

XIX.

(From the Department of Pathology of Columbia University,
at the College of Physicians and Surgeons.)

Cancer among the American Indians and its bearing upon the ethnological distribution of the disease.¹⁾

By

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Cancer in the broadest meaning of the word, i. e., a malignant new growth formed through limitless cell proliferation, may undoubtedly occur in any multicellular organism. In fact the investigations of the last decade, and mainly those of the Imperial Cancer Research Fund in London, have shown that cancer may occur not only in every human race, but in nearly every species of vertebrates. But the malignant new growths in different species of animals differ to a great extent both as to frequency of their occurrence and their characteristics, and very probably also as regards the primary etiological moment.

If a comparison be made between the carcinoma of the thyroid of a trout, the adenocarcinoma of the breast of a white mouse and the sarcoma of a white rat, and human carcinoma or sarcoma, the conditions, while similar morphologically, present totally different clinical and pathological entities.

The investigations of Haaland (1), Gierke (2) and others have shown that a tumor, which is readily transplantable into Berlin mice, loses its virulence if implanted into Danish mice. Albrecht and Hecht (3) state that in a careful examination of several thousand mice conducted in Vienna since 1904, they found only one tumor mouse, while in 25 mice

1) This research is conducted at the expense of the George Crocker Special Research Fund. Read before the American Association for Cancer Research. May 2, 1910.

sent to them from London tumors developed in several. Whether these differences are of a purely racial character, or are due to the influence of climate, diet, etc., is immaterial. The important fact remains that different classes of animals of the same species react differently to implantations, as well as to spontaneous formation of tumor.

A priori then it seems very plausible that racial differences may also have a certain significance in the frequency of occurrence and characteristic features of human cancer.

In 1903, the Imperial Cancer Research Fund of London instituted an investigation into the ethnological distribution of cancer among the native races of the British Colonies (4). Some of the results obtained by this research are extremely interesting. In Gambia, Ashanti, and Natal, cancer was not found at all. It occurred very rarely in British Central Africa, Southern Nigeria and at the Gold Coast.

Dr. Morris (5) of the Blantyre Mission saw only one supposed case of cancer in four years. Dr. Old, during several years residence in British Central Africa, saw only two cases of Sarcoma and Carcinoma. Dr. MacGregor saw only one case in ten years in British New Guinea, and Dr. A. G. Craigen did not encounter a single case of cancer among the native population in his four years stay in the same colony.

In Ceylon, during the year 1904, there were reported 234 cases in a total population of 3812931, or an average of about six cases in 100000, which is certainly very low in comparison with the 70 to 100 cases in 100000 population, — the rate for European countries. The disease occurs somewhat more frequently in St. Helena and Mauritius, but the population in these colonies is heterogeneous and consequently affords no favorable ground for the study of the race incidence of cancer.

Of great significance seem to be the results obtained among the Chinese population of Hong-Kong. During the ten-year period of 1895—1904, there were reported in Hong-Kong 119 cases of Carcinoma and Sarcoma, in a Chinese population of about 300000, or an average of about 4.45 cases per 100000; which again must be considered very low in comparison with the 71.0 per 100000 of population reported in England during the same time.

Dr. Balfour reports that during five years, he saw in Soudan only ten cases of malignant tumor. Of these $\frac{1}{2}$ were carcinomatous and $\frac{1}{2}$ sarcomatous. Several other physicians of the same colony seem to have come to the same conclusion, — that the disease is extremely rare in that province. So, for instance, Capt. Anderson, of El Obeid, Kordofan, writes: „During a year spent in the province, in which time I have had occasion to examine a great many natives, I have never come across a single case of malignant disease amongst the Arab, Nuba and Misad tribes.“

Capt. Bousfield, of Kassala, states that in the military hospital of Kordofan there have been no cases of malignant disease from 1904 to 1907.

Dr. F. C. Wellman informs us that he saw only two cases of Sarcoma among the natives of Angola, and his experience extends over several years, during which time he had occasion to examine a great number of natives.

There also seems to be a difference in the cancer amongst the caucasian and non-caucasian races, in regard to the organs involved. W. J. Niblock, writing about cancer in India, states that in the cases found in the last ten years in the Madras General Hospital, cancer of the cheek occurs in about $33\frac{1}{3}$ of all the instances, and together with the cancer of the jaws and tongue, it covers over 50 pCt. of all the cases of malignant growth.

Cancer of the penis is extremely frequent among the Hindoos, while not a single case is met with among Mohammedans. This fact is apparently due to the circumcision practised by the latter.

Cancer of the alimentary canal, on the other hand, is comparatively rare among non-caucasians. Dr. Nebe, writing about cancer in Kashmir, states that a great many of the tumors met with among the natives involve the cheek and the mouth, while more than $\frac{3}{4}$ ths of the epitheliomata are due to Kangri burn. Kangri is a charcoal oven which the natives of Kashmir wear next to the skin of the abdomen in winter. This produces superficial burns of the skin, on the basis of which a cancer forms in a great many cases. Such an epithelioma of the skin of the abdomen is never met with among Europeans.

Dr. Bashford, in his analysis of the results of the investigation of the Imperial Cancer Research, came to the conclusion that the rare occurrence of the disease amongst primitive races is only apparent and is due to the difficulty of obtaining data and of diagnosing cases of „inaccessible“ cancer (cancer of the internal organs), and furthermore, to the fact that the average length of life amongst these races is much shorter than that of the Europeans.

While these conclusions are undoubtedly true for a part of the results obtained, it may be open to question whether they account for all cases. For instance, as noted above, cancer was shown to be extremely rare among the Chinese population in Hong-Kong. Dr. F. Clark, who compiled the report, states that „during the past ten years, no less than 15365 post mortem examinations have been made on the bodies of Chinese dying in the colony, and out of this total number, only ten are returned as having died of malignant disease. These bodies cannot be said to be specially selected, though a small proportion of them are bodies removed to the mortuary during an epidemic of plague, under suspicion that they have succumbed to this disease. The bulk of them represent merely those

Chinese persons whose deaths have occurred outside the public hospitals, and have not been certified by a registered medical practitioner. The figures, as they stand, represent a proportion of only 0,65 per 1000 deaths, whereas, I believe, in England about 38 per 1000 of all deaths are due to malignant disease." Such results, verified by autopsy, can hardly be accounted for by anything but actual rare occurrence of the disease in that race.

That this difference again is not due to a shorter average life seems to be indicated by the following statement of Dr. Clark: „At the census taken in Hong-Kong in 1901, the age distribution of the Chinese population was as follows:

0—15 years	17 per cent
15—45 „	69 „ „
45 „ and upwards	14 „ „

The corresponding figures for England (1891 census) were as follows:

0—15 years	35 per cent
15—45 „	47 „ „
45 „ and upwards	18 „ „

The difference, — between 14 and 18 pCt. of the proportion of persons over 45 years of age would not be sufficient to account for the very great difference in the incidence of malignant disease."

It must, however, be borne in mind that the vast British Colonies, populated by numerous heterogenous races, as India or Egypt, present almost unsurmountable difficulties to such a statistical investigation. On the other hand, the colonial possessions of the United States consist of insular territories of comparatively small dimensions and would consequently lend themselves more readily to a similar investigation. Such an investigation would appear to be of the greatest interest since within the domain of the United States as constituted at present, every conceivable race and nationality may be met living under different conditions, from the primitive state to the state of highest civilization. In view of all these considerations, the George Crocker Special Research Fund of the Columbia University instituted in the latter part of last year, a statistical investigation of the etiology of cancer, based on American clinical material.

In order to study the ethnological distribution of cancer, the investigation was begun simultaneously in Hawaiian Islands, Philippine Islands, Porto Rico, Isthmian Canal Zone and among the American Indians of the United States. The investigation is only a few months old and considering the distances separating the different territories and the difficulties inherent in such a research, final results cannot be expected by this time, though some information of interest has already been obtained, as for instance

the observation made by Dr. Lloyd Noland, at Colon Hospital, Cristobal, Canal Zone. According to the statement of Dr. Noland, he was able to collect only 35 cases out of 54249 patients treated in the past five years, and there were very few cases of deaths, in which there was any doubt as to diagnosis, that did not come to autopsy.

The work at Colon Hospital, both clinical and pathological, is on a par with that of any metropolitan hospital, and this number is very small in comparison with the usual percentage of cancer cases in European hospitals. This comparative infrequency of cancer cases in Colon Hospital is most probably due to the fact that the population in the Canal Zone is three quarters negro, and it seems to be a fairly well established fact that cancer is less frequent in the negroid race than among the whites of the United States.

This fact can be noted in the following table computed from the census statistics of 1900:

States	Population	Cases of Cancer	Ratio
Virginia	white 1 190 000	397	1 in 3000
	colrd. 660 000	136	1 " 5000
S. Carolina	white 560 000	147	1 " 4000
	colrd. 780 000	144	1 " 5500
N. Carolina	white 1 250 000	326	1 " 4000
	colrd. 630 000	84	1 " 7500
Georgia	white 1 200 000	290	1 " 4000
	colrd. 1 000 000	161	1 " 6000

But the most significant results were obtained from the investigation among the American Indians in the United States, and we shall therefore present here a detailed report of this part of our study.

The American Indians residing in the United States lend themselves peculiarly well to such an investigation in view of the fact that the government considers this race as wards of the nation and consequently keeps practically a record of each individual member. The primitive Indian population, according to the last report of the Commissioner of Indian Affairs, is 199184. Practically the entire population is confined within government Reservations under control either of a government agent or a superintendent of an Indian School located at the same reservation. At each reservation or Agency, there also resides a government physician. There are in all 130 physicians thus employed by the office of Indian Affairs of the Department of the Interior.

The investigation was conducted in the following manner: The Hon. R. G. Valentine, then Commissioner of Indian Affairs, kindly agreed to send a personal letter to each physician in the Indian Field Service.

This letter, together with our own circular of information and ten copies of our cancer schedule, which is used in all our statistical work, was forwarded to each of the 130 physicians in the Indian Field Service. The contents of the letters and the form of the schedule follow:

Sir!

Doctor Levin of the Department of Pathology of the Columbia University, 433 West 59th Street, New York City, is working under a special research fund upon the question of cancer. He is making a statistical investigation of the aetiology of the disease, and wishes the co-operation of the medical corps of the Indian Field Service.

This is an important work on which Dr. Levin is engaged, and the Office is anxious to do what it can to advance the world's knowledge on a subject of such vital import. You will, therefore, on receipt of this letter, make prompt answer to the questions propounded by Dr. Levin. It is hoped that you will take such interest in the subject as will tend to aid the investigation in every possible manner.

Dr. Levin will communicate with you; please follow closely his suggestions.

Very respectfully,

R. G. Valentine,
Commissioner.

Dear Doctor!

As stated in the enclosed letter of Mr. R. G. Valentine, our Department is making a statistical investigation of the etiology of cancer under the Special Research Fund of Columbia University. The question as to whether cancer (carcinoma or sarcoma) occurs among the American Indians, and if so, the extent of its prevalence and its characteristic features, will undoubtedly be of the greatest importance in our investigation. I should like to know how many cases of cancer you have met with in the locality in which you are now stationed, the size of its Indian population during that time, and the average length of life of said Indians. Would you also state whether, in your estimation, there are some characteristics or peculiarities in the course of the disease among your patients which are worthy of note.

Besides answering the above questions, I would also ask you to kindly fill out the enclosed cancer schedules, covering patients now under your care as well as old cases shown by your records. Should you be in possession of any anatomical material which you wish us to examine, our Department will gladly defray the expenses of transportation and send you the result of the examination.

Your co-operation in this work will be of great value and will receive full acknowledgment in the published report of the study.

Very sincerely,

The Columbia University — Special Research Fund.
Department of Pathology.

Cancer Schedule
No. . . .

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- 1. Attending Surgeon. Dr.
- 2. Place and Date of Record

 (State address of Attending Surgeon or name of Hospital.)
- 3. Name of Patient or Initials
- 4. Sex
- 5. Age
- 6. Single or Married
 (If female state whether patient had children or miscarriages.)
- 7. Race or Nationality
 Australoid (Coolies of East India),
 Negroid (Negroes, Negritos of the Philippines),
 Mongoloid (Chinese, Japanese, American Indians, Philippinoes),
 Melanochoic (Italians, Spaniards, Greeks, Arabs, Jews),
 Xanthochroic (Fair Europeans).
 State not only the name of the race, but also of the subdivision.
- 8. Place of birth
 (State not only the country but also the town or village where the patient
 was born.)
- 9. Residence, etc.
- 10. Occupation
 (Pay special attention to occupation, involving use of Chemical [Anilin, Pa-
 raffin, Tar, etc.], Physical [X-Rays, Radium, Excessive Heat, Electri-
 city, etc.], or Mechanical irritants).
- 11. Diet

 (State whether the diet is composed chiefly of vegetables, fresh fish, fresh
 meat, salted fish, salted meat).

12. Habitual use of drugs
(Alcohol, Tobacco [chewing, smoking pipe or cigar], Opium [opium smoking or morphium injection], Cocaine.)
13. Previous general diseases
(Tuberculosis, Lepra, Arterio-sclerosis, Syphilis, Gonorrhoea, etc.)
14. When were the first symptoms of the disease observed?
15. On what data or symptoms was the diagnosis made?
(If the diagnosis was made at an operation, autopsy or microscopically, specify so and state the exact anatomical diagnosis.)
16. What organ was primarily involved?
17. Was the same organ previously diseased or subjected to trauma?
(As instances of such previous local diseases important in the study of the etiology of cancer may be mentioned Leucoplasia of the tongue, Mastitis, Lupus of the fact, Noevi, Scars or Leprous Nodules of the skin, Gallstones, Round Ulcer of the stomach, Varicose Ulcers, Old Fractures of Bones [osteosarcoma], etc.)
18. What organs became subsequently affected?
19. Did any other tumor develop on the same patient?
20. Were there any other cases of cancer in the patient's family?
(The family may mean grandparents, parents, brothers and sisters, man or wife, children. State relationship to patient and organ primarily involved.)
21. Were there any other cases of cancer in the same house or neighborhood?
(State time, place, and organ primarily involved.)
22. Was there a retrogression of the tumor?
(After treatment — Operation, X-Ray, Radium, Fulguration — or spontaneously.)

Remarks.

107 physicians kindly responded to our inquiry. I deem it a pleasant duty to express here my gratitude to the Hon. R. G. Valentine, former Commissioner of Indian Affairs, for the kind assistance rendered, as well as for the authority granted to pursue the investigation, and to the physicians, whose names follow, for their co-operation in our research.

The reports of the physicians were analyzed and the contents tabulated in accordance with the several points of inquiry, namely the size of the population of the Reservation, the length of residence of the physician in it, the number of cases of cancer met with, and the physicians' opinion

on the question of the average length of life of the American Indian, whenever such a statement was made by the physician.

Data of vital statistics are calculated usually at the annual ratio per a 100000 of population. Therefore a column was added to indicate the total from a multiplication of the number of years of residence and the population for each physician, thus arranging the answers in a uniform manner.

Name and address	Popu- lation	Years	Total	Cancer cases	Average length of life
Dr. Ernest J. Allen, Tongue River Indian School, Lama Deer, Mont.	1 500	$\frac{1}{3}$	500	0	Same as white race
Dr. A. J. Anderson, Lawrence, Kans.	750	5	3 750	0	
Dr. J. L. Atkinson, Ft. Peck Indian Agency, Poplar, Mont.	1 700	23	39 100	0	—
Dr. E. V. Bobb, Sisseton, S. Dak.	1 900	9	17 100	1	—
Dr. Carl B. Boyd, San Carlos, Ariz.	3 000	$\frac{3}{4}$	2 250	0	30 years
Dr. Chas. M. Buchanan, Tulalip Indian Agency, Tulalip, Wash.	2 000	15	30 000	1	55 or 60 years
Dr. Ino. R. Colloway, Mescalero, N. Mex.	475	2	914	1	27 years
Dr. J. R. Collard, Red Lake, Minn.	1 350	6	8 100	0	—
Dr. L. L. Culp, Fort Totten, N. Dak.	980	4	3 920	1	—
Dr. Homer Davis, Genoa Indian School, Genoa, Neb.	300	4	1 200	0	—
Dr. Ed. J. Davis, Zuni, N. Mex.	1 700	6	10 200	0	40 to 45 years
Dr. Lewis C. Day, San Juan Indian School, Shiprock, N. Mex.	10 000	$\frac{1}{2}$	5 000	0	—
Dr. S. C. Davis, Colony, Okla.	300	2	600	0	—
Dr. Guy P. Doyle, Bishop, Cal.	700	12	8 400	0	—
Dr. Fred Dillon, Laguna, N. Mex.	2 500	5	12 500	1	—
Dr. Henry E. Goodrich, Fort Yates, N. Dak.	3 500	13	45 500	0	—
Dr. H. V. Hailman, Ft. Apache Ind. Agency, White River, Ariz.	2 200	2	4 400	3	—
Dr. E. E. Hart, Cantonment, Okla.	700	5	3 500	0	—
Dr. L. M. Hardin, Canton, S. Dak.	10 000	16	160 000	1	—
Dr. C. M. Hollister, Ind. School, Pierre, S. Dak.	150	3	450	0	—
Dr. John S. Hogshead, Covelo, Cal.	600	$2\frac{3}{4}$	1 750	0	—
Dr. H. L. Hulburd, Ind. School, Morris, Minn.	160	2	320	0	—
Dr. M. A. Israel, Nevada Indian Agency, Wadsworth, Nev. . . .	500	3	1 500	0	—
Dr. R. J. Jackson, Rapid City, S. Dak.	250	3	750	0	—

Name and address	Population	Years	Total	Cancer cases	Average length of life
Dr. G. O. Keck, U. S. Ind. School, Albuquerque, N. Mex.	1 961	4	7 844	1	—
Dr. Elmer F. Kinne, Luepp, Ariz.	1 250	1	1 250	0	—
Dr. E. W. Latham, Myselem Sub-Agency, Wash., Colville Reserv.	2 000	many	—	0	25 to 30 years
Dr. Chas. E. Leithead, Indian School, Ft. Bidwell, Cal.	71	$\frac{2}{3}$	47	0	—
Dr. T. P. Martin, Taos, N. Mex.	800	20	16 000	0	—
Dr. Mary H. McKee, Elbowoods, N. Dak.	1 200	18	21 600	1	35 years
Dr. W. T. McKay, Indian School, Chilocco, Okla.	500	5	2 500	0	—
Dr. J. M. Meyers, Odanah, Wis.	1 200	$5\frac{1}{2}$	6 600	1	—
Dr. A. P. Meriwether, Ft. Shaw, Mont.	8 600	9	77 400	0	—
Dr. Roy G. Melinder, Senaca School, Quapaw Agency, Wyandotte, Okla.	1 700	2	3 400	0	—
Dr. Geo. H. Niemann, Ponca City, Okla.	800	$2\frac{1}{2}$	2 000	0	—
Dr. M. L. Oberlander, Pryor, Mont.	450	8	3 600	0	Below general aver.
Dr. S. M. Parks, Kaw Agency, Kaw, Okla.	160	$\frac{2}{3}$	107	0	—
Dr. F. D. Patterson, Walker River Ind. Reserv., Schurz, Nev.	400	$\frac{1}{2}$	200	0	—
Drs. Phillips and Didier, Browning, Mont.	2 000	$\frac{1}{2}$	1 000	0	—
Dr. L. A. Parkinson, Beaulieu, Minn.	5 000	8	40 000	7	—
Dr. G. H. Phillips, Pawnee, Okla.	625	20	12 500	0	same as white
Dr. Lester D. Riggs, U. S. Ind. Agency, Tulalip, Wash.	500	1	500	0	50 to 60 years
Dr. F. H. Richards, Gila Bend, Ariz.	4 000	5	20 000	3	55 years
Dr. P. Richards, White Earth Ind. Agency, White Earth, Minn.	2 000	$2\frac{1}{2}$	5 000	2	less than the white
Dr. Paul F. Rice, Cannon Ball, N. Dak.	1 500	$3\frac{1}{2}$	5 250	1	—
Dr. L. Rothman, Indian School, Wittenberg, Wisc.	120	10	1 200	0	—
Dr. A. W. Robbins, Bayfield, Colo.	350	6	2 100	0	many live to be 70 years
Dr. R. L. Russell, Anadarko, Okla.	5 000	5	25 000	0	—
Dr. E. O. Sears, Decatur, Neb.	1 200	23	27 600	0	—
Dr. F. Shoemaker, U. S. Indian School, Carlisle, Pa.	3 400	13	44 200	0	—
Dr. W. L. Shawk, U. S. Indian School, Stewart, Nev.	275	1	275	0	—
Dr. Roy Thomas, Indian School, Phoenix, Ariz.	600	$\frac{1}{2}$	300	0	—
Dr. J. L. Taylor, Navajo Springs Agency, Cortez, Colo.	450	$\frac{1}{4}$	112	0	—

Name and adress	Popu- lation	Years	Total	Cancer cases	Average length of life
Dr. J. F. Turner, Canton, S. Dak.	2 500	16	40 000	0	—
Dr. J. G. Veldheim, Little Eagle, S. Dak.	1 800	5	9 000	0	—
Dr. W. Warner Watkins, Phoenix, Ariz.	2 000	1½	3 000	3	—
Dr. Louis W. Weekstroth, Wahpeton Ind. School, Wahpe- ton, N. Dak.	80	2	160	0	—
Dr. Lawrence W. White, Keshena, Wis.	1 400	4	5 600	0	—
Dr. F. W. Wyman, Sac and Fox Agency, Okla.	589	15	8 844	0	21,7 years
Dr. F. A. Yoakam, Cerrillos, N. Mex.	1 100	8	8 800	0	—
Dr. Chas. F. Zimmerman, Naper, Neb.	456	12	5 472	0	—
Dr. Edw. P. Ford, Randlett, Uinta Co. Utah	600	8	4 800	1	Younger Gene- ration to 45, the older to 65 years

A number of other physicians were kind enough to reply to our inquiry, but as they did not state the population of their reservation, their data could not be used.

The analysis of this table shows a population of 115455, which very nearly corresponds with the recorded Indian population, and during a time of practice ranging from a few months to over twenty years, only 29 cases of cancer were encountered. In other words, cancer is extremely rare among the Indians as compared with the whites of the same locality, since according to the twelfth census, cancer is just as frequent among the whites of the states in which the Indian Reservations are located, as in other states.

This fact of the extremely rare occurrence of cancer among the American Indians must be considered as established, since it is impossible to suppose that many cases of deaths from cancer could have escaped the notice of the Government physician.

Thus the conclusion must be reached, that while it may be true that cancer prevails among all the races of mankind, it is also true that the American Indians living under the same geographical and climatic conditions as their white neighbors, may be actually nearly immune from the disease.

If we turn now to the possible causes for the rare occurrence of cancer among the Indians, we have to exclude the theory that in this race the average length of live is less than in the white population of the

United States. From the statements of the physicians quoted above, as well as from the data of the Twelfth Census, one must infer that the average length of life of the American Indian compares favorably with the length of life of the white population of the United States. At the ages from 35 to 59 years, both male and female, there were in 1900, 207,81 Indians per thousand, as against 219,12 whites. At the ages from 60 to 89 years, there were 67,93 Indians per thousand to 65,28 whites. At the ages from 95 to 99 years, 537 Indians per million and 51 whites.

It is very interesting in this connection, and also in connection with the hypothesis that cancer is a function of age, to read the following abstract from Dr. Ales Hrdlicka's (6) „Physiological and Medical Observations Among the Indians, etc.“

„The proportion of nonagenarians and especially centenarians among the Indians is far in excess of that among native white Americans. It may be objected that the sources of error are apt to be greater among the Indians in such cases, and that the low ratio for males between 80 and 90 years of age may signify that some individuals of this group were classed as older, but the objection is not so serious as might be anticipated, on account of the marked general interest centering about the oldest in every tribe; at all events, no ordinary error could account for the extreme disproportion of centenarians observed, viz, 224 per million of Indians to 3 per million of whites. The relative excess of aged persons (80 years and above) among the Indians can signify only that the infirmities and diseases known ordinarily as those of old age are less grave among them — a conclusion in harmony with general observation.“

Thus, the difference in age cannot account for the rare occurrence of cancer among Indians. Climatic differences are frequently considered of importance in the occurrence of cancer, and Dr. Sodre, writing about cancer in Brazil, claims that the rare occurrence of the disease in that country is due to its tropical situation. The climate cannot play any role among the American Indians of the United States, since the reservations are situated in different states south, north, east and west, and furthermore, cancer is prevalent among the whites of the same localities.

The only fact then remaining, is that of the racial characteristics, which comprise not only the ethnological difference in the structure of the body, but also the difference in the environment, the mode of life, the diet, the occupation, etc. Now we must remember that a primitive uncivilized race lives under conditions of physical well-being far inferior to the conditions of a civilized community, and is much more exposed for instance to effects of infectious diseases. Tuberculosis actually decimates the American Indians, still they are nearly immune to cancer. W. R. Williams (7) thinks that the prevalence of cancer among the civilized nations is due to the great amount of food rich in nitrogen consumed by

the people, and that the poorer classes, having less nutrition, are less liable to be attacked by cancer. But this fact also hardly holds good in regard to the Indians. They consume a great deal of food, frequently to excess, and diseases of the digestive tract is very common among them.

The only advantage of a primitive race over a civilized one may be found in the fact that the former does not suffer from the severe wear and tear of a civilized life, from the complex nerve — mental irritations, which are by far more injurious to the organism than all the physical hardships of the savage.

Dr. Hrdlicka, writing about the character and social conditions of the Indians, states „In disposition, which has much bearing on the mode of life of a people, the Indians are generally cheerful and contented Their passions are moderate, their wants few, and prolonged worry is almost unknown to them. there is seldom seen anything in the mental status of these natives that could act adversely on their constitutions.“

Thus the conclusion is forced on one's mind, that while every human being may carry within himself the X which may develop into cancer, it is the modern civilization and the conditions created by it, that give rise to the mediate causes which produce the disease.

It is interesting to note here that when cancer occurs in a primitive race, it is usually sarcoma or epitheliomata of the different external parts of the body — conditions of which it is more feasible to suppose that they are due to mechanical irritations, while in civilized nations there is a prevalence of the cancer of the parenchymatous organs. These latter conditions are certainly due to mediate causes of more complex a nature. Whether these causes are similar to conditions of undue fatigue, so aptly described by Prof. Irving Fischer (8) in his article on „National Vitality, its Wastes and Conservation“, conditions caused by alcohol, tobacco, faulty diet, over-exertion, excessive length of the working day, and all other irritations of civilized life which are apt to act as such mediate causes, future research will have to indicate more definitely.

The American Indians residing in the Latin-American Republics, like Mexico or Brazil, present the most promising field for such an investigation, since there we may meet side by side Indians of pure blood leading a primitive life, others living in civilized communities, and the half breeds, i. e., mixtures of Indian and other races. This investigation is in progress now, but by its nature it will require a great deal more time before conclusions of value can be reached. Very similar results are expected from a study of the prevalence of cancer among the native races of the Philippine and Hawaiian Islands.

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