

centrations of the 2 ions in plasma and intestinal fluid are also approximately equal.

The rôle played by the intestinal epithelium, in this type of salt removal, is not specific for sodium chloride. This, together with the close agreement of the chloride and bromide concentration ratios, points to some physical process rather than a specific chemical one as the mechanism by which the movement is brought about.

8409 P

The Mammary Gland in the Normal Adolescent Male.

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The mammary gland of the human male, though generally dismissed as vestigial, deserves more attention than it has received. Like its counterpart in the female, it is subject to both inflammatory and neoplastic disease. It occasionally increases to such a size that the resulting gynecomastia becomes a medical or surgical problem, and actual lactation has been reported repeatedly.¹ Although the phrase "mastitis adolescentium" occurs in the literature,² we have not found any data on the frequency of this condition nor on the behavior of the gland in the normal pubescent boy. Unpublished observations on 49 boys in southern Wisconsin convinced Jung that a certain degree of mammary hypertrophy must be a regular feature of normal pubescence. The present study of a larger series was undertaken partly for the purpose of testing the correctness of this conviction, and was made possible by the generous cooperation of the Department of Public Welfare of the State of Illinois.

One purpose, then, was to obtain data analysis of which would give a chronology of the mammary changes as compared with the other phenomena of puberty. Hence the following observations were made: date of birth; weight; height; bi-iliac diameter; color of hair; amount* of hair on the pubes, in the axillae, on the face (*i. e.*, cheeks, upper lip, and chin), and on the chest; diameter of right areola; height of right nipple above surrounding skin; size* of

¹ Haenel, H., *Munch. Med. Wochenschr.*, 1928, **75**, 261.

² Kriss, B., *Arch. f. Gynäkol.*, 1930, **141**, 507.

the subareolar node on the right; height of left nipple above surrounding skin; size* of the subareolar node on the left; pitch of voice; sizes of right and left testicle. The quantities marked * had to be, of necessity, graded in arbitrary units from 0 to ++++. The bi-iliac diameter was taken with an obstetrical caliper. The heights of the nipples were measured by using a micrometer screw mounted on 3 legs so as to work vertically; some obvious sources of error in this method must be borne in mind in interpreting the data. The diameter of the right areola was measured with a Vernier caliper. The testicular sizes represent the results of applying the Vernier caliper to the scrotum in such a way as to obtain the least of the 3 diameters of the testicle considered as an ellipsoid; here also certain sources of error must be borne in mind.

The subjects examined were all active, well-nourished boys in good physical and mental health and with excellent opportunities for outdoor work and play. Altogether 169 were examined; the number of boys in each age-group can be seen in the legend to Fig. 1.

Fig. 1 represents graphically the frequencies (in percent) with which palpable subareolar nodes were found in the various age-

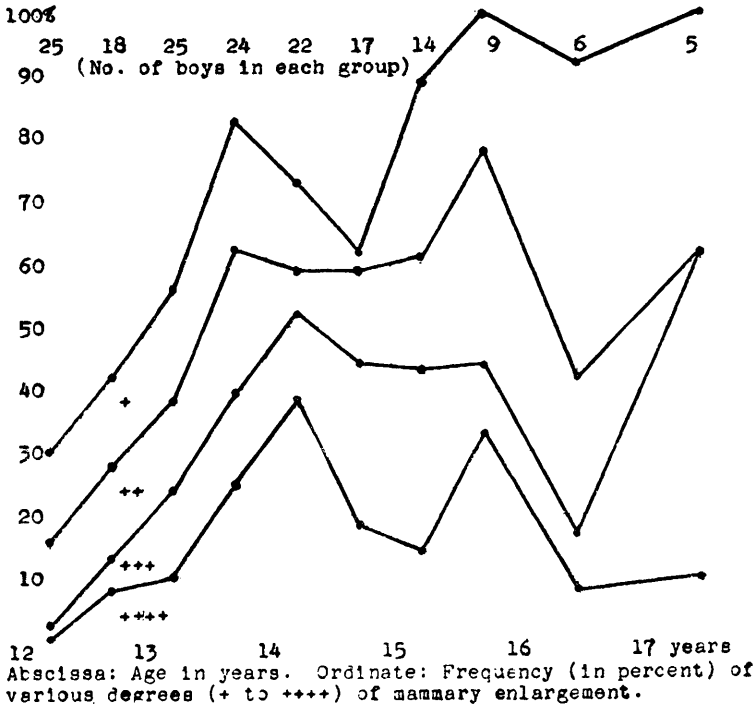


FIG. 1.

groups. From this it appears that the extreme (+++++) enlargements of the node were most frequent in the 14.25 age group. In this group, however, it was still impossible to feel a node under 27% of the nipples examined; in 5 (23%) of the 22 boys of this group no node could be palpated under either nipple. After 14.25 years, extreme enlargement was found less frequently, while moderate degrees were more frequent; in the 15.75 and 17.5 age groups (9 and 5 boys respectively) nodes of small or moderate size were felt under both nipples in every case.

The nodes thus palpated varied from very firm, spherical, circumscribed nodes to masses measuring (in diameter) more than 1.5 cm. and so vaguely defined that two independent observers would make conflicting notes. None of the enlargements seen in this series would ordinarily be called gynecomastia, and in none of the cases was there any suggestion of a secretion.

The most marked enlargement was seen in a boy, aged 15 yrs. and 5 mos. He was strikingly muscular, the heaviest in his age group (140¼ lbs.; the median was 113¼ for the 15.25 group), slightly above the median in height (64 in.; median 63 in.), and second largest in bi-iliac diameter (28.7 cm.; median 25.8 cm.). He had the adult distribution of hair on the pubes and in the axillae, had begun to shave, and had the beginnings of hair on his chest. His testicular diameters (3.02 and 2.78 cm.) slightly exceeded the average values (2.37 and 2.50 cm. for right and left respectively) for the 15.25 age group.

Another boy, aged 14 yrs. 10 mos., had an especially marked bilateral enlargement, and said that the lumps had been actually painful for about 2 months. They were still tender at the time of examination, but there was no redness, warmth, or discharge to complete the picture of inflammation. This boy occupied a position near, and slightly above, the medians for the 14.75 age group with respect to weight, height, and bi-iliac measurement; he had a moderate amount of pubic hair, the beginnings of axillary and facial hair, and no chest hair; his voice no longer had the high pitch of the pre-pubescent voice, and seemed to be changing at the time. His testicular measurements were 2.39 and 2.38 cm., and thus lay close to the averages (2.27 and 2.41 cm. for right and left respectively) found by us for the 14.75 age group. These 2 cases are mentioned to show that the extremes of normal mammary enlargement are compatible with normal genital development.

Further analysis of the data is being carried out, but the following conclusions can now be stated: Enlargement of mammary tissue is

probably an invariable accompaniment of adolescent changes in boys. It was noted in 73% of boys in the 14.25 age group, in which the height of the nipple and the incidence of marked enlargement were maximal, and in 100% of boys in the 15.75 and 17.5 age groups, in which both the height of the nipple and the incidence of marked enlargement had declined. Older age-groups will have to be examined to observe the complete regression of the phenomenon.

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A Note on the Analysis of Sympatheticomimetic Action.

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Langley¹ enunciated the broad rule that the pharmacological activity of suprarenal medullary extracts upon plain muscle simulates that of electrical excitation of the sympathetic nerves supplying each particular muscle. Dale² discovered that ergot depressed or paralyzed the motor sympathetic nerves, leaving the inhibitory effects relatively unaffected. After ergot, epinephrine no longer raises the blood pressure, but lowers it. Froelich and Loewi³ made the further discovery that cocaine magnifies the effect of epinephrine on blood pressure.

These peculiarities of epinephrine after ergotamine or cocaine have been advanced as criteria of sympatheticomimicity,⁶ despite the fact that the inhibitor activity elicited by epinephrine is but slightly affected by these drugs. In analyzing sympatheticomimicity Tainter⁷ especially has emphasized the value of the ergot reversal and of the cocaine synergism. He used anesthetized animals, so that reflex and brain stimulants were not so easily separated from drugs acting peripherally. It is obvious that when a drug is injected into anesthetized animals, the resulting effects are more complex than would be the case in adrenalectomized animals with the central nervous system destroyed. Ergot reverses the motor effects of stimulation of the sympathetic nerves, and of injected epinephrine, while cocaine augments both of these. It is possible to elicit the effects

¹ Langley, *J. Physiol.*, 1901, **27**, 237.

² Dale, *J. Physiol.*, 1905, **32**, lvii.

³ Froelich and Loewi, *Arch. f. exp. Path. u. Pharm.*, 1910, **62**, 159.