to reach a figure at the twelfth year of 88 in the female and 94 in the male. Tables I-A and I-B show the averages of the chest width-hip width index in both boys and girls at each age.

A special study is being made of those children who had a higher index than the average for their age and those who had a lower index than the average for their age. Present findings indicate that girls who menstruate earlier than 12½ years have an index below the average, and that those girls who menstruate later than this age have, in the majority of cases, an index greater than the average. Onset of maturity in boys is more difficult to diagnose. It was found, however, that all the obese boys with retarded genital development had an index above the average for their age.

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Vasomotor Responses of Mucosa of Upper Respiratory Tract to Thermal Stimuli.

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Chilling of the cutaneous surface was assumed in the past to be associated with congestion of the mucous membrane of the nose and throat and that this congestion was favorable to bacterial invasion. The reverse have been the findings in the experiments conducted. A cold stimulus applied to the cutaneous surface produces a reflex vaso-constriction and a lowering of the temperature of the mucosa of the upper respiratory tract, and a hot stimulus produces a reflex vaso-dilatation.

One hundred and sixty-four experiments were performed and distributed as follows: 81 general experiments on one normal man, 52 experiments on 8 normal men, 31 experiments on 15 hyperesthetic rhinitis cases including 3 children. These experiments were conducted in a regular laboratory room with a temperature varying between 21° and 26°C., and in which drafts were minimized. The thermo-electric method was employed with a thermopile electrode applied to the mucosa of the nose and the E. M. F. measured through a potentiometer. Cold air, cold sprays, and aluminum cups, varying in diameter from 4 to 19 cm., partly filled with chipped ice were

used as cold stimuli. The ice filled cups gave a skin temperature of 12.60°C. The cups were applied to the upper and lower dorsals and to the lumbo-sacral regions of the back, to the upper and lower anterior chest, to the upper and lower abdomen, and to the feet.

The findings were: I. *Normal Reactions.* (a) The 4 cm. ice cup was the smallest cold stimulus to produce a reflex lowering of the temperature of the mucosa of the upper respiratory tract. (b) The normal response to a short circumscribed cold stimulus (2 minutes) was first a lowering of the mucous membrane temperature, then a rise and gradual return to the initial temperature. (c) The normal response to a continuous circumscribed cold stimulus (10 minutes) to one cutaneous area or to numerous cutaneous areas applied in regular succession, *i. e.,* when the reaction was completed in one area, the stimulus was immediately removed to another, was first a lowering of the mucous membrane temperature and then a gradual rise, stopping short in the majority of the experiments from reaching the initial temperature by 0.18 to 0.36°C.

It will be noted here that with a continuous cold stimulus the thermal endings in the skin gradually "adapted" themselves to this stimulus. "Adaptation" is a process associated, to a certain extent, with the phenomenon of fatigue. Whether this continuous cold stimulus which produces a reflex vaso-constriction, first of maximal and then minimal degree, is a phenomenon of "adaptation" or fatigue is being determined by further experimentation.

(d) A cold stimulus applied to an anesthetized cutaneous area, in which pain was removed, produced a reflex lowering of the mucous membrane temperature. Since thermal impulses take a course similar to pain this proved that pain is not a factor in producing reflex vaso-constriction. (e) Changes in the temperature of the mucosa of the upper respiratory tract to cold stimuli were proved to be the result of a reflex change in the vaso-motor tone of the vessels supplying the mucosa. A fall in temperature indicated a vaso-constriction, a rise, a vaso-dilatation.

II. *Abnormal Reactions.* (a) Head colds (infections). Prior to,* during and following a head cold, there is a period of vaso-motor suspense, *i. e.,* a cold stimulus applied to the cutaneous surface produces no vaso-motor response in the mucous membrane. This suspense of the vaso-motor reaction is unquestionably of a local

* On several normal subjects daily experiments were made. In some of these during April and December, 1932, head colds developed. It was found in these subjects that the day prior to the actual appearance of the signs and symptoms of a head cold and during the head cold there was a vaso-motor suspense.

effect within the mucosa, produced by the toxic products of the infection upon the vaso-motor endings in the mucosa. (b) Hyperesthetic Rhinitis. The hyperesthetic cases, using the same method as in normals, produced erratic vaso-motor changes. Frequently in such cases a cold stimulus on the cutaneous surface produced a reflex rise in the mucosa temperature instead of a drop; a hot stimulus produced a lowering of the mucosa temperature instead of a rise.

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Thyroid Hypertrophy as a Response to the Gonad-stimulating Hormone of the Pituitary.

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Following our[1] isolation of a third anterior pituitary hormone (prolactin) in fairly pure form, together with the purification of the growth and gonad-stimulating hormones facilitated by this accomplishment and notably by the very recent purification of the growth hormone,[2] it is perhaps admissible to attempt the association of certain hitherto observed structural and functional responses with each of the (3) now known hormones of the anterior pituitary. If still other now unrecognized hormones exist in the pituitary this attempt may be premature. In our opinion, only accelerated body growth was hitherto a proved specific response to the growth hormone; only accelerated gonad growth a proved specific response to the gonad-stimulating hormone; and only activation of crop-glands and lactation proved specific responses to prolactin. Many other responses are known but remain unassigned to a specific pituitary hormone. On the basis of scant evidence a few previous workers have variously suggested that thyroid hypertrophy is a response to the growth, the gonad-stimulating and to a specific thyreotropic hormone.

The data tabulated here are taken from several hundreds of as-

* Deceased.

[1] Riddle, O., Bates, R. W., and Dykshorn, S. W., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 1216. (Also, *Am. J. Physiol.*, 1933, in press.)

[2] Collip, J. B., Selye, H., and Thomson, D. L., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 544.