dispensaries in the Punjab, 192 ing to this report the number of malignant tumors treated at the year 1921

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Note on Cancer in India:

Since the foregoing paper was completed I have come in receipt of additional information contained in the Triennial Report on the Working of Hospitals and Dispensaries in the Punjab, 1929-1931. According to this report the number of malignant tumors treated at hospitals during the year 1931 was 2,891 with 61 deaths. The relative significance of this is best illustrated by the statement that the total number of patients treated at indoor hospitals and outdoor clinics was 12,425,334. The number of patients was fairly evenly divided between the Hindus and the Mohammedans. The number of nonmalignant new growth treated during the year was 12,789 with 23 deaths. These two figures are suggestive of an incredibly small proportion of tumors in the enormous population treated during the year, suggestive of the conclusion that malignant newgrowths are certainly a very rare occurrence in the Punjab in proportion to the population affected. The report gives a table of the geographical distribution of the new growths by districts but it would hardly serve a practical purpose to enlarge upon this aspect except to say that the largest number occurred in the Lahore district, or 662 cases, this being the center of hospitalisation on account of the Mayo Hospital which is the outstanding medical and surgical institution in the Punjab.

