

it behooves us as good citizens to use it with as little waste as possible lest we unnecessarily increase its cost; yet, I am one of those who believe that whatever expenditure of money is necessary to procure an abundant and good supply of wholesome water is not extravagance.

DISEASES OF THE INDIANS, MORE ESPECIALLY OF THE SOUTHWEST UNITED STATES AND NORTHERN MEXICO.*

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There lives today in this country a separate people of 300,000 individuals about whose anatomy and physiology, as well as pathology and related conditions, accurate knowledge is still quite restricted. This people are the Indians. It may astonish many of you to hear that there is as yet no definite knowledge about the size, form or structure of a single internal organ of the Indian, and not one function in the Indian has heretofore received a proper extended scientific attention. The Indian brain, for instance, has never as yet been described, and only two imperfect specimens are in preservation (both in the National Museum), and very few could tell what is the normal Indian's pulse rate or frequency of respiration. As to pathology and medicine in general, the knowledge extant is comprised in a fairly large number of notes and articles on the subject, but these are very scattered and mostly restricted to a single locality. Yet the Indians are a race that shows at first sight already some differences from the whites; and they have lived, and to a certain extent still live, in different environment, and with habits different from those of the white people. They ought to show numerous peculiarities in both normal and abnormal conditions of the body; and, the differences between their life and that of the whites being known, such peculiarities ought to prove highly instructive. The Indians deserve more scientific, general, systematized medical attention than they have received or are receiving. To impress this fact

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upon you, more than to treat you to completed studies, is the object of this communication.

My paper consists of two parts, the first of which embraces personal observations and the second, data obtained from the physicians in the Indian service. The personal observations represent a part of the information gathered by me on six expeditions (1898-1905), among 38 groups or tribes of Indians, in the Southwestern United States and Northern Mexico. It should be borne in mind that these data do not apply to Indians beyond the region covered. The second category of statements was elaborated from the answers furnished in 1904-'5 to the Bureau of Indian Affairs (on a special blank, prepared by me) by the physicians of 103 Indian schools and agencies, from all parts of the United States. The actual value of the records from both sources should be regarded only as fair, for both series, it is well appreciated, embody many imperfections.*

On the whole, the health of the Southwestern and North Mexican uncivilized Indians is superior to that of the whites living in larger communities. The advantage of the Indian lies principally in the greater freedom from those various morbid conditions that arise through defective heritage, from those that in the white race frequently accompany such processes or periods of life as teething, puberty, menstruation, gestation, menopause and senility, and from malignant growths; while the only disadvantage of the Indian consists in a possibly lesser resistance of his system to a few of the contagions.

Of the afflictions of definite parts of the organism in the Indians of the Southwest and Northern Mexico it is possible to state as follows:

Pathological conditions of the blood are very rare, but anaemia is occasionally met with in the later stages of malaria, or, in a light degree, in some of the taller school-girls, who have become debilitated. As to the blood glands, the spleen suffers secondarily in malaria, as in whites. The thyroid degenerates occasionally, particularly in certain regions and individuals (almost exclusively females) into goitre. Lymph glands are apparently the seat of but one affection, namely scrofula. Even this is rare

*The detailed data on which the remarks are based will be published in a Bulletin of the Bureau of American Ethnology. This abstract is given with the permission of the authorities of the Smithsonian Institution.

among the more primitive people, but a moderate number of examples can be found in every tribe of the more civilized Indians.

The prostate gland was found enlarged in a few instances. Affections of the breast glands are much less common in the Indian than they are in white women.

Diseases or defects of the circulatory apparatus are very infrequent. The writer has found among over 2,000 individuals examined but three cases of organic heart trouble (all valvular insufficiencies), and not one pronounced instance of advanced arterial sclerosis. No definite information could be obtained about any case of apoplexy, but some rather sudden deaths are remembered. Varicose veins are rare. Direct examination in many hundreds of individuals failed to show one very pronounced instance. Hemorrhoids are also infrequent. No case of a naevus came to observation.

Diseases of the respiratory apparatus are, on the other hand, relatively common and cause numerous deaths. Among the non-civilized tribes the most frequent and more serious of these affections is pneumonia; among the tribes on the road to civilization this begins to be rivaled by pulmonary consumption. This latter disease, which in all probability was extremely rare, if it existed at all, in the prehistoric Indians, is gradually becoming everywhere more common, even among the Indians of the Sierras. It attacks especially the adolescents and younger adults. It follows a rapid course in some individuals and moderately rapid in others, and is nearly always fatal; in a few only it becomes chronic. Pleurisy, judging from descriptions, is not uncommon at certain parts of the year, and milder grades of bronchitis and allied affections are met with quite often during the cold weather. No instances of asthma or of "false" or membranous croup were seen or heard of.

Disorders of the digestive apparatus are very common, more so than any other diseases in the Indian, but they are rarely, except in infants, of a serious nature.

Typhoid, against all expectation, is very infrequent.

Forms of bloody diarrhoea, or dysentery, often probably of malarial origin, attack the Indians in certain localities, especially in the lower parts of Mexico.

Intestinal parasites are heard of but seldom. No case was seen of appendicitis, peritonitis, ulcer of the stomach or any grave disease of the liver.

Constipation, while by no means as common as among the whites, and especially as among white women, is still heard of quite often.

A few individuals in every tribe die of dropsy, which indicates nephritis. Kidney disorders in pregnancy and eclampsia appear to be rare.

Diseases of the sexual organs, barring syphilis and gonorrhoea, are very seldom mentioned, or indicated by any external signs, among those who approach or are approached by the physician. The women usually deny their existence. Theoretically, perineal and uterus lacerations, prolapsus and other morbid conditions should be rather common, but whatever evidence is obtainable in the matter contradicts such an opinion. Amenorrhoea, dysmenorrhoea, or metrorrhagia occur, though rarely. Venereal diseases, while carefully, and in some instances apparently successfully, guarded against, prevail more or less in the tribes near railroad centers and near larger white settlements. Neither syphilis nor gonorrhoea is commonly, notwithstanding the unhygienic condition of the Indians, attended by great destruction of tissue or grave general consequences. The bones of the syphilitics, however, will ultimately become affected as in whites. In women, syphilis generally conditions premature births, and the infant is usually dead. Signs of hereditary syphilis in living children are very uncommon.

Diseases of the skin are nearly limited to cases of eczema, favus, or ulcers (pemphigus, and especially impetigo contagiosa) in the children, acne in adolescents or young adults, and some ulcers, due to neglect, in the older.

Of nervous and mental disorders, diseases or defects, headache is quite common; vertigo is heard of occasionally; tremors occur in those addicted to drink; epilepsy is quite rare, weak-mindedness, insanity and paralysis much so, and idiocy is almost unknown. Of many nervous and mental pathological conditions nothing could be learned at all. Hysteria of light to moderate form is met with occasionally in growing girls.

Diseases and defects of the sense organs include numerous ophthalmias, some trachoma, and occasionally a cataract. Strabismus is very rare. Narrowing of the lids in consequence of chronic inflammation of the conjunctiva is common in old people. Corneal ulceration and opacities are not infrequent; and in every

tribe, but particularly among some of the Pueblos, there is found a number, in some instances a relatively large number, of individuals who have lost the sight in consequence of some eye affection. In a few the cause of the loss of sight has been an attack of smallpox. Minor disorders of vision are common among the more advanced Indian scholars. Ear diseases and defects of hearing are quite rare, even in the aged. In a few tribes there are one to several deaf and dumb.

Caries of teeth are not rare, though much less frequent than in the whites. It is usually a premolar or a molar that is found affected. Occasionally the gums or alveoli become involved, which results in suppuration. Necrosis was never seen in the living or in the examined bones. Defect of the palate in a full-blood Indian has not been met with, and only one minor case of hare-lip came to notice.

Of contagious and infectious diseases, not before specially mentioned, the most dangerous and one from which none of the visited tribes has been spared, is smallpox. Localized epidemics of measles are quite common. The disease attacks children and adolescents, and occasionally, but usually in the absence of proper treatment, is attended with mortality much greater than in whites with the same disease. Where early hospital treatment has been afforded, fatal or even grave cases were rare. Scarlet fever, seems to be very uncommon. The writer could learn of no case of it, either personally or from the resident physicians, or the Indians in these regions. Whooping cough, on the other hand, is not very infrequent; it does not seem to be any more severe or dangerous than it is among the whites. Diphtheria, of moderate severity, existed in 1902 and at other seasons in the Albuquerque school for Indians; it also occurred at Zuni. Influenza has been reported from a number of localities among the Southwestern Indians. Pneumonia has, in isolated cases, appeared in an epidemic form. Parotitis is seldom heard of. Malaria, known as "fever," "frios," or "calentura," occurs more or less, and in various forms, among all the tribes. Usually it is not fatal in the north and on the highlands, but assumes more dangerous including hemorrhagic and not seldom fatal forms in the valleys and especially in the lower coast lands of northern Mexico. Leprosy is not heard of; but there were met with a few cases of a condition allied to elephantiasis.

Malignant diseases, if they exist at all, which it would be difficult to doubt, must be extremely rare. The writer heard of "tumors," and saw several cases of the fibroid variety, but has never come across a clear case of an epithelioma or other cancer; nor has he as yet encountered unequivocal signs of a malignant growth on an Indian bone. Rheumatic affections are very seldom serious. They seem to be restricted to the muscular variety, lumbago, and the arthritis of senility. Of rachitis or osteomalacia not a trace was encountered either in the living or in the bones, and though goiter exists, there was found no case of cretinism.

Hernia is rare, and the few cases seen or heard of were nearly all of the umbilical variety and nearly all in children.

Pathological obesity does not exist.

Albinism exists principally among the Hopi and Zuni.

Fractures of bones are infrequent; more rare than among white people.

In general, then, the morbid conditions that occur frequently and those that occur more rarely among the southwestern and north Mexican Indians than among average white Americans are as follows:

Frequent in Indians.—Affections of the gastro-intestinal tract, affections of the respiratory organs, affections of the eyes, muscular and senile arthritis, smallpox, measles, malaria, dysentery.

Rare in Indians.—Anaemia, affections of breast, diseases of heart, arteries and veins, asthma, affections of the liver, affections of the female sexual organs, many affections of the skin, dental caries, cancer, rachitis, hernia, idiocy (high grade), insanity, nervous diseases (excepting epilepsy), scarlatina, bone fracture.

A few special remarks should be made in this place concerning syphilis among the southwestern and north Mexican natives before the advent of whites. As already remarked, the disease in the Indians affects the bones as it does in the whites; therefore, if syphilis existed before the Spaniards reached this country, signs of it should be at least occasionally discovered in the ancient burials. But the bones from the old burials are, as a rule, free of any sign of the disease; and this is true of the bones from ancient graves in California, northwest coast and other localities, exclusive of some mounds. It is difficult to see, if the disease existed before the whites came, how, with the well known wide inter-

course among the Indians, whole great regions could escape it. It may be remarked that it is also absent in the older burials from Peru and other localities in South America. From some of the regions mentioned the osteological collections* are extensive and made in a thorough manner.

The second part of this abstract deals with the analysis of the reports of physicians in the employ of the United States Bureau of Indian Affairs, the obtaining and utilization of the same having been kindly permitted by the authorities of that bureau.*

In this first attempt only a limited number of pathological conditions were inquired into, to assure prompt and more accurate returns. These conditions included: Albinism, goitre, cretinism, insanity, epilepsy, idiocy, deaf mutes, spinal curvatures and tuberculosis. Reports were obtained from 102 localities, on approximately 125,000 Indians, including some mixed bloods. The data regarding the different forms of tuberculosis, due to many difficulties encountered by the physicians, must be regarded as approximates only. Concerning most of the other condition the accuracy is greater.

The results of the inquiry were, in brief, as follows:

Complete Albinism.—In all there were reported 24 complete albinos (8 male adults and 5 male children, 6 female adults and 5 female children), living at the end of 1904, and 21 of these were among the Indians of Arizona and New Mexico.

Of Goitre there were reported 376 cases, from 36 localities; in 66, or nearly two-thirds of all the localities heard from, goitre was absent. The proportion to the total Indian population reported upon was 3 per thousand. Of the total of cases only 21 per cent. were in the males and 79 per cent. in the females, showing that among the Indians goitre is four times as frequent in the females as in the males. The female sex, it is well known, is more liable to the affection also among the whites and other races. Seven per cent. of the cases were in children and adolescents, showing that in quite a large proportion of instances the condition starts before the period of growth is completed. It was also plain that the disease did not depend on any condition inherent in the

* This part of the paper was accompanied by the presentation of tables with numerous statistical data, for which see the final publication in the Bull. B. A. E.

tribes, but was due to purely local agencies, the nature of which is not as yet well known.

Of Cretinism were reported in all but 3 cases, in as many localities; but a few additional cases of the condition in mild form are said to exist among the Chippewa in northeastern Wisconsin. It is remarkable that in all the localities where a cretin was found goitre was very rare, while, on the other hand, in tribes in which goitre was relatively frequent, there was no cretinism.

Insanity.—There were reported in all 48 cases of insanity of all forms, from 26 localities; no case existed in 76 localities. Of the 48 cases 33 were in males and 15 in females, which is in the proportion of 220 of the former to 100 of the latter. It is evident that insanity in the Indians predominates in the male sex, being there more than twice as frequent as in the females. Among whites, female insane exceed the male by only the very small proportion of 104 to 100. Of the 33 males but one, of the 15 females only 2 were young; all the rest (94.0 per cent.) being adults. There is but one tribe in which the proportion of insane is large, namely the Crow, where there is one insane to every 183 individuals of the population. The proportion of insane is among the Indians 1 to 2,730 of population, or 0.38 per 1,000, against 1 to 552, or 1.81 per 1,000, among the whites.

Of Epilepsy.—There were in all, 146 cases in 47 localities. Very probably all these cases were those of *grandmal* in various degrees. No cases were reported from 55, or a little over half of the schools and reservations. The proportion of epileptics to the total Indian population was 1.17 per thousand, which is quite near the mean proportion among whites. In central and southern Europe, an estimate puts the average frequency of the disease at about 1 or 1.5 per thousand inhabitants. In France it ranges in the various Departments from 0.5 to 3.4, and among the Italian conscripts from 1.3 to 5.1 per thousand.

Among the 146 epileptics, 76 were males and 70 females, hence nearly equal proportions of the two sexes. As to age, 35 of the males were adults and 41 adolescents and children; while among females 32 were adults and 38 young. It is evident that the disease develops in most cases during the period of growth.

As to *Idiocy, of all grades*, the total reported cases was 134 in 41 localities. In 61, or three-fifths of the schools and agencies, the condition was absent. The proportion of Indian feebleminded to

the total Indian population, as far as reported upon, is 1.07 per thousand. Among the total white population of the United States the proportion of similar morbid conditions was, in 1900, 1.55 per thousand. Many of the tribes are undoubtedly very free from idiocy in any grade.

There is shown some but not a general agreement between the frequency of idiocy and other neuropathic conditions in various tribes. Of the 134 cases 84, or over three-fifths, were males; 50, or less than two-fifths, females, giving the proportion of 168 to 100. Among the whites enumerated by the Eleventh United States Census the proportion of male to female idiots was 118 to 100. Sixty per cent. (51 individuals) of the male and seventy-four per cent. (37 individuals) of the female idiots were children and adolescents.

Deaf and Dumb.—The above report embraces 113 deaf and dumb in 39 localities; in 63, or three-fifths of the schools and reservations, individuals with this condition were not found. The proportion of deaf and dumb per thousand of population is 0.87 in the Indians against 0.68 in the whites of the United States. The excess in the Indians is very probably chargeable to neglect, and not a greater proportion of congenital deaf mutes. The influence of climate and heredity is suggested by the facts that the tribes in which the condition predominates live nearly all in cold regions, and that the majority of them belong to one people, the Sioux. Among the total 113 cases 74, or 65.5 per cent., were males, and 39, or 34.5 per cent., females, which gives the proportion of 190 to 100. Among the whites, according to the data of the Eleventh Census, the proportion of male and female deaf mutes was only as 116 to 100. The causes of this discrepancy in the two races are not apparent.

As to age, among the males 38, or a little over a half, among the females 10, or one-fourth, were adults, the remainder being adolescents and children.

Spinal Curvatures.—Under this heading are included curvatures of every variety and without distinction as to cause. It is safe to say that a large majority of the cases are due to tuberculous diseases and some are the result of injury.

The total number of cases amounts to 96, from 35 localities. No cases of spinal curvature were reported from 66, or very nearly two-thirds of the schools and agencies. The number of Indian

population to which the 101 reports apply being in round numbers 113,000, the proportion of the individuals with spinal curvatures per 1,000 population is 0.85. There were found no suitable data on the whites that could be utilized for comparison, but there is no doubt that the proportion of cases of the deformity in our race is larger. As to the nature of the curvatures, kyphosis seems to be the most frequent; then comes scoliosis, and then lordosis. As to the sex, 48, or exactly the half of the 96 cases, were males, and 48 females.

If the data on tuberculosis be referred to it will be seen that there is some correspondence between the prevalence of that condition and the frequency of spinal curvatures, pointing to the tubercular origin of the latter. The simple character of all the curvatures, the nature of which was specified (see detailed table in appendix), speaks also more for their tuberculous than rachitic origin.

As to tuberculosis, separate reports were requested for the pulmonary variety, for that of bones and joints, and for the glandular. There were in all 91 acceptable reports on tubercular diseases, applying to 107,000 Indian population. They gave 2,836 cases of the disease, of which 1,038 were of the pulmonary, 208 of the bone and joint, and 1,590 of the glandular variety. The given relation was 100 of pulmonary tuberculosis to 20 of that of bones and joints and 153 of glands.

The proportion of the several forms of the diseases to the population was as follows: pulmonary tuberculosis, 9.7 cases; tuberculosis of bones and joints, 1.95 cases, and glandular tuberculosis, 15.0 cases per 1,000 of population.

The writer searched in vain for suitable statistics with which the above could be compared. There are many and extensive data as to the mortality from tuberculous diseases, but not as to the morbidity. The deaths from phthisis among the United States white population vary according to localities from 1.5 to 5.5 and in Europe from 2 to 9 per thousand of population, or 1 in 5 to 1 in 7 of deaths; but these figures give no accurate clue as to the distribution of the disease among the living. In all probability the proportion of the several main varieties of tuberculosis is not much if any larger among the Indians *as a whole* than it is among the poorer classes of white people as a whole. There are, however, great differences in the tribes. In some the disease is de-

cidedly rare, while in others its frequency is appalling. Among the large tribes, the greatest sufferers are the Sioux, the least the Navaho. The geographical distribution is somewhat irregular; nevertheless the most involved are the northwestern and northern regions, west of the lakes, hence the humid and cold parts of the country, with the consequences of much indoor life, and greater chances of exposure and infection.

The frequency of other forms of tuberculosis corresponds in general to that of the lungs, but there are numerous exceptions.

All forms of the disease predominated somewhat in the males, and that in the following proportion: Pulmonary, females 100, males 110; bones and joints, females 100, males 124; glandular, females 100, males 111. As the excess of males to females in the total mainland Indian population is (1900) only as 101.5 to 100, it seems that there is actually a slightly greater predisposition to tuberculous diseases among the male than among the female Indians. It is well known that phthisis, at least, is also somewhat more common in the male sex among white people.

As to age, pulmonary consumption predominates in the adults in the proportion of nearly 3 to 2, but of both the other forms there are more cases in the young.

Pulmonary tuberculosis, to 100 adults, 67 children and adolescents; bones and joints, 126; glandular, 248.

The relation of tuberculosis to other morbid conditions can not well be studied from general statistics.

As to the prevalence of morbidity in general, it was seen that many of the northern and some northwestern tribes, such as the Sioux, Menominee, etc., showed a larger percentage of most of the pathological conditions inquired into than the tribes in other parts of the country.

The conclusion seems fully justified that the northern regions, including, especially, parts of Wisconsin, Dakotas and Montana, are at present, whatever the direct causes may be, the most unfavorable to the health of the Indian.

Dr. D. S. Lamb, in opening the discussion, asked Dr. Hrdlicka if the tables he showed represented the Indian *pure* bloods or were there some mixed bloods, to which Dr. Hrdlicka replied that he had tried to limit the tables to pure bloods, but, so far as the tables were based on reports of physicians at the Indian agencies, he could not absolutely guarantee that only pure bloods had been

included; but that so far as his own statistics went they were based on pure bloods. Dr. Lamb then stated that if any mixed bloods were included in the tables the conclusions were to that extent unreliable. So far as he knew there was no very important difference in the anatomy and physiology of the Indian from that of the white man. If it were a fact that there was no important difference, then we would not expect to find any important difference in the pathology. As a matter of fact the tables showed marked differences in the prevalence of disease between the tribes themselves, as much indeed as there appeared to be between the Indians as a whole and the whites.

He never had had any medical relations with the Indians, but he had had the peculiar good fortune to examine and study many bones from the Indian mounds, bones that showed evidences of disease and injury, and he had therefore formed some opinions as to the diseases and injuries of the Indians, at least those of the mound builder times, and besides had become somewhat interested in the diseases of the more modern Indian.

In the main his observation and reading agreed with the statements made by Dr. Hrdlicka, but there were a few points on which he wished to remark.

Dr. Hrdlicka stated that malignant tumors were rare among the Indians. This statement was particularly interesting because of another statement that had often of late years been made, namely, that malignant tumors were increasing in frequency and in proportion to the increase of civilization. Dr. Lamb had some doubts of the correctness of this statement as to increased frequency, because of the fact that these tumors were so common among the lower animals, both the domestic and those in captivity, to which the question of civilization could hardly apply. There was here, however, a large field for research work.

The reports from the Indian agencies mentioned the frequency of hysteria, of epilepsy, of idiocy and imbecility; but, as Dr. Hrdlicka stated, reports of insanity were rare. Dr. Lamb thought that this might be expected, because with us it was probably the "carking care" of our lives that favored the appearance of insanity, and the much simpler life the Indian led would seem to largely exempt him therefrom.

Dr. Hrdlicka mentioned the rarity of intestinal parasites; external parasites were, however, presumably a frequent trouble. Some agency reports mentioned many cases of "worms," and it would seem that the parasitic conditions would hardly be limited to only a few tribes. Indeed, when we recall the fact that both domestic and wild animals are very much infested with parasites, both internal and external, we would certainly expect that the Indian, who many times eats food that is either not cooked at all or only partially cooked, would be repeatedly exposed to parasitic infection. So, therefore, Dr. Lamb doubted if parasitism was so

rare among the Indians, knowing how frequently animal parasites are found among civilized peoples who so much more thoroughly cook their food.

Passing now to the question of the mound bones and what they teach as to the diseases and injuries of the Indians of the mound period, several thoughts suggest themselves, among the first of which is the question as to what diseases have been communicated to the Indians by the whites. It is only natural to think that communicable diseases that affected the whites were, when the whites were brought in contact with the Indians, communicated to the Indians. Indeed, since many centuries diseases of an infectious character have been carried from one place to another by travelers and by merchandise. From this fact arose the necessity of some form of quarantine. This facility of carrying disease has, of course, much increased during the last hundred years, the years of steam transportation. Time would fail to tell all the instances of the introduction of disease from one to another tribe or people. We all remember how the arrival of a ship at the Fiji Islands brought the measles to the people of those islands and nearly decimated the inhabitants. We recall the frequent spread of Asiatic cholera from the East Indies westward through Europe and America; of influenza also, from Tartary westward; and of the yellow fever from the West Indies to the United States.

The arrival of the European on the shores of the so-called New World meant the introduction of new diseases among the Indians—infectious diseases, of course. Just exactly what diseases were thus communicated, diseases with which the Indians had not previously been affected, he hesitated to say; he would rather leave that to others more familiar with that part of the subject. But if we are to credit the belief of those persons who have devoted much time and effort to the investigation of the Indian mounds, that most of these mounds were made by the Indians before the advent of the European, then it logically would follow that the diseases found evidenced in the bones of such mounds were diseases that more or less prevailed before the arrival of the white man. It is to these bones that he had given some study, and not himself alone, but many other persons. The conclusion he had reached in the case of at least one disease was that it prevailed among the Indians before the arrival of Columbus. This disease is syphilis. The number of bones affected with what cannot be anything else than syphilis is so large that there seems to be no room for doubt that this disease prevailed among the Indians before the arrival of the whites. It is an old story to tell, but there are some who do not know it, that a belief prevailed in Europe that the return of the ships of Columbus to Europe carried the disease to Europe. There was no time now to elaborate the subject. This was the only communicable disease that he had satisfied himself existed precolumbian among the Indians. He had seen

in some mound bones what strongly suggested tuberculosis, but the number of the bones is so few that he hesitated to make a positive statement either way. There are some non-communicable diseases, such as spondylitis deformans, arthritis deformans, osteitis deformans, that have many representatives among the mound bones. A few bones show what looks like either lupus or malignant tumor of the bones of the face, and a few bones show what certainly looks more like rickets than anything else. Of course the injuries of bones and the repair of the same could hardly be expected to show any differences between Indians and other peoples.

The reasons why a mound burial was considered to be precolumbian might be stated as follows: First, and especially among the coast Indians, there was a custom of burying with the dead the personal property he had owned during life, and this included, of course, those things he had obtained by barter with the Europeans; therefore it was very common to find in the mounds along with the skeletons many objects of European manufacture. Where no such objects were found the question arose among the mound investigators whether the burials were or not precolumbian. If many skeletons were found together and with them no objects of European contact then it seemed very probable that the burials antedated the arrival of the whites.

The age of the mound itself could sometimes be estimated by the age of the trees growing on it; trees that showed a growth of several hundred years aided, therefore, in arriving at the antiquity of the mound. Again, in some mounds there were two sets of burials, namely deep and superficial; with the deep burials there were no objects of European contact; with the superficial burials there were objects of such contact. It seemed logical to infer that the deeper burials antedated the arrival of the whites.

As to the spread of disease from one place or one people to another we have to recognize that this spread has its limitations. Some diseases are rather limited to tropical or semitropical countries; diseases that are slow to spread in a cold climate or in cold weather. The micro-organisms of these diseases can propagate and exist only under certain conditions of temperature, light and moisture, and where these necessary conditions are absent the germs will perish. Again, some diseases are carried by insects, the habitat of which is rather limited as to place and climate. It is plain, therefore, that there are very important limitations to the spread of disease, and modern sanitation consists in taking advantage of what we have learned concerning these things.

On one point Dr. Lamb wished to lay some stress, namely, that *post mortem* examinations of Indians were scarcely ever made, and therefore we were to that extent ignorant of the pathological anatomy of the diseases which affected the Indians, except as we interpreted the clinical symptoms by the same rules that we used

in interpreting the symptoms observed in the whites. But undoubtedly we would obtain much more exact knowledge if such *post mortem* examinations were made. The diagnosis has probably in some cases, and perhaps in many cases, not been correct; it depends, of course, to a large extent on the knowledge and experience of the physician. Here, then, is a vast field that has not been explored. It has been suggested that a hospital devoted to the Indian be established at some convenient place where a more scientific study of his diseases could be made than in the medical work of the Indian agency. Of course, such hospital would be under the control of the Indian Bureau.

Dr. Geo. M. Kober said that Dr. Hrdlicka and the Bureau of Ethnology are to be congratulated upon his splendid piece of work in studying the diseases among the aborigines of our own continent, a work of inestimable value to the modern physiologist and pathologist and may possibly pave the way for determining how many of the diseases, such as arterio-sclerosis, apoplexy, diseases of the liver, heart and kidneys, mental diseases and cancer, which appear to be constantly increasing in the Caucasian race, in spite of a positive decrease in the infectious diseases, are due to our artificiality of life, especially in the matter of food, which doubtless plays an important rôle in the so called chemical causes of disease, especially those originating within the body as a result of malnutrition, malfermentation and other defects of metabolism and physiological function. It is very fortunate that Dr. Hrdlicka has extended his studies also to the physiology and hygiene of the Indian, and his contributions will certainly serve to throw some light upon modern problems of metabolism.

Dr. Hrdlicka's summary of the relative frequency of certain diseases among the Indians accorded very closely with Dr. Kober's personal observations among the Piutes, Nez Perce, Spokanes, Colville, Coeur d' Alènes, Klamath and Modoc tribes, although, in the absence of clinical microscopy and autopsies, he was not prepared to state that the intestinal parasitic diseases and malignant internal tumors were quite uncommon. Dr. Hrdlicka, however, had accumulated considerable evidence to sustain this opinion, and it was certainly true that in Dr. Kober's observations, extending over a period of 18 years, he had never seen a case of epithelioma or other malignant growth of the breast or external tissues in the Indian.

The singular freedom from heart disease, arterio-sclerosis, renal and biliary disorders in the Indian strongly suggested that the increasing prevalence of these diseases in the white race was intimately connected with our present mode of life, just as the alarming increase of tuberculosis in the Indians of the present day is strongly influenced by their changed environments. Personally he had no doubt that the abrupt change from the tepee with its copious ventilation to a house with deficient light and air, and a

radical change from coarse cereals to refined flour and other carbohydrates, had established a vulnerability of the respiratory and digestive tract and otherwise prepared a suitable soil for the proliferation of the tubercle bacillus.

Gen. Forwood said that he desired to congratulate the essayist upon his paper; he had been much interested in the statements contained in the communication and hoped that it would be published, as so much of the data presented was statistical. He was not prepared to agree with the author as to the influence of race upon diseases found among Indians. If the object of the paper was to show what sort of diseases affect Indians, he thought that the investigation might as well have been upon negroes, malays, or any other race. In his opinion race had very little to do with the kinds of diseases found among any given people; the determining factors were environment, habits, occupation, degree of civilization, and the like; it was not race.

He had been stationed in the West from 1865 to 1870, and during that time he had seen wild tribes of Indians ranging on the plains of Kansas, Nebraska and the Dakotas. They were very primitive, nomadic tribes, wore the native costume, lived in tepees, owned vast herds of ponies, and spent their days in the open air and sunshine. They were far from the boundaries of civilization. Both men and women were strong and active, and their habits of life made them excellent gymnasts and great riders. An Indian brave would frequently ride from 60 to 75 miles in a day, changing ponies three or four times on the journey, and subsisting on jerked buffalo meat.

They were at that time a remarkably healthy people, as might be expected from their mode of life and the habit of frequently changing the camping place, which they did to avoid the necessity of cleaning up. Their food was largely buffalo flesh. The buffalo were plentiful in those days; Dr. Forwood had seen a column of troops long delayed by a herd of bison crossing the track. The Indians followed the herds and subsisted upon them.

He had lived among the Indians and had treated them for all sorts of diseases, so that he felt somewhat acquainted with the class of diseases found among wild tribes. Many of these arose from their mode of life. They lived in the familiar tepees, and for warmth they built a small fire in the center, the smoke escaping through an opening at the top. Some smoke was retained in the tepee, so that much of their time was spent in an acrid, smoky atmosphere, while in the open they were subjected to exposure to high, dry winds, at times laden with dust. For these reasons the Indians had various skin diseases, never of a serious nor malignant nature, and also inflammatory affections of the eyes. So far as he knew, they were remarkably free from tuberculosis, and he had never seen a malignant tumor in a wild Indian.

He thought that there was not much to be gained by discussing diseases among the Indians after they had come into intimate contact with the whites; then there was nothing peculiar to Indians from a medical standpoint. Racial peculiarities with respect to disease could only be studied among wild tribes.

The Indians were very scrupulous about bathing, for which purpose they used the open streams. Their diet was largely of meat, but they were fond of berries and of certain roots, which they pounded into a meal. The nut of the *pinus pinea* was frequently used for food and was very nutritious. The buffalo meat was cured by drying; was never salted. It was cut into strips, and when exposed to the dry air of the plains quickly became dry, hard and brittle, and when so treated kept indefinitely. The Indians, as a rule, had very strong digestive powers. But they suffered much from catarrhal conditions of the air passages from exposure to smoke and dust.

They were all skillful riders, and, though seemingly most reckless, were seldom hurt. They occasionally had fractures of all sorts, and wounds received in fights were of frequent occurrence.

[Dr. Forwood exhibited a calculus removed from the bladder of an Indian chief in 1868.] Seven years prior to that date the man had been wounded by an arrow, which had entered the buttock, and, traversing the pelvis, lodged in the bladder. There was a history of bloody urine at the time the injury was received. This chief had been in the hands of many surgeons, and finally came to Dr. Forwood's notice. He obtained permission to examine the man, and discovered a vesical calculus, by the use of a sound. After the lithotomy operation several Indian medicine men were present, and, although not at all interested when the calculus was first shown, were astonished when section of the stone revealed the iron arrow head, and they pronounced Gen. Forwood "good medicine."

He was interested in finding out what surgical methods they had of their own knowledge, and found that there were very few. Charlatans were many, and incantations and charms were the most potent armamentarium they possessed.

He found that the dry air of the plains seemed to have an excellent effect upon wounds. He had treated a compound fracture of the femur, from a gunshot wound, in a young brave of 18, who had never before been among white men. Smith's anterior splint was used and the result was perfect, with no shortening.

The Indians applied counter-irritation by a sort of cupping, in pleurisy and lung affections. The suction was produced by the mouth of the medicine man, was very effective, and seemed to be original with them.

They also used a pessary made by rolling a ball of curly buffalo hair, which they introduced into the vagina. It proved satisfactory

and was to be commended in that it allowed the vaginal secretions to escape.

The management of labor was very interesting. He had contributed a description of the habits of the Indians in this event to a book entitled "Labor Among Primitive People," by Dr. Geo. Engelmann, of St. Louis. They set up a circle of bushes, with an overlapping entrance, for privacy; in the center two stakes were driven beside two small excavations. In one pit a hot stone was placed, and in the other, some loose earth. During pains the woman clung to the stakes, squatting over the pit containing the loose earth when any discharges were flowing and over the hot stone at other times. The placenta was secretly disposed of by some person specifically designated for that purpose.

Dr. Jos. Taber Johnson asked Gen. Forwood if the statements that Indian women had little trouble in child-birth, that they dropped out on the march, had their babies, and caught up with the tribe, were correct. He thought that if such little care was exercised tears and prolapsus must be frequent.

Gen. Forwood replied that the women did get up immediately and go on with the march. He believed that they were favored on account of the conditions under which they lived, and the statement was correct that primitive people were able to go through the natural processes more easily than the civilized.

Dr. E. L. Morgan said that he had lived at Che-we-lah, Colville Valley, State of Washington, from August, 1879, to the latter part of July, 1886, among the Calispels, Spokanes, a few Colvilles, Nez Percez, Iroquois, Cherokee, and other Indians, who were once employed by the Hudson Bay and the American fur companies.

He operated successfully on a case of hare-lip in an infant under one year old. He also saw an Indian brave about 20 years old with hare-lip and cleft palate, as horrible a deformity as any usually seen in surgical works illustrating the severer forms of this malformation.

The Indians bleed their patients by means of sharp flints and knives. For pains in the head, *more especially the eyes*, they make small gashes on the temples, and for aching in the chest they make two, three, or more long cuts on the thorax. He had often seen these scars, *especially on the body*. A cow's or buffalo's horn is cut off to the required length and a hole is made in the end, a piece of moss, fur, etc., is inserted into the inside of the horn against the opening at the upper end. This cup or crude artificial leech is placed over the incision and the doctor sucks the horn full of blood. For headache a tight band is sometimes placed around the head. For pains in the chest, pleurisy, pneumonia, phthisis, etc., a rope or band is tightly tied around the chest.

The so-called "medicine bag" of some Indian tribes is their charm against evil and a talisman for good luck, etc.

The Indians use a slat splint also hides, etc., in the treatment of fractures. This splint is composed of many thin strips of wood, tied together. Fur and other substances are laid on the limb, and the splint is applied and tied on the injured member.

He was called by a squaw to see a wounded Calispel, who was lying alone in a lodge about seven feet in diameter and of the same height, made of tulé mats placed on crossed poles, in the usual Indian style. This man's wound was over the region of the liver. While approaching his lodge he was heard crying out in a loud voice and rattling his rattle or magic wand. He was lying on a grizzly bear's skin, and around his head was a broad band of the animal's fur, while the skin itself was soaked in blood, and the ground was like a little pond of blood. The wound was dangerous. The half breed interpreter said he "*was making his medicine.*" The grizzly bear was his protector, and he was calling on him for assistance. This man had reached over from his horse, upon which he had mounted, to get a *Hudson Bay gun*, which went off and shot him in the side. It was said that he rode five miles to the camp and fainted. He finally recovered, with an extensive scar on his side.

At the Colville Mission on Corpus Christi a native was shot with a twenty-two caliber pistol. The bullet penetrated the thorax beneath the heart. Dr. Morgan saw him the next day. The Indian was on his hands and knees, and it was said this was the most comfortable position for him, although it may have been selected by his operating doctor. The "medicine man," was "blowing" the patient and sucking his back vigorously, which had not been perforated by the bullet, to suck out through the sound parts the piece of lead at the place where he applied his mouth. Every now and then he would spit out some blood on the ground, and no doubt he had cut his own gums before commencing his operations. The patient died that night.

At an Indian dance during the winter at Che-we-lah I saw a Calispel physician "blow" a man quite hard, first in one ear, then in the other, in the same manner that we would extinguish a lighted candle. This redskin either was knocked senseless, or seemed to be so, as a result of the ceremony. The Shaman would sing in quite a monotonous way in a low voice, though high pitched in character, and at times would raise the tune several keys higher, crying out in a loud voice and rattling the man all over the body. The rattle was a stick two feet long and one-third of an inch in diameter, to the end of which were attached claws, charms, etc.

This "medicine man" attributed scrofula amongst the Indians to the change of life of the aborigines, *the white man's food*, especially baking powders, *laying stress on bread soda* used in baking bread.

He attended an Indian woman who had a suppurating inguinal gland. She said that small bugs or insects were the cause of her disease and were eating her up. Still another native, a consumptive man, made a similar statement. This is an evidence of an Indian germ theory, or may be due to education imparted to them by their native physician, who always produces a cause of disease, that all may see for themselves.

Old Patrick McKenzie, a half-breed Chippeway, whose wife was a half-breed Cree, said that the aborigines use a powdered rattlesnake button to cure headaches; it was taken internally.

The sweat house is used to cure fevers, rheumatism and other diseases. The sick rush out steaming, and plunge into icy cold streams. This, too, often in the past, greatly *added to the mortality of variola*. Dr. Morgan saw a case of measles in the morning, warning the patient of the danger of this practice, and was afterwards informed that the sweat house caused his death that night.

The Indians suck frosted fingers and toes. A friend of mine described his personal experience when he frosted his toes. He said their powers of suction were strong and painful.

They use a small jointed root larger than a lead pencil, that grows along streams in damp places, has a large green leaf, shaped like an elephant's ear. They break off one joint and powder it, giving it after labor, to control uterine hemorrhage, and if necessary they repeat the dose. It is used to provoke abortion.

There are many small sunflowers growing out of a bunch of leaves close to the ground on mountain and hill sides, a dwarf species. The seeds are sometimes eaten as a kind of food. The roots are baked, cut open while hot, and poultices made therefrom are applied to boils, enlarged painful glands, etc.

Heated boulders are wrapped in blankets, or furs, etc., and used for various purposes; for instance, are laid along a painful limb, in pleurisy, myalgia, and in the treatment of a stiff neck. Sometimes the blanket is made wet when a local steaming is desired. In the treatment of measles for cough, etc., a hot infusion of cedar berries is sometimes given to the patient, in some places as in Calispelum near Lake Calispel (or Kalispel).

The Indians use balsam of the silver fir, and castoreum. An infusion is made of the bark of a tree *that purges* and vomits according to the dose given. A half-breed showed a small plant that he called wild sarsaparilla growing on mountains. A plant found in the fields, which is not large, called rosin weed, having a pretty small pinkish or reddish flower, is said by settlers to grow on good land; the root, they say, is used as an astringent. If pulled up it breaks easily, making the hands sticky. An infusion of the bark of the wild cherry is popular.

A powder is made of scorched leaves, which is dusted on ulcers and burnt surfaces. They treat a burn by dusting this powder

on it, and apply several layers of the leaves, holding this dressing in place by securely bandaging it.

An infusion of tamarach bark is used by the Indians as a wash for ulcers, etc. They know the poisonous effects of *veratrum viride*. At certain seasons, in damp places along streams, their horses eat a poisonous plant that usually proves fatal. They attempt to doctor their animals. I have seen them take a small knife and carefully cut in and around an injured pony's joint near the hoof. They also cut the gums for stomach troubles.

There is a soap bark for washing the head; for the same purpose the leaves of a low shrub; these leaves are small, long, glazed and green; the stem is long, tough, wiry and about the size of a finger. This shrub grows near the top of the mountain, usually the north side. Very large patches of it are seen. An infusion of these leaves is used as a hair tonic. A half-breed girl said that it made the hair soft and glossy, and increased its growth.

There are several very small lakes in Colville Valley, State of Washington, the waters of which are impregnated slightly with alkalis. But the White Bluff Prairie Medical Lake near Spokane Falls is heavily charged with chemicals leached out of the soil, and disintegrating basaltic and other volcanic rocks. This medicinal water was used by the Indians, and afterwards the whites, both externally and internally, in the treatment of diseases, especially as a bath in rheumatism, and for other aches and pains. Used also as a wash for ulcers. There was some evidence that cases of rheumatism were benefitted by a sojourn at Medical Lake. A company of white men used to boil down its waters, and they sold the powder obtained by the evaporation. Indians and others stated that if one washed his head or a greasy blanket in its water a fine lather would be produced—an alkaline water.

Dracontium foetidum, or skunk cabbage, grows around Chewelah, Colville Valley; the Indians say that they never heard of any native treating a disease with this drug.

In the application of remedies in the treatment of diseases the Indian has his theories, and uses his limited powers of reasoning. His reasons for selecting a drug may be good, poor or exceedingly bad. *Not everything that the aborigines do is magical.* They experiment in many ways with roots and herbs, and are good observers on occasion, studying nature to a greater or less degree. They must not always be measured by the white man's standard.

The mere fact of autochthonous tribes of North America applying hot baths, their roots, herbs, etc., in the treatment of syphilis or any other malady does not necessarily prove that those diseases originated in the new world. The native American of centuries long past, before Columbus was born, found that roots or other medicines were beneficial in pains, aches of all kinds, skin diseases and rheumatism, and possibly facilitated the healing of

ulcers; quite naturally applied the remedies in the treatment of syphilis.

One old Indian "Medicine," a minor chief, having found that the tincture of iodine was good for aches and pains, especially in his own case (a rheumatic shoulder), to say nothing of it being of the right color to his experienced eye; insisted, in spite of a good prescription of chalk mixture, etc., that the abdomen of his sick child should be painted with the tincture of iodine, as a cure and as a sovereign remedy for any disease. The child's diarrhoea was cured. In his mind the iodine was the most important factor in the recovery of the child. The color alone may have carried conviction.

Maj. James O'Neill used to relate the following incident: Over in Idaho a doctor gave an Indian a red medicine, which had the most soothing and happy result. So charmed was an old chief with the physician's remedy, that he soon procured a supply of red oxide of mercury, and began his therapeutic investigations with one or more fatal results, it is said. The color here again was a leading factor in the treatment.

Dr. Morgan observed the following diseases: Two cases of diphtheria in females. Many cases of tonsillitis, pharyngitis, laryngitis, bronchitis; pneumonia and capillary bronchitis were comparatively rare; but few cases of pleurisy; phthisis and scrofula, were common. Measles, varicella and whooping cough; many patients with whooping cough died as a result of complications. Remittent fever was very rare, he saw only two patients. He saw one small fatty tumor of the thigh in a quarter-breed.

Pott's disease, one male and one female; palsy in a man about sixty years old; dyspepsia, diarrhoea, enteritis, anaemia, tertiary syphilis. But few cases of syphilis where the doctor was stationed. Gonorrhoea was quite prevalent. Hysteria among the half-breeds; mumps and cataract; coxalgia, two cases; seminal emissions; uterine hemorrhage; subclavicular dislocation of the humerus; fracture of the humerus, fractured ribs, pyarthrosis of knee. Eczema; eczema capitis, chronic eczema. Ascites; operated on this case with trocar on two occasions; a boy ten or twelve years old. Staphyloma, conjunctivitis, keratitis; pterygium quite common, being either seen as single bands on both eyes, or double, extending from the inner and outer corners of the eye to the cornea; otorrhoea, functional paralysis. He was told that one squaw "operated for cataract," and probably successfully for pterygium, but not cataract. One Indian had valvular disease of the heart; he suddenly died; one squaw hung herself. A buck tried to commit suicide by shooting himself in the abdomen by means of a Hudson Bay gun; sometime afterwards, while gambling, he rose up, removed a plug of straw or grass from the opening, and allowed the pus to run out; then inserted another bunch of grass to close the opening. Several

persons saw this Indian with the wound in his abdomen and the plug sticking in it.

A Spokane chief said that he had heard of a chief who lived near Snake River, and who requested at the funeral of his son to be and was buried alive with the son.

Dr. Morgan heard of one case of a squaw dying in labor.

Dr. Hrdlicka, in closing the discussion, said that if syphilis had existed among the Indians in pre-Columbian times he could not understand why the Indians of that era in the southwest portion of the United States and in northern Mexico should have been exempt. Many bones of that period had been recovered there, and none presented evidence of the disease. With the habits of travel and intercourse common to the Indians of that time, he could not understand why it should have existed in one part of the country and not in another.

With reference to Gen. Forwood's statement that disease depends upon environment and not upon race, Dr. Hrdlicka said that it was well recognized in this day that racial traits were evolved as a result of environment, and that race and environment were almost synonymous terms. His studies were for the purpose of discovering the conditions as they exist today, and simple facts not hitherto published were interesting and important to know.

As the peoples investigated in his studies were confined to reservations, they were little exposed to foreign influences. In Mexico the Indians of some localities were as primitive as in pre-Columbian times.

His regret was that, in the pursuit of information, close physical examinations and microscopic studies could seldom be made, and pelvic examination of women was entirely out of the question.

His statement that intestinal parasites were not found among the Indians was in respect to tape-worms. Ascarides were fairly frequent. The existence of tape-worm was not only denied by the Indians themselves, but indirect evidence on this point could be adduced from the fact that of the 160 remedies used by them only one was a vermifuge.

PROCEEDINGS OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

Wednesday, November 8, 1905.—Dr. T. N. McLaughlin, President, in the chair; over 60 members present.

Dr. S. S. Adams, Chairman of the Executive Committee, reported that at a meeting of that committee held November 6, the following recommendations were made to the Society: First, that the Medical Society cooperate with the Commissioners of the Dis-

trict of Columbia to secure the passage of a bill for the regulation of pollution of the Potomac River; second, that the Medical Society assist in a public movement to consider the "Pollution of the Potomac River" and the "Methods to secure a pure water supply for the District of Columbia;" third, that the Medical Society cooperate with the Commissioners of the District of Columbia to secure the passage of a "Pharmacy and Poison Law." The recommendations were accepted and the report approved.

Dr. J. D. Thomas reported a case of Septic Endocarditis, with specimen. Discussed by Drs. S. S. Adams, Briggs, D. S. Lamb, James Dudley Morgan, Hagner, Frank Leech, Fremont-Smith and Ruffin.

Dr. James C. McGuire read the paper for the evening. Subject, "The Etiology of Eczema, with report of cases." Discussed by Drs. McLaughlin, Crosson and S. S. Adams.

Wednesday, November 15.—Dr. J. D. Thomas, Vice-President, in the chair; over 60 members present.

Dr. Hickling reported a case of *Sebaceous Cyst*, with specimen. Discussed by Dr. D. S. Lamb.

Dr. Hickling said that the specimen was interesting because of its unusual site and because its walls had undergone calcareous degeneration. The walls were very thick and the cyst contained ordinary sebaceous material. The mass was removed from the scrotum of a colored man, who gave his age as 65 years, but was apparently older. The cyst was adherent to the cord, but not to the testicle. It was suspended between the sac of a hernia above and the testicle below.

Dr. D. S. Lamb said that when the cyst was brought to him it was entirely filled with sebaceous material; this had been allowed to dry, which fact accounted for the shrinkage of the specimen as exhibited. He found it difficult to account for the origin of the tumor; its location had suggested to his mind the possibility of its being a dermoid cyst. Although such cysts at times contain only sebaceous matter, the absence of other epithelial elements made it more probable that the specimen was a pure sebaceous cyst.

Dr. Vincent reported a case of Ulcer of Stomach, with specimen. Discussed by Drs. D. S. Lamb, Acker, J. Ford Thompson and Kober. See p. 357.

Dr. D. S. Lamb presented specimens from two cases: 1. Cheesy tubercle of glands; 2. Diphtheria of air passages. Discussed by Drs. Chappell, Wellington, I. H. Lamb, Acker and Hagner. See pp. 349 and 354.

Dr. Edwin M. Hasbrouck described a new anaesthetic, Somnoform, and exhibited the manner of its use and its effects. Discussed by Drs. R. S. Lamb, S. B. Muncaster, Randolph, Balloch and Snyder. See page 345.