the animal had received only 3 injections. The height of the cells was increased, the number and size of the neutral red granules was larger than in the controls (and in normal standard animals in general) and the intensity of the neutral red stain was distinctly greater. This animal showed only a few signs of metamorphosis.

In another animal (CCXCIV b 3) the thyroid was examined unstained, after 3 injections had been given. The cells were distinctly enlarged and showed the typical dome-like protrusion of the apices, observed in active glands of spontaneously metamorphosing larvae. In this animal no definite start towards metamorphosis had been made.

In a third animal (CCXCIV b 1) which had received 5 injections, the cells exhibited characters indicative of the highest secretory activity. Some cells were found which were twice as high as the cells of control thyroids and contained one large Andersson vacuole at the apex. Other cells were merely increased in size; of these 50% contained so many Andersson vacuoles that little of the cytoplasma remained. This animal had shed its first skin completely one day before examination.

Our conclusion is that genuine anterior lobe extract has the same action on the thyroid as Armour's commercial product, that a fully potent extract can be obtained not only from dried, but from fresh glands; that the anterior lobe contains a substance which, alone among other substances tested and quite contrary to thyroid substance and substances stimulating the autonomic nerves, forces the inactive thyroid gland into function; and that, in amphibians, metamorphosis is caused by this principle only indirectly, through the function of the thyroid gland.

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Anterior Lobe Substance, the Thyroid Stimulator. IV. Effect in the Absence of Thyroid Gland.

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Spaul[1] reported that injections of anterior lobe substance induced metamorphosis in thyroidectomized axolotls. According to our

* These experiments were made possible through the generosity of Mr. Victor G. Bloede, Baltimore.

[1] Spaul, E. A., *Brit. J. Exp. Biol.*, 1925, ii, 427.

work, however, the effects of the hormones are quite different and anterior lobe cannot replace the thyroid hormone.

To test our claim 6 larvae of the Utah axolotle were most carefully thyroidectomized. As complete thyroidectomy of salamander larvae is very difficult and regeneration of remnants not visible under the dissecting microscope takes place frequently, the injections of an anterior lobe extract prepared in our laboratory, as described in Article I of this series, were started in 4 of the thyroidectomized larvae immediately (one day) after the operation. Two normal control larvae of the same stage and approximately same size were injected at the same time with the same sample of anterior lobe powder as the experimentals. Both controls metamorphosed after the sixth injection, 11 days after the first injection. None of the experimentals showed even a sign of metamorphosis after the ninth injection, fifteen days after the first injection. The injections were stopped after the ninth injection; 51 days after the first injection, the experimentals are still completely larval.

Anterior lobe substance has absolutely no effect on metamorphosis if the thyroid is absent. It is possible that Spaul's axolotles had not been completely thyroidectomized. Anterior lobe is a specific thyroid stimulator, but it cannot replace the thyroid hormone.

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Action of Several Disinfectants on Yeasts.

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Ten strains of yeasts were subjected to the action of gentian violet, mercurochrome-220, iodine and acriflavine. The technic involved the use of a plate very much like that used by Churchman. The plate which we used, however, had 2 control areas instead of one. The agar containing the dye was added to the middle compartment, leaving one compartment on each side without the disinfectant. Gentian violet was studied in 3 ways: (1) application of the dye directly to the cells; (2) behavior of the organisms on dye-agar; and (3) attempts to raise the tolerance of the organisms for the dye. All of the cultures except one were susceptible to the presence of gentian violet. This organism, when stained according to Henrici's[1] technic for applying the Gram stain to yeasts, was Gram

[1] Henrici, *J. Med. Res.*, 1914, xxx, 409.