but very small quantities of glucose and maltose. The bulk of the reducing sugars produced by blood diastase is a non-fermentable substance which we were able to isolate in crystalline form. It possesses approximately one-third of the reducing power of glucose, and preliminary examination indicates that it is a trisaccharide (Lohmann, Barbour). By alcoholic fractionation another crystalline polysaccharide was separated which does not reduce copper, gives no color reaction with iodine and is probably identical with Pringsheim's "graenzdextrine," a tetra- or hexa-hexosan. Further analysis of the 2 substances is in progress. The generally assumed presence of the enzyme maltase in blood found no substantiation in our experiments.

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Effects of Anterior Pituitary from Various Species on Sex and Thyroid of Immature Guinea Pigs.*

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We have shown that different preparations of the anterior pituitary gland of different species, as well as urine of pregnant women, exert on the sex organs of immature guinea pigs varying effects. The differences were not equally marked in all cases; they were quite definite in the following 3 groups: (a) various preparations of anterior pituitary of cattle; (b) urine of pregnant women, and (c) anterior pituitary of guinea pig, rabbit and cat. Within the latter group (c) the differences between cat and rabbit were of a quantitative character, rabbit anterior pituitary showing somewhat greater effects than cat anterior pituitary; otherwise they were essentially the same. The effects of anterior pituitary of guinea pig differed from those of anterior pituitary of rabbit and cat, in that in the former the development of large mature follicles was very prominent, while the production of pseudolutein bodies and interstitial gland was relatively insignificant in contrast to the latter, in which the pseudoluteinizing effects were much more marked. Our attempts to make the effects of the anterior pituitaries of rabbit and guinea pig identical by varying the quantities of both, were not quite successful.

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We concluded therefore that, while quantitative differences in the concentration of the active principles in the anterior pituitary of rabbit and guinea pig were partly responsible for the results obtained, there might be in addition a difference in the relative strength of the principle supposed to promote the growth and maturation of follicles on the one hand and of the pseudoluteinizing agent on the other hand. To investigate further, we carried out a new series of experiments in which we varied to a still greater extent the quantities of anterior pituitary glands of different species inoculated into immature guinea pigs; we also tested the effects of rat anterior pituitaries. The number of guinea pig anterior pituitaries inoculated varied in different experiments between one and 6. The quantities of rabbit anterior pituitaries used varied between one and one-third of a gland. In former experiments we had used in addition 2 anterior pituitaries of rabbits. The number of rat anterior pituitaries inoculated varied between 1 and 4. Altogether it was necessary to use in this second series the anterior pituitary glands of 148 rats, 182 guinea pigs and 76 rabbits. They were inoculated into 44 immature guinea pigs. These figures indicate that the number of experiments of this kind which can be carried out is limited. We also extended our investigations concerning the effects of the other 2 groups of substances, anterior pituitary of cattle and urine of pregnant women, by further varying the quantities.

Our further experiments confirmed our conclusions concerning the differences between the main 3 groups, (a) anterior pituitary of cattle, (b) of rabbit and guinea pig, (c) urine. We have not found it possible to make the effects between these groups equal by varying the quantities used. Our experiments indicate that the differences between the effects of rabbit, guinea pig and also rat anterior pituitary glands depend essentially on the concentration of the active principle or principles present in these organs. However, these concentrations differ considerably in the different species. Inoculation of one-third to one-half of a rabbit anterior pituitary (weighing approximately between 4-6 mg.) is about equal in effect to inoculation of 6 anterior pituitary glands of the guinea pig weighing about 44.5 mg. The inoculation of 6 anterior pituitaries of guinea pig is approximately equal in its effects to inoculation of 1 rat anterior pituitary weighing approximately 3 mg.†

This similarity in the action of the pituitaries of these 3 species

† We are indebted to Miss Hilda Friedman for determining the weights of the various kinds of anterior pituitary glands.

relates, first, to the changes which take place in the ovary. Here with increase in the quantity of anterior pituitary the pseudolutein bodies and interstitial gland become relatively more prominent, although mature follicles may still continue to be produced. However, with an increase in the number of rat anterior pituitaries, daily inoculated, to 4, the number of mature follicles decreases, perhaps owing to the fact that the increase in hypertrophy and activity of the thyroid gland, which was parallel to the increase in rat anterior pituitaries used and its unfavorable influence on the weight of the animals, exerted a depressing effect on the maturation of follicles.

Second, the similarity relates also to the condition of the vagina. After inoculation of one anterior pituitary of rabbit or rat, the vaginal epithelium did not usually undergo full proliferation, although there were fully mature follicles present. On the contrary after daily inoculation of one to 5 guinea pig anterior pituitaries typical squamous epithelium developed in the vagina; but after daily inoculation of 6 anterior pituitaries of the guinea pig, the vagina underwent only a very rudimentary proliferation. In accordance with our previous conclusions[1] we may assume that the presence of pseudolutein bodies and of interstitial gland or of either of these 2 kinds of structures inhibits the full proliferation of the vagina. On the other hand, in case the maturation of follicles was prevented by underfeeding, vagina, uterus and mammary gland were usually found in a resting condition.

In our former series ovulation occurred mainly after inoculation of guinea pig anterior pituitaries and only exceptionally after inoculation of the anterior pituitary of other species. In this series we found also some ovulations taking place after inoculation of rabbit as well as of rat anterior pituitaries. But in the latter cases the ovulation occurred only in guinea pigs weighing over 200 gm., while in the former case it occurred in young animals in the majority of cases. Further investigations must show whether this difference is of significance. Furthermore we obtained ovulation only after daily inoculation of 3 mg. of rat anterior pituitary and not after inoculation of 12 mg. of this material, corresponding to 4 rat anterior pituitaries, while we obtained ovulation after daily inoculation of one as well as of 4 guinea pig anterior pituitaries varying in quantity approximately between 7 and 30 mg. It is probable that the presence of large amounts of pseudolutein tissue and of in-

[1] Loeb, Leo, PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 642; *Endocrinol.*, 1932, **16**, 129.

terstitial gland is an unfavorable factor as far as the occurrence of ovulation is concerned. If after inoculation of anterior pituitary glands ovulation does take place, the typical changes in the ovaries consisting in an almost complete degeneration of all except the smallest follicles and in the marked proliferation of the vaginal epithelium were in a number of cases more or less inhibited.

The anterior pituitary of the guinea pig is very inactive also in its effect on the thyroid of the guinea pig. In this case again 44.5 mg. of guinea pig anterior pituitary is not more and is perhaps even less active than 3 mg. rat and 12 mg. rabbit anterior pituitary. In 4 out of 5 cases in which we inoculated 12 mg. rat anterior pituitary the hypertrophy of the thyroid gland of the guinea pig was very much more pronounced than the hypertrophy produced by similar weights of guinea pig or even of rabbit anterior pituitaries. This relative ineffectiveness of guinea pig anterior pituitary is perhaps related to the relatively low average size of the acinus cells of the thyroid gland or to the absence of interstitial gland in the ovary of the guinea pig. On the other hand, the thyroid gland of the guinea pig seems to be functionally very active to judge from the relatively large amount of organic iodine found in the blood of normal animals of this species (Closs, Loeb and MacKay[2]).

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Effect of Adrenal Cortex Extract on Maxillary Sinusitis in the Rabbit.

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Several investigators[1, 2, 3] have demonstrated that adrenalectomized animals showed a decreased resistance to infection and bacterial toxins. Blanchard[4] found that the opsonic power of the serum of adrenalectomized cats is greatly decreased. Phagocytic activity

[2] Closs, Karl, Loeb, Leo, and MacKay, Eaton, PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 170.

[1] Oppenheim and Loeper, *Compt. Rendu. Soc. Biol.*, 1903, **55**, 332.

[2] Jaffe and Marine, PROC. SOC. EXP. BIOL. AND MED., 1923, **21**, 64.

[3] Scott, *J. Exp. Med.*, 1924, **39**, 457.

[4] Blanchard, *Physiol. Zool.*, 1931, **4**, 302.