A GENERAL DISCUSSION OF PELLAGRA[1] WITH REPORT OF A PROBABLE CASE IN THE PHILIPPINE ISLANDS.[2]

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Pellagra is a chronic or acute, afebrile or febrile, endemic and at times epidemic, probably noncontagious, systemic disease of unknown etiology, occurring chiefly among the poorer classes of maize-eating peoples. It is characterized clinically by a seasonal periodicity, a typical skin eruption, digestive disorders and nervous and mental disturbances, and pathologically by slight peculiar anatomical lesions.

The disease first occurred in Spain in 1735, and now is found extensively in Italy and Roumania, in Greece, France, Austria, northern Portugal, Poland, Turkey, Africa, upper and lower Egypt, the West Indies, various parts of South America, Barbados, Mexico, and in the United States, especially in the South Atlantic portion. Two cases have been reported from England, several from India, one from Porto Rico, and two from the Panama Canal Zone. Although the cultivation of Indian corn and its consumption as food occurs in parts of the world from which pellagra is not reported, yet pellagra is unknown in sections where maize is not used as an article of diet.

The original home of Indian corn and the date of its introduction into Europe are apparently debatable questions, but nearly all authors agree that pellagra was not known in Europe until maize growing and eating had existed for some time. King(6) claims North America as the original home of Indian corn and also of pellagra and states that Baruino, in 1600, described meagerly a condition among certain Indian tribes which doubtless was pellagra and that he thought it arose from eating maize.

Gaspar Casal, in 1762, reported pellagra under the name of *mal de la rosa*, having seen his first case near Ovieda, Spain, in 1735, and subsequently other cases in the Asturias (Asturiensis). It was found in other parts of Spain within a few years, and in 1893, 2 per cent of the Spanish peasantry were pellagrous. (Tuczeh).[3]

The disease appeared in Italy, in the Lombardy district, in 1750, and gradually spread to other provinces. It was clearly described by Frapoli, of Milan,

[1] Synonymy: Mal de la Rosa; Mal de Padrone; Lepra Scorbutica; Asturiensis; Mal de Sole; Vernal insolation; Mal de Miseria; Maladie de la Teste; Buba tranjilar; Maidimus; Psychoneurosis Maidica.

[2] Read at a meeting of the Manila Medical Society, October, 1910.

[3] Quoted by Lavinder.

in 1771, under the name of pellagra (from *pellis*—skin, and *agra*—rough), and, according to King,(6) Frapoli declared it to be an ancient disease known in 1578 as pellarella, as might be seen by reference to the regulations for admission to the Hospital Major of Milan at that time. The ravages of the disease have been most marked in Italy and Roumania, where it appeared in 1810. In Italy, in 1879 there were 97,835 cases; in 1881, 104,067 cases; in 1899, 72,603, and in 1902, 55,029 (Wollenberg).(26) In Roumania, in 1885 there were 10,626 cases; in 1886, 19,797; in 1898, 21,272;(6) and in 1906, 30,000 cases (Triller).[4]

The elder Hameau[5] reported pellagra from the vicinity of Teste, France, in 1818 (*Maladie de la Teste*) and Pruner[6] found it in Africa in 1847. It appeared in Corfu, in 1856, and Sandwith found it in Egypt in 1893. Ray[7] reported it in 1892, from one of the provinces of North Bebar, India, and three physicians from India recognized photographs of cases of pellagra shown them by Sandwith in England as being typical of a condition they had seen in India, but had not understood. Two sporadic cases were reported in the United States in 1863 and 1864 by Doctor Gray, of Utica, New York, and Doctor Tyler, of Somerville, Massachusetts. Doctor Sherwell, of Chicago, found a case in a sailor on a ship in New York in 1902 and, in the same year, Dr. H. F. Harris,(4) of Atlanta, Georgia, reported a case of agchylostomiasis in a native of Georgia who had always resided in the State, presenting the typical symptoms of pellagra. In 1907, Searcy(17) described an epidemic of 88 cases in the Mount Vernon Hospital for the colored insane in Alabama. Since 1907 many articles relative to pellagra have appeared in American medical literature and many cases, especially from the insane institutions of the South Atlantic States, have been reported. The condition has become so serious in the United States that The National Association for the Study of Pellagra has been formed and the Surgeon-General of the Public Health and Marine-Hospital Service has appointed a commission to investigate the disease.

Since Marzari,[8] in 1810, associated pellagra with the eating of Indian corn, the majority of investigators of the disease have attributed it to the continued use of maize as a foodstuff; persons holding this opinion are known as the *zeists*, in contradistinction to the *antizeists* who consider the condition merely a symptom-complex occurring in alcoholics, insane persons, and in persons with other depressed symptoms (Lavinder).(7) However, the zeists differ widely in their beliefs as to just how the disease is caused by a diet of maize. Thayer(20) divides the opinions of this school into four classes, as follows: (1) Toxic substances are produced by changes occurring in healthy maize in the process of digestion (Neusser); (2) the poisons are chemical substances arising from the decomposition of maize before ingestion (Lombrosso); (3) the disease is caused by the products of changes produced [in maize] by various special micro-organisms and bacteria (Majocchi and Cuboñi); (4) it arises from changes produced [in maize] by various molds (Ballardini, Gossio and Ferrati, Ceni, Fossati).

Lavinder summarizes as follows the reasons why the ideas of the zeist school can not lightly be passed over:

"(1) The disease is an endemic one confined largely at least, if not exclusively, to populations which grow and eat corn and more especially to those who, through force of circumstances, eat a poor grade of corn. (2) By far the great majority of thinkers and students believe the disease to be in some definite, if at present rather ill-defined, way connected with the use of corn as a foodstuff. (3) Italian and other authorities, in their attempts to limit and eradicate pel-

[4] Quoted by King.
[5] Quoted by Lavinder.
[6] Quoted by Sambon.
[7] Quoted by King.
[8] Quoted by Taylor.

lagra, base all prophylactic measures almost entirely upon this theory and, as an outcome of such means, good results are claimed."

Sambon,(13) in 1905, referred to the United States as a conspicuous example of a maize-growing, maize-eating country which did not have pellagra, but, prior to June, 1909, Williams,(11) of South Carolina, obtained records of about 1,000 cases in that country, most of which were from asylums. It is variously estimated that at present there are from 5,000 to 10,000 pellagrins in the United States. Furthermore, it has been established that the disease doubtless existed there for at least fifteen or twenty years and probably for thirty-five or forty years before it was recognized. It is interesting in this connection to note certain changes in vogue in recent years regarding the harvesting and marketing of maize in the United States, as pointed out by Nichols(12): Shelled maize is marketed from four to eight weeks earlier than formerly, the time of weathering and drying it on the stalk also is cut short, and more trouble is experienced in handling the maize and preventing it from spoiling. Sambon,(13) in 1905, after discussing the various theories of the zeists as to the etiology of pellagra, concluded by saying that if he were asked to suggest a new theory of pellagra he would feel inclined to draw attention to the many analogies between it and some of the protozoan diseases. It has been claimed recently that the disease is caused by a protozoan(14) parasite transmitted to man by a minute biting midge of the genus *Simulium*. The protozoan theory is, at present, attracting much attention. Taylor(19) draws a striking comparison between the points of similarity occurring in pellagra, sleeping sickness and syphilis. However, the results secured by applying the Wassermann reaction to pellagrins are conflicting. Bass(1) obtained 8 positive reactions out of 12 cases, other conditions, such as syphilitic history, malaria, etc., which might have had their influence, being excluded. Fox,(3) on the other hand, obtained three or four weak reactions, but not a single strong positive one in 30 cases. However, he used Noguchi's modification of the Wassermann test.

The following conservative resolution was adopted at the closing session of the conference on pellagra, held at Columbia, South Carolina, November 3 to 4, 1909.

"*Resolved*, That while sound corn is in no way connected with pellagra, evidences of the relation between the use of spoiled corn and the prevalence of pellagra seem so apparent that we advise continued and systematic study of the subject and, in the meantime, we commend to corn growers the great importance of fully maturing corn on the stalk before cutting same."

Although individuals of all ages are susceptible to pellagra, the majority of cases occur in persons between 20 and 50 years of age. Locality predisposes only in so far as the climate may be favorable for the growing and maturing of corn. Other conditions have no predisposing influence except as the general state of nutrition may be lowered thereby. Direct sunlight is not necessary for the production of typical skin lesions of pellagra, though they may be influenced somewhat by it. Lombrosso, to some extent, controlled the location of lesions by the use of fenestrated gloves, but it is shown that gipsy children of Roumania, who go about naked, have skin lesions of pellagra confined to the usual sites (Neusser),[9] and five of Walker's(23) cases had not been out of doors in eight months.

The pathologic findings are neither constant nor characteristic, and Harris(5) says that "there are few, if any, diseases characterized by perceptible organic lesions the pathological anatomy of which is so difficult to arrive at as that of pellagra." The evidences of cachexia are seen in the wasted muscular tissue and in the atrophic and fatty changes in the heart, lungs, liver, kidneys, and spleen. In the digestive tract, the tongue is more or less denuded of epithelium, the

[9] Quoted by Sambon.

gums and the buccal mucosa are the seat of a dirty, grayish deposit and perhaps of ulceration, the mucosa of the stomach is frequently hyperæmic, especially at the pyloric end, and slight areas of hyperæmia are found in various locations in the large and small intestine. Ulcerations also may occur and in various situations there usually is found a thinness of the walls of the intestine. When examined microscopically, this is found to be in the muscular tissue. In performing the autopsies, one is impressed with the slight pathologic changes in the digestive tract as compared with the marked symptoms which often precede death.

Tuczeh [10] calls attention to abnormal pigmentation in the ganglionic cells, heart musculature, hepatic cells and spleen. He believes that the hyperæmia, anæmia, œdema and, at times, inflammatory affections of the central nervous system and its coverings, together with the obliteration of the central canal of the spinal cord, are not peculiar to pellagra, but are present in many chronic affections of the central nervous system and in senility. Other findings in the brain are negative, except for fatty degeneration or calcification of the intima of small blood vessels and pigmentation in the adventitial coats. However, in the cord, Tuczeh [11] found fairly constant and important changes, namely, a degeneration in the lateral columns in the dorsal region and in the posterior columns in the cervical and dorsal regions, with very few changes in the lumbar region. Lombrosso [12] confirmed these findings, as did Sandwith,(16) but they believed the lesions of the posterior columns to have originated in the posterior nerve roots. Harris(5) found a combined sclerosis and from the character of the lesions was led to discredit the occurrence of so-called acute pellagra, believing that practically all cases are chronic and die when suffering from an acute exacerbation.

The skin changes usually consist of congestion, thickening and pigmentation, and atrophic thinness. (Radcliffe-Crocker.) [13]

The alterations in the blood, other than a secondary anæmia, are inconstant. Relatively large mononuclear increase has been reported. In a few of Walker's(23) cases the hæmoglobin varied from 65 to 95 per cent, red cells from 2,500,000 to 5,292,000, whereas the white cells showed but slight and inconstant variations. Nucleated red blood cells were found in three out of ten cases and were present early in the disease and when the hæmoglobin was either normal or above that figure.

To sum up, aside from the changes in the skin and those to be expected in a general cachectic condition, practically the only constant pathologic findings are those in the spinal cord.

The attempt to discover prodromal symptoms has been unsatisfactory for the reason that the great majority of cases in Europe have occurred among the poorer agricultural classes, who are accustomed to pay but little attention to the lesser ills of life, as well as to the fact that most of the cases in the United States have been studied in insane institutions.

One of my cases, a white female, recovered sufficiently to give a fairly good history. The first symptoms which attracted her attention were slight vertigo, insomnia, an increased appetite, irritability, occipital headache, lassitude, a growing lack of interest in her home and family, slight irregularity in her bowel movements (chiefly of a diarrhœal nature),

[10] Quoted by Lavinder.
[11] Quoted by Sandwith.
[12] Quoted by Sandwith.
[13] Quoted by Lavinder.

difficulty in remembering names, and a vague fear that some calamity would befall her. She did not recall having nausea, a burning sensation in the stomach, or abdominal pain particularly referred to the epigastric region, symptoms mentioned by various writers as prodromal of the disease.

When pellagra is well established, the symptoms fall into three groups, skin lesions, digestive symptoms, and nervous and mental manifestations.

The skin lesions are symmetrical in distribution and involve chiefly, almost exclusively, the uncovered portions of the body: the hands, feet, face and neck. The elbows frequently are involved and lesions in unusual locations are reported: For instance, Walker had two cases in which the nipples were attacked and one case in which the umbilicus was affected. The extensor surfaces of the hands and feet are involved primarily; the palmar and plantar usually are not affected. The first appearance of the lesions generally is erythematous, but initial erythema may be lacking (Lavinder) [7]. The erythema not infrequently is accompanied by some local puffiness and a sensation of burning, the whole picture being somewhat like sunburn. D'Oleggio believed the condition to be caused by the sunlight and as the lesions in Italy, at least, tend to recur in the springtime, he called it *vernal insolation,* the popular name being *mal de sole.*

Vesicles and bullæ which easily become infected may follow the erythema and these, upon breaking down, disclose a raw, weeping, and at times ulcerated surface. In other cases, the skin dries and desquamates, leaving a slightly pigmented surface, or possibly a normally appearing skin. However, initially the skin may be dry, rather thick and pigmented to a bronze or blackish color. As the attacks are repeated, a chronic thickening and an increase in the pigmentation occur in the affected parts. The majority of writers believe that there is no relation between the severity of the skin lesions and the constitutional disturbance, while others consider the moist variety of lesion to be a grave symptom.

In the digestive tract, stomatitis is present in a large percentage of cases. The edges and under surface of the tongue, the floor of the mouth and the inside of the cheeks usually are reddened and the tongue may later appear to have lost its epithelium, constituting the so-called "bald" tongue. A whitish pellicle frequently is present upon the lower gum and this may involve all the mucous membrane of the buccal cavity. Its first appearance not rarely is back of the last molar tooth. Abdominal distress, a burning sensation in the stomach, nausea and vomiting may be present. Diarrhœa is the rule, but there may be constipation. The diarrhœal stools are characteristically of a light yellow or greenish-yellow color, they have a very offensive odor and a decidedly acid reac-

tion, are often of a mushy consistency and, as a rule, vary in frequency from 2 to 6 a day. When other symptoms are well marked and great emaciation is present, the diarrhœa at times may give place to constipation, a condition which the physicians at the Georgia State Sanitarium have learned to regard with apprehension.

The nervous symptoms are very variable, depending upon the stage of the disease and the individual case. The earliest symptoms are headache, restless irritability, insomnia (rarely drowsiness), vague neuralgias and some depression of spirits. As the disease advances, these symptoms become more marked and an alteration in the knee jerk occurs. In some cases, with mental symptoms similar to those of acute mania, all of the deep reflexes appear to be increased. Muscular weakness is characteristic. Many other conditions of a miscellaneous nature are reported, such as paraplegia, hemiplegia, contractures of the extremities, tetanoid states, convulsions, tremor of the tongue, head and upper extremities, and paræsthesias. Trophic changes also, such as œdema, sensations of cold, and general paleness, are reported.

Some cases show no mental involvement, while others vary from slow cerebration, faulty memory and slight depression, to asylum cases where almost any psychosis from dementia præcox to senility may be simulated. Some, with a history of long-continued illness, are diagnosed readily as an infective-exhaustive type, but others may be confused with manic-depressive insanity in the depressed stage, involutional melancholia, imbecility or dementia præcox. Negative symptoms, particularly with regard to taking food, not infrequently are present, and also stereotyped movements. Bizarre, fantastic, changeable delusions, often of the nature of a phobia, are at times coupled with a profound depression. As in the case of skin lesions, where a slight change is left in the affected parts when one attack clears up, just so some depression, irritability, and lack of interest in ordinary duties is left over, and as often as the disease recurs this condition is increased.

Many of the insane in Italy are pellagrins. There were 945 such cases in 1874, and 1,348 in 1877. Statistics for Saint Clement's Hospital of Venice give the following data (King) (6):

	Number of insane.	Pellagrous insane.
1874	558	178
1875	595	153
1876	666	175
1877	802	215
1878	859	294
1879	924	337

It is not stated whether these pellagrins were insane when admitted to the hospital or became pellagrous after admission.

A vaginitis is quite common in the genito-urinary tract, occurring about the same time as the skin lesions and the stomatitis. Coupled with these various symptoms there is an increasing emaciation as the pellagra recurs from year to year, until finally the patient dies of exhaustion or some intercurrent disease.

While nearly all of the old-world cases are of the chronic type just described, there are records of acute ones (Lavinder)(7). Walker(23) reports 51 cases of so-called acute pellagra in the United States; Searcy(17) 88 of epidemic acute pellagra, and Zeller(27), of Illinois, 130. Harris(5) is inclined to believe that all cases are chronic because of the nature of the pathologic lesions in the spinal cord, even of those who died in an apparently acute attack. In this connection it is interesting to note that Siler(18) found that many of the Illinois series gave a history of preceding attacks, whereas 80 per cent of Searcy's(17) were previously in good health. Certainly, there is a wide divergence clinically between the cases clearly chronic, recurring yearly, and those apparently acute, which, without giving a history of a preceding attack, terminate fatally in from about one week to two months.

The various symptoms of pellagra develop quickly and are severe in these rapidly fatal cases. The development of stomatitis, skin lesions, and digestive disorders in which vomiting is not uncommon and diarrhœa is persistent, leading to rapid emaciation, pronounced nervous and mental manifestations, vaginitis, slight fever and the occurrence of bedsores, is so rapid that the picture is rather explosive in character when compared with typically chronic cases which continue for years.

The division of pellagra into varieties depends upon the symptoms which are most pronounced. On this basis, the following division is given (Procopin):[14] (1) gastro-intestinal; (2) nervous, with mania; (3) nervous, with paralysis; (4) *pellagra sine pellagra;* and (5) typhoid pellagra.

Some authors discredit the occurrence of *pellagra sine pellagra,* and doubtless it is true that this division affords a good opportunity for other affections to be diagnosed as pellagra. There is no symptom more characteristic of pellagra than the skin lesions. However, I have seen at least one case in which the lesions were very slight and fleeting in character. In 8 per cent of Searcy's(17) series the cutaneous system was not involved. In the typhoid variety, a typhoid state has developed, but the *Bacillus typhosus* is absent.

The diagnosis of a well-marked case which exhibits the typical skin lesions, stomatitis, diarrhœa and depression is made easily after the physician has once seen pellagra. As in other affections, the atypical cases offer difficulties. A history of maize eating is important. In my opinion, the strongest evidence of pellagra is found in the skin lesions, and in the absence of this symptom one should be cautious in rendering a diagnosis. The London School of Tropical Medicine instructs its students to diagnose

[14] Quoted by Lavinder.

pellagra before the skin lesions appear, and certainly it would be well if diagnosis could be rendered thus early in all cases. However, as stated before, the division of *pellagra sine pellagra* affords an opportunity for incorrect conclusions to be drawn. Recently, I have read the reports of two or three cases of pellagra which, in my opinion, were not pellagra at all. Provisional diagnosis could be rendered in such instances and time would indicate the positive diagnosis.

The prognosis is guarded, even though the patient may recover from one attack. The most hopeful cases are those of the chronic type without mental involvement; the least so, those of the acute or fulminating variety with pronounced mental impairment. Searcy says that the majority of acute cases die within from ten days to six weeks after the onset. The chronic ones recur in increasing severity year after year and the patient finally dies of exhaustion, or of an intercurrent disease. Some affections are said to have continued for twenty-five years.

Fever, marked mental symptoms, and a typhoid state are looked upon with gravity, as also is any complication.

Lombrosso, in 1884, found that 13 per cent of a large number of cases died. (Lavinder.) The death rate in Italy in 1905 was 4 per cent.(26) Of the cases at the Peoria State Hospital, Illinois, 22 per cent died, 10 per cent were not expected to recover, 17 per cent improved, and 51 per cent apparently had recovered, when reported. (Siler.) (18)

Italy especially has instituted prophylactic measures against pellagra, all her efforts being directed against the use of spoiled maize as food. The Italian law of 1902 regarding the prevention and cure of pellagra provides for a census of the disease and a report of all new cases; artificial dessicating plants and public storehouses for maize; exchanges where, under certain conditions, good maize is given for spoiled; the exclusion from entrance into the country of spoiled grain and the inspection of home-grown maize when brought to the mill; the education of the public, including the school children, by means of lectures and pamphlets as to the causation and prevention of pellagra; and farmers' institutes to teach the peasantry better methods of agriculture. Apparently, the measures have been very successful, as indicated by the fact that in 1906, 1907, and 1908 the new cases reported were, respectively, 6,783, 5,307, and 2,766. (Wollenberg.) (26) However, it is pointed out that this decrease in the number of new cases is coincident with an improvement in general conditions in Italy; that emigration has reflexly widened the view of the peasant class so that they demand and get better food and living conditions; that wages are higher and that the consumption of meat is increasing. (Lavinder.) (9)

The law of 1902 provides, as curative measures, for the establishment of rural bakeries from which well-made, wheaten bread is distributed to those ill of pellagra, and also hospitals (*pellagrossari*) for the treatment of the more pronounced cases of the disease. There are now 22 such hospitals in Italy. (Thayer.) (20) The patients are given a liberal diet and are treated symptomatically, slight importance being placed on any one drug; and these efforts appear to be successful, since in 1906 and 1907 the death rate from pellagra in Italy fell to about one-fifth of the former death rate. (Wollenberg.) (26)

Austria, in 1905, provided for its pellagrins by establishing community bakeries where bread from fresh flour was distributed, each patient receiving daily a loaf

weighing 1 kilo; salt and meat were given for a period of from sixteen to forty weeks; free pamphlets relating to the cause and prevention of the disease were circulated, with the result that 86 per cent of the patients were benefited to such an extent that they could attend to their ordinary duties even in cases where the disease was of from four to eight years' duration. In 1909 there were recurrences in 126 of the cases treated during 1907 and 1908. (Vienna letters.) (21, 22)

No drug has been found to counteract pellagra. The best results, as just indicated, have been obtained by excluding corn from the diet, giving a liberal allowance including meats, and treating the cases symptomatically. Tonics are often administered. The skin lesions do not respond well to local treatment. The exhibition of common salt is thought to be beneficial. Arsenic in the form of Fowler's solution, arsenic trioxide, atoxyl and soamin has been used, but reports of the results are very conflicting, some men apparently obtaining good results, while others believe that no beneficial effects are secured from its use. However, the balance of evidence tends to show that Fowler's solution is of importance, especially in nonasylum cases. Reports regarding the administration of atoxyl and arsenic trioxide combined have recently been made and encouraging results claimed (Babes),[15] but these have not been verified.

Bearing in mind that pellagra is a disease which characteristically recurs, it is evident that the physician must be exceedingly careful in interpreting apparently *good results* from the use of any drug. Warnock,[16] in 1907, believed atoxyl had a favorable action, but, in the following year, he lost faith in its beneficial effects (possibly because of recurrences).

There is evidence tending to show that specific antibodies are developed in the blood, and the serum of cured cases has been used successfully in the treatment of typhoid pellagra (Antonini and Mariani).[17] Cole and Winthrop(2) report successful results in 6 out of 9 cases treated by transfusion. In some of the cases the blood of a cured pellagrin was used, but in most of them the blood was taken from a healthy individual. Special reasons existed why the operation would probably be unsuccessful in the three which were fatal.

PELLAGRA IN THE PHILIPPINE ISLANDS.

Mariano Agustin, of Cabeceria No. 10, of San Antonio, a hacienda of the Compañia Tabacalera, and a barrio of Ilagan, Province of Isabela, an Ilocano, was born in Batac, Ilocos Norte. He moved to San Antonio about fifteen years ago. He is about 30 years of age and the father of three healthy children, the youngest of whom is between 3 and 4 years old. Since moving to San Antonio, he has continuously lived in that place and been engaged in growing tobacco. His family history is negative except that his father died suddenly two years ago at about 60 years of age. No history of serious illness could be elicited until the present illness

[15] Quoted by Lavinder. [16] Quoted by Lavinder. [17] Quoted by Lavinder.

began. The patient says his chief articles of diet have been maize, grown at San Antonio, and rice, but largely maize.

Somewhat more than two years ago the patient had attacks of diarrhœa alternating with constipation. The diarrhœal stools were of a mushy consistency, light yellow in color, and varied in number from two to six a day. About the time the diarrhœa developed, the skin of the extensor surfaces of the hands and feet became rather thick and pigmented, and the forearms, legs, thighs and buttocks were affected with a different kind of a dermatitis. Previously, his neck had become enlarged anteriorly. It was impossible to determine whether the hands and feet were reddened at first or whether the lesions were at any time moist.

While the patient says his hands and feet have been continuously pigmented since the eruption first appeared, his answers to certain questions tend to show that there have been three exacerbations or recurrences in his symptoms. He refuses to take a bath, except by having the water poured on his head, because his symptoms were more pronounced on one occasion after having taken a bath in the usual way; he also, for similar reasons, refuses to have his hair cut and his nails trimmed.

Throughout this period the patient has slept well and has had a good appetite, but has felt that he was growing weaker. In January, 1910, there were some skin lesions on his face. He realizes that he has become irritable and depressed. He has not walked for several months.

The patient is a fairly well nourished man of above medium height. His arms, and especially his legs, are diminished in size; the muscles are flabby. He complains of nothing but weakness. His countenance indicates mental depression, and this, together with his long hair and nails, a peculiar dermatitis involving the hands and feet symmetrically and an enlarged neck, probably from goiter, gives him a rather striking appearance.

A dry, rather thick, blackish, somewhat granular dermatitis involves the extensor surface of the hands quite symmetrically, and fades away rather abruptly slightly above the wrist joint; this gives place to a dermatitis which extends nearly to the elbow, involves the whole circumference of the forearm and is characterized by large, thin, grayish-colored flakes. At the wrist joint the first variety of determatitis spoken of extends around the forearms like a bracelet. The feet are affected in precisely the same manner as the hands and with precisely the same sort of dermatitis; it fades away rather gradually above the ankle joint to give rise to the large, flaky variety of dermatitis which involves not only the legs, but also the thighs and buttocks. This is more pronounced on the lower than on the upper extremities. Both varieties of dermatitis are symmetrical in distribution. The palmar and plantar surfaces are not involved. Slight puffiness of the extensor surfaces of the fingers

is present. No burning sensation of the affected parts is experienced by the patient, but he complains of some itching wherever dermatitis is found.

Unfortunately, the patient's mouth was not examined, but he stated that his mouth was not at the time, and had not been, sore. Examination of the abdomen is negative, as is that of the lungs, but the heart is found to be enlarged, the apex beat being displaced outward and downward. No murmurs. The examination of the nervous system is unsatisfactory because it is impossible for the patient to understand what is desired. However, fine tremors of the upper extremities are present, the knee jerks appear to be diminished and the Babinski reflex is absent. Mentally, the patient is at times irritable and moody, but usually he is depressed and indifferent to what is going on around him. His answers to questions are slow, as though he had difficulty in finding words to express himself, and he apparently entertains vague fears that some ill will befall him. Memory for recent events is good. He has no hope of recovery. Pulse full, regular, 68 per minute. No capillary pulse, exophthalmos absent; temperature normal.

Facilities were not at hand for examining the blood or the urine, but the latter was apparently normal as to color, amount, and frequency. The fæces were light yellowish, soft, decidedly acid in reaction and negative for evidences of parasitism.

The patient was in about the same condition each time he was seen, and the above notes were taken from the results of examinations during five visits. He was told to abstain from eating maize and rice but that he might eat all he desired of other things, especially eggs, chickens and milk. He was also given elixir of iron, quinine and strychnine. The directions were not followed either as to diet or the tonic.

Having had the opportunity of seeing a number of cases of pellagra in the Georgia State Sanitarium during the past two years, I believe the case here reported to be one of that disease. The involvement of the hands and feet, the character of the bowel movements and the depression, cardinal symptoms of pellagra, all form a very striking picture. However, because of the impossibility of obtaining a perfectly accurate history either from the patient or his family, because of the presence of the second variety of dermatitis, which is new to me (but which is not uncommon at San Antonio), and because of the fact that pellagra has not yet been reported from the Philippine Islands, the diagnosis is modified to a case of probable pellagra.

It is well known that in certain parts of the Philippine Islands maize forms the chief article of diet. This is true of the tobacco districts of the Cagayan Valley, and among certain wild tribes (e. g., Negritos), in Bulacan and Pampanga Provinces. Since pellagra is found in so many parts of the world where maize is cultivated and used as a

foodstuff, and it seems so apparent that the cause of pellagra is in some way connected with the eating of maize, one would rather expect to find the disease in the Philippine Islands. It may be added that several physicians have told me that certain cases seen by them may have been pellagrous. Dr. Cesar Sorerain, of Ilagan, tells me he has seen eight cases of pellagra during about twenty-two years of practice in the Cagayan Valley.

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The Index Catalogue of the Surgeon-General's Library, Washington (1907) (II) **12,** and the Journal of the American Medical Association (1909), **53,** 1657–1658, give references to practically all the literature on pellagra up to within a few months.

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ILLUSTRATION.

PLATE I. Case of probable pellagra.

PLATE I.