There is evidence that the low values for sebum in eunuchs are due primarily to a lack of testicular secretions and not to concomitant reduction in steroids of extragonadal origin(8,9). Urinary metabolites of adrenal cortical secretions, which serve to assess these secretions, have been measured in most subjects utilized in the present study(8,9); daily titers of 17-hydroxycorticoids, and of a chromatographic fraction containing dehydroepiandrosterone, may be noted in particular to have been as high in castrate as in intact men. Since the amounts of these substances were not reduced as a result of castration, the subnormal sebaceous values in eunuchs can not be attributed to a decrease in adrenocortical secretions.

Summary and conclusions. Comparisons of intact and castrate males indicate that testicular secretions or their metabolites are responsible for the increased amount of sebum observed in males after sexual maturation. Values for sebum were less in oöphorectomized than in intact women, which suggests that ovarian secretions or their metabolites may also enhance sebaceous function. Sebum values remained high in tests made 4 weeks after orchiectomy. A long latent period before sebum values decline markedly upon reduction in androgenic stimulation (even with the sudden and drastic decrease afforded by castration) should be considered in evaluating therapy designed to reduce sebaceous secretions and acneform responses.

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Received November 7, 1962. P.S.E.B.M., 1963, v112.

Effect of Egg Yolk Size on Yolk Cholesterol Concentration.* (28051)

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Recent workers(1,4,5) have shown no change in egg yolk cholesterol concentration due to dietary differences in fat, choline or addition of a hypercholesteremic agent to the ration. It has been reported(6) that the membranes, theca interna and granulosa, surrounding the developing ovum in the chicken synthesize fatty acids and cholesterol, depositing them in the yolk.

Since cholesterol concentration per gram of dry ova of developing ovarian follicles has been shown to increase as dry weight of the follicle increases(3) it was thought that a study of mature yolks of different sizes would be a next logical point to investigate.

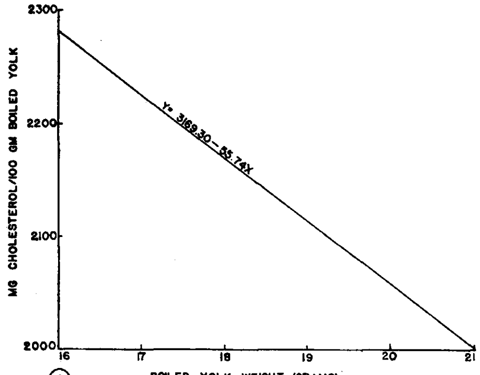
Procedure. In each of the 4 experiments presented here, the hens were kept in community cages and fed a basal corn-soy laying ration.

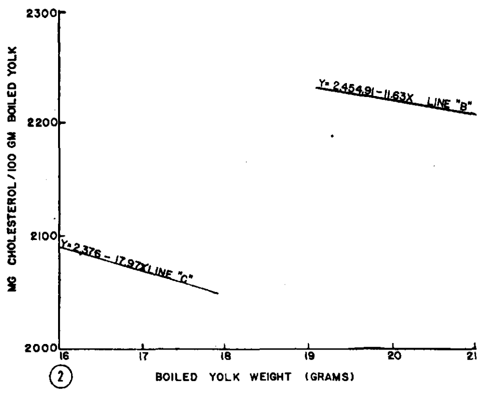
In Exp. 1, eggs were collected over a 14-day period from a group of 15 crossbred Rhode Island Red hens.

In Exp. 2, eggs were collected from 2 groups of 20 linebred, Single Comb White Leghorn hens. Hens designated as line "B" had been selected through several generations for an individual trait of large body size, and line "C" had been selected for small body size.

Experiment 3 was conducted to determine the dry matter of the boiled egg yolks of both line "B" and line "C" eggs so that the choles-

* Journal Paper No. J-4467 of Iowa Agric. and Home Economics Exper. Station, Ames. Project No. 1063.





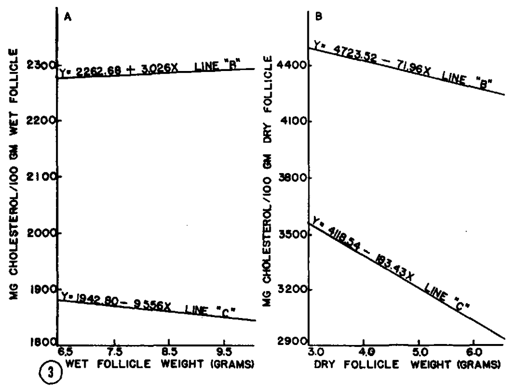


FIG. 1. Regression of cholesterol concentration on boiled yolk weight; Experiment 1.

FIG. 2. Regression of cholesterol concentration on boiled yolk weight; Experiment 2.

FIG. 3. Regression of cholesterol concentration on developing follicle weight; Experiment 4.

terol content of boiled yolks could be compared with concentrations from yolks expressed on a 100% dry matter basis. The "B" and "C" line birds were of the same lines as those in Exp. 2, but 3 was conducted one year later than was Exp. 2. Each line had been selected for its specific trait for one more generation.

In Exp. 4, developing ovarian follicles from the same birds as in Exp. 3 were analyzed for their cholesterol content.

Results and discussion. In Exp. 1, 117 egg yolks were analyzed for cholesterol concentration(4) and the data subjected to regression analysis(8). Cholesterol concentration was expressed as milligrams cholesterol per 100 g boiled yolk. The regression equation and the regression line are shown in Fig. 1. The regression coefficient is statistically different from zero ($P<.01$).

In Exp. 2, 66 yolks from line "B" and 65 yolks from line "C" were analyzed(4). Negative regressions for the separate lines "B" and "C" are shown in Fig. 2, and evidence failed to show the regression coefficients statistically different from zero or from each other.

In a recent report(3) large size differences in the maturing follicles removed from hens may have been the reason for a positive regression coefficient, indicating an increase in yolk cholesterol concentrations as the developing follicles grew larger.

In Exp. 3, solids content of boiled egg yolks was determined. Twenty-seven yolks from line "B" eggs gave a solids value of 50.4% and yolks from 29 eggs from line "C", 49.6%. This indicated that there was probably no difference between the solids content of the egg yolks from the 2 strains of birds. It has been reported(7) that the percentage of such constituents as fat and water in the boiled egg is approximately the same as in the raw egg.

At this time, there was some question as to whether the differences between our negative regressions and the positive regression previously reported(3) were due to the fact that we were working with whole egg yolks while Marion and Sell worked with developing follicles or whether this was a true strain difference. Strain effect on egg cholesterol has been reported(2). In the fourth experiment, we sacrificed 11 line "B" birds and 11 line "C" birds and removed their developing follicles. Fifty-six ova were obtained from line "B" hens and 37 ova from line "C" hens. Each ovarian follicle was analyzed for solids and cholesterol contents(4). Since there was no difference between the line "B" and line "C" in solids content of developing follicles these data were combined and regression analyses calculated. Ova weighing less than 3 g were analyzed as one group and the ova weighing more than 3 g were considered in another group(3). For ova less than 3 g, the following regression equation expresses the relationship between follicle size and solids content: $Y = 16.65 + 17.88\ X$, and for ova greater than 3 g the equation is $Y = 55.03 + 0.003\ X$. These equations are in agreement with those reported earlier(3).

A regression analysis of follicular cholesterol on ovum weight yielded regression coefficients that did not differ statistically from zero or from each other for line "B" or line "C" eggs (Fig. 3A). However, when the data were considered on a dry weight basis, the regression coefficients approached statistical significance ($P<.05$) in the line "B" eggs and were statistically different from zero ($P<.01$) for line "C" (Fig. 3B). The regression coefficients were statistically different from each other ($P<.05$) indicating a possible strain difference.

Even though the regression values in the studies presented here, with one exception, are negative regressions, there is a strain difference in rate of transfer of cholesterol from the membranes surrounding the developing ova into the ova. The surrounding membranes are more active in synthesizing cholesterol(6) with younger (or smaller) ova than in more mature ova. Earlier data(3) which gave positive regression coefficients as compared with the data presented here also indicate a strain difference.

In the first experiment in this series, the effect of clutch position upon yolk size was measured. In clutches of 4 eggs or more, the later eggs seemed to have smaller yolks than the earlier eggs in the clutch. This agrees with findings(7) indicating a tendency for the first egg of the cycle to be the heaviest and for succeeding eggs to decrease gradually in size. Since yolk size follows the same trend as total egg size, the authors conclude that from strains showing a negative relationship between ova size and cholesterol concentration, the later eggs in the clutch contain less cholesterol per unit yolk weight. For strains showing a positive relationship between yolk size and cholesterol concentration, the cholesterol concentration per unit weight of the eggs laid at the end of the clutch would be greater than at the beginning of the clutch.

Summary. Within a line of birds, there was an inverse relation between size of the yolk and cholesterol concentration of the yolk. On a dry weight basis there was a difference between the regression coefficients for 2 strains with respect to yolk cholesterol. A differential rate of cholesterol transfer into the follicle existed between strains. While a negative relationship existed between ovum size and cholesterol concentration, a positive relationship existed between ovum size and solids content. The solids content of developing ovum increased rapidly until the ovum reached 3 g, after which the solids content increased slowly as the ovum size increased. There was no difference in the solids content of the mature boiled egg yolks between lines "B" and "C".

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Received November 7, 1962. P.S.E.B.M., 1963, v112.