active virus the partial specific volume was 0.839, corresponding to a specific gravity of 1.19.

Molecular stability[8] is at a maximum between pH 7.0 and 8.5. When the pH is reduced below about 6.5, the virus precipitates, and its infectivity is rapidly lost.[9] Disintegration, occurring slowly in the optimum pH range and more rapidly above the optimum to about pH 10.5, takes place as a splitting off of relatively very small light-absorbing fragments. These fragments are evident in the sedimentation patterns above the still sharp boundary of the residual virus, which thus becomes progressively obscured. At pH levels above about 10.5, the sedimentation constant of the residual large component is greatly diminished. Exposure of the virus to ultraviolet light of 2537 Å results in inactivation at a rate of the same order of magnitude as that reported for certain bacteria.[10] Virus inactivated in this way to the extent of 7 decimal dilutions gives a slightly diffuse sedimentation boundary and the same sedimentation constant as that of the fully active material. The molecular stability of the inactive material is much less than that of the untreated virus, but the process of disintegration subsequent to irradiation appears similar to that of the intact virus. The nitroprusside test of the inactive material is negative.

The purified material studied is specific to the virus-diseased chick embryos. No trace of a similar or related component has been found in repeated studies of normal embryo tissue. The homogeneity of the product is clearly evident in the findings with the analytical ultracentrifuge and in the uniformity of its biological and chemical behavior. It would thus appear that the virus of equine encephalomyelitis (Eastern strain) is a complex of high molecular weight consisting of phospholipids, cholesterol, fatty acid and ribonucleoprotein.

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HYPERFUNCTION OF ANTERIOR PITUITARY IN RATS. II. ESTRUS CYCLES[1]

IN previous papers[2,3] the authors have reported the following as evidence of a hyperactivity of the anterior pituitary in their colony of the Yale strain of rats: (1) high fasting blood sugar, (2) low glucose tolerance, (3) an exaggerated hyperglycemic response to epinephrine, (4) an initial resistance to insulin, (5) a high percentage of body fat, (6) an exaggerated rate of growth and adult size, (7) large urine volume and (8) high incidence of sterility. If these characteristics result from a hyperfunction of the anterior pituitary, one might expect to find a reflection of this activity in the estrus cycle.

Observations on 122 rats revealed a significant difference between the cycles of the Yale strain and the normal strain, although quantitatively the difference was not as great as that observed by Evans[4] following the injection of anterior pituitary extracts. The procedure consisted of comparing under controlled conditions the estrus cycles of the Yale strain with those of the Wistar strain which we consider normal for reasons previously enumerated.[2,3] Individuals from the two strains were matched according to age, type of cage, number per cage, degree of light exposure and diet. Smears were made each morning, and the first appearance of cornification was taken as the end-point.

In the first series of observations, 17 sexually mature rats ranging in age from 40 to 60 days at the inception of the experiment were selected from each strain and smeared daily for at least 3 cycles. The average cycle in days for the Yale strain was 5.8 P.E. ± 0.36 and for the Wistar strain 4.7 P.E. ± 0.36. There are 8 chances per 100 that the difference is not significant. Sixty-five per cent. of the Yales and 35 per cent. of the Wistars had average cycles of 5 days or more, and 35 per cent. of the Yales and 6 per cent. of the Wistars had average cycles of 6 days or more. The chances that these differences are not significant are 4 and 3 in 100, respectively.

The second series totaled 44 Wistars and 45 Yales ranging in age from 80 to 295 days. One Yale rat, 97 days of age, showed no cycle although smeared for 16 days. Table 1 shows that the cycles averaged 5.48 days for the Yales and 4.45 for the Wistars. The chance that this difference is not significant is less than 1 in 100. Thirty-four per cent. of the Yales but only 9 per cent. of the Wistars have cycles of 6 days or over. The chance that this difference is not significant is less than 1 in 10,000.

In view of the work of Blunn[5] on the relation of the genetic composition of rats to the time of opening of the vagina, it appears important to record that the Yale, more accurately called the Connecticut Agricul-

[1] This investigation was supported by a grant from the Committee on Research in Endocrinology, National Research Council.

[2] V. V. Cole and B. K. Harned, *Endocrinology*, 23: 318, 1938.

[3] B. K. Harned and V. V. Cole, *Endocrinology*, 25: 689, 1939.

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TABLE 1

A COMPARISON OF THE LENGTHS OF THE ESTRUS CYCLES OF MATURE RATS IN THE WISTAR AND YALE STRAINS. RATS FROM THE TWO STRAINS WERE PAIRED ACCORDING TO AGE. RANGE 80–295 DAYS

Length of cycle in days	No. of rats showing cycle		P*
	Wistar 44 rats	Yale 44 rats	
3	7	5	
4	23	13	
5	10	11	
6	1	5	
7	2	3	
8	0	2	
9	1	3	
11	0	1	
14	0	1	
Average cycle in days ..	4.45 ± 0.13	5.48 ± 0.23	0.009
Percentage 3–5 days	91	66	0.00005

* Chance that deviation is due to sampling.

tural Experimental Station strain, and the Wistar experimental strain used in these studies are genetically different, as shown by the results of mating a piebald male with two Yale and two Wistar females. The 17 offspring from the Yale crosses were black with white paws and vest, while the 21 offspring from the Wistars were all piebald.

The data on the estrus cycle of the Yale rats have been interpreted as further evidence of a hyperfunction of the anterior pituitary in this strain.

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LIFE HISTORY OF SPIRORCHIS PARVUS (STUNKARD) TREMATODA: SPIRORCHIIDAE

THE life history of *Spirorchis parvus,* a monostomate blood fluke from the arterioles of the muscular gut wall of the turtle *Chrysemys picta,* has been completed experimentally in the laboratory. The large non-operculate eggs contain active miracidia when passed from the host; hatching occurs after four to six days' incubation at room temperature. The miracidium is complicated, having a complex sensory apparatus, eighteen dermal plates arranged in four tiers and two pairs of flame cells. Miracidia penetrate young snails of the species *Helisoma trivolvis* Say and *H. campanulatum* Say and develop into elongated mother sporocysts in the mantle of the hosts. Young daughter sporocysts escape from the mother sporocyst sixteen to eighteen days after penetration of the miracidia and migrate to the liver of the snail by way of lymph channels. The young daughter sporocyst has a subterminal birth pore, a spinose anterior end, and contains several young cercarial embryos. The cercaria is an apharyngeal, distomate cercaria of the furcocercous, brevi-furcate type, having a dorsal body crest and compound pigmented eyespots. Body and tail are spinose. The body is humped above the insertion of the tail, broad posteriorly and narrow anteriorly to the ventral sucker. The mouth is subterminal as in schistosome cercariae; esophagus long, ceca short and inflated. The head organ is larger than the ventral sucker, the former is transformed within the final host into the oral sucker while the ventral sucker disappears. The tail-stem is muscular and more than twice the length of the body. The furcae have fin-folds. Both body crest and fin-folds are organs of flotation.

The crest is formed by an elevation of the cuticle above the dorsal mass, but the two cuticular portions are not in contact, thus forming a cavity between the apex of the crest and the dorsal body wall. The crest may be obliterated by extreme elongation of the body, or it may appear even higher than usual when the body is greatly contracted. It may disappear altogether when specimens are placed in hot fixing solutions, but it is demonstrable in specimens fixed in warm or cold solutions.

There are seven pairs of penetration glands in cercariae dissected from the snail, but only six pairs in naturally emerged cercariae. The seven pairs may be divided into four groups; the first group, found only in cercariae dissected from snails, consists of a single pair of small pyriform, mononucleated gland cells located about halfway between the eyespots and the ventral sucker. They and their ducts are filled with coarse granules. The second group contains two pairs of eosinophilic glands, located just anterior to the ventral sucker. The three pairs of glands in the third group are basophilic in staining reaction and are located dorsal and posterior to the ventral sucker. They are larger, more elongated and have more finely granular contents than the first two groups. The fourth group consists of a single pair of large glands located in the extreme posterior part of the body. In naturally emerged cercariae they appear as a single large granular mass and are so reported in related cercariae. The contents of these glands and their ducts are coarsely granular as in the first pair. During most of the developmental period of the cercarial embryo these glands are clearly separate. They migrate posteriorly from near the head organ, where they were first seen, to the posterior end of the body as the embryo grows into a fully developed cercaria. By this time the glands are so overlapped as to appear as one, but their ducts, which may be observed at any stage of development after their first appearance, indicate the paired condition. The presence of the first group of glands in cercariae dissected from snails and their absence in naturally emerged cercariae sug-