

mice harbor Theiler's virus in their intestines as do albino ones.^{1, 2} (Cf. Theiler⁷.)

Although rigid quarantine and isolation are practiced in the animal house, no such control can be applied to predatory, wild gray mice. Hence the possibility arises that they were contaminated with Theiler's virus in an endemic focus populated by virus-carrying albino mice. This has not as yet been proved a fact; meanwhile, 5 experiments in which were examined 7 house and 3 field gray mice, all trapped at a distance from the laboratory, failed to show virus in their intestines or brains. Dr. Max Theiler reports, in addition, that virus was not detected in a much larger series of gray mice trapped away from the Institute.⁷

Conclusions. (1) Wild gray house-mice are as susceptible to intracerebral introduction of Theiler's virus as are albino mice. (2) Apparently normal gray mice trapped in an animal house in which almost all adult albino mice are carriers of Theiler's virus, reveal this virus in their intestines and not in their brains. (3) The virus is indistinguishable from that obtained from the intestines of normal albino mice. (4) The number of gray mice shown to be carriers of Theiler's virus, while considerable, appears to be lower than that of carriers found among the albino strain.

Preliminary tests to the present time have failed to indicate that the virus is demonstrable in gray house and field mice trapped at a distance from the laboratory. This subject is still under investigation.

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Correlation of Histological Differentiation with Beginning of Function of Developing Thyroid Gland of Frog.

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The capacities for removal of inorganic iodine from the blood stream and for storage of such iodine in organic form in relatively high concentration are well known properties of the adult thyroid gland. The recent use of "tagged" radioactive iodine has provided the tool for the striking, graphic demonstration of these properties

⁷ Theiler, M., Studies on Poliomyelitis, De Lamar Lecture, in press.

of the thyroid.¹ The accumulation of administered radio-iodine in thyroid tissue was revealed by these workers by placing sections of tissue in contact with X-ray films.

Using this method for revealing accumulated iodine, an experiment was devised to show at what stage of differentiation of the thyroid gland the ability for storage of iodine could first be demonstrated. Sixty-three tadpoles of the frog, *Hyla regilla*, were placed in a glass container in 800 cc of tap water. To this water was added an amount of radio-iodine,* as the sodium salt, which had a total activity of 150 microcuries. The preparation used has a half-life of 8 days. The mass involved was less than 0.1 mg.

The tadpoles, which were of all sizes from the just-hatched 7.0 mm larva to the 38 mm larva with well developed hind limbs (5.0 mm long) were kept in the radio-active water for 2 days. Most of the animals were fixed in formalin and serially sectioned. The lower jaws of the remaining tadpoles were dried on glass slides. Radio-autographs were made of the whole lower jaws, and of the serial sections by allowing the glass slides bearing them to remain in contact with a sensitive "no-screen" X-ray film. The serial sections were then stained in hematoxylin-eosin for matching with the radio-autographs. The staining properties of the tissues were slightly, but not seriously, impaired by the drying and handling incident to making the radio-autographs.

No evidence of storage of iodine by the thyroid could be found in larvae having a total length of less than 10 mm. Division of the thyroid lobes occurred at about 7 mm total length and beginning formation of follicles at about 9.0 mm. Stokes² has provided a complete description of the normal development of the thyroid in this frog. In the 10.0 mm larva (body length 3.0 mm) the first faint radio-autographs (Fig. 1) were produced by the 2 lobes of thyroid tissue. At this stage each thyroid lobe consisted of about 3 to 6 follicles with very small, if any, lumen. Each follicle was from 10μ to 15μ in diameter and was circumscribed, in cross section by about 4 to 6 cells. In the 12.0 mm larva (4.0 mm body length), although differentiation had not proceeded much farther (each lobe 6 to 7 follicles, 18μ to 28μ in diameter, 6 to 9 cells in cross section) the radio-autograph was somewhat darker. As the thyroid increased

¹ Hamilton, J. G., Soley, M. H., and Eichorn, K. B., *University of Calif. Publ. Pharmacol.*, 1940, **1**, 339.

* The writers are indebted to the Radiation Laboratory of the University of California, and especially to Dr. J. G. Hamilton for the radio-active iodine used in this work, and to Mr. M. Murayama for assistance with photomicrography.

² Stokes, M., Thesis, University of California, 1941 (unpublished).

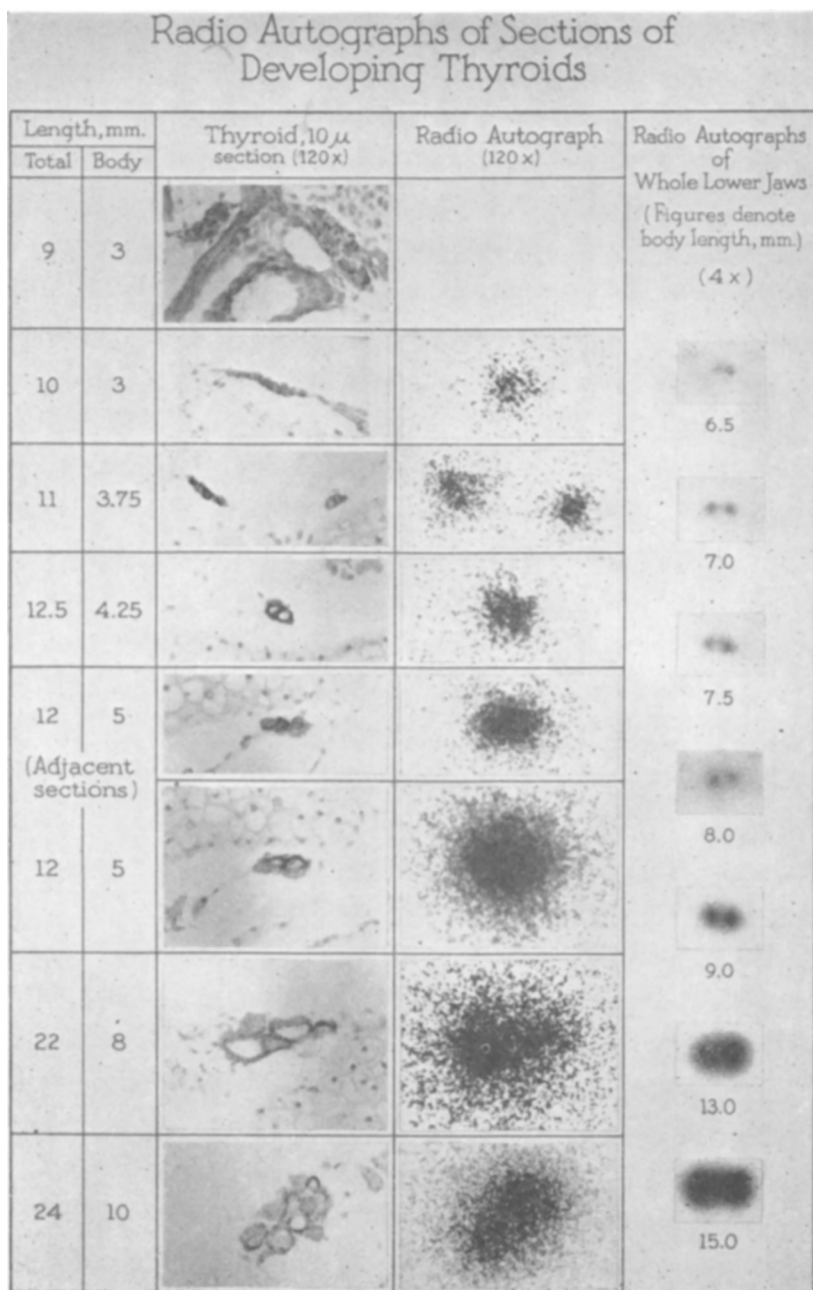


FIG. 1.

in size, and colloid increased in amount, the sections produced progressively blacker records. It is interesting to note in the figures of the thyroid of the 5.0 mm body length tadpole that of the adjacent sections, the one containing more colloid contained also much more radio-activity, revealed by a striking difference in the radio-autographs.

It is clear, therefore, that in this frog function by the thyroid can be demonstrated very early after formation of follicles within each of the 2 primitive, still yolk-laden, lobes. It should be remembered that the iodine in the serial sections which produced the radio-autographs had remained in the thin section even after immersion in aqueous and alcoholic solutions, in alcohol-ether, and xylene. The iodine is, therefore, quite likely in an organic linkage, probably as thyroglobulin.

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Origin and Differentiation of Epithelium of Urinogenital Sinus in the Opossum.

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Previous results have shown^{1, 2} that administration of estrogens to young opossums during early pouch life produces extreme hyperplasia and cornification of the lining of the urinogenital sinus and structures associated developmentally with the sinus. The related structures are the *neck* and *trigone* region of the bladder, and the *sinus horns* (dorso-lateral diverticula of the sinus which received the gonoducts and subsequently contribute extensively to the *lateral vaginal canals*). The sinus epithelium undergoes intense squamous metaplasia with continuous shedding of keratinized layers after estrogen treatment, closely resembling the adult vagina at estrus. Similar results are reported by Moore.³

Where other epithelia of the urinogenital tract join the sinus the former do not respond, and the transition is abrupt. The response was, therefore, considered specific for sinus epithelium. In 20-day

¹ Burns, R. K., Jr., PROC. SOC. EXP. BIOL. AND MED., 1939, **41**, 270.

² Burns, R. K., Jr., J. Morph., 1939, **65**, 497.

³ Moore, C. R., Physiol. Zool., 1941, **14**, 1.