inhibits that of the other treated females. These, however, may show male behavior and also submit to copulation. Adult males, through their larger size and aggressiveness, are able to subdue the most dominant treated female which then submits to copulation.

Testosterone propionate pellets also produce full sex activity in immature and adult castrate males. One treated immature male, on 3 separate occasions, exhibited the estrous bend of neck and was copulated with 5 times. This male likewise copulated twice in male manner.

Summary. Testosterone propionate enlarges the Müllerian duct, keratinizes the cloaca and produces estrous behavior in *Anolis*. It also enlarges the epididymis, ductus deferens and sexual segment of the kidney, while producing male sex behavior. It has a gonadotropic effect on the ovary but not on the testis.

11492 P

Size and Stroke of the Normal Human Heart During Neosynephrin Bradycardia.*

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Marked bradycardia with pulse rates from 30 to 50 per minute is produced in normal young adults by therapeutic doses (3 to 10 mg subcutaneously) of neosynephrin—1-α-hydroxy-β-methylamino-3 hydroxy ethylbenzene hydrochloride (Keys and Violante[1]). The effect persists for 30 to 60 minutes or more and is not attended by any symptoms or sensations of cardiac or respiratory embarrassment. Since repeated trials failed to disclose any significant change in the total oxygen usage during the bradycardia it seemed probable that the total minute output of the heart was not seriously diminished. If this were so there should be a very appreciable increase in the stroke output. We have investigated this question with the roentgenkymographic method of Keys and Friedell.[2]

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1 Keys, Ancel, and Violante, Antonio, PROC. SOC. EXP. BIOL. AND MED., 1940, **44**, 4.

2 Keys, Ancel, and Friedell, H. L., *Am. J. Physiol.*, 1939, **126**, 741.

Trained normal young men and women subjects were used. All studies were made in the post-absorptive state in the early morning with the subject seated in a roller chair in a quiet room. When a roentgenkymographic exposure (R.K.G.) was made (66 inches), the chair was rolled into position and the subject coöperated only to the extent of holding the breath during the 1.5 second exposure. After a preliminary rest of 20 minutes or more, one or 2 R.K.G.s were made before injection of the drug. R.K.G.s were made subsequently when the bradycardia was well established—usually 10 or 15 minutes later—and when the bradycardia had begun to diminish. In some cases a final R.K.G. was made when the pulse and blood pressure were nearly normal again.

A striking alteration of the heart size was frequently apparent even from casual inspection of the resulting films. When the areas of the anterior-posterior projections were measured it was found that there is an increase of 5 to 20% or more during the period of bradycardia. The change is more remarkable when the corresponding volumes are calculated from our formula (op. cit.): vol. $= 0.63 (\text{Area})^{1.45}$. To illustrate, we may cite 3 cases, selected at random, and compare the diastolic volumes in cc before and 15 minutes after subcutaneous injection of 5 mg of neosynephrin:

	Subj. E.H.	Subj. D.W.	Subj. B.N.
Before	467	503	506
After	497	601	625

The left side of the heart shows the most pronounced increase in size but all parts of the heart appear to share in the dilatation and the original form of the heart is well preserved in both systole and diastole. We have never observed any signs of pericardial restraint, in spite of the fact that the dilatation in many cases surpasses what is frequently considered to be the upper limit for immediate dilatation. In a number of cases the P.A. transverse diameter increased more than 15 mm; in one case the increase was 19 mm and in another 18 mm. In all cases the degree of inspiration was the same.

Significant increases in diastolic heart size were found in 90% of all our studies with neosynephrin. It does not appear when epinephrine or sterile saline are similarly administered. The systolic volume of the heart also increases, but to a lesser extent, so that there is a definite and usually large increase in stroke volume. In 12 studies on 8 subjects the mean stroke volume before injection was 57.5 cc; between 15 and 30 minutes after injection of neosynephrin the mean indicated stroke volume was 90.1 cc. The net effect is usually to leave the minute volume relatively constant though there may be a slight reduction in the minute volume after the largest doses

(10 mg) and a net increase in minute volume frequently results from a rather small (3 to 5 mg) dose of the drug.

The contraction form shown by the R.K.G. corresponds to the RT interval of the E.C.G. in that ventricular contraction and discharge are not unduly prolonged. It is notable, however, that during much of diastole the left ventricle appears to pause at constant volume (diastasis). The R.K.G. film usually resembles extreme athletic bradycardia.

These studies are being continued with additional techniques. The first few experiments with the acetylene method have shown an increased stroke volume of the same general magnitude found with the R.K.G. method, so that apparently the dilatation does not invalidate the volume calculations.

11493 P

Effect of Relative Humidity on Insensible Weight Loss of the Newborn Infant.*

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Although Rubner and von Lewschew[1] and Benedict and Carpenter[2] noted that high relative humidity of the environmental air produced a decrease in the rate of insensible weight loss in both man and experimental animals, recent investigators[3, 4] have stated that, within the range of average environmental conditions, the relative humidity produces no significant effect. The failure of the insensible weight loss method in predicting accurately the energy metabolism of infants prompted this investigation of the effect of changes in relative humidity on the insensible weight loss. This report deals with 76 observations on the insensible weight loss in 41 unclothed newborn male infants at relative humidities ranging from 19% to 94% and at an environmental temperature of 31.2-32.5°C (87-89°F).

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2 Benedict, F. G., and Carpenter, T. M., Carnegie Inst., Washington, 1910, Pub. No. 129.

3 Levine, S. Z., Wilson, J. R., and Kelly, M., *Am. J. Dis. Child.*, 1929, **37**, 791.

4 Yaglou, C. P., *J. A. M. A.*, 1937, **108**, 1708.