solvents used. It reacts positively to acid fuchsin and mercuric bromophenol blue (Hg · BPB) but negatively to periodic acid-Schiff (PAS). From these reactions it can be said that the main substance of the idiosome is made up of proteins, with some amount of lipoprotein component. It is argentophobe, but in over-impregnated spermatids it is blackened with silver.

(2) *Rods and granules.* The rods and granules are distributed inside and around the idiosome (Figure 1–7); most of them usually lie at the periphery of the latter. They are also present in the general cytoplasm. They have been studied in the living spermatids and spermatocytes examined with a wracked down sub-stage condenser. They colour intensely with Sudan black B, indicating lipids in them. Their lipid contents are of a phospholipid nature, as interpreted from their positive reaction with acid haematein followed by a negative reaction in the pyridine extracted material. They continue to colour with Sudan black after acetone extractions, but after ethanol extractions their lipids are dissolved away as shown by the negative reaction with Sudan black. These solubility tests further reveal the phospholipid nature of their lipids. They seem to contain some proteins as, after pyridine extractions, some corroded material, which is sudanophobe, Hg·BPB-positive and PAS-negative, is left behind. They are easily blackened with silver, showing their argentophil nature. Thus they have been identified as 'Golgi bodies or granules' by SHARMA et al.[9], and DHILLON[10] in the guinea-pig and rat respectively; 'Golgi plates and rods' by GATENBY and WOODGER[11] in Cavia; 'Golgi rods and granules' and 'Golgi substance or material' by GRESSON[1] in the mammals; 'rods' by AUSTIN and SAPSFORD[3] in the rat; and 'rods and curved plates (dictyosomes)' by LACY and CHALLICE[4] in the mouse. The paired 'Golgi membranes' bounding flat vesicles, as studied under the electron microscope[4–7], evidently correspond to the argentophil rods and granules associated with the idiosome. The rods and granules are also seen in the general cytoplasm. They have been identified as the 'extra idiosomic Golgi granules' by SHARMA et al.[9] and DHILLON[10].

Vacuoles. The argentophobe and sudanophobe vacuoles of various sizes lie inside and around the idiosome (Figure 1–7); most of them are situated at the periphery of the latter. They are also present in the general cytoplasm of the early spermatids. The histochemical nature of their contents could not be determined with the techniques employed. The earlier workers, using light and phase-constrast microscopy, have overlooked them. However, LACY and CHALLICE[4] have described them as forming a sudanophobe part of their 'Golgi apparatus'. They can easily be studied in the gelatine sections coloured with Sudan black B (Figure 1–7). By using electron microscope, the earlier workers have identified them as vacuoles or vesicles. CLERMONT[5] has described them as spherical vesicles of various sizes. He has suggested their origin from the flat vesicles (vesicles bounded by the Golgi membranes). According to him, the vacuoles of the general cytoplasm have moved out from the 'Golgi zone'. When a careful examination of the electron micrographs of the 'Golgi complex', described by earlier workers[4–7], is made, then there appears a dark-shaded, fundamental substance or material which encloses or bounds the spherical vacuoles or vesicles. This substance seems to represent the idiosomic material.

Résumé. L'examen histochimique des spermatides du bouc et du buffle montre que le «complexe de Golgi» des auteurs comprend l'idiosome constitué par des protéides et des lipidoprotéides, les bâtonnets et granules constitués par des phospholipides et peut-être des protéides et enfin les vacuoles.

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Prolamellar Body of the Proplastids in Barley Root Cells

Since the work of STRUGGER[1,2] confirming Schimper-Meyer's theory of the individuality and continuity of plastids, it has generally been recognized that chloroplasts as well as leucoplasts are not formed *de novo*, but originate from a common precursor, proplastid. In the case of chloroplasts, the occurrence, in this proplastid stage, of a structure designated as *'prolamellar body* (= Primärgranum)' has been widely observed, preceding the development of their characteristic lamellar structure[3–5]. Similar findings have been reported concerning leucoplasts in various plant cells, such as the root cells of *Vicia faba*[6], in the root hairs of *Trianea bogotensis*[7] and in the epidermal cells of *Allium cepa*[8] and *Chlorophytum comosum*[9]. The leucoplasts in these cells have also been shown to develop from proplastids of meristematic cell, which are also reported to possess a prolamellar body.

However, no detailed description of the fine structure of the prolamellar body in leucoplasts has yet been published. STRUGGER[10] recognized an electron dense structure in the leucoplasts of meristematic cells of *Allium* root, and considered this to represent a prolamellar body. Close inspection of his electron micrographs, however, fails to reveal the vesicular structure which is characteristic of the prolamellar body. HEITZ[11], studying the leucoplasts of *Vicia*, found prolamellar vesicles arranged in a curved line, which, however, bore no resemblance to known figures of typical prolamellar bodies. Recently, SITTE[12], WHALEY et al.[13] and CAPORALI[14], investigating the fine

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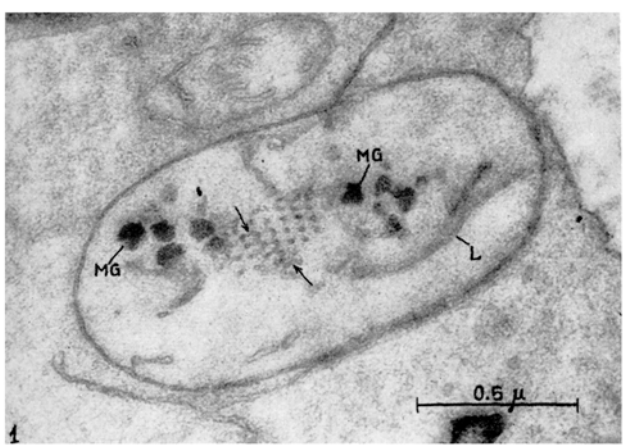
structure of proplastids and leucoplasts in the root meristem of *Pisum*, *Zea* and *Lens*, respectively, could not discover any typical prolamellar structure.

During the course of studies on the development of leucoplasts in the root cells of barley, *Hordeum vulgare* L. var. *hexastichon* Aschers. germinated on moistened filter paper under the light which is strong enough for the normal development of chloroplasts in the leaves, the author found a prolamellar body which is essentially similar to those discovered in the proplastids of chloroplasts. Tips were cut from root of actively growing seedlings, and fixed in 5% aqueous solution of $KMnO_4$ for 10 min. The fixed specimens were then dehydrated through a graded series of ethanol, and embedded in araldite resin.

Proplastids can be easily recognized and distinguished from other cell components by low electron density of their plastoplasm. The Figure illustrates a typical proplastid (1.5 × 0.8 μ) with a prolamellar body, presenting its characteristic crystalline pattern. The proplastid is covered with a double-layered membrane consisting of two electron dense layers 5–6 mμ thick and a less dense space 7–10 mμ wide. The electron density of the membrane is greater than that of mitochondria. In the plastoplasm, which consists of granular substance, are embedded a small number of lamellae, a prolamellar body, and several *manganophilic granules* (80–200 mμ in diameter). The outer and inner diameter of the vesicular elements of the prolamellar body are about 20 mμ and 10 mμ, respectively; thickness of the wall, 4 mμ. The vesicles are regularly arranged to form a crystal lattice-like structure. However, such a crystalline pattern is not always encountered, but there are many proplastids with a prolamellar body, in which vesicles do not arrange regularly.



Proplastid in postmeristematic cell of barley root. Prolamellar body which is composed of small vesicular elements arranged in an apparently crystal-like lattice can be seen in its centre. Besides, lamellae (L) and *manganophilic granules* (MG) will also be seen.

Serial sections which are not presented here indicate that the vesicles in such a prolamellar body are arranged to form a spatial lattice. Not only the structure of the prolamellar body, but also the appearance and dimensions of the vesicles are quite similar to those usually encountered in the proplastids of normal chloroplasts. At scattered points in the prolamellar body (Figure, arrows), can be seen figures suggesting coalescence of the vesicles. In another sections, the relationship between the developing lamellae and vesicles of the prolamellar body can be recognized. The newly developing lamellae and the vesicles coincide in their dimensions, as well as the double-layered structures of this membrane, suggesting that the lamellae are formed by fusion or coalescence of the vesicles of the prolamellar body.

According to the observations described above, the whole sequence of changes occurring during the development of the leucoplast can be summarized as follows: No distinct prolamellar body is discernible in the proplastids of promeristematic cells. The vesicles first appear at the postmeristematic stage of the cell development. These vesicles, irregularly scattered at first, gradually assume a regular lattice arrangement as development progress, to lead finally to the appearance of some lamellar structure, which, however, is less prominent than in the case of ordinary chloroplasts.

From another point of view, the suggested transformation of vesicular to lamellar structure may be regarded as indicating a possible common origin of chloroplasts and leucoplasts.

Zusammenfassung. Ultradünnschnitte durch Wurzelproplastiden von *Hordeum* lassen den Prolamellarkörper erkennen. Struktur und Dimensionen der Elementareinheiten dieses Körpers sind mit dem bei den Chloroplasten-Proplastiden beschriebenen Prolamellarkörper vergleichbar.

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Propriétés phytobiologiques de la sérotonine

Si la sérotonine (5-hydroxytryptamine) a déjà donné lieu à d'innombrables applications en neurologie, par exemple[1], le rôle qu'elle joue sur les tissus végétaux est encore fort mal connu. Alors que la tryptamine peut être considérée, à l'image de l'acide β-indolylacétique[2], comme un véritable effecteur de croissance[3], la sérotonine n'a pratiquement aucune activité. En effet, nous avons montré[4] que: (1) sur des tests tige (*Lens*), ce composé est sans effet, ce qui confirme complètement les expériences réalisées à l'aide du test mésocotyle[5], (2) sur des tests racine (*Lens*), cette substance est très légèrement active, observation partiellement en accord avec celles qui furent faites avec le test «racine de maïs»[6]. Pourtant, une série d'essais, qui font l'objet de cette note, ont permis de mettre en évidence une autre propriété de la sérotonine[7] qui pourrait indirectement toucher la croissance des tissus végétaux.

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[7] Cette substance, employée sous forme de *sulfate de créatinine*, nous a été aimablement offerte par le Service de recherches chimiques de la Maison Sandoz (Bâle). Dans nos essais, la créatinine s'est révélée être totalement inactive aux concentrations utilisées.