The authors have been unable to confirm this stoichiometric relationship under the conditions described by Christomanos and investigated the factors influencing the distribution of iodine in the system, diethylsulfide—aqueous solutions of potassium iodide.

The experiments were carried out as follows: The diethylsulfide was weighed by difference from a weighing burette into 500 cc. volumetric flasks embedded in an ice-water mixture ($t = 2°$ to $5°$) and containing iodine, potassium iodide and hydrogen iodide. The mixtures were shaken until equilibrium was reached with respect to the iodine distribution. A portion of the mixture was centrifuged at 2° to 5°, and 25 cc. of the clear aqueous solution were subjected to iodimetric titration. The results are shown in Table I.

Results. The amount of iodine taken up by diethylsulfide varies with the amount of the sulfide and also with the concentration of iodine, iodide ion and hydrogen ion, the effect of the last factor being the slightest. This suggests that the removal of iodine from its solution by diethylsulfide is due to the solubility of iodine in the sulfide. In fact, iodine was found to be miscible with diethylsulfide roughly in all proportions.

In the light of the present experimental results the method for the determination of diethylsulfide in biological solutions should, therefore, be based upon other principles.

Summary. The amount of iodine taken up at a constant temperature by diethylsulfide is the function of the concentrations of iodine, iodide ion and hydrogen ion in addition to the amount of diethylsulfide added, and there is no such chemical relation under the experimental conditions as expressed by the equation:

$$(C_2H_5)_2S + I_2 = (C_2H_5)_2SI_2$$

The analytical method based upon this erroneous principle is unreliable.

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Effects of Avian Pituitary Glands in Salamanders.

KATHRYN F. STEIN. (Introduced by A. E. Adams.)

From the Zoology Department, Mount Holyoke College.

Induction of ovulation has been secured in various forms by administration of implants or extracts of the pituitary glands of

species and of classes other than that of the host animal.[1-7] Response of the host was negative, however, in the following cases: pigeon implants in mice,[1] implants of hypophyses of cow, dog, guinea-pig, rat, frog, fish, chicken, and snake under the skin of toads,[3] frog implants and mammalian implants and extracts in toads,[7] frog hypophyses in mice,[8] and in toads,[9] rat implants in toads.[10] Further experiments indicated that the probable explanation of these negative results, at least in some cases, was failure to administer the glands in adequate dosages. Thus by increasing the daily dosage Lipschütz, Kallas and Wilckens[11] were able to induce ovulation in mice with pigeon pituitaries, and Wills, Riley and Stubbs[10, 12] secured positive results in toads with frog and fish glands. The latter authors therefore concluded that, contrary to the conception of Houssay *et al.*,[3] there was no specificity of the maturity hormone of the anterior lobe of the pituitary among anurans. Their subsequent failure to obtain ovulation in toads by rat implants caused them to admit a possible specificity between these classes, with the alternative that the hormone might be destroyed due to the incompatibility of the tissues and subsequent reactions.[10] The following experiments, in which avian anterior lobes were administered to urodele hosts, do not support the idea of specificity of hormones and are reported as an additional case of induction of ovulation by heteroplastic implants and injections of pituitary. They are also concerned with the difference in potency between glands of young and adult donors, and with the effect of implants and injections on the thyroid of the host animal.

Implants of Adult Fowl Pituitaries. Glands were obtained from fowl (chiefly Rhode Island Red roosters) killed for market. The

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10 Wills, I. A., Riley, G. M., and Stubbs, E. M., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 784.

11 Lipschütz, A., Kallas, H., and Wilckens, E., *Comp. Rend. Soc. Biol.*, 1929, **100**, 28.

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heads were kept on ice until needed when the pituitaries were removed and implanted in the back muscle of *Triturus viridescens* females. Implants were made from the same series of heads over a period of one week. Three animals were used as hosts and each received a definite third of the anterior lobe of each pituitary (Table I). Since 2 implants were made twice a day, each host received the equivalent in amount of approximately 1⅓ glands daily.

TABLE I.
Adult Fowl Anterior Lobes in Triturus Females.

Animal	Daily Dosage	Total Implants	Duration	No. of Eggs
CC1	2(2 × ⅓) glands	Ant. ⅓s ≏ 8⅔ glands	6½ days	None
CC2	"	Mid. ⅓s ≏ 6⅔ "	5 "	10 laid
CC3	"	Post. ⅓s ≏ 8⅔ "	6½ "	7 in oviducts

No eggs were ovulated by control animals kept under the same conditions while one of the 3 experimental animals laid eggs and a second had eggs in the oviduct when killed on the eighth day. The failure of CC1 to ovulate is not necessarily due to the region of the gland implanted but is more likely an individual difference in sensitivity to the hormone.

Injections of Powdered Fowl Pituitaries. The anterior lobes of 35 pituitary glands from heads of Rhode Island Red roosters were treated with several changes of acetone, ground in a mortar, and the dry powder taken up in 0.6% salt solution. Injections of ½ to 1 cc. were made daily into each of 2 female Triturus from October 18th to 23rd inclusive. One of the host animals laid eggs after 2, the other after 5 injections. No estimate can be made of the glandular equivalent of the injected material as the larger particles would not pass through the injecting needle and were allowed to settle out. At least 31 eggs were ovulated by one female and at least 32 by the other before the termination of the experiment on the sixth day. As ovulation did not occur in control animals during this period, it may be concluded that the anterior lobe of the fowl pituitary possesses gonad-stimulating hormone, the potency of which is not destroyed by acetone.

An attempt was made to extract fowl anterior lobes in pyridine following drying in acetone, but the potency of the material was apparently destroyed at some point in the procedure as no eggs were ovulated by either of 2 females given 11 injections from October 25th to November 5th inclusive.

Implants of Chick Pituitaries. Rhode Island Red chicks, varying in age from one to 10 days, were decapitated and the anterior lobes of the pituitaries removed and implanted into the back muscle of 11

TABLE II.
Chick Anterior Lobes in Triturus Females.

Animal	Daily Dosage	Total Implants	Duration	No. of eggs
CH1	½ gland	7⅔ glands	22 days	None
CH2	,,	7½ ,,	22 ,,	,,
CH3	,,	12½ ,,	32 ,,	2 in ovid.
CH4	,,	11½ ,,	32 ,,	None
CH5	,,	11 ,,	32 ,,	,,
CH6	,,	11½ ,,	32 ,,	,,
CH7	2 × ½ glands	44 ,,	23 ,,	,,
CH8	,,	44 ,,	23 ,,	,,
CH9	2 × ½ (22 days) 2 × 1 (3d), 2 (3d) 2 × 2 (4d)	50 ,,	53 ,,	6 laid 7 in ovid.
CH10	2 × ½ (22d) 2 × 1 (3d), 2 (5d) 2 × 2 (8d) 2 × 3 (8d)	118 ,,	70 ,,	1 laid 3 in ovid.
Hypo'sec-tomized	2 × ½ (2d) 2 × 1 (4d), 2 (2d)	14 ,,	14 ,,	14 in ovid.

Triturus viridescens females (Table II). In 4 cases ovulation occurred, while none of a control series ovulated. The fact that 3 of the 4 pituitary-treated newts that ovulated received at least 2 glands per day at some time during the experiment, while only one (CH3) out of 8 receiving daily from one-half to one gland ovulated, seems to indicate that the latter may have been too small a daily dosage to cause ovulation except in very sensitive host animals. This is in line with the results, mentioned earlier in this paper, obtained after implants of pigeon pituitaries in mice and of frog pituitaries in toads, where a relatively small daily dosage gave negative, a larger, positive results. The need for the larger amount of chick pituitary might result from destruction of hormone by the host, failure of the tissue to release the hormone, or, and this seems more likely in the light of the results from adult glands, to the slight gonad-stimulating potency in the glands of young donors.

As a check, a series of 11 hosts were given implants of Triturus pituitaries and in every case ovulation occurred after 3 to 15 implants (average 7.5). Thus both the *total amount* and the *amount per dose* of Triturus gland tissue required for ovulation in Triturus were less than the *amounts* of fresh chick or fresh fowl tissue required. The average of the total *number* of glands of Triturus and of adult fowl was almost exactly the same, (7.5 Triturus, 7.6 fowl), but this may be merely a coincidence. Certainly the number of animals concerned is too small to draw any conclusion on this point.

Effect of Avian Pituitaries on Thyroid of Triturus. The thyroids of control animals and of hosts receiving Triturus, chick, powdered fowl, and fresh fowl anterior lobes were fixed in picro-aceto-formol

and stained in iron hematoxylin and Mallory B, and compared as to degree of stimulation. The thyroids of animals with Triturus and with adult fowl implants presented a picture similar to that obtained in Triturus by Adams[13] following injection of phyone and hebin for short periods. The height of the epithelium was increased over that found in normal glands, there were chromophobe vacuoles bordering the colloid indicative, according to Severinghaus,[14] of colloid absorption, and droplets of colloid within the cells. Implants of chick pituitaries likewise caused stimulation of the thyroids, slightly greater after 7⅔ glands than that found in normal or muscle-injected controls, markedly greater after 118 glands and after injection of powdered fowl glands in 0.6% salt solution. After both of the latter types of treatment, the thyroid picture resembled that obtained by Adams[13] after long-continued injection of phyone and hebin, with hypertrophy and hyperplasia of the gland, high follicular epithelium, scanty colloid in the follicles, and increased vascularity. Practically all the glands possessed the type of active follicle described by Severinghaus[14] in the duck and characterized by high active epithelium on one side, and lower, inactive appearing cells on the other.

The fact that an hypophysectomized animal injected with chick anterior lobe molted after having received 14 glands also suggested that its thyroid was affected, since Adams *et al.*[15] have demonstrated that thyroidectomized animals will molt after thyroid but not after pituitary implants. Histological examination of the thyroid of this animal gave evidence of stimulation in that some of the epithelial cells were cuboidal rather than flat and apical vacuoles were present in the cells of some follicles, indicating colloid absorption. Such evidence was lacking in the thyroids of hypophysectomized controls.

Summary. Anterior lobes of pituitaries of adult fowl (as fresh implants or powdered and injected in salt solution), or of young chick pituitaries (if a sufficient number of glands is implanted daily), will cause ovulation out of season in *Triturus viridescens* females. The thyroids of these females are stimulated beyond the normal condition. These results indicate that no specificity of hormone or hormones in ovulation-inducing and thyroid-stimulating capacities exists between birds and amphibians.

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