

SCIENTIFIC PROCEEDINGS.

ABSTRACTS OF COMMUNICATIONS.

One hundred twenty-third meeting.

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President Wallace in the chair.*

140 (1887)

Basal metabolism in relation to body surface at different ages with special reference to prematurity.

By FRITZ B. TALBOT and WARREN R. SISSON.

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In 1902 Rubner¹ brought forth evidence that the heat loss of the body was proportional to its surface area. This became known as Rubner's law of surface area. The principle was not new as half a century earlier Regnault and Reiset noted that the heat production of sparrows per unit of weight was ten times greater than that of fowls, and concluded that it was due to the fact that the smaller animals had a relatively larger body surface, and, consequently, lost more heat than larger animals, with relatively less surface. In 1913 Rubner² presented further evidence to show that the even heat production per unit of body surface was not dependent on the active tissues within the organism.

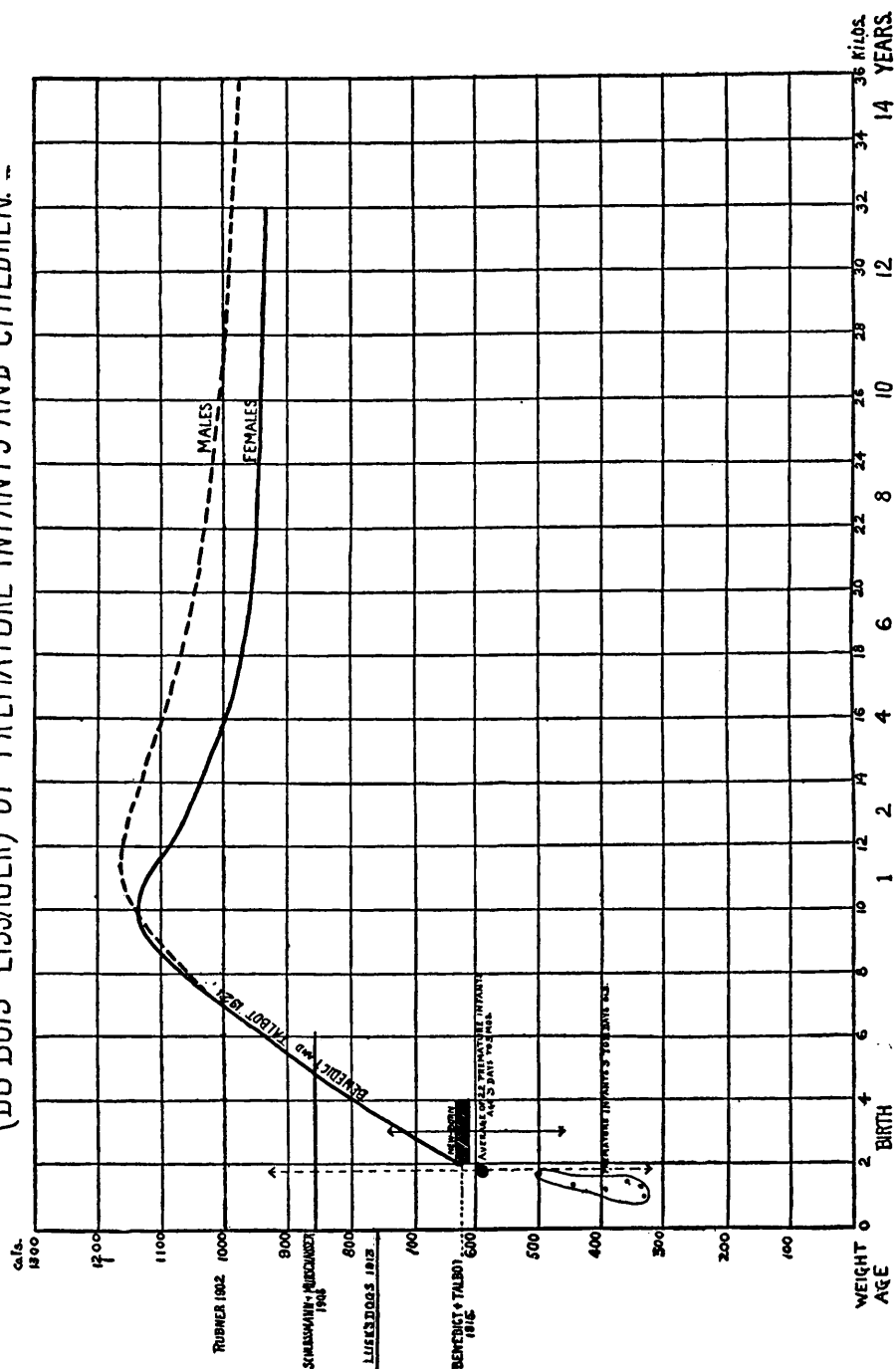
In 1908 Schlossmann and Murschhauser³ in their investigations, in which the effect of muscular exercise on the metabolism was eliminated, found that instead of the 1,000 calories per square meter of body surface, absolutely quiet healthy infants produced only 866 calories in 24 hours.

¹ Rubner, "Die Gesetze des Energieverbrauchs bei der Ernährung," Leipzig and Vienna, 1902.

² Rubner, *Arch. f. Physiol.*, 1913, p. 240.

³ Schlossmann and Murschhauser, *Biochem. Zeitschr.*, 1908, xiv, 385.

BASAL METABOLISM PER SQ METRE BODY SURFACE (DU BOIS-LISSAUER) OF PREMATURE INFANTS AND CHILDREN.



Lusk in 1913⁴ showed that sleeping dogs could produce as low as 750 calories, while Benedict and Talbot in 1915⁵ found the average heat production per unit of surface of 105 new-born infants was 612 calories.

In 1921 Benedict and Talbot⁶ constructed a curve of the metabolism from birth to puberty from studies based on a new series of 256 infants and children, see following chart. This shows a rapid increase from 612 calories in new-born infants to 1,170 calories in boys of about one year of age, weighing 11 kilograms.

During the past year we have studied, with the assistance of Miss Margaret Moriarty and Mrs. A. J. Dalrymple, the heat production of 22 premature infants. Since premature infants have proportionally more body surface per unit of weight than larger subjects, they should produce more heat per unit of surface. On the contrary, our studies show quite the reverse. The average heat production per unit of surface of the 22 premature infants studied was 597.3 calories in 24 hours. We have included in this group premature infants of 3 days to 3 months of age. A critical analysis will be made of these cases later, but it seems probable that the few older infants of this series will fall in the category of malnutrition, in which the metabolism is usually high.

Six of these 22 infants were studied during the first 11 days of life and in these instances the metabolism was extraordinarily low. They are represented in the lower part of the chart by dots inside the light line.

This data is presented as further evidence that Rubner's law of the constant relationship between heat production and body surface is not a physiological law, and that it does not hold true in infants.

141 (1888)

Studies on salt action. IV. The mutual influence of acidity and salt concentration upon bacteria.

By C.-E. A. WINSLOW and I. S. FALK.

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Four years ago¹ we presented certain preliminary results of

⁴ Lusk, *Jour. Biol. Chem.*, 1913, xiii, 450.

⁵ Benedict and Talbot, Carnegie Institution of Washington Publication No. 233.

⁶ Benedict and Talbot, Carnegie Institution of Washington Publication No. 302.

¹ Winslow and Falk, *Proc. Soc. Exp. Biol.*, 1918, xv, 67.