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ELECTRON MICROSCOPY OF THE MEGASPORE *HORSTISPORITES SEMIRETICULATUS* FROM LIASSIC STRATA OF GERMANY

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ABSTRACT

Kempf, E. K. (Dept. Geol., Univ. Cologne, W. Germany.) *Electron microscopy of the megaspore Horstisporites semireticulatus from Liassic strata of Germany.* Grana 11: 18–22, 1971.—Ultra-thin sections of paratypes of the megaspore *Horstisporites semireticulatus* Jung from Liassic strata of Germany have been investigated by the transmission electron microscope. By this it could be demonstrated that the fossil sporoderm consists of two distinct layers. The inner layer (exine) is very thin (about 0.5 μ) and reveals a lamellated structure. The outer layer (perine) is thicker by far (about 25 μ or more) and is composed of ramifying sporonin threads, which form a three-dimensional network. Proximally, in the region of the triradiate dehiscence commissure, both layers coalesce. Distally the exine separates from the perine, forming a cavity hitherto, erroneously, called mesosporoid. The structural similarity of the *Horstisporites semireticulatus* sporoderm and that of such megaspores of *Selaginella* which show a monozonal kind of perine formation e.g. *Selaginella selaginoides,* favours the idea that the fossil species in question belongs to the Selaginellaceae.

INTRODUCTION

In 1960 the dissertation of W. Jung was published, in which he dealt with the dispersed megaspores of the Rhaetic-Liassic transitional strata of southern Germany. He described 11 form species belonging to 7 form genera, of which 3 species and 1 genus were regarded to be new to science. One of the new species was *Horstisporites semireticulatus.* Later Gry (1969) and Bertelsen (1970) considered this form to be synonymous with *Horstisporites harrisi* (Murray, 1939) Potonié, 1956.

For the present paper I retain the name *H. semireticulatus* Jung, as I received paratypes of this species for the investigations by the electron microscope. Paratypes of *H. harrisi* should be studied in the same manner to prove its synonymity with *H. semireticulatus.*

One aim of this paper is to clear up the fine structure and stratification of the sporoderm of the megaspore *H. semireticulatus.* Since Ehrlich & Hall (1959) discovered in ultra-thin sections, that fine structural details of fossil spores can be preserved, only a few papers on this matter have been published (Pettitt & Chaloner, 1964; Pettitt, 1966; Kempf, 1969 *a,* 1969 *b*). Some others have dealt with the fine structure of fossil cysts of Dinoflagellates and Chlorophyceae (Jux & Moericke, 1965; Wilson & Skvarla, 1967; Jux, 1968 *a* and *b*). The main result of all these investigations is that the fine structure of plant microfossils of Cenozoic, Mesozoic, and even Palaeozoic age can be preserved in a very good state. Therefore it is possible, for instance, to study directly different kinds of sporoderm formation during plant evolution. In like manner, the sporoderm fine structure of fossil and living plant species or genera can be compared directly, a second aim of the present paper. Needless to say, in palaeobotany a vast field is thereby opened up for transmission electron microscope investigations.

MATERIALS AND METHODS

The clay samples, from which the megaspores were derived, were collected by M. Hirmer and L. Hörhammer in 1932 or 1933 at Grossbellhofen—situated about 20 km northeast of Nuernberg—from strata dated as Lias α. As described in his papers of 1958 and 1960, W. Jung soaked the samples in hydrogen peroxide (15%) and