*Serum Albumin.* The intravenous injection of serum albumin solutions resulted in a rise of blood pressure to almost the initial level. The rise in blood pressure was maintained and all of the animals recovered without after-effects (Table I). No dyspnoea or other anaphylactic phenomena were observed in this group of animals.

*Discussion.* It would appear that normal horse serum is less toxic to dogs than is bovine serum.[2] The toxic effects following the injection of horse serum globulin are similar to those observed with bovine serum globulin.[2] Horse serum albumin, like bovine serum albumin, does not appear to be toxic to dogs, inasmuch as it is able to raise and maintain the blood pressure of dogs subjected to severe hemorrhage. In these experiments the concentration of serum globulin was approximately the same in the whole serum and in the globulin solution obtained after separation. Despite this fact, serum globulin was more toxic when injected alone than when administered with the other constituents of whole serum. This suggests the possibility that some substance in whole horse serum, *e. g.,* serum albumin, tends to diminish the toxicity of the globulin when whole horse serum is injected.

*Summary.* Horse serum albumin solution is effective in raising and maintaining the blood pressures of dogs subjected to severe hemorrhage. Equally effective is whole serum from the horse. However, horse serum globulin solution is much less effective in this respect and appears to be more toxic.

13564

## The Pubertal Increase in Response of Accessory Sex Organs to Steroid Hormones.*

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The fact that age plays an important rôle in determining the response of the accessory sex organs to stimulation by testoid (or "androgenic") compounds has previously been emphasized on the basis of experiments on female rats. It could be shown that testo-

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sterone inhibits the development of the uterus during the first days of life, while at a later term it causes uterine enlargement.[1] More recently Hooker[2] noted that in male rats, castrated at birth, the smallest dose of testosterone necessary to elicit recognizable enlargement of the seminal vesicles, decreases suddenly when the animals reach the pubertal age, that is about 40 days. The experiments to be reported here indicate that the effect of puberty upon the sensitivity to various testoid compounds is dependent upon their chemical structure.

The results of our experiments are summarized in Table I. Each figure in italics represents the average value of a group of 6 rats, the range being indicated in brackets. In every case the animals were castrated on the day before treatment was begun. The daily dose of the finely ground steroids [$\Delta^5$-androstene-3($\beta$),17($\alpha$)-diol and 17-ethinyl testosterone] was suspended in 0.2 ml peanut oil and administered in 2 subcutaneous injections (morning and night) on 10 consecutive days. The animals were sacrificed on the 11th day and their organs weighed after fixation in Heidenhain's Susa mixture.

It appears that in the prepubertal animals (weighing less than 60 g at the beginning of the experiment) ethinyl testosterone causes much more pronounced enlargement of the seminal vesicles, prostates and

TABLE I.
Effect of $\Delta^5$-androstenediol and Ethinyl Testosterone on Pre- and Post-pubertal Castrate Male Rats.

| Treatment | Mg per day | Body weight in g | | Seminal vesicles in mg | Ventral prostate in mg | Middle prostate in mg | Preputial gland in mg | Coagulating gland in mg |
|---|---|---|---|---|---|---|---|---|
| | | Initial | Final | | | | | |
| $\Delta^5$-Androstenediol | 2 | *47* (40-55) | *90* (85-100) | *14* (11-18) | *36* (29-44) | *18* (14-25) | *47* (31-78) | *4* (3-6) |
| Ethinyl Testosterone | 2 | *48* (40-60) | *92* (80-110) | *43* (36-51) | *55* (31-64) | *38* (32-46) | *29* (15-56) | *11* (9-13) |
| $\Delta^5$-Androstenediol | 6 | *120* (105-140) | *153* (130-180) | *130* (82-189) | *101* (90-116) | *83* (71-110) | *80* (55-105) | *29* (20-45) |
| Ethinyl Testosterone | 6 | *119* (100-145) | *126* (100-150) | *102* (81-126) | *87* (71-109) | *67* (57-74) | *46* (24-67) | *24* (18-31) |
| $\Delta^5$-Androstenediol | 10 | *46* (40-58) | *86* (75-100) | *16* (12-19) | *39* (27-48) | *21* (16-23) | *62* (55-72) | *6* (2-11) |
| Ethinyl Testosterone | 10 | *46* (40-58) | *88* (80-100) | *79* (62-91) | *55* (46-70) | *46* (43-49) | *46* (30-59) | *16* (9-21) |
| $\Delta^5$-Androstenediol | 10 | *87* (75-95) | *127* (100-150) | *165* (90-196) | *97* (69-126) | *73* (61-84) | *109* (61-152) | *35* (26-39) |
| Ethinyl Testosterone | 10 | *87* (75-95) | *130* (120-150) | *79* (65-99) | *78* (60-99) | *50* (48-49) | *53* (32-73) | *22* (16-32) |

[1] Selye, Hans, *Endocrinology*, 1940, **27**, 657.

[2] Hooker, Charles W., *Endocrinology*, 1942, **30**, 77.

coagulating glands than $\Delta^5$-androstenediol, while the reverse is true of the post-pubertal castrates. The preputial glands, which are particularly sensitive to androstenediol at any age, do not show this change in sensitivity as clearly as the other accessory sex organs. However, even their responsiveness at puberty increases more markedly to androstenediol than to ethinyl testosterone.

*Summary and Conclusions.* Experiments on the rat indicate that in prepubertal castrates ethinyl testosterone stimulates the seminal vesicles, prostates and coagulating glands more markedly than an equivalent dose of $\Delta^5$-androstenediol, while the reverse is true in post-pubertal castrates. It appears that at puberty the sensitivity of the accessory sex organs increases only with regard to steroid compounds of a certain chemical structure. This fact must be kept in mind when the hormonal potency of various testoid substances is to be compared.

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## Pantothenic Acid Absorption in Pernicious Anemia.

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The most generally accepted view regarding the etiology of pernicious anemia is that the nervous manifestations of the syndrome result from the lack of some other factor than that required for hematopoiesis. The anemia and the neurological lesions frequently develop independently, since one may be present for long intervals before the other. The knowledge that this may occur has led to the acceptance, by a majority of observers, of the dual deficiency theory of the etiology of the disease.

Considerable attention, especially in recent years, has been directed toward the possibility that a deficiency of one or more vitamins might be responsible for the neural disturbances. These observations, together with the reported occurrence of the neuropathology of the spinal cord in chicks receiving a diet deficient in pantothenic acid,[1] prompted the work herein reported. Like thiamin,[2]

1 Phillips, P. H., and Engel, R. J., *J. Nutrition*, 1939, **18**, 227.

2 Field, H., Jr., Robinson, W. D., and Melnick, D., *Ann. Int. Med.*, 1940, **14**, 588.