Such strands are schematically represented in (3). The further development of the granular membrane needs no comment in addition to the above description.

The so-called vitelline membrane of the unfertilized egg is not identical, as often assumed, with the fertilization membrane. It forms only a part of the latter. In certain circumstances, the cortical granules are not incorporated into the membrane. Under these conditions, a thin membrane results which has a low double refraction and may be identical with the vitelline membrane.

The description given above of the fate of the cortical granules is at variance with the ideas entertained by Moser[5] concerning their role in the activation.

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Water Contents of Last-stage Larvæ, Pupæ, and Adults of the Meal Moth

ACCORDING to Speicher[1], larvæ and pupæ of the meal moth, *Ephestia kuehniella* Zeller, an important pest in meal stores, maintain a constant percentage of free water, independent of the relative humidity of the environment.

In contrast to Speicher's results, our observations show that migrating larvæ of Ephestia, which have been reared at low relative humidities, have a much lower average water content than larvæ kept at high humidities, although the water contents show considerable fluctuation.

On the other hand, water contents of pupæ of all ages show a practically steady average figure, which is independent of the relative humidity in which the insects were reared. This figure (see accompanying table), which agrees very well with Speicher's value, lies between the average percentage water contents of larvæ reared at 30 per cent and 70 per cent relative humidity respectively.

	Average water content as % of body weight	
	30% relative humidity	70% relative humidity
Migrating larvæ	57·3	73·5
Pupæ	65·4	66·4
Adults	65·4	66·3

The average water content of adults is practically the same as that of pupæ, and again appears to be independent of the humidity of the environment.

It is generally held that the water content in various instars of insect development can be regulated by the retention of metabolic water[2]. It seems, however, that Ephestia larvæ cannot compensate entirely for the increased rate of evaporation of water at low relative humidities.

When larvæ reared at low relative humidities are preparing to pupate, a more efficient mechanism of regulation comes into operation, so that the water contents of the resulting pupæ are almost identical with those reared at high humidities. The average weight of these pupæ developing at low humidities (30 per cent relative humidity), however, is approximately only 80 per cent of those reared under standard conditions (70 per cent relative humidity). It may be that the regulatory process involves the oxidation of a greater weight of reserve substances during the prepupal stage of those individuals reared in the drier environment.

Low environmental humidity definitely increases the duration of larval development (fifty days at 30 per cent relative humidity, as compared with thirty-three days at 70 per cent relative humidity), but the length of the pupal instar is only slightly affected.

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New Interference Phenomena with Newton's Rings

SOME striking new interference phenomena have been found with Newton's rings by using multiple-beam interference instead of the usual two beams. The rings, formed between a convex lens and a flat piece of glass, are modified profoundly by the employment of multiple beams. The two surfaces in contact are coated (by evaporation *in vacuo*) with high reflecting coefficient transparent silverings, the reflecting coefficient exceeding 0·85 for the green mercury line. The resulting multiple beams lead to the production of fringes which are characterized by their remarkable sharpness. The fringes in transmission are fine narrow brilliant rings on a broad dark background, and in reflexion can be seen a complementary system of fine dark 'absorption' fringes on a broad bright background.

Normal Incidence. Typical transmission rings (green mercury) with light incident normally on the interference faces are shown in Fig. 1. The sharpness is unique. It is necessary to restrict the incident light to a single angle of incidence by employing a small source at the focus of a lens in order to achieve the best definition. Comparison with the ordinary classical two-beam rings reveals the superiority of the multiple-beam fringes in the following particulars:

(1) They are much more intense.

(2) They are so sharp that very high precision can be attained. A change of 1/100 of an order can readily be *accurately* measured. This corresponds to a displacement of only 25 angstroms between the optical components. A great increase in precision is thus now available in all the numerous metrological applications of Newton's rings.

(3) The fringes are so inherently sharp that fine-scale surface defects and irregularities on the glass surfaces are rendered as detail in the fringes. For the reproduction shown as Fig. 1, the flat component was a simple piece of glass, and all the local