The β lead, as well as the gamma lead, is very similar in form to the α, except that the P-wave is always positive.

The deflections are low at first, come to their greatest height at the eighth to ninth days in the auricular complex, and at the ninth to tenth day in the ventricular complex. Following these dates, they again become low to gain slowly afterwards to the twentieth day.

The behavior of these tracings points to a possible relation to the establishment and initiation of a nervous control over the chick embryo heart, which occurs at approximately the same time. Thus, nervous control would be inhibitory in type and would affect the auricular complex earlier than the ventricular complex. The series is now being extended to include the first days of life outside the shell.

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Pellagra and Vitamin Deficiency.

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Despite the fact that pellagra is a definite clinical entity, extensive investigation over several centuries has failed to establish a causative agent.[1, 2, 3] Of all the many theories advanced as to its etiology, the two most important would seem to be infection or dietary deficiency. All attempts to transmit the disease have failed and no incontrovertible evidence of an infectious agent have been advanced. The relationship of this disease to poverty has been stressed since its earliest recognition. Goldberger, *et al*,[3, 4, 5, 6] brought forward considerable additional evidence toward establishing pellagra as a dietary deficiency disease.

[1] Wood, Edward Jenner, "Pellagra." Oxford Medicine, Vol. IV, part L, page 307.

[2] Funk, C., *Die Vitamine.* Wiesbaden, 1914.

[3] Goldberger, J., "The transmissibility of pellagra." *U. S. Public Health Rep.*, Nov. 17, 1916, page 3159.

[4] Goldberger, Waring, and Willets, "The prevention of pellagra." *U. S. Public Health Rep.*, 1915, XXX, page 3116.

[5] Goldberger, Wheeler, and Sydenstricker, "The relation of diet to pellagra incidence." *U. S. Public Health Rep.*, March 19, 1920, XXXV, page 648.

[6] Goldberger, J., and Wheeler, G. A., "Experimental production of pellagra in human beings by means of diet." Hygienic Laboratory, Washington; Bull. 120, Feb. 7, 1920.

There has been considerable difference of opinion as to the relationship of chronic alcoholic intoxication to this disease. It is certain that pellagra often occurs without alcoholism. On the other hand, it seems fair to admit that sufficient indulgence in alcohol may prevent an adequate food intake, thus favoring the production of pellagra.

During the past several decades innumerable minerals, drugs, and diets have been proposed as a cure for this disease. Controversy has inevitably arisen as to their efficacy. In view of the large number of inadequately controlled experiments, it seemed especially worthwhile to study the acute phase of this disease under strict experimental conditions.

The present report deals with the study of four cases of pellagra which were limited to a diet deficient in minerals and vitamins "B" and "C".

Three of the four classical cases of pellagra chosen were white males with a history of alcoholism. The other case was a negress with no history of drinking during the past few years. All the patients had a definite history of dietary deficiency extending over a period of two months or longer. Three patients had diarrhea; three had stomatitis, three had anal lesions, two had mild mental deterioration; the one female had vaginal ulcerations. The four patients had characteristic bilateral symmetrical dermatitis of the hands. In addition, the negress had a butterfly-shaped, symmetrical lesion on the vulva, thighs, and anus, typical of pellagra.

Each patient received a daily diet of 2,300 calories (cal. from C = 1700, cal, from P = 110, cal. from F = 490) consisting of: corn meal mush, corn meal muffins, pork fat, maple syrup, polished rice (boiled), cornstarch pudding, coffee, and sugar. This diet was administered from the time the patient entered the hospital until the day prior to discharge when he was given a high protein, high vitamin diet.

It can readily be seen that the diet used was even more restricted in mineral content and in vitamin "C" and "B" (including pellagra-preventive factor) than Goldberger's pellagra-producing diet.[6] (He produced pellagrous lesions of the scrotum in six of eleven normal subjects after five months.)

The condition of all patients rapidly improved (see Figs. 1 and 2). The stomatitis, diarrhea, and anal lesions were relieved during the first three hospital days. The deep purplish erythema over the hands and tongues of the three white male patients disappeared during the first week. Desquamation of the involved epithelium

FIG. 1.
Showing the symmetrical lesion of pellagra.

then began in the central portions and progressed toward the periphery. The involved sites became covered by thin soft epithelium of pink color during the second hospital week. The skin lesions of the negress improved less rapidly than those of the white males and desquamation did not appear before the end of the second week. During the third and fourth weeks the thick, roughened skin was then replaced by soft, deeply pigmented epithelium.

The mental change showed much less change during the period of observation.

Conclusions. Four cases of moderately severe pellagra have been presented, which improved strikingly on a diet of 2,300 calories de-

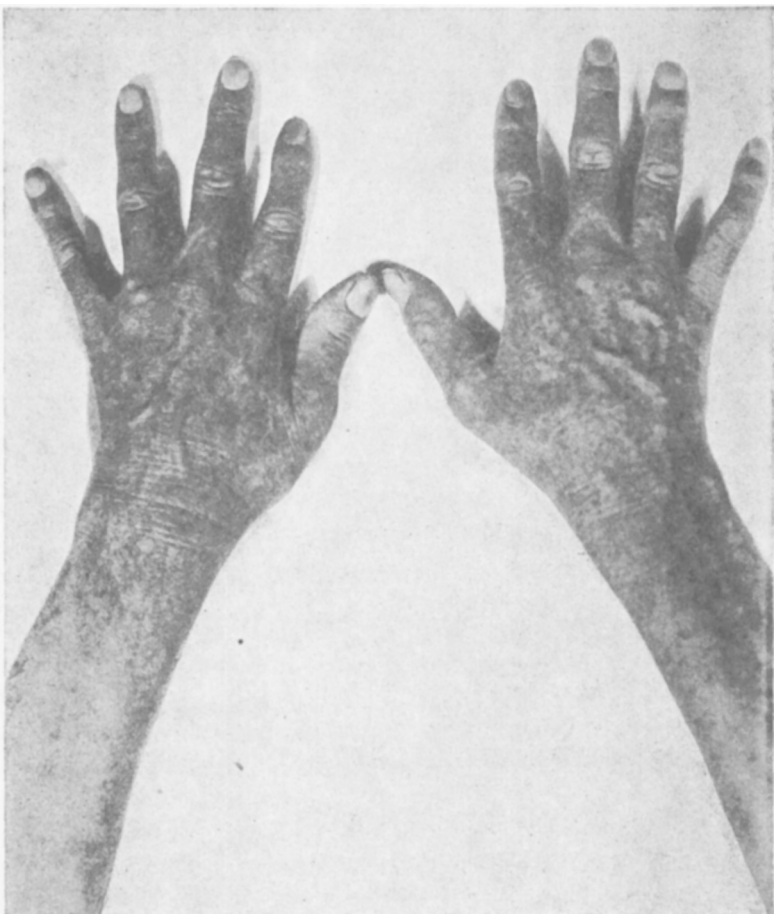

FIG. 2.
The same patient 23 days later. Note, the chief residual change is due to freckles.

ficient in mineral content and vitamins "C" and "B" (including pellagra-preventive factor). The patients showed no return of signs or symptoms during the six to seven weeks they received this diet.