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Variations in Basal Metabolism and Their Relation to Skin Temperature.*

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The basal metabolic rates of 47 women 20-29 years old (unselected university students, born and living in a goitrous region and about 50-90% of whom have had adolescent enlargement of the thyroid) have been repeatedly determined by Claire Conklin or myself. None of them had basal metabolic rates above the Aub-Dubois standard and only 5 equal to this standard. The 17 highest averaged 35.87 calories per square meter per hour which is 3% below the Aub-Dubois standard. The remaining 30 averaged 32.15 calories per square meter per hour or 13% below the Aub-Dubois standard. This was true whether the metabolism was calculated from the O₂, CO₂ and urinary N, controlled by an alcohol check, or from the O₂ by means of the Benedict-Roth-Collins method. It was found possible to raise the metabolism of many of the 30 women in the low group to the Aub-Dubois standard in 50 hours by the subcutaneous injection of 5 mg. thyroxine (Hoffman-LaRoche) or ingestion of 25 gm. desiccated thyroid (Eli Lilly). Amenorrhea was more frequent among those with a low B.M.R. and was relieved by thyroid in 2 cases. A short menstrual cycle, 17-26 days, was more frequent in those of lower B.M.R. The menstrual cycle was shortened in one woman by lowering her B.M.R. and lengthened by raising it.

Measurements were made of muscle tone, the psychogalvanic reflex and skin temperature in relation to metabolism. The muscle tone was determined by C. A. McKinley's apparatus. The psychogalvanic reflex was determined by immersing 2 fingers in 2 vessels of salt solution kept at constant temperature. It was found that collodion used to define the margin of the zone of electrical contact of skin and salt solution gave rise to errors but that vaseline eliminated these errors. The skin temperature was measured by F. G. Benedict's method of moving a thermocouple (backed with a heatinsulator) over the skin. The temperature of the skin of the ventral

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surface, under the bed clothes was determined and then the rate of fall of skin temperature after uncovering the body and with an electric fan at constant distance blowing air of constant temperature and humidity downward on the body. In general, the areas which dropped to the lowest temperatures were areas of low sensibility to cold or areas with thick subcutaneous fat. Although a higher metabolic rate (heat production) was often associated with a slower fall in skin temperature on exposure, there were many complicating factors. The fall in skin temperature on exposure was at first most rapid but after a time regulatory processes were called into play. Heat loss was influenced by anatomical differences in individuals. One individual with a tendency to maintain a relatively high general skin temperature acquired cold feet on exposure. No pulse could be detected in the feet. One finger of another individual became cold and white on exposure. Although a psycho-galvanic reflex resulted from exposure to cold, it might result from other causes as well and some of the individuals were much more emotional than others. Since muscle tone is a fibrillation similar to a voluntary contraction, it must be associated with heat production and shivering may be regarded as a special form of tone due to a reflex whose receptors are the muscle spindles.

It seems probable that a lowered thyroid function resulting from a low iodine intake during uterine life, infancy and childhood, affects the physiology of the individual in such a manner that thyroid therapy in adult life will not make the individual normal. From the standpoint of health and efficiency, it seems better to assure a higher iodine intake in pregnancy and infancy than to wait until adult life before paying attention to the thyroid.

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A Method for Assay of Ovarian Hormone in Blood and Urine and Relation of Assay to Menstrual Cycle.*

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Ten cc. of blood are drawn from the Median Basilic vein into oxalate to prevent coagulation. The blood is centrifuged, and the blood plasma pipetted off. The blood corpuscles are washed with

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