

Red Blood Cell Stippling in Negro Workers
—A Study of Cases of Lead Absorption among Jamaican Negroes
Observed by the Authors at the National Lead Company, Atlantic
Branch, Perth Amboy, New Jersey—

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Red Blood Cell Stippling in Negro Workers —A Study of Cases of Lead Absorption among Jamaican Negroes Observed by the Authors at the National Lead Company, Atlantic Branch, Perth Amboy, New Jersey—

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THERE prevailed a general man-power shortage throughout this area during the war but our shortage was further complicated by the additional factor that the laborers in this locality had a fear of lead exposure—which we term "plumbophobia." This phobia is of many years duration and exists wherever lead industries prevail. This is most unfortunate and is due to the fact that too many men who have too little clinical experience in this field write too many unsupported articles and thus freely disseminate information about this metal which is untrue, misleading and exaggerated.

During April, 1945, when the peak of our man-power shortage developed and the need for war materials became the greatest, our company with the assistance of the U. S. Employment Agency and the British government, was fortunate enough to obtain the services of 86 Jamaican Negroes. Of this group, 55 men were directly employed in our smelting department where the exposures prevalent were from lead fumes and lead dust in combination with oxides, sulfates, hydroxides and antimony; the most prevalent exposures being lead dust and the primary manner of absorption being through the respiratory tract, by inhalation of the dust.

It is interesting to note that all of these employees were of colored stock and in view of the generally accepted thought that the Negroes were extremely susceptible to absorption, we were most interested in keeping an unusually close watch as to their behavior and response to their exposures. Another reason for this close observation was the obligation that our company assumed towards these men (through the British government which requested this pledge) that the best available care be provided for their health and welfare. Our company fulfilled its pledge by leasing an entire small hotel directly opposite the plant where they were all comfortably accommodated; all rooms were thoroughly cleansed before their arrival—beds were all painted—bathrooms made adequate—large recreation rooms provided—soft drinks and candies made available—radios installed—religious services held weekly. Speeches and lectures were given by key men as to the types of work they were to perform, along with descriptions of the hazards to be encountered; and at the same time cleanliness and the use of masks were stressed.

Our studies covered a period of eight months, and during that period the following statistical

data were accumulated with the interesting fact that not one of these men developed lead intoxication.

The tables provide the results of our studies; however, we believe that it will be more informative if we first present our classification of various degrees of absorption which we use as our guide (Brockway).

TABLE I.

Group 1	—	1-4 stippled cells in entire field
Group 2	—	5 or more stippled cells in 30 fields
Group 3	—	30 stippled cells in 30 fields
Group 4	—	60 to 120 stippled cells in 30 fields
Group 5	—	6 stippled cells in every field

Table 1 shows the various groupings of lead absorption and intoxication. As to Groups 1 and 2, the absorption is minimal and usually insignificant. However, as soon as the one reaches Group 3, there is sufficient evidence in the blood smears to indicate genuine absorption with impending signs and symptoms depending upon the reaction of the individual to the exposure. From that point, evidence of intoxication can be expected, and the case then treated accordingly.

TABLE II.
STIPPLE-CELLS GROUPING

16 cases	—	Group 1	11 Cases	—	Group 3
25 cases	—	Group 2	3 Cases	—	Group 4

Table II indicates that all employees exposed to lead fumes or dust, absorb variable quantities and eventually demonstrate their effects in blood smears.

TABLE III.
RATE OF ABSORPTION (VIA STIPPLE-CELL COUNTS)

10 cases	showed stippling on employment (1-3 cells per 30 fields)
33 cases	showed stippling from 2-4 weeks (1-73 cells per 30 fields)
55 cases	showed stippling from 7-8 weeks (1-84 cells per 30 fields)

Table III indicates that 16% of the entire special group employed (86) demonstrated evidence of stippling on pre-employment examinations and yet were never exposed to any lead hazard. This confirms what is universally known, that many other diseases and conditions exist which produce this stippling phenomenon other than lead.

This table likewise shows that in this special group of employees, the rate of absorption varies among individuals, just as occurs among all groups of workers.

See "Plumbophobia—Occupational lead Poisoning," by WM. C. WILENTZ, M.D., INDUSTRIAL MEDICINE, 18:4, 253-256, April, 1944.

TABLE IV. AGE-GROUPINGS		
1-19 yrs.	4-27 yrs.	3-33 yrs.
3-22 yrs.	2-28 yrs.	1-34 yrs.
3-23 yrs.	4-29 yrs.	2-35 yrs.
3-24 yrs.	4-30 yrs.	1-36 yrs.
7-25 yrs.	2-31 yrs.	1-38 yrs.
11-26 yrs.	2-32 yrs.	1-41 yrs.

Table IV shows that the average age of this group was 28 years.

TABLE V. BLOOD VARIATION	
Range of stippling —	1 to 96 (in 10 weeks)
Range of hemoglobin —	104 to 64% (in 17 weeks)
Range of red blood cells —	7,300,000 to 4,060,000 (in 22 weeks)

Table V shows range of stippling, hemoglobin and red blood cell counts, and periods at which these extremes were reached.

SUMMARY: A study of 55 lead absorption cases among Negroes with no evidence of intoxication has been presented—this study covered eight months and terminated when the group returned to their native country.

Table I shows that (a) when stippling count is less than one stipple to a field, minimal absorption is present; and (b) when stipple count shows at least one stipple to a field, then one may expect evidence of intoxication unless immediate steps to therapy are inaugurated.

Table II shows that (a) most of the group were in Group 2; and (b) all employees exposed to lead fumes or dust absorb variable quantities of lead and their effects are easily demonstrated in blood smears.

Table III shows that (a) rates of absorption vary with the individual and exposure; and (b) intensity of absorption also vary with individual and exposure.

Table IV shows that average age of group under study was 28.

Table V shows that there exist marked time variations as to blood changes between stippling, hemoglobin and red blood cell counts.

CONCLUSIONS: (1) A study of 55 Negroes with various degrees of lead absorption is presented. (2) Exposure to lead dust and fumes

was maximum. (3) No lost time resulted in any case. (4) No disability of temporary or permanent nature occurred. (5) No evidence of lead intoxication was found. (6) This study again shows what excellent results can be accomplished when cooperation exists between the medical department and the lay executives of a company. (7) General fear of lead exposure (plumbophobia) is again proved to be unfounded, inaccurate and unfair. An industry that is spending large amounts for the installation of modern protective equipment in addition to providing well trained physicians, technicians and modern medical dispensaries, deserves a more equitable and unprejudicial reception from the medical profession.