Preliminary results of ontogenetic and phytogenetic studies of the genus Omphalia.

Recent anatomical and ontogenetic studies in the Agaricinae have shown that some genera are not natural at all; that the sections are not well founded and that some of them belong to other genera. Many authors (Berkeley, Ricken, Rea, Velenovský a.o.) contended themselves mostly with outer features, so that the division given by Fries was almost universally accepted. Fries (in 1821, Systema myc. I.) placed Omphalia (with the genus Mycena) as tribus IX. and X. in the class of the Leucospori of the genus Agaricus LINNÉ (IV., Hymenini II., Pileati), in the division with central unveiled stem. In the genus Mycena, the group Omphalariae comprises species which really belong to Omphalia, and besides comprises also representatives of the genera Marasmius and Clitocybe. With but small modifications, the division of the genus Omphalia given by Fries (with the exception of the third section), is accepted to this day, though it is not in keeping with the anatomical and ontogenetic features. The species of the aspect of Mycena form the section of the Mycenariae, with submembranous cap and decurrent gills. In youth the rim of the cap is smooth and pressed to the stem. The species of the aspect of Collybia form the section of the Collybiariae, with pulpous-membranous cap and adnate gills. In youth the rim is incurved. The third section (Lentiscyphi) does not belong to the Omphalieae, most of these species forming the genus Lentinus. Some species considered as Omphaliae belong to the genus Clitocybe, Collybia (Ag. atratus, muscorum, fragrans, ericetorum, etc).

According to Fries the genus Omphalia gives the impression of uniformity, the species having the aspect either of Collybia or of Mycena. Morphologically, as shown by certain outer features, they would represent but a kind of transition. The division given by Fries, is very convenient from a practical point of view, and has therefore been employed in all mycologues. The genus Omphalia like the genus Mycena, sensu Fries is not however a natural genus, as can be seen from the histological organization of the receptacle as well as from its ontogeny. The subsection Integreliae, with rib-like gills, shows considerable morphological and anatomical differences, and therefore caused Fayod and Patouillard to separate it into a special genus, Delicatula. The group of species around Omphalia gracillima forms a transition to this genus. Similarly, in the genus Mycena sensu Fries, the section Basipedes shows quite a number of features which would exclude it from the genus Mycena. The detailed studies by Kühner (Paris 1926) and Kavina (Preslia VI, 1928) furnished many interesting remarks to the knowledge of the anomical structure of both genera. In the Omphaliae
special attention has to be paid to the epidermis of the cap which, from an anatomical point of view, distinguishes these species from the Mycenae. A kind of transition between these two genera is formed by the group Adonideae of the genus Mycena. The white species here look entirely like Omphalinae, and some of the network characteristic of Mycena are developed as in Omphalinae (epidermal layer of the cap). The surface layers are badly differentiated in an hypodermal part and epicutis. In the genus Omphalia, the hypodermic part is not differentiated at all. The genera Omphalia and Delicatula are generally characterized by a small differentiation of the network, striking in comparison with the genus Mycena and especially with the group Basipedes. We also do not find a mucous epidermis as it is developed in many species of Mycenae. The group Integrellae, which Fayod separated as the genus Delicatula, has a very thin epidermis which disappears leaving the hyphae in the receptacle an irregular mass as compared with the relatively regular course of the hyphae in the receptacles of Mycenae and Omphalinae. In the hymenium we find quite a number of lesser deviations, but the essential feature is the slightly developed subhymenial layer. The external hyphae in the cap are entirely like the external hyphae at the base of the stem, and this is in favour of an angiocarpal receptacle, further indicated by the nature of the cells of the traces of a velum at the surface of the cap and also in other places (for instance by hairs at the base of the stem). There is, however, no true angiocarpium, as Köhner thought, but a special case of hemangiocarpium because the part forming the hymenium is at least in earliest youth closed. Of course, at the time when the gills begin to develop and when the different parts of the hymenium begin to differentiate, we can already speak of a free hymenium. The velum does not form any ring and is restricted to tiny hairs at the surface of the stem. Traces of this velum appear however distinctly in the earliest youth.

In the group Basipedes of the genus Mycena, the stem is anatomically separated from the network of the cap. The hyphae of the stem continue parallelly to the cap and end bluntly at its border. These ends of the cylindrical hyphae intertwine with thin ramified hyphae, which form a kind of collar at the top of the cylinder of stem hyphae, and these connecting filaments, much intertwined and entangled, form the connection with the remaining network of the cap. Köhner was the first to draw attention to this fact, and bring some light into the study of this irregular section.

The Omphalinae may be compared not only with the genus Mycena with which a whole group shows similar morphological features, but also with the genera Clitocybe, Collybia and Hygrophorus, into which to-day many species are placed. Hygrophorus and Clitocybe have decurrent gills, but Hygrophorus has a more watery, wax-like receptacle while Clitocybe has a pulpy membranous one. On the other hand, Collybia has adnate, almost nondecurrent gills (and in this, appears more closely related to the genus Mycena), but the border of the cap is first incurved as in some Omphalinae. The genus Lentinus, distinctly different from the genus Omphalia, was attached to it by Fries (Systema, 1821) only according to its apparent outer features. The correlation between the individual species and their relation to neighboring genera is at present still very problematical, since very few comparative studies have as yet been made. From anatomical and ontogenetic study it is apparent that Omphalia (and Mycena) represent an unnatural group even after separating from them the genus Delicatula. Certain species of the genus Omphalia (in the actual sense) show distinct relations to the genera Clitocybe, Pleu-
rotus, Hygrocybe, Lentinellus, Xerotus, as was repeatedly pointed out by Fayod. This applies especially to the species Omphalia fibula, scyphoides, campanella. Omphalia fibula corresponds strikingly to the genus Hygrocybe. The whole group Mycena-Omphalia is considered as part of the Clitocybeae which comprise very different types of which the lowest ones show certain relations to the Cantharellaceae and Hygrophoraceae. These views resulting from anatomical and morphological facts are confirmed by the preliminary serodiagnostic study carried on especially by Neuhoff and Ziegenspeck.