THE NATURE OF NUTRITIONAL DISEASES OCCURRING IN THE SOUTH[1]

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WHEN nutritional diseases in the South are mentioned, there is always one disease that stands out above all others. This is pellagra, and because of its high incidence, it *should* attract our attention first. It is by far the most serious of our deficiency disease problems. However, we should not let this fact blind us to the existence of other deficiency diseases in this part of the United States. It is to be expected that other dietary deficiency diseases will also develop in an area in which a large number of people live on a diet restricted enough to produce pellagra. You cannot expect a generally poor diet to be deficient in only one respect, and there is ample evidence that other deficiency diseases such as scurvy, beriberi, nutritional edema, and nutritional anemia occur in the South. There are occasional reports of cases of beriberi, and there is evidence that vitamin B_1 deficiency may be more widespread than was thought a few years ago. Spies and his associates have found that the peripheral neuritis which is frequently seen in cases of pellagra responds to the administration of vitamin B_1, a strong indication that these cases really are suffering from a multiple vitamin deficiency.

Another deficiency disease in the South associated with these same types of diet is nutritional edema, which was discussed at the Milbank meeting last year by Dr. Youmans.[3] This condition appears to be due to a protein deficiency and usually manifests itself

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[3] Youmans, John B.: The Diagnosis of Nutritional Edema with Particular Reference to the Determination of Plasma Proteins and Consideration of their Behavior. NUTRITION: THE NEWER DIAGNOSTIC METHODS. Proceedings of the Round Table on Nutrition and Public Health, Sixteenth Annual Conference of the Milbank Memorial Fund, March 29-31, 1938, pp. 166-173.

by unexplained swelling of the feet and ankles. We do not know how much of it occurs in the South, but its prevention involves the same factors that are concerned in the prevention of pellagra, and the use of proper methods for the prevention of pellagra will also prevent this as well as the other deficiency diseases that are peculiar to the South.

Table 1. Total number of deaths from pellagra as reported to the Public Health Service, compared with those as published by the Bureau of the Census for the years 1930 to 1937, inclusive.

Year	Deaths Reported to the Public Health Service	Deaths as Published by the Census Bureau
1930	7,146	6,333[1]
1931	5,855	5,091[1]
1932	4,134	3,694[1]
1933	3,821	3,955
1934	3,409	3,602
1935	3,463	3,543
1936	3,634	3,740
1937	3,162	3,258

[1] The Registration Area includes only forty-seven states: Texas being the only state not in.
In 1933 and subsequent years, the Registration Area includes all states.

You who are here at this meeting have already heard much about pellagra and these other nutritional diseases, and there is no need for me to discuss the well-known observations on them. Instead, I shall discuss briefly some of the practical aspects of the prevention of nutritional diseases in the South and present some new observations that tend to further complicate our problems.

Last year at this meeting there was a presentation on the relation of nicotinic acid to pellagra.[4] Nicotinic acid has proven its value as a therapeutic agent in pellagra, but I am afraid it has only opened up new problems in prevention. It is too early for the beneficial effects of the use of nicotinic acid to show up in our mortality statistics, but it is to be expected that in the next few years we shall see a marked decrease in the deaths from pellagra, although I see little prospect for any marked diminution in the incidence of the disease. The number of deaths from pellagra in the United States for the

[4] Spies, Tom D.: The Relation of Nicotinic Acid to Pellagra as Evidenced by Therapeutic Studies and its Implications for a Diagnostic Test. NUTRITION: THE NEWER DIAGNOSTIC METHODS. Proceedings of the Round Table on Nutrition and Public Health, Sixteenth Annual Conference of the Milbank Memorial Fund, March 29-31, 1938, pp. 103-113.

period 1930 to 1937 is given in Table 1. This shows very clearly that we have made definite progress in reducing our mortality. Unfortunately, we are unable to tell whether this represents better treatment due to the widespread application of our knowledge of the disease or whether it represents a reduction in the number of cases that occurred. I am inclined to think that both of these things are taking place.

Table 2. Deaths and death rates (number per 100,000 estimated population) from pellagra in certain states, 1937.

Area	Number	Rate
UNITED STATES	3,258	2.5
Alabama	309	10.7
California	74	1.2
Florida	104	6.2
Illinois	19	0.2
Iowa	6	0.2
Kentucky	86	2.9
Massachusetts	13	0.3
Mississippi	234	11.6
Missouri	20	0.5
New York	25	0.2
North Carolina	332	9.5
Ohio	19	0.3
Pennsylvania	15	0.1
South Carolina	272	14.5
Tennessee	203	7.0
Texas	578	9.4
West Virginia	11	0.6

Table 2 shows the number of deaths from pellagra and the rate per 100,000 for certain states in 1937. Although the rate is high in the southern states, pellagra is not an exclusively southern disease. It occurs to some extent in every state, and in several the death rate reaches an appreciable figure. In some southern states pellagra stands about fifteenth as a cause of death, exceeding the number of deaths from such diseases as typhoid fever, diphtheria, measles, and poliomyelitis, diseases which we usually associate with the activities of the health department.

It would be very desirable to know the actual number of cases of pellagra occurring in the United States. For some selected states, the reported numbers of cases and deaths are presented in Table 3. In several instances, the number of deaths reported from the disease even exceeds the total number of cases reported, and it really would be better if we had no case reporting at all since the figures are so misleading. For some years I have been estimating the number of cases on the basis of the reported deaths representing about 3 per

State	1934		1935		1936		1937	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Alabama	374	309	563	254	300	306	270	311
Arkansas	523	184	646	186	272	213	463	148
Florida	151	230	74	181	35	133	115	103
Georgia	643	351	707	365	701	391	836	370
Kentucky	131	58	73	68	56	72	47	75
Louisiana	199	143	218	136	161	115	159	101
Mississippi	4,157	211	3,963	222	3,693	264	3,699	236
North Carolina	543	424	732	387	831	349	576	327
South Carolina	1,470	329	1,237	300	1,807	274	2,263	269
Tennessee	147	227	253	215	288	244	277	204
Texas	782	493	546	602	589	645	1,676	508
Virginia	237	124	149	141	148	130	110	110

Table 3. Number of cases and deaths from pellagra reported in selected states for 1934 to 1937.

cent of the cases, a rate obtained from Goldberger's survey in South Carolina many years ago. This gives an estimate of about 100,000 cases for 1937, an astounding figure, but one which I believe is conservative because the death rate today probably is lower than it was at the time of Goldberger's survey. During the summer months I have followed the country roads in several southern states and found case after case of pellagra simply by stopping at a house and asking if anyone in the neighborhood had the disease. Fortunately, it is a mild disease in most cases, as is indicated by the low death rate and by the number of cases that can be found who have never had medical attention. I have even found severe skin lesions on a man ploughing a field.

Although we have known how to prevent pellagra for years, we find the health departments busily fighting diphtheria, measles, and smallpox, but doing very little about pellagra. Now, do not misunderstand me; I am not criticising the health departments. After I explain the difficulties you will see why the problem is one that they cannot handle and one which they should not be expected to handle alone, although they can do their share. Many are already doing as much as can be expected of them. First, it is difficult to get

money for a pellagra campaign. Since the disease is not contagious, no horrible picture of its menace to the community can be drawn by the health officer; secondly, since it attacks those on the lowest economic level, the sufferers themselves are unable to contribute to their relief and at the same time they constitute the least influential group in the community; thirdly, the health officer cannot see how he can organize and conduct a satisfactory campaign; and, finally, there is no way for him to present figures proving his industry in this field as he can with other diseases by showing numbers immunized, x-rayed, vaccinated, etc. These factors in most communities result in the health department's campaign against pellagra consisting of the distribution of pamphlets on the subject, and the giving away of much dried yeast, the latter probably saving many lives, but being a palliative measure which will never solve our problem.

In addition to these causes, there are other reasons why the health departments are almost helpless. Let us take an actual case: Early in March, I was in a rural southern county that cannot afford a health officer, and stopped to see a reported case of pellagra. (The season starts at this time and cases occur with increasing frequency up into the summer, when they disappear following the use of the more liberal summer diet.) I found a small lady, probably in her fifties, with a typical case of pellagra. I advised her to drink milk and eat some lean meat and green vegetables if she wanted to get well. With tears in her eyes, she said, "Doctor, I can't get it. My children are no good. They won't help me, and everything in the world I have is $3.00 a month that the county gives me." What are you going to do with a case like this? I then advised her to go to the county nurse and get some dried yeast. She told me she had already been there but couldn't get any. I then visited the county nurse and found that her supply of yeast had been exhausted for months; she had been unable to get more and had a list of people who had been asking for it. I then had a talk with some of the in-

fluential men in the county, and they said, "Doctor, the County is broke. We are closing the schools next Friday because we can't pay the teachers." I saw other cases of pellagra in this same county, and there probably will be dozens there before the summer is over. What can the state health department do about it without assistance? Under present circumstances, nothing, except distribute yeast and try to keep the mortality down. But there are two things that can be done that will solve the problem if the proper agencies will work with the health department. These are (1) education and (2) crop diversification—measures which Goldberger and those who have followed him in the Public Health Service have been preaching for more than ten years.

Marzari, one of the great Italian pellagrologists, wrote an appeal to Eugene Napoleon in 1810 begging him to control pellagra by education and the eradication of poverty. I don't believe we will ever eradicate poverty, but I do believe we can eradicate our pellagra by crop diversification even if this leaves our poverty unchanged.

When I say education, I am using the word in a broad way. I mean not only the teaching of the necessity for eating an adequate diet, but also detailed instruction on how to produce, preserve, and prepare the necessary foods. At least one properly balanced meal should be served to the school children each day in order to educate the palate and cultivate a taste for desirable foods at an early age. I have found numbers of pellagrins who refused to include milk and green vegetables in their diet because they had not learned to like them.

By crop diversification I mean the production of food and forage crops. In looking for pellagra, I long ago learned not to waste my time stopping at a house with livestock and with a large vegetable garden around it. Here, then, is the solution of our pellagra problem, stated in a few words. However, the problem is so further complicated by such things as freight rates, industrial development, the price of cotton, the price of tobacco, the production of turpentine,

and numerous other factors, that the practical application of these measures is one of the most difficult problems facing the South today. In other words, it is so tied up with economic conditions that it is beyond the power of the health departments to solve it without help. A health department alone cannot sell a program of crop diversification, and the development of health education as an integral part of our secondary school curriculum is still in its infancy. Progress is being made. The South of today is a different South from that of ten years ago. Industry is moving in, livestock raising is increasing, and crop diversification under government stimulation in the face of an unprofitable cotton market has made great strides. This is a start in the right direction, in which the eradication of pellagra, if it has been considered at all, has played a very minor rôle. The big thing that is lacking and the essential thing that must be developed if pellagra and the other nutritional diseases are to be prevented in the South is an adequate program of health education directed particularly toward nutrition. This is not the place to go into the details of the organization of such a program, which must necessarily vary from state to state. The important thing here is to recognize that there is an urgent need for such a program. A few of the southern state health departments have added a nutritionist to their staff. This is desirable, but it is a feeble effort to meet the situation, and more heroic methods are needed. In one southern health department the nutritionist is devoting practically all of her time to a dental hygiene program. There is a certain amount of grim humor in the fact that her efforts are being devoted to attempts to control conditions whose etiology is unknown, when pellagra is widespread in the same state. However, regardless of what the objective may be, her efforts to improve the diet, if successful at all, probably will reduce the pellagra just as much as if that were her objective.

Neither the health departments, nor any other one group or class of people or organization can be blamed for our pellagra and our

failure to eradicate it. It is a monument to the failure of our social order to properly care for its people, and a manifestation of the low economic level to which an entire section of the population of this enlightened nation has been permitted to sink. There has been a tendency to blame it on the plantation owner and the textile mill operator, but this is a short-sighted view. You might just as well blame it on the government. For example, unequal freight rates make it cheaper to deliver New England granite to the market than to deliver Georgia granite, with the result that the Georgia granite quarries close and the loss of income to the granite workers of Georgia makes them eligible for pellagra. So let us not be too hasty to blame anyone for our pellagra. Instead, keep in mind that anything that operates to improve the food supply in the South will operate to reduce our pellagra incidence, and in the meantime the most effective weapons we can develop and use are health education and crop diversification, while we keep our mortality down with the use of palliative measures such as dried yeast and nicotinic acid.

I mentioned earlier in this paper that nicotinic acid has added to our problems of pellagra control rather than simplified them. One of the most serious problems in this connection is whether nicotinic acid should be added to some commonly used southern food, such as cornmeal. There are many objections to such a procedure, and, in my opinion, it would be unwise to do such a thing at this time, particularly since we do not know either the quantity of nicotinic acid necessary to prevent pellagra or the factors governing the individual's requirements.

There is now no question that nicotinic acid is an effective therapeutic agent in the treatment of pellagra. In view of the presence of other deficiency diseases, however, as well as the possible presence of unrecognized subclinical stages of deficiencies, it seems much wiser to continue to try to prevent pellagra by improving the diet.

In addition to the deficiency diseases already mentioned, my associates and I have recently found that there is another deficiency

disease present in the South which has hitherto been unrecognized. This is a clinical syndrome due to riboflavin deficiency,[5] and we have therefore designated it "ariboflavinosis." It is characterized by lesions in the angles of the mouth which begin as a pallor of the mucosa of the lips, followed by maceration, and within a few days superficial transverse fissures appear, usually bilateral and exactly in the angle of the mouth. These fissures showed a tendency to extend onto the face rather than the buccal mucosa. It appears that we have here a deficiency disease different from pellagra in both etiology and symptomatology, but which has been confused with pellagra in the past because the two conditions have so frequently occurred together and because the foods which contain the pellagra-preventive factor also usually contain riboflavin.

I call your attention to this differentiation particularly because the symptoms do not respond to nicotinic acid therapy. If we attempt to substitute nicotinic acid for natural foods in the prevention of pellagra it is not unlikely that ariboflavinosis or some of the other deficiency diseases present in the South will simply take the place of pellagra as a public health problem. I am of the opinion that it is wiser to continue our efforts to improve the food supply with natural, readily available foods which can be produced at home at little cost and which will not only prevent the specific disease we happen to be aiming at, but will also prevent all other nutritional diseases and at the same time furnish that optimum degree of good health, comfort, and mental ease which is popularly associated with a stomach well-filled with the end products of a diversified crop.

[5] Sebrell, W. H. and Butler, R. E.: Riboflavin Deficiency in Man. *Public Health Reports*, United States Public Health Service, December 30, 1938, 53, No. 52, pp. 2282-2284.