

THE NUCLEAR CHANGES IN *AGRIPPINA BONA*
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LEWIN² has recently described the account which I gave of the nuclear changes and sporulation of *Agrippina bona* as a remarkable narrative.

His own description, however, differs but slightly from mine, as the following table will show.

<i>My account</i>	<i>Lewin's account</i>
1. The karyosome consists of a close-wound skein of chromatin in the young trophozoite.	There is no evidence of this.
2. The nuclear "spherules" do not become chromatinised.	They become chromatic ³ , but finally in the cyst achromatic again.
3. In the cyst when the partition between the sporonts has disappeared the nucleus can no longer be seen, the membrane goes, the spherules go, and the karyosomatic band goes.	The nuclear membrane disappears, the spherules go, and only a little chromatin remains in the tropho-nucleus.
4. The details of the differentiation of the endoplasm into spores is very difficult to make out. Clear areas (sporocysts) loom up and resolve themselves into spores.	Mitosis occurs, gametes are formed which conjugate to form sporocysts and spores.

These are the main differences in the accounts and it is therefore difficult to see why Lewin should have found mine so remarkable. Lewin certainly fills up a gap in my account by his description of the

¹ Strickland (1912). *Parasitology*, v, 97-108.

² Lewin (1913). *Parasitology*, vi, 257-264.

³ "Chromatinic" according to Minchin.

mitotic changes but it was not the incompleteness of my description which he appears to criticise.

I contend, however, that the narrative which I gave is correct with regard to these points.

The structure of the karyosome in the young trophozoite.

I say this is a close-wound skein, because I have seen it. Moreover, the older trophozoites, Lewin admits, have a band-like karyosome, and it is reasonable in itself to suppose that this band is derived from a pre-existing band rather than from a globule of chromatin. Lewin's figure of a section cut through a young karyosome may perhaps be considered to have resulted from distortion, and that it is no thinner than an optical section of the entire karyosome.

The presence of chromatin in the spherules.

I admit that sometimes the spherules become distinctly blue after staining with Haidenhain, but only rarely. It is not, however, the rich deep blue that chromatin takes on, but looks rather like a weak "solution" of the stain. Moreover, Romanowsky stains did not give at any time a chromatin reaction although Lewin says "it seems probable (sic) . . . when they contain chromatin they may stain purple" (*i.e.* the chromatin reaction). Lewin admits that finally the spherules lose all their "chromatin." My own experience has been that they never hold chromatin in the sense that the karyosome does. It is surely not unreasonable to find chromatin in the spherules when it can be discerned in the sporozoites.

The disappearance of the nucleus.

I stated that the nucleus in the cyst completely disappeared, and as far as the membrane and spherules are concerned Lewin agrees with me, but his sections show some karyolymph and patches of (?) chromatin remaining. In the first place it is difficult to see how the karyolymph remains when the membrane goes, and I think it fair to assume that ultimately it also disappears. Secondly, certain of Lewin's results have shown that the impoverished trophonucleus retains a very small amount of faintly staining chromatin (the remains of the karyosome

presumably). It is therefore probable that on occasions *all* is lost, which would account for my not being able to detect it. The truth must therefore be that the chromatin, which Lewin admits only stains but faintly, either remains in small amount, or completely disappears.

It is not my description which is remarkable, for it is correct as far as it goes; it is the creature which is remarkable. It is to be hoped that some explanation will be forthcoming of the nuclear spherules, now that Lewin has happily shown that the sporulation is homologous to that in other Gregarines.