THE INFLUENCE OF HOOKWORM DISEASE UPON THE APPARENT AGE OF CHILDREN IN THE COTTON MILLS.*

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1. *Stunted Development*—Among the rural tenant whites, children very commonly appear to be younger than they actually are. This is due very frequently to the effects of hookworm disease, which retards their development. Great care must therefore be exercised in estimating the ages of these children. The following cases of hookworm disease, which I saw personally in one series of study, illustrate this point:

Children on farms, never worked in mills—

Age 7 years: 1 male, appears not over 5 years old.
13 years: 1 female, appears not over 9 years old.
14 years: 1 female, appears not over 9 years old.
15 years: 1 male, appears not over 12 years old.
17 years: 1 male, appears not over 12 years old.
1 male, appears not over 13 years old

Children in mill villages, but not at work in mills—

Age 7 years: 1 female, appears not over 6 years old.
14 years: 1 male, appears not over 10 years old.
17 years: 1 male, appears not over 13 years old.

Hands working the cotton mills—

Age 9 years: 1 female, appears 8 years old.
10 years: 1 male, appears 7 or 8 years old.
1 male, appears 8 or 9 years old.
10 or 11 years: 1 female, appears about 8 years old.
12 years: 1 male, appears not over 8 years old;
a "dirt-eater," in mill about 3 weeks.

1 male, appears about 10 or 11 years old.

13 years: 1 male, appears about 10 or 11 years old.

1 male, appears about 12 years old.

2 males, appear about 11 years old.

13 or 14 years: 1 female, appears 11 or 12 years old.

14 years: 1 male, appears about 7 or 8 years old.

1 male, appears not over 8 years old.

1 male, appears about 9 years old; in mill only a few weeks.

1 male, appears 10 or 11 years old.

1 male, appears 11 or 12 years old.

1 male, appears 12 years old.

1 female, appears about 13 years old.

14½ years: 1 female, appears about 11 years old.

15 years: 1 female, appears not over 9 years old.

15 yrs. 10 mos.: 1 female, appears about 14 years old.

16 years: 1 male, appears about 13 years old.

1 male, appears about 14 years old.

17 years: 1 male, appears not over 11 years old.

1 female, appears about 13 years old.

17 yrs. 2 mos.: 1 male, appears 13 years old.

18 years: 1 male, appears not over 14 years old.
1 female, appears about 16 or 17 years old.

19 years: 1 male, development not over 14 years.

20 years: 1 male, appears not over 17 years old.

22 years: 1 female, appears not over 17 years old; much stunted in growth.

24 years: 1 male, appears not over 19 years old.

26 years: 1 male, appears 16 years old.

Summarizing these three classes of cases we obtain the following:

Six persons on farms, and never connected in any way with either cotton mills or cotton mill villages, appeared on an average 3.83 years younger than they actually were.

Three persons in cotton mill villages, but not working at the time in cotton mills, appeared on an average 3 years younger than they actually were.

Thirty-three persons, working in cotton mills, appeared on an average 3.25 to 3.59 years younger than they actually were.

From these data it is seen that the stunted growth of the "cotton mill child" is found in persons who never worked in cotton mills and who never lived in a cotton mill village.

All of the foregoing forty-two persons were marked hookworm cases and their stunted growth was apparently due to this disease. This stunted growth is one of the characteristics of severe hookworm infection contracted before puberty; it is correlated with an absence or scarcity of axillary and pubic hair.

The conclusion to be drawn is that the so-called "cotton mill child," like the "cotton mill anemia," is a product—not of the cotton mill, but of soil pollution and the resulting hookworm infection taking place before puberty. As about one-fourth of the children in Southern cotton mills I have inspected are

*At the request of Dr. Charles P. Neil, Commissioner of Labor, an investigation into the prevalence of hookworm disease in the cotton mills was undertaken. Certain portions of the results obtained will be published in the reports to be submitted to Congress by the Bureau of Labor, while the more strictly medical discussions will be published elsewhere. The present article represents one in the series to be issued.

hookworm suspects, and as most of these children come from the rural districts, it is clear that great care is necessary in judging their ages, and the view is not unjustified that the accounts published by various persons, not familiar with this disease, relative to the large number of young, stunted children in the Southern mills, are not entirely free from error of interpretation.

Age.	MALES.			FEMALES.			TOTALS.		
	Mill hands.	Others.	Totals.	Mill hands.	Others.	Totals.	Mill hands.	Others.	Totals.
4	1	1	2	1	1	2	1	1	2
5	1	2	3	1	2	3	1	3	4
6	1	2	3	1	2	3	1	3	4
7	1	2	3	1	2	3	1	3	4
8	1	2	3	1	2	3	1	3	4
9	1	2	3	1	2	3	1	3	4
10	1	2	3	1	2	3	1	3	4
11	1	2	3	1	2	3	1	3	4
12	1	2	3	1	2	3	1	3	4
13	1	2	3	1	2	3	1	3	4
14	1	2	3	1	2	3	1	3	4
15	1	2	3	1	2	3	1	3	4
16	1	2	3	1	2	3	1	3	4
17	1	2	3	1	2	3	1	3	4
18	1	2	3	1	2	3	1	3	4
19	1	2	3	1	2	3	1	3	4
20	1	2	3	1	2	3	1	3	4
21	1	2	3	1	2	3	1	3	4
22	1	2	3	1	2	3	1	3	4
23	1	2	3	1	2	3	1	3	4
24	1	2	3	1	2	3	1	3	4
25	1	2	3	1	2	3	1	3	4
26	1	2	3	1	2	3	1	3	4
27	1	2	3	1	2	3	1	3	4
28	1	2	3	1	2	3	1	3	4
29	1	2	3	1	2	3	1	3	4
30	1	2	3	1	2	3	1	3	4
31	1	2	3	1	2	3	1	3	4
32	1	2	3	1	2	3	1	3	4
33	1	2	3	1	2	3	1	3	4
34	1	2	3	1	2	3	1	3	4
35	1	2	3	1	2	3	1	3	4
36	1	2	3	1	2	3	1	3	4
37	1	2	3	1	2	3	1	3	4
38	1	2	3	1	2	3	1	3	4
39	1	2	3	1	2	3	1	3	4
40	1	2	3	1	2	3	1	3	4
41	1	2	3	1	2	3	1	3	4
42	1	2	3	1	2	3	1	3	4
43	1	2	3	1	2	3	1	3	4
44	1	2	3	1	2	3	1	3	4
45	1	2	3	1	2	3	1	3	4
46	1	2	3	1	2	3	1	3	4
47	1	2	3	1	2	3	1	3	4
48	1	2	3	1	2	3	1	3	4
49	1	2	3	1	2	3	1	3	4
50	1	2	3	1	2	3	1	3	4
Totals.	260	22	282	204	14	218	464	36	500

Ages of 500 Hookworm Cases and Suspects

In most instances the cases and suspects were divided into "age groups," but in the following 500 cases and suspects the exact or approximate age in years was obtained.

From the foregoing table it is seen that of 464 hookworm cases and suspects observed in the mills, and whose exact or approximate age was obtained, three were 9 years old, five were 10 years old and eleven were 11 years old; thus nineteen of these cases and suspects, or 4 per cent, were below the legal mill age limit (12 years) of South Carolina (not considering exceptions for vacation or for widowed mothers and invalid fathers). I know of several cases personally where children began to "help" in the mill at the age of 7 years.

The exact ratio of the children under 12 years of age to the total number of employees observed I am unable to give, but I would estimate it as somewhere between 2 and 5 per cent of the total hands seen. Kohn (1907, pp. 110-111) gives it as 1¼ per cent for the mills in South Carolina, based upon mill reports, but expresses the view that about 3.8 per cent would be a closer estimate. My estimate of 2 to 5 per cent was made before I was aware of Kohn's estimate. For more exact figures, the reader is referred to the reports which are in preparation by the Bureau of Labor.

2. "Helping" in Mill—It is a very common occurrence to find a small boy or girl in the mill and to be told that he or she is "not employed" by the mill, but is simply "helping his mother" or "sister."

The real facts about these "helpers," as explained to me both by mill managers and mill hands, seem to be as follows:

The mills cannot, under the laws, hire these young children, and from an administrative point of view it is difficult to see any reason why they should wish, or even be willing, to do so. A girl who is working in the mill happens, however, to have a younger brother or sister who is under mill age; the wage earning sister is paid according to the number of "sides" she can run, and if she "runs" eight sides at, say 12½ cents per side, she earns \$1 per day; if her younger brother or sister "helps" her, the two together can run, say,

ten "sides" per day. The younger sister does not appear on the pay roll, hence the mill is not employing the child under the age limit; the work of the young child does not appear to her credit on the rolls, but the older sister receives credit and pay for ten "sides" per day, say, \$1.25.

The older sister argues that her little sister might just as well help her in the mill as help her mother with the housework at home—the child is not being "employed," and no law is being broken.

The system of "helpers" is therefore in fact an invasion of the law, for which the hands themselves, not the mills, are chiefly responsible.

According to my observations, the majority of mill managers are against allowing these helpers in the mill and would put a stop to them if they could. But the situation as it appears to me is simply this: If the mill puts the "helpers" out, that particular family moves to another mill and the scarcity of labor is made just that much worse for the mill which tries to stop this evasion of the law.

If this system of "helpers" is to be stopped it can be successfully done, so far as I see, in only two ways:

(a) By legally prohibiting any persons under the legal mill age from *entering* the mill work rooms. This, however, means hardship in certain cases. Still such cases will probably be exceptional.

(b) By a mill association agreement to exclude "helpers." This plan, however, to be successful, involves inducing all the mills to join the state association.

Of the two plans, I believe the former the better, as many of the mill hands resent any restrictions made by the mills, but accept in more or less good faith restrictive laws.

3. *Mothers in the Mill*—In a number of cases I have found children 4 or 5 years old, playing on the spinning room or spool room floor, but I have never seen them in the weave or in the card room. The assumption that these children are "mill hands" or that the

mills are trying to make them work is hardly one to be discussed seriously. In the cases which I saw, the children's mothers were at work, and they brought their children with them for the simple reason that they saw no other plan open to them. For the mills to prohibit the mothers from bringing such young children into the mills would be excellent administration and a plan certainly most mills would gladly adopt, but I fear that in many cases it would mean increasing a widow's difficulty in her efforts for self support. The kindergarten, provided by some of the mills, is of course a good place for these children; but these kindergartens are not open all the day, every day, or all the year. Facing now the practical fact of poverty on the part of a deserted or widowed mother with a 4-year-old child, is it charity to forbid her from taking her child to the mill? Or is it a greater charity on the part of the mill to permit her to bring her child with her? There are two sides to this question.

4. *Ambition to Enter the Mill*—The average child in a cotton mill family seems anxious for the time to come when he can go with the older children to the mill. This ambition may perhaps be cured by a few months of work, but it is nevertheless common in the young children. In order to go to the mills, there is little doubt in my mind that many of them will practice deception in regard to their ages—and this will probably account for some of the young children in the mills.

5. *False Statement Regarding Age*—I have heard of cases where the parents compelled the children to lie about their ages, but personally during five months of constant study of mills (from another point of view), with almost daily and often intimate contact with the mill hands, cases of this kind did not happen to come to my personal knowledge. It is very probable that I would have found some if I had hunted for them. Certain it is that it is sometimes amusing to see what a large number of children are *just above the legal age* for mill work, and there is no doubt

in my mind that parents will in some cases make false statements regarding the age of their children in order to get them into the mills.

6. *Ignorance Regarding Age*—A very large number of these children have no idea of their exact age. This may seem strange, but it is a still stranger fact that in many cases their fathers are about as ignorant on this point as are the children. In general the mother is the only member of the family whose word on this point is, in my experience, to be taken as trustworthy. These statements refer not only to the mill hands, but to this class of people generally—on the farms or elsewhere.

The following cases, in which there was no possible object in deception, will serve to illustrate these points:

In A—— I saw a little girl, certainly at least 10 years old, in the mill, but she positively maintained that she was "five."

In B—— I met two sisters in a mill. Upon my asking their ages, each claimed she was older than the other; the father was called upon to settle the question, and the three together, after much discussion, finally agreed that one would be 16 in November and the other 16 the following May (!), but still they could not definitely decide which was the elder. Finally the mother came into the room and settled the question by stating that one was 14 years and 6 months and the other 15 years and 10 months old.

In C—— I noticed a young boy who had hookworm symptoms. I asked the superintendent how old the boy was and received the reply that he was 13 years old; I ventured the opinion that he was at least 15; the superintendent laughed at the idea; the boy stated he was 16; the boy's father confirmed this

claim and offered to prove it by the record in the family Bible; at his house I examined the record and found the boy to be 17 years and 2 months old.

Both on farms and in mills, it has been an absolutely common experience I have had among the tenant whites to be told by boys and girls and also by their parents, in reply to questions, that they do not know how old they are.

Summary—From the foregoing it will be seen that while hookworm disease fully accounts for some of the statements relative to the young age at which children work in the mills, this explanation does not account for all such statements—in fact there are a number of children under mill age to be found at work in the mills.

Is a physical examination better than an age limit? Personally, I believe that a physical examination by local medical officials—say the secretary of the local board of health, or, better still, by agents of the state board of health—would be a more ideal plan than the present age limit laws. By a physical examination law, not only would many cases of disease, which might not otherwise come under medical attention, be forced to undergo treatment as a prerequisite to working in the mills, but cases of pulmonary tuberculosis, which might otherwise enter the mills, could (as they should, in justice to the other hands) be excluded from the mills. Such a plan would be a radical innovation in this country. *If of practical application.* (a point in regard to which there may perhaps be a difference of opinion) it would assuredly be far superior to any law demanding an age limit, and, in addition, any person who would under existing circumstances be justly excluded from the mill by an age limit law would also be excluded by a physical examination law.