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## The metabolism, directly determined, of healthy children during sleep.

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Through the kindness of Dr. Lusk these experiments were made in conjunction with him, Dr. Williams and Mr. Riche.

As yet experiments have been made on only two children, but the results are given on account of the interest attaching to the first direct determination of heat produced by children.

The children were healthy, were gaining weight and were fed every four hours so as to keep their metabolism as constant as possible. They were put on the portable metabolism apparatus devised by Dr. Du Bois that allows great freedom, accurate collection of all the urine and feces and no discomfort. They were kept awake during the forenoon, fed at 1 p.m. and put at once into the calorimeter where they usually slept throughout the whole experiment.

Some of the results are given in the chart. It will be seen that the amount of heat produced varied considerably from hour to hour, and that during the same hours of different days with a constant diet the heat produced is not the same. The average for the hours in which the conditions were entirely satisfactory was 14.18 calories. The metabolism directly determined compared moderately with the metabolism as calculated in about half the cases. In the other half of the cases a low respiratory quotient indicated an erroneous oxygen determination, which invalidated the calculations.

Comparing the results in the two children it is found that the second, McG., regularly gave off more heat than the first (Newman) and that his heat production per square meter of surface per 24 hours was much greater. This is undoubtedly due to the greater surface area of the second child which fails to show by the ordinary formula for calculating the surface area ($12.3 \times \sqrt[3]{\text{weight}^2}$). Tne second child, McG. was 8 months old, weighing 4.320 kilos,

450 grams more than the first, Newman, who weighed 4.770 kilos, and he was 3½ cm. longer, but as the formula contains only one variable and that the weight, it gives a surface area for the second child less than for the first, though it is undoubtedly greater. The formula is apparently very accurate for well-nourished infants but not for the long and poorly nourished.

The heat directly determined and calculated for a square meter of body surface in twenty-four hours was in the two cases 994 and 1,093 calories. These figures correspond closely with the calculated heat in three of Rubner's cases, viz., 1,006, 1,143 and 1,090. The average $CO_2$ per square meter per hour was: Newman, 15.24; McG., 17.19.

HEAT PRODUCED BY INFANTS.

Newman (3 mos.)

| 1.45–2.45 P. M. | | 2.45–3.45 P. M. | | 3.45–4.45 P. M. | |
|---|---|---|---|---|---|
| Calculated. | Found. | Calculated. | Found. | Calculated. | Found. |
| 17.17 | 17.01 | 15.96 | 13.62 | 15.86 | 14.91 |
| | | 15.31 | 15.72 | 15.89 | 13.05 |
| | | 18.16 | 13.85 | | |
| | | 13.06 | 13.42 | 17.47 | 13.48 |
| | | 17.82 | 15.05 | 15.31 | 14.29 |
| McG. (8 mos.) | | | | | |
| 15.87 | 15.19 | 16.28 | 14.57 | 16.66 | 15.18 |
| | | | | 18.02 | 15.64 |

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## Studies on human nephritis.

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PRELIMINARY REPORT.

The object of this investigation was to determine the functional capacity of the kidneys of nephritics with regard to their power of eliminating nitrogenous material, water and salts, and to determine the influence of the "protective therapy" on the kidney efficiency.