significant decline in TSH-SR was found(6). However, it should be pointed out that at 7 to 10 months of age these calves were still growing quite rapidly and could not be considered adult.

In the previous studies on immature fowl (2,5) the TSR's presented are, in general, considerably elevated as compared to the TSR's determined in this study. The breed of chicken used(5) was the same as for the present investigation. The thyroidal activity of growing chickens was also unaffected by changes in environmental temperature(5) as opposed to the observed depression of both pituitary TSH and thyroid hormone secretion of mature birds exposed to increasing temperatures(1). The present report supports the previous data in that mean TSR and TSH-SR of these birds, studied at 55°F, is increased as compared to values obtained following exposure to heat(1).

Unfortunately no data are yet available for TSH-SR's of immature growing fowl. However, it can be postulated from the available evidence that pituitary TSH output and, therefore, thyroidal activity of immature fowl are significantly higher than in the adult, but once the chicken reaches the adult stage this depressed pituitary-thyroid activity becomes more susceptible to alterations by environmental temperature.

Summary. TSR's and TSH-SR's of 53 adult New Hampshire hens ranging from 1 to 4 years of age were determined. No significant changes of TSR or TSH-SR occurred with increasing age within these adult stages. These birds had a mean TSR of 0.94 ± .07 μg of L-thyroxine/100 g bw and a mean TSH-SR of 3.8 ± 0.23 mμ of TSH/100 g bw during late winter when the temperature was controlled to a mean of 55°F. However, this level of thyroidal activity represents a depression when compared to available data on the immature growing fowl.

1. Hendrich, C. E., Turner, C. W., Proc. Soc. Exp. Biol. and Med., 1964, v117, 218.
2. Tanabe, Y., Poultry Sci., 1965, v44, 591.
3. Narang, G. D., Turner, C. W., Proc. Soc. Exp. Biol. and Med., 1966, v121, 203.
4. Gregerman, R. I., Endocrinology, 1963, v72, 382.
5. Stahl, P., Pipes, G. W., Turner, C. W., Poultry Sci., 1961, v40, 1036.
6. Hendrich, C. E., Turner, C. W., J. Dairy Sci., 1964, v47, 1007.

Received October 14, 1966. P.S.E.B.M., 1967, v124.

Age as a Factor Influencing the Level of Parthenogenesis in Eggs of Turkeys. (31806)

M. W. OLSEN
*United States Department of Agriculture**

Studies of parthenogenetic development in turkey eggs were initiated at this Station in 1952. Continuing studies have demonstrated repeatedly that both genetic and physiological factors may play an important role in the expression of parthenogenetic development.

Following the initiation in 1954 of a selective breeding program based on the progeny test method, the average level of parthenogenesis in eggs of virgin Beltsville Small White (BSW) hens increased from about 16 to over 45%(1). Likewise, significant increases in the level of parthenogenesis have been recorded following the inoculation of virgin BSW hens with certain live poultry viruses (2,3,4). The present study was undertaken to obtain information on the possible influence of age of the turkey hen on the percentage incidence of parthenogenesis in eggs produced during the first and second laying season.

Materials and methods. A total of 163 virgin BSW hens was involved in this 6-year study. Each of these was outstanding with respect to number of parthenogenetic eggs produced during the first laying season. On completion each year of the 60-90-day par-

* Animal Husbandry Research Division, ARS, Beltsville, Md.

TABLE I. Incidence of Parthenogenesis in Beltsville Small White Turkey Eggs During the 1st and 2nd Laying Season.

Laying season	No. of hens	Eggs examined	No. & % of eggs found to contain— Membranes No.	%	Blood & membranes No.	%	Embryos No.	%	Avg age of embryos, days	All categories of parthenogenesis No.	%
1954	20	1138	350	30.7	73	6.4	34	3.0	9.1	457	40.2
1955	20	738	205	27.8	19	2.6	5	.7	3.8	229	31.0
1955	29	1534	559	36.4	162	10.6	65	4.2	8.4	786	51.2
1956	29	893	256	28.7	38	4.3	5	.6	3.0	299	33.5
1956	28	1049	267	25.4	78	7.4	112	10.7	13.1	457	43.6
1957	28	955	366	38.3	50	5.2	24	2.5	10.7	440	46.1
1957	44	1921	511	26.6	117	6.1	152	7.9	12.0	780	40.6
1958	44	1104	351	31.8	57	5.1	51	4.6	8.0	459	41.6
1964	31	1408	272	19.3	146	10.4	204	14.5	13.9	622	44.2
1965	31	1233	323	26.2	164	13.3	59	4.8	11.5	546	44.3
1965	11	700	121	17.3	86	12.3	130	18.6	11.5	337	48.1
1966	11	418	110	26.3	67	16.0	20	4.8	10.1	197	47.1
Total &	163	7750	2080	26.8	662	8.5	697	9.0	13.1	3439	44.4
averages	163	5341	1611	30.2	395	7.4	165	3.1	9.6	2170	40.6

thenogenetic tests, females from families showing the greatest predisposition toward parthenogenesis were mated to males from high incidence families. At the close of the regular breeding season (usually before May 1) males were removed and the breeder hens were isolated for the remainder of the year. The incidence of parthenogenesis in eggs from these hens was then observed during the second breeding season, beginning some 8-9 months following separation from males.

Eggs as collected each day were placed in an incubator at a temperature of 99.5°F and a relative humidity of 57%. Eggs were incubated 9-10 days before being candled. Those in which live embryos could be detected were replaced in the incubator. Clear eggs and those showing other types of parthenogenesis were broken and their blastodiscs examined for evidence of development. Only embryonic growth that could be detected macroscopically was recorded. Eggs whose disc showed no discernible increase in size were classified as nonparthenogenetic.

Eggs undergoing parthenogenetic development were placed into one of 3 classifications: (1) development consisting solely of unorganized membranes with no evidence of blood formation; (2) eggs in which both membranes and blood formation had taken place; and (3) eggs in which embryos were identifiable on gross examination. Embryos were further classified as to age, as estimated from size and development in relation to normal turkey embryos.

Results and discussion. Data presented in Table I are based on the incubation and classification for parthenogenesis of more than 13,000 unfertilized eggs. Listed separately by years are percentages of parthenogenesis recorded for eggs laid by the same hens during their first and second laying seasons. The average percentage incidence of parthenogenesis for the 6 groups of birds is given in the last column of Table I.

In general, the overall percentage of eggs undergoing development was about the same for eggs laid during the first and second year of production. The most consistent difference was in production of embryos. In each of of the 6 yearly tests, the percentage of well-developed embryos was much higher in eggs produced during the first year. Despite the greatly increased incidence of embryos over the 9-10-year period, the ratio between first and second year eggs remained much the same.

Not only was there a much higher percentage yield of embryos in eggs laid during the first year, but these embryos encountered in eggs of younger birds survived, on the average, longer within the shell, 13.1 as compared

to 9.6 days. These findings would seem to suggest that certain physiological changes, associated with age, tend to inhibit the full expression of parthenogenetic development. The exact reason for the decline in level of embryo production and in embryo viability in eggs produced the second season is not clear. It is suggested, however, that the same factors responsible for lowered reproductive performance in older birds generally may also be operative in the case of parthenogenetic embryos.

Summary. Unfertilized Beltsville Small White turkey eggs produced by the same hens during their first and second laying year were incubated for 9-10 days and subsequently examined for parthenogenesis. Involved were 163 hens and more than 13,000 unfertilized eggs. On the average, parthenogenetic development encountered in eggs of younger birds yielded a higher percentage of embryos. It was likewise found that, on the average, embryos in eggs of younger birds survived longer within the shell than did those of older birds.

1. Olsen, M. W., Proc. Soc. Exp. Biol. and Med., 1960, v105, 279.
2. ———, Science, 1956, v124, 1078.
3. ———, Nature, 1961, v190, 191.
4. Olsen, M. W., Poole, H. K., Proc. Soc. Exp. Biol. and Med., 1962, v109, 944.

Received October 24, 1966. P.S.E.B.M., 1967, v124.

The Lightening Effect of Actinomycin D on the Skin of *Amphiuma tridactylum.** (31807)

KEDAR N. PRASAD
Department of Radiation Biology and Biophysics, University of Rochester Medical Center, Rochester, N. Y.

While investigating the effects of actinomycin D on ribonucleic acid (RNA) and protein synthesis of the hepatic melanocytes of amphiuma, it was observed that the antibiotic causes a lightening of the skin within 4 to 6 hours following injection. The present paper describes the effects of actinomycin D, melanocyte-stimulating hormone (MSH), cycloheximide and melatonin on the skin of amphiuma. The data suggest that the actinomycin D probably inhibited the secretion of MSH by the pituitary.

Materials and methods. Since it was difficult to identify the sexes of *Amphiuma tridactylum* grossly, both males and females were used in the present study. The weight of the animals varied from 200 to 400 g. The animals were maintained in a polyethylene tank filled with demineralized water which was changed twice a week. They were fed beef liver once a week. The room in which the animals were kept had 12 hours of fluoresent light and 12 hours of darkness. The experiment was carried out in a room in which the light condition was kept constant for at least 16 hours.

Actinomycin D was dissolved in absolute ethyl alcohol in a concentration of 1 mg/ml and was injected intraperitoneally to a group of 14 animals at a dose of 5 and 10 μg/g of body weight. The animals were observed for 24 hours. The initial skin color of these animals was similar. An equivalent amount of absolute ethyl alcohol was given intraperitoneally to a group of 6 animals.

The skin biopsies from the experimental and control animals were taken under ice anethesia, fixed in 10% buffered formalin and stained with hematoxylin-eosin.

To investigate whether the lightening of the skin was due to an inhibition of melanin dispersing action of melanocyte-stimulating hormone (MSH) by actinomycin D, a group of 3 animals was injected intraperitoneally with 10 mg/animal of synthetic β-MSH in

* This work was supported by the U.S. Atomic Energy Commission and performed at Brookhaven National Laboratory, Upton. L.I., N.Y.