The Lower and Middle Viruan Sequence in Two Borings in Östergötland, Central Sweden

By

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ABSTRACT.—The Viruan (Middle Ordovician) Aseri, Lasnamägi, and Uhaku Stages, and the overlying Dalby Limestone (Kukruse and Idavere Stages of the Estonian sequence) are described from two cores drilled in the northern part of the Cambro-Silurian area of Östergötland. For the local sequence the topo-stratigraphic and litho-stratigraphic divisions previously distinguished in southern Öland (Jaanusson, 1960) are used. Only the beds corresponding to the Folkeslunda Formation differ in Östergötland conspicuously from those of southern Öland, being formed mostly by fine-grained calcilutites with intercalations of mudstone instead of by calcarenites. The Aserian Segerstad Limestone and the Lower Lasnamägian Skärlöv Formation consist mainly of finely nodular limestones, and in northern Östergötland the thickness of these divisions exceeds that of the other Cambro-Silurian areas of Sweden. The thickness of the other divisions is of the same order of magnitude as in southern Öland, and, as far as the Dalby Limestone is concerned, as in the Siljan district. The sequence of the Aseri, Lasnamägi, and Uhaku Stages was previously unknown in Östergötland.

Introduction

The present paper is the writer’s second contribution to the series on the stratigraphy and lithology of the Viruan Series of Sweden (the first contribution is that listed here as Jaanusson, 1960). It contains a description of the Lower and Middle Viruan sequence from two borings in the northern part of the Cambro-Silurian area of Östergötland. The upper part of the Viruan sequence (from the bentonitic beds to the top of the series) will be treated in a separate paper.

The outcrop area of the Aserian, Lasnamägian, and Uhakuan Stages is covered in Östergötland by thick Quaternary deposits, and no undoubted exposure of these beds seems to be known. Thus, with the exception of some erratic boulders containing trilobites (cf. Plectasaphus plicicostis in Jaanusson, 1953, p. 443), and probably belonging to the Uhakuan Furudal Limestone, these beds were previously virtually unknown in this province. The infra-bentonitic Ludibundus beds (Dalby Limestone) are, on the other hand, known from several small exposures (listed as Lower Chasmops Limestone by Linnarsson & Tullberg, 1882, p. 25, and Jönsson, 1887, p. 19) which are now mostly overgrown. The fauna and lithology of the Dalby Limestone of these exposures is not treated in this contribution. The ostracode fauna of the portions of the cores treated here has been described by Jaanusson (1957).
The methods used in the investigation of the cores are those summarized by JAAUSSON (1960).

The writer is very much indebted to the authorities of the Geological Survey of Sweden (Sveriges Geologiska Undersökning) for placing the cores at his disposal. The paper was elaborated at the Palaeontological Institute of Uppsala University, where all the pertinent laboratory work was carried out. Professor P. THORSLUND, the Head of the Institute, offered much useful advice during the completion of this work. The cores were examined for ostracodes and macrofossils mostly by Mrs. MEITLINDELL, who also carried out the laboratory work in connection with the determination of the total insoluble residue and the sand fraction of this residue. Mrs. INGA THOMASSON has drawn the text-figures.

**Ekön Boring**

The Ekön boring was carried out by the Geological Survey of Sweden in 1943 in the northernmost part of the town of Motala (see figure in WESTERGÅRD, 1944, p. 14). In 1942 Svenska Diamantbergbörningsbolaget had made a percussive boring at that place down to a depth of 99.5 m, and the drill boring for the Geological Survey was a continuation of this bore-hole. The Cambrian and Tremadocian sequence of the boring was described by WESTERGÅRD (1944); the Ontikan Limestones of the core have not yet been studied.

The diameter of the core from the top of the boring (99.54 m) down to 103.10 m is 8.5 cm, and below this level 7 cm.

**Description of the Section**

**Furudal Formation 3.95 m**

99.54–99.65 m. In the upper part finely nodular, in the lower part nodular limestone with a very faint reddish tint.

- *Remopleurides* sp. (99.58 m)
- *Uhakiella* cf. *aequigranosa* JAAU. (99.60 m)
- *Steuslofia linnarssoni* (KRAUSE)

99.65–99.98 m. Faintly reddish, in the lowermost 3 cm grey, thin-bedded to nodular limestone.

- *Paracerarus* sp. indet. (99.93 m)
- *Euprimites* cf. *bursellus* JAAU.
- *Euprimites* sp. (99.77 m)

99.98–100.01 m. Grey mudstone, in the lowermost part finely mottled, with small inclusions of limestone.

100.01–100.23 m. Grey, fine-grained, thin-bedded limestone.

- *Remopleurides* sp. (100.04 m)
- *Euprimites bursellus* JAAU.

100.23–100.77 m. Thick-bedded, grey, coarse-grained limestone with chamositic and goethitic grains (especially between 100.37 and 100.45 m). The lowermost centimetre of the division fine-grained.

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1 The numbers after the name of a species refer to the level of the core that has yielded the species in question. The range of species without this information is given in the figures (Fig. 2 for the Ekön boring and Fig. 7 for the Smedsby Gård boring).
Remopleurides sp. (100.54 m)
Chilobolina lativelata JAAN.
Laccochilina (Prochilina) ostrogothica JAAN.
Euprimites bursellus JAAN.

100.77–100.87 m. Greenish-grey mudstone with irregular, thin intercalations of limestone.

100.87–100.94 m. A bed of grey, fine-grained limestone.
Remopleurides sp. (100.94 m)

100.94–100.97 m. Dark grey mudstone with some small inclusions of limestone.
Uhakiella aequigranosa JAAN.

100.97–101.02 m. A bed of grey, fine-grained limestone.
Remopleurides sp.
Euprimites bursellus JAAN.
Steusloffia cf. linnarssoni (KRAUSE)

101.02–101.19 m. Greenish-grey mudstone, in the uppermost and lowermost parts with some thin, irregular intercalations of limestone.
Steusloffia linnarssoni (KRAUSE)

101.19–101.31 m. Irregularly thin-bedded, grey, fine-grained limestone.

Laccochilina (Laccochilina) sp. indet.

101.39–101.49 m. Irregularly bedded, grey, fine-grained limestone.
Euprimites bursellus JAAN.
Tallinnella sp. (101.48 m)

101.49–101.53 m. Greenish-grey mudstone with small inclusions of limestone in the lowermost part.

101.53–101.78 m. In the lower and upper part thin- to thick-bedded, in the middle nodular, grey, fine-grained limestone.
Plectasaphus plicicostis (TÖRNQ.)
Laccochilina (Prochilina) ostrogothica JAAN.
Euprimites bursellus JAAN.

101.78–101.81 m. Greenish-grey mudstone.

101.81–102.06 m. Thin-bedded to nodular, grey, fine-grained limestone containing flakes of mica between 101.93 and 101.95 m.
Laccochilina (Laccochilina) sp. indet.
Euprimites bursellus JAAN.

102.06–102.16 m. Greenish-grey mudstone with thin, irregular intercalations of limestone.
Euprimites cf. bursellus JAAN.
Steusloffia sp. indet. (102.11 m)

102.16–102.33 m. In the upper part nodular to finely nodular, in the lower part thin- to thick-bedded, grey, fine-grained limestone.
Illaenus schroeteri (SCHLOTH.)
Illaenus sp. indet. (102.19 m)
Remopleurides sp. (102.19 m)
Uhakiella aequigranosa JAAN.
Euprimites bursellus JAAN.
Laccochilina (Laccochilina) sp. indet.
Sigmobolbina cf. sigmoidea JAAN. (102.27 m)

102.33–102.48 m. Greenish-grey mudstone with thin, irregular intercalations of limestone.
Euprimites cf. bursellus JAAN.
Fig. 1. Ekön boring. Diagrammatic representation of the sedimentary structures of the Viruan sequence of the core down to the uppermost part of the Segerstad Limestone. For explanation of symbols, see Fig. 6.

102.48–102.55 m. Two beds of grey fine-grained limestone.

*Euprimites bursellus* JAAN.

*Sigmobolbina sigmoidea* JAAN. (102.51 m)

102.55–102.61 m. Greenish-grey mudstone with irregular intercalations of limestone in the lowermost and uppermost part.
102.61–102.76 m. Finely nodular, grey, fine-grained limestone.

*Llaenus* sp. indet. (102.66 m)
*Laccochilina (Laccochilina)* sp. indet.
*Euprimites bursellus* JAAN.
*Sigmobolbina sigmoidea* JAAN. (102.74 m)

102.76–102.82 m. Thin-bedded, grey, fine-grained limestone.
*Euprimites bursellus* JAAN.

102.82–103.10 m. In the upper part finely nodular, in the lower part nodular, grey, fine-grained limestone.

103.10–103.12 m. Greenish-grey mudstone.

103.12–103.18 m. Grey, argillaceous, fine-grained limestone with thin, irregular laminae of marl or mudstone.
*Euprimites bursellus* JAAN.

103.18–103.49 m. Dark greenish-grey mudstone, in part speckled, with some thin beds of fine-grained limestone.
*Laccochilina (Laccochilina)* sp. indet.

Beds corresponding to the Folkeslunda Formation 2.76 m

103.49–103.89 m. Thin- to thick-bedded, grey, fine-grained limestone.
*Euprimites bursellus* JAAN.
*Steusloffia cf. linnarssoni* (KRAUSE)

103.89–104.15 m. Thick-bedded, fairly coarse-grained, grey limestone with chamositic and goethitic grains.
*Euprimites effusus* JAAN.

104.15–104.25 m. Greenish-grey mudstone with irregular intercalations of limestone.

104.25–104.33 m. A bed of grey, fine-grained limestone.
*Euprimites bursellus* JAAN.

104.33–104.40 m. Nodular to finely nodular, grey, fine-grained limestone.
*Illeaenus* sp. indet.

104.40–104.44 m. A bed of grey, fine-grained limestone.

104.44–104.53 m. Finely nodular, grey, fine-grained limestone, in the lower part rich in irregular intercalations of mudstone.
*Rnelopleurides* sp. (104.46 m)

104.53–104.66 m. Greenish-grey mudstone, in the lower part with irregular inclusions of limestone.
*Laccochilina (Laccochilina)* sp. indet.
*Euprimites bursellus* JAAN.

104.66–104.77 m. Finely nodular, grey, fine-grained limestone.

104.77–104.81 m. Greenish-grey, calcareous mudstone.

104.81–104.91 m. Some beds of grey, fine-grained limestone.
*Ogmasaphus?* sp. (104.87 m)
*Rmopleurides* sp. (104.90 m)
*Laccochilina (Laccochilina)* sp. indet.
*Euprimites cf. bursellus* JAAN.
*Steusloffia* sp. indet. (104.90 m)

104.91–105.51 m. Greenish-grey mudstone with thin irregular layers and inclusions of limestone.
*Rmopleurides* sp. (105.10 m)
*Laccochilina (Laccochilina)* sp. indet.
*Euprimites cf. bursellus* JAAN.
*Nicoellela* sp. (105.15 m)
105.51–105.53 m. A bed of grey, fine-grained limestone.
105.53–105.60 m. Finely nodular grey limestone to greenish-grey mudstone with limestone inclusions.
   *Illaenus* sp. indet.
   *Laccochilina (Prochilina) ostrogothica* JAAN.
   *Euprimites effusus* JAAN.
105.60–105.62 m. A bed of grey, fine-grained limestone.
   *Euprimites effusus* JAAN.
   *Steusloffia linnarssoni* (KRAUSE)
105.66–105.92 m. Thick- to thin-bedded, grey, fine-grained limestone.
   *Laccochilina (Laccochilina) paucigranosa* JAAN. (cf. 105.86; 105.90 m)
   *Euprimites effusus* JAAN.
   *Steusloffia cf. linnarssoni* (KRAUSE)
105.92–105.97 m. Greenish-grey mudstone.
   *Euprimites effusus* JAAN.
105.97–106.01 m. A bed of grey, fine-grained limestone.
   *Laccochilina (Laccochilina) sp. indet.*
106.01–106.12 m. Finely nodular, grey, fine-grained limestone.
   *Euprimites bursellus* JAAN.
106.12–106.25 m. Thin- to thick-bedded, grey, fine-grained limestone.
   *Laccochilina (Laccochilina) paucigranosa* JAAN. (116.16 m)
   *Euprimites effusus* JAAN.
   *Euprimites cf. bursellus* JAAN.
106.25–106.29 m. A bed of fine-grained limestone, in the upper part faintly reddish-brown, in the lower part grey. The upper boundary is formed by a surface resembling a discontinuity surface (strongly polished and partly destroyed during the boring process).
   *Euprimites effusus* JAAN.
106.29–106.40 m. Grey to faintly reddish-brown, finely nodular to nodular, fine-grained limestone.
   *Remopleurides* sp. (106.30 m)
   *Euprimites effusus* JAAN.
106.40–106.47 m. A bed of grey to faintly reddish-brown, fine-grained limestone.
   *Euprimites effusus* JAAN.
106.47–106.79 m. In the uppermost 5 cm grey to faintly reddish-brown, otherwise intensely reddish-brown, finely nodular limestone to reddish-brown mudstone with limestone intercalations. The base is formed by a continuous layer of greenish-grey limestone, 1 cm thick.
   *Nileus* sp. (106.65; 106.68 m)
   *Laccochilina (Laccochilina) sp. indet.*
   *Steusloffia linnarssoni* (KRAUSE)
106.79–106.92 m. In the upper 6 cm greenish-grey, in the lower 5 cm reddish-brown mudstone with some irregular inclusions of limestone.
   *Laccochilina (Laccochilina) sp. indet.*
   *Euprimites effusus* JAAN.
   *Steusloffia linnarssoni* (KRAUSE)

**Seby Formation 1.18 m**
106.25–106.29 m. In the uppermost 5 cm grey to faintly reddish-brown, otherwise intensely reddish-brown, finely nodular limestone to reddish-brown mudstone with limestone intercalations. The base is formed by a continuous layer of greenish-grey limestone, 1 cm thick.
106.92–107.16 m. Finely nodular to nodular, fine-grained limestone of varying colour (from above: 3 cm greenish-grey, 5 cm faintly reddish-brown, 3 cm intensely reddish-brown, 7 cm faintly reddish-brown to greenish-grey, and 6 cm reddish-brown).

*Euprimites effusus* JAAN.
*Steusloffia linnarssoni* (KRAUSE)
*Steusloffia* sp. indet. (106.95 m)

107.16–107.43 m. Thin- to thick-bedded, fine-grained limestone with varying colour (from above: 11 cm variegated, reddish-brown and grey, 8 cm grey, and 8 cm intensely reddish-brown).

*Euprimites effusus* JAAN.

107.43–107.47 m. Reddish-brown mudstone with some thin inclusions of reddish-brown, fine-grained limestone.

107.47–107.60 m. Finely nodular, reddish-brown limestone with an intercalation of thin-bedded, reddish-brown, fine-grained limestone.

*Chilobilbina* cf. *lativelata* JAAN.
*Steusloffia linnarssoni* (KRAUSE)

107.60–107.66 m. A bed of fine-grained, reddish-brown limestone.

*Euprimites effusus* JAAN.

107.66–107.80 m. Finely nodular, reddish-brown limestone.

*Chilobilbina* cf. *lativelata* JAAN.
*Euprimites effusus* JAAN.

107.80–107.90 m. Thin-bedded, fine-grained, reddish-brown limestone.

*Euprimites effusus* JAAN.

107.90–108.00 m. Finely nodular to nodular, fine-grained, reddish-brown limestone.

*Euprimites effusus* JAAN.

108.00–108.09 m. A bed of reddish-brown, fine-grained limestone.

*Euprimites effusus* JAAN.

108.09–108.18 m. Finely nodular, in the upper 4 cm reddish-brown, in the lower 5 cm grey limestone.

*Euprimites effusus* JAAN.
*Tallinnella sebyensis* JAAN. (108.09 m)
*Steusloffia* cf. *linnarssoni* (KRAUSE)
*Sigmobolbina* cf. *sigoidea* JAAN. (108.09 m)

108.18–108.25 m. Reddish-brown, fine-grained, bedded limestone.

*Euprimites effusus* JAAN.

108.25–109.48 m. Finely nodular, rarely nodular to thin-bedded, reddish-brown, fine-grained limestone.

*Chilobilbina lativelata* JAAN.
*Chilobilbina* sp. indet. (109.04 m)
*Laccochilina (Laccochilina) bulbata* JAAN.
*Laccochilina (Laccochilina)* sp. indet.
*Euprimites effusus* JAAN.
*Steusloffia linnarssoni* (KRAUSE)

109.48–109.52 m. Two beds of reddish-brown, fine-grained limestone.

*Euprimites effusus* JAAN.

109.52–109.62 m. Finely nodular, reddish-brown limestone.

*Euprimites cf. effusus* JAAN.
*Steusloffia linnarssoni* (KRAUSE)
109.62–109.68 m. A bed of reddish-brown, fine-grained limestone.
*Laccochilina (Laccochilina) bulbata* JAA.

109.68–110.20 m. Finely nodular, reddish-brown limestone.
*Remopleurides* sp. (110.03 m)
*Laccochilina (Laccochilina) bulbata* JAA.
*Euprimites effusus* JAA.
*Steusloffia linnarssoni* (KRAUSE)
*Steusloffia* sp. indet. (109.85; 109.82 m)
VIRUAN SEQUENCE IN TWO BORINGS IN ÖSTERGÖTLAND

110.20–110.64 m. Thin-bedded to nodular, reddish-brown, fine-grained limestone.
- *Paraceraurus* sp. (110.40 m, juv. cran.)
- *Laccochilina (Laccochilina)* cf. *bulbata* JAAN.
- *Laccochilina (Laccochilina)* sp. indet.
- *Euprimites effusus* JAAN.
- *Euprimites* sp. (110.26 m)
- *Tallinnella* sp. (110.60 m)

110.64–110.70 m. Finely nodular, reddish-brown limestone.
- *Chilobolbina cf. lativelata* JAAN.
- *Steusloffia linnarssoni* (KRAUSE)

110.70–110.78 m. Thin-bedded, fine-grained, reddish-brown limestone.
- *Chilobolbina lativelata* JAAN.

110.78–110.83 m. Finely nodular, reddish-brown limestone.

110.83–110.93 m. Two to three beds of fine-grained, reddish-brown limestone.

110.93–111.87 m. Finely nodular, reddish-brown limestone.
- *Remopleurides* sp. (111.83 m)
- *Chilobolbina lativelata* JAAN.
- *Laccochilina (Laccochilina) bulbata* JAAN.
- *Euprimites effusus* JAAN.
- *Steusloffia linnarssoni* (KRAUSE)

111.87–111.92 m. A bed of fine-grained, reddish-brown limestone.
- *Chilobolbina lativelata* JAAN.

111.92–112.24 m. Nodular to finely nodular, reddish-brown limestone.
- *Chilobolbina lativelata* JAAN.
- *Laccochilina (Laccochilina) bulbata* JAAN.
- *Euprimites effusus* JAAN.
- *Euprimites* sp. (111.94 m)
- *Steusloffia linnarssoni* (KRAUSE)

112.24–112.30 m. Thin- to medium-bedded, reddish-brown, fine-grained limestone.

112.30–112.36 m. Finely nodular, reddish-brown limestone.
- *Laccochilina (Laccochilina) bulbata* JAAN.
- *Remopleurides* sp. (112.30 m)

112.36–112.47 m. Thin-bedded to nodular, reddish-brown, fine-grained limestone.

112.47–112.53 m. Finely nodular, reddish-brown limestone.
- *Trinodus* sp. (112.48 m)
- *Laccochilina (Laccochilina) bulbata* JAAN.
- *Steusloffia linnarssoni* (KRAUSE)

112.53–112.60 m. Thin-bedded, reddish-brown, fine-grained limestone.
- *Laccochilina (Laccochilina) bulbata* JAAN.

112.60–112.70 m. In the upper part nodular, in the lower part finely nodular, reddish-brown limestone.
- *Laccochilina (Laccochilina) bulbata* JAAN.

112.70–112.77 m. One or two beds of reddish-brown, fine-grained limestone.
- *Remopleurides* sp. (112.76 m)
- *Laccochilina (Laccochilina) bulbata* JAAN.

112.77–112.97 m. Finely nodular, reddish-brown limestone.
- *Laccochilina (Laccochilina) bulbata* JAAN.

112.97–113.03 m. One or two beds of reddish-brown, fine-grained limestone.
- *Laccochilina (Laccochilina) bulbata* JAAN.

113.03–113.13 m. Finely nodular, reddish-brown limestone.
Fig. 3. Ekön boring. To the right, particle size of the limestone according to the method of JAANUSSON, 1952. To the left, percentage of the substance soluble in dilute acetic acid (roughly the content of calcium carbonate). Only thick beds of mudstone are indicated, outside the columnar section.

Remopleurides sp. (113.05 m)
Laccochilina (Laccochilina) cf. bulbata JAAN.
113.13–113.21 m. Thin-bedded, reddish-brown, fine-grained limestone.
Laccochilina (Laccochilina) cf. bulbata JAAN.
Euprimites sp. (113.18 m)
113.21–113.72 m. Finely nodular reddish-brown limestone.
Laccochilina (Laccochilina) bulbata JAAN.
Piretia sp. (113.58 m)
Euprimites effusus JAAN.

Segerstad Formation 6.22 m

113.72–114.33 m. Thick-bedded, medium- to fine-grained, reddish-brown limestone with thin intercalations of finely nodular limestone.
Remopleurides sp. (113.58; 113.87 m)
Laccochilina (Laccochilina) bulbata JAAN.
Piretia geniculata JAAN.
Euprimites effusus JAAN.
114.33–116.64 m. Finely nodular, occasionally nodular, reddish-brown limestone with some thin intercalations of thin-bedded, fine-grained limestone.
Asaphus (Neoasaphus) platyurus ANG.
Remopleurides sp. (116.10; 116.21; 116.43 m)
Trinodus sp. (115.30 m)
Chilobolbina lativelata JAAN.
Laccochilina (Laccochilina) bulbata JAAN.
Laccochilina (Laccochilina) n. sp. (115.40; 116.00; 116.10 m)
**Fig. 4. Ekön boring.** To the right, frequency of pyrites and of non-glaucunitic internal moulds larger than 0.125 mm in the insoluble residue of 100 g limestone. To the left, occurrence (filled rectangles) of chamosite and goethite in thin sections. For explanation of symbols, see Fig. 2.

*Laccochilina* (Laccochilina) sp. indet.
*Piretella tridactyla* JAAN.
*Euprinites effusus* JAAN.

116.64–116.73 m. Intensely reddish-brown, fine-grained limestone.
*Piretia geniculata* JAAN.

116.73–117.25 m. Finely nodular reddish-brown limestone.
*Trinodus* sp. (117.12 m)
*Piretella tridactyla* JAAN.

117.25–117.33 m. Fairly thick-bedded, fine-grained, reddish-brown limestone.
*Chilobolbina* cf. *lativelata* JAAN.

117.33–117.42 m. Finely nodular, reddish-brown limestone.
*Piretia geniculata* JAAN.

117.42–117.48 m. Thin-bedded, fine-grained, reddish-brown limestone.

117.48–117.72 m. Finely nodular, reddish-brown limestone.

117.72–118.01 m. Thick-bedded, medium to fine-grained limestone, reddish-brown, mottled greenish-grey.
*Euprinites effusus* JAAN.

118.01–118.40 m. Finely nodular, reddish-brown limestone.
*Illaenus* sp. indet. (118.32 m)
*Euprinites* cf. *effusus* JAAN.

118.40–118.47 m. A bed of fairly fine-grained limestone, reddish-brown, mottled greenish-grey.
I18.47–119.08 m. Finely nodular, reddish-brown limestone.
Sigmobolina ? sp. indet. (119.06 m)

119.08–119.94 m. Thick-bedded, fairly coarse-grained, reddish-brown limestone. The lower boundary is drawn according to faunal evidence.
Laccochilina (Laccochilina) bulbata JAAN.
Piretia clypeolaria JAAN. (119.58 m)
Euprimites effusus JAAN.
Euprimites anisus JAAN.
Sigmobolina ? n. sp. (119.11 m)
“Endoceras” sp. (119.43 m)

Notes on the Microlithology of the Limestones

The microlithological examination of the limestones was restricted to beds above the Skärlöv Formation.

The limestone of the studied sequence is mostly a calcilutite with a varying but usually scanty content of small shells and shell fragments larger than 0.1 mm (Fig. 3). The microtexture agrees with that of the Furudal limestone of the Smedsby Gård and Gammalsby borings. The matrix of the examined thin section close to the base of the Seby Formation (107.17–107.20 m) is brownish-red speckled with irregularly distributed haematite, and the content of shell fragments larger than 0.1 mm is there close to what is proposed by JAANUSSON (1952) as the limit between calcilutites and calcarenites. In the upper part of the beds corresponding to the Folkeslunda Formation, between the levels of 103.89 and 104.15 m, the grain size of the limestone is still greater, and there the rock can be classified as a calcarenite. Some beds of the Furudal Limestone, between the levels of 100.23 and 100.77 m, contain up to 29% grains longer than 0.1 mm in thin section (cf. Fig. 3), and represent a lentil or a tongue of calcarenite within a calcilutitic and pelitic sequence. The microtexture of the calcarenitic portions of the core agrees with that of the Dalby Limestone of the Smedsby Gård boring and the Folkeslunda and Persnäs Limestones of the Böda Hamn boring (JAANUSSON, 1960).

On account of the abundance of differently sized flakes and grains of mudstone which could not be further disintegrated by dissolving in acetic acid, the insoluble residue of calcilutites mostly contains a large amount of particles larger than 0.125 mm. Other grains are few, except grains of pyrite in a sample between the levels of 103.06 and 103.10 m (cf. Fig. 4). Not a single grain of glauconite has been observed in any of the examined samples of the core.

Non-glaucconitic internal moulds (steinkerns) occur in small quantities in the calcarenitic portions of the Furudal Limestone and of the beds corresponding to the Folkeslunda Formation. They are fairly common in the mottled calcarenitic calcilutite close to the base of the Seby Formation (cf. Fig. 4). The occurrence of the internal moulds coincides with that of chamosite observed in thin sections (Fig. 4). Usually chamosite coatings and fillings are surrounded by, or
partly or entirely altered to goethite. The mode of occurrence of these two substances, as well as the appearance of non-glauconitic internal moulds, agree with those in the Böda Hamn boring (JANNUSSON, 1960).

**Smedsby Gård Boring**

The Smedsby Gård boring was carried out by the Geological Survey of Sweden in 1946. It is situated 3.2 km NNW. of the Ekön boring on a height E. of the state highway No. 8. The boring pierced the Lower Silurian, Upper Ordovician (Harjuan), and Middle Ordovician (Viruan) beds down to the Furudal Limestone, the base of which was not reached. A diagrammatic section of the Viruan bentonitic beds and the upper part of the Viruan sequence of this boring was given by THORSLUND (1958, Fig. 3). Otherwise the boring has not been described previously.

The diameter of the core of the part of the sequence treated here is 6 cm.

**Description of the Section**

89.70–89.74 m. Bentonitic clay.

**Dalby Limestone (infrabentonitic part) 18.70 m**

89.74–90.07 m. Thick-bedded, grey to greenish-grey, fairly coarse-grained limestone.

- *Platybolina* sp. (89.92; 89.95; 89.97 m)
- *Uhakiella* sp. (89.87 m)
- *Bimuria peregrina* JAAN. (89.88; 89.89 m)

90.07–90.12 m. Dark grey, in part finely mottled mudstone.

90.12–90.19 m. Two beds of grey to greenish-grey, fairly coarse-grained limestone.

90.19–90.27 m. Finely nodular, grey limestone.

90.27–103.64 m. Mostly thick-bedded to somewhat nodular, coarse-grained, grey to greenish-grey limestone. Some levels abound in cystoids (cf. Fig. 5). Between 92 and 97 m occasionally abundant grains of chamosite and hydrous ferric oxide which are especially conspicuous macroscopically between 95.33 and 95.64 m. Flakes of mica at the levels of 92.07 m, 95.78 m, and between 91.91 and 91.95 m.

- *Panderia parvula* (HOLM)
- *Illaenus* sp. indet. (97.62; 101.10 m)
- *Remopleurides* sp. (94.80; 101.50 m)
- *Lacochilina* (Prochilina) *decumana* (BONN.)
- *Uhakiella* cf. *coelodesma* ÖP1K (96.37; 100.84 m)
- *Euprimites locknensis* (THORSLUND)
- *Steusloffia* sp. indet. (90.96; 90.98; 97.35 m)
- *Hesslandella* n. sp. (92.57; 92.63; 92.93 m)
- *Sigmobolina* cf. *pentagona* JAAN. (96.12 m)
- *Conchoprimitia* sp. (100.90 m)
- *Tetraodontella biseptata* JAAN.
- *Eoplectodonta* ? sp. (99.62–99.65 m)
- *Onniella* sp. (mostly indet.) (92.68; 93.14; 93.34; 100.40; 100.42; 100.84 m)
- *Nicoletella* sp. (99.60 m)
- *Echinospaerites* sp.
- *Heliocrinites granatum* (WAHLENBERG) (94.82 m)
Fig. 5. Smedsby Gård boring. Diagrammatic representation of the sedimentary structures of the Dalby Limestone (except of its lowermost part). Continued in Fig. 6. For explanation of symbols, see Fig. 6.

103.64–104.08 m. Mostly thin-bedded, fairly fine-grained, grey limestone.

*Euprimites locknensis* (THORSLUND)

*Euprimites* sp. (103.84 m)

*Onniella* sp. indet. (104.05 m)
Fig. 6. Smedsby Gård boring. Diagrammatic representation of the sedimentary structures of the lower part of the Viruan sequence of the core. Continued from Fig. 5. Signs: 1, mudstone (with an inclusion of limestone); 2, speckled mudstone; 3, bedding plane covered with argillaceous matter; 4, stylolitic bedding plane; 5, finely nodular limestone; 6, cystoids; 7, cephalopods.

104.08–104.57 m. Mostly thick-bedded, coarse-grained, grey limestone. *Euprimites lockenensis* (Thorslund)

104.57–105.75 m. Fine-grained, thin-bedded, in part nodular to finely nodular, grey limestone.
Remopleurides sp. (104.80 m)
Laccochilina (Laccochilina) cf. sp. C JAAN. (105.62 m)
Euprimites locknensis (THORSLUND)
Steusloffia multimarginata ÖPIK
105.75–108.44 m. Coarse-grained, thick- to thin-bedded, in part nodular, grey limestone, finely nodular between 105.91–106.08, 107.48–107.53 and 107.65–107.74 m.
Remopleurides sp. (106.75; 106.85 m)
Sphaerocoryphe sp. (107.74 m)
Laccochilina (Laccochilina) cf. sp. C JAAN. (106.39; 106.51 m)
Laccochilina (Laccochilina) sp. indet. (107.48; 107.54 m)
Uhakiella cf. coelodesma ÖPIK (106.10; 106.25 m)
Euprimites locknensis (THORSLUND)
Euprimites sp. indet. (108.24 m)
Tallinnella cf. dimorpha ÖPIK (106.20 m)
Steusloffia multimarginata ÖPIK
Steusloffia sp. indet. (107.48 m)
Sigmobolbina sp. (106.33 m)
Conchoprimitia sp. (106.45 m)
Onniella sp. indet. (107.68 m)

Furudal Limestone 11.90 m +
108.44–108.96 m. Finely nodular to nodular, grey, fine-grained limestone.
Laccochilina (Laccochilina) sp. indet. (108.67; 108.85; 108.96 m)
Euprimites sp. (cf. bursellus JAAN.) (108.80 m)
Steusloffia linnarssoni (KRAUSE)
Steusloffia sp. indet. (108.60; 108.85 m)
Sigmooopsis sp. indet. (108.49 m)
108.96–109.01 m. A bed of grey, fine-grained limestone.
Euprimites cf. eutropis (ÖPIK)
109.01–109.09 m. Greenish-grey mudstone, in the lowermost part finely mottled, in the uppermost part with thin inclusions of limestone.
Chilobolhina sp. indet.
Laccochilina (Laccochilina) sp. indet.
109.09–109.30 m. Fairly thick-bedded, grey, fine-grained limestone, in the lowermost part thin-bedded to nodular and with intercalations of greenish-grey mudstone.
109.37–109.56 m. In the upper part nodular, in the lower part finely nodular, grey, fine-grained limestone.
Laccochilina (Prochilina) ostrogothica JAAN.
Laccochilina (Prochilina) cf. ostrogothica JAAN.
109.71–109.95 m. Nodular, grey, fine-grained limestone with thick intercalations of greenish-grey mudstone in the lower and uppermost part.
Trinodus sp. indet. (109.73 m)
Laccochilina (Laccochilina) sp. indet. (109.78; 109.84 m)
Laccochilina (Laccochilina) cf. paucigranosa JAAN. (109.90 m)
109.95–110.10 m. Fairly thick-bedded, grey, fine-grained limestone.
Laccochilina (Laccochilina) sp. (109.99 m)
110.10–110.14 m. Greenish-grey mudstone with some thin inclusions of limestone.
110.14–111.35 m. Finely nodular to nodular, grey, fine-grained limestone with intercalations of some thin beds of regularly bedded limestone.
Chilobolina n. sp. (111.20 m)
Laccochilina (Laccochilina) sp. indet. (110.15; 111.05; 111.07; 111.09 m)
Uhakiella sp. indet. (110.14 m)
Steusloffia linnarssoni (KRAUSE)
Christiana sp. (110.65 m)

111.35–111.46 m. Fairly thick-bedded, grey, fine-grained limestone.
Laccochilina (Laccochilina) sp. indet. (111.40 m)

111.46–111.94 m. Finely nodular to nodular grey limestone and greenish-grey mudstone with thin inclusions of limestone.
Laccochilina (Laccochilina) sp. indet. (111.70; 111.89; 111.91 m)
Laccochilina (Prochilina) ostrogothica JAAN.

111.04–112.14 m. Fairly thick-bedded, grey, fine-grained limestone.
Laccochilina (Laccochilina) sp. indet. (111.99; 112.05 m)

112.14–112.40 m. Finely nodular, grey limestone.
Laccochilina (Laccochilina) sp. indet. (112.26; 112.27 m)
Steusloffia linnarssoni (KRAUSE)
Steusloffia sp. indet. (112.20; 112.27 m)

112.40–112.70 m. Thick-bedded, grey limestone, irregularly bedded to nodular in the middle.
Illaeus cf. Schroeteri (Schloth.)
Laccochilina (Laccochilina) cf. paucigranosa JAAN. (112.63 m)
Laccochilina (Laccochilina) sp. indet. (112.45; 112.48; 112.66 m)

112.70–112.90 m. Finely nodular, grey limestone with intercalations of greenish-grey mudstone.
Illaeus Schroeteri (Schloth.)

112.90–113.00 m. A bed of grey, fine-grained limestone.

113.00–113.14 m. Finely nodular limestone with intercalations of greenish-grey mudstone.

113.14–113.48 m. Thin-bedded, fine-grained, grey limestone, in part nodular to finely nodular with some thin intercalations of greenish-grey mudstone.
Remopleurides sp. (113.40 m)
Laccochilina (Laccochilina) sp. indet. (113.29; 113.45; 113.48 m)

113.48–113.62 m. In the lower part grey, finely nodular limestone, in the upper part greenish-grey mudstone with thin intercalations of limestone.
Remopleurides sp. (113.60 m)

113.62–114.08 m. Thin- to thick-bedded grey limestone with some intercalations of greenish-grey mudstone.

Steusloffia linnarssoni (KRAUSE)

114.08–114.13 m. Greenish-grey mudstone with inclusions of fine-grained limestone.

114.13–115.83 m. Finely nodular to nodular, grey, fine-grained limestone with intercalations of some beds of regularly bedded, fine-grained limestone.
Nileus sp.

Illaeus sp. indet. (114.70 m)
Remopleurides sp. (114.55; 114.85 m)
Laccochilina (Laccochilina) paucigranosa JAAN. (114.15; 114.66 m)
Laccochilina (Laccochilina) sp. indet. (114.25; 114.30; 114.32; 114.86 m)
Steusloffia linnarssoni (KRAUSE)
Sigmobolbina sp. (114.96; 114.45 m, indet.)

115.83–115.93 m. Greenish-grey mudstone with small, irregular inclusions of limestone.
Fig. 7. Smådby Gård boring. Range of selected species in the lower and middle parts of the Viruan sequence of the core. For explanation of symbols, see Fig. 2.
Trinodus sp. indet.
Laccochilina (Laccochilina) sp. indet. (115.90 m)
Steusloffia sp. indet. (115.90 m)

115.93–116.20 m. Nodular, fine-grained limestone with intercalations of greenish-grey mudstone in the middle.
Nileus sp.
Steusloffia linnarssoni (KRAUSE)

116.20–116.31 m. Greenish-grey mudstone with inclusions and thin beds of limestone.
Laccochilina (Laccochilina) sp. indet. (116.21 m)

116.31–116.57 m. Thick-bedded, grey, fine-grained limestone.
Laccochilina (Laccochilina) sp. indet. (116.44 m)
Steusloffia sp. indet. (116.65 m)
Sigmobolbina sigmoidea JAAN. (116.42 m)

116.57–116.73 m. In the lower part finely nodular limestone with intercalations of greenish-grey mudstone in the upper part greenish-grey mudstone with some thin inclusions of limestone.
Laccochilina (Laccochilina) sp. indet. (116.62 m)

116.73–116.79 m. Two beds of grey, fine-grained limestone with intercalations of greenish-grey, fine-grained limestone.

116.79–116.98 m. Finely nodular to nodular limestone with intercalations of greenish-grey mudstone.

116.98–117.43 m. Grey, fine-grained limestone; a bed of greenish-grey mudstone with thin inclusions of limestone between 117.15–117.19 m.
Remopleurides sp. (117.40 m)
Laccochilina (Laccochilina) paucigranosa JAAN. (117.16; 117.20; 117.33 m)
Laccochilina (Laccochilina) sp. indet. (117.12–117.17 m)
Steusloffia linnarssoni (KRAUSE)

117.43–118.01 m. Greenish-grey, in part calcareous mudstone with thin lenses and irregular beds of fine-grained, grey limestone.
Nileus sp.
Laccochilina (Laccochilina) sp. indet. (117.43; 117.46; 117.48; 117.97; 117.99 m)
Steusloffia linnarssoni (KRAUSE)
Sigmobolbina cf. sigmoidea JAAN. (117.90 m)

118.01–118.10 m. A bed of fairly dense, grey limestone.
Steusloffia linnarssoni (KRAUSE)

118.10–118.20 m. Greenish-grey, in part calcareous mudstone with small inclusions of limestone in the lowermost part.
Steusloffia linnarssoni (KRAUSE)

118.20–118.47 m. Thin-bedded, grey, fine-grained limestone.
Remopleurides sp. (118.35 m)
Sphaerocoryphe sp. (118.20 m)
Laccochilina (Laccochilina) sp. indet. (118.26; 118.35 m)
Piretella sp. indet. (118.35 m)

118.47–118.54 m. Greenish-grey mudstone with irregular intercalations of beds and lenses of grey, fine-grained limestone.
Pseudobasilicus ? brachyrachis (TÖRNQ.)
Nileus sp.
Laccochilina (Laccochilina) cf. paucigranosa JAAN. (118.50 m)

118.54–118.65 m. Thin-bedded, grey, fine-grained limestone.
Nileus sp.
Steuslofia linnarssoni (Krause)  
Orthoceros ? sp. indet. (18.64 m)  

Orthoceras ? sp. indet. (18.64 m). Greenish-grey mudstone with irregular intercalations of limestone.  

Steuslofia linnarssoni (Krause)  
118.83-118.88 m. Finely nodular, grey, fine-grained limestone.  

118.05-118.02 m. To the right, particle size of the limestone according to the method of Jannusson, 1952. To the left percentage of the substance soluble in dilute acetic acid (roughly the content of calcium carbonate). Continued in Fig. 9. For explanation of symbols, see Fig. 2.

Fig. 8. Smedsby Gård boring. To the right, particle size of the limestone according to the method of Jannusson, 1952. To the left percentage of the substance soluble in dilute acetic acid (roughly the content of calcium carbonate). Continued in Fig. 9. For explanation of symbols, see Fig. 2.
Chilobolina lativelata JAAN.
Euprimites cf. eutropis (ÖPIK)
119.70–119.83 m. Finely nodular, grey, fine-grained limestone.
Remopleurides sp. (119.80 m)
119.83–120.22 m. Thin-beded, grey, fine-grained limestone. A distinct surface pig­mented by haematite at 120.14 m.
Laccochilina (Prochilina) ostrogothica JAAN.
Sigmobolina sigmoida JAAN. (120.10 m)
120.22–120.28 m. Finely nodular, grey, fine-grained limestone.
120.28–120.34 m. Thick-beded, grey, fine-grained limestone with irregular reddish-brown spots.
Illaenus Schroeteri (Schloth.)
Fig. 10. Smedsby Gård boring. To the right, frequency of pyrites and of non-glauconitic internal moulds larger than 0.125 mm in the insoluble residue of 100 g limestone. To the left, occurrence (filled rectangles) of chamosite and goethite in thin sections. Continued on Fig. 11. For explanation of symbols, see Fig. 2.
Notes on the Microlithology of the Limestones

**Furudal Formation.**—The grain size and the texture of the limestones agree closely with those of the Furudal Formation of the Gammalsby bore, southern Öland. The matrix is mostly cryptocrystalline, the shell fragments have as a rule distinct outlines. Entire small shells or valves are not uncommon. No undoubted pelletal structures have been observed. The rock is a calcilutite,
mostly with a small content of grains longer than 0.1 mm in thin section (Fig. 9). The grain size of the intercalating mudstones has not been determined.

The amount of grains larger than 0.125 mm is generally low in the insoluble residue except in samples containing laminae or layers of mudstone. Not a single grain of glauconite has been observed either in this formation or in the Dalby Limestone. Pyrite is common at some levels (Fig. 11), non-glaucocitic internal moulds are absent.

Some few chamositic coatings around, or fillings within, small shell fragments have been observed in a thin section between the levels of 113.87–113.90 m. They are as usual associated with, and partly altered to goethite. Some goethite was observed also between the levels of 120.14–120.17 m. Its mode of occurrence is the same as above, but no unaltered chamosite could be ascertained. Between the latter levels the matrix is variegated, grey and brownish-red.

**DALBY FORMATION.**—The main part of the formation consists of coarse calcarenites, similar in appearance and texture to those of the Dalby and Persnäs Limestones of the Böda Hamn core (Jaanusson, 1960). The sequence includes, however, also calcilutites, particularly between 104.57–105.75 and 103.64–104.08 m (Fig. 8). The microtexture of these agrees with that of the Furudal Formation.

The amount of grains larger than 0.125 mm varies in the insoluble residue, depending on the frequency of particles of mudstone and shale and also of the non-glaucocitic internal moulds. The latter occur in almost every studied sample of the calcarenitic part of the Dalby Limestone, sometimes in abundance (Figs. 10 and 11). In the calcilutitic portions of the formation they are rare or absent. The appearance of the non-glaucocitic internal moulds agrees with that of the calcarenites of Öland (Jaanusson, 1960). The identification of the substance which forms the internal moulds requires a special study.

Chamosite and its alteration product goethite is common in thin sections between the levels of 97 and 92 m (cf. Fig. 10) filling interiors and cavities of small shells or shell fragments or forming a thin coating around them. Some grains with chamosite or goethite coating resemble superficial ooids, but real ooids have not been observed. Some few inclusions of chamosite were observed also in a thin section from a sample between the levels of 107.27–107.28 m.

**Stratigraphical Remarks**

The general lithological development of the described sequence resembles that of southern Öland and of the northern and western parts of the Siljan district. An exception is the mostly calcilutitic and pelitic composition of the beds corresponding to the Folkeslunda Formation (cf. Fig. 3) which in the shelly facies of Sweden, except that of Västergötland and Östergötland, con-
sists mainly of calcarenites of the general Orthoceratite Limestone type. A thin
tongue of such calcarenite occurs in the Ekön boring in the upper part of the
comparable sequence, but, in spite of this, the lithology of the beds correspond-
ing to the Folkeslunda Formation differs only slightly from that of the overlying
Furudal Limestone, and it is difficult to define these divisions in a strictly
litho-stratigraphical sense. In this paper the upper boundary of the beds
corresponding to the Folkeslunda Formation is tentatively drawn according
to faunal evidence, and the lower boundary according to lithological criteria,
i.e. the division is defined in the topo-stratigraphical (Jaanusson, 1960) sense.
To the other topo-stratigraphic and strictly litho-stratigraphic divisions of the
described cores the names used in the description of the Viruan sequence of
Öland can easily be applied. In Östergötland also these divisions, with the ex-
ception of the Dalby Limestone, are rich in intercalations of mudstones and
finely nodular limestones, the latter composing a large part of the sequence of
the Segerstad and Skärlöv Limestones. The preservation of fossils, not at
least the ostracodes, in these rocks is mostly poor. The number of identifiable
macrofossils found in the cores is small, and without the help of ostracodes
(or, perhaps, also of some other group of microfossils) a reasonably safe and
detailed topo-stratigraphic subdivision of the sequence is scarcely possible.

With the possible exception of the upper boundary of the Seby Limestone,
the described sequence is essentially continuous without any lithological or
faunal indications of a break in the succession.

SEGERSTAD LIMESTONE.—The base of the Aserian beds is, as usual, well
defined in the ostracode faunas, but lithologically unrecognizable. The top and
the base of the division are formed by thick-bedded limestones with the thick-
nesses of 0.61 and 0.86 m, respectively. The main part of the division consists
of finely nodular, reddish-brown limestones with thin intercalations of regularly
bedded limestones. The finely nodular rock comprises about 67% of the total
thickness of the formation, i.e. more than in any other Cambro-Silurian district
of Sweden. The total thickness of the Segerstad Limestone, 6.22 m., is also the
largest known thickness of the division. It is not known whether or not the
upper boundary of the Segerstad Limestone coincides here with that of the
Aseri Stage. The occurrence of *Piretia* in the lowermost Skärlöv Formation
and the appearance of *Steusloffia linnaessoni* not before 1.1 m above the base of
this formation (cf. Fig. 2) indicates the possibility of the level of the top of the
stage being situated within the lowermost metre of the Skärlöv Formation.
In this case the thickness of the beds belonging to the Aseri Stage would be still
greater in Östergötland than in the shelly facies of the other Cambro-Silurian
districts of Sweden.

SKÄRLÖV FORMATION.—The formation consists preponderantly of reddish-
brown, finely nodular limestones (cf. Fig. 1) which form about 75% of the total
thickness of the formation. Intercalations of reddish brown more or less regularly bedded limestone are thin and inconspicuous. The thickness of the formation, 6.29 m, exceeds that in the other Cambro-Silurian districts of Sweden. The lower boundary is drawn on the top of the uppermost thick-bedded division of the Segerstad Limestone, and the upper boundary at the level, where the rock becomes intensely reddish-brown.

Seby Formation.—The formation consists of mostly variegated, irregularly reddish-brown-spotted rocks. Finely nodular limestones comprise about 41%, more or less regularly bedded limestones about 34%, and mudstones about 25% of the total thickness. The limestones are throughout calcilutitic, though fairly coarse-grained close to the base of the formation (cf. Fig. 3). The rock is poorly fossiliferous, and no macrofossil distinctive of the formation on Öland or in the Siljan district has been found. The thickness, 1.18 m, agrees with that of southern Öland.

Beds Corresponding to the Folkeslunda Formation.—The grey to greenish-grey rocks which rest upon the Seby Formation correspond with regard to their stratigraphic position to the Folkeslunda Limestone of Öland and the Siljan district. The part of the sequence in question consists of more or less regularly bedded limestones (about 47% of the total thickness), mudstones with limestone inclusions (about 36%), and finely nodular limestones (about 17%). The limestones are calcilutitic, except for a thin tongue of calcarenite close to the top of the division (Fig. 3). The approximate correspondence of this division with the Folkeslunda Limestone is shown by the range of *Euprimites effusus* (Fig. 2), which species has never been found in beds above that formation. As tentatively defined here, the thickness of the beds corresponding to the Folkeslunda Formation, 2.76 m, agrees with that of the formation on Öland.

Furudal Formation.—The lithology prevailing in the beds corresponding to the Folkeslunda Formation continues without change in the Furudal Limestone. The lowermost part of that division was pierced in the Ekön boring, and consists of about 60% more or less regularly bedded limestones, about 28% mudstones, and about 12% finely nodular limestones. The Smedsby Gård boring penetrated the main part of the formation, but did not reach the base. There the available section of the division consists of about 49% more or less regularly bedded calcilutites, 35% finely nodular limestones, and about 16% mudstones. The limestones are calcilutitic (cf. Figs. 3 and 9) except for a 0.64 m thick tongue or lentil of calcarenite in the lower part of the division in the Ekön boring. The colour of the rock is grey to greenish-grey, though faintly reddish-brown portions occur at some levels (between 99.65 and 99.98 m in the Ekön core and between 120.28 and 120.34 m in the Smedsby Gård core). The presence of haematitic impregnation in some beds of limestone is a point
of resemblance to the corresponding sequence of Västergötland, where the reddish-brown portions are not rare within the Furudal Limestone. The thickness of the division exceeds 12 m, but the total thickness is still unknown.

Dalby Limestone.—The base of the Dalby calcarenite is well defined lithologically (cf. Fig. 9) as well as faunistically (cf. Fig. 7). The sequence is fairly uniform, consisting of regularly bedded to somewhat nodular calcarenites, which mostly contain non-glaucophytic internal moulds in the insoluble residue (cf. Figs. 10 and 11). The lower part of the division includes beds of calcilutite which mostly lack internal moulds in the insoluble residue, and the internal moulds are rare or absent also in the topmost beds of the division. Some of the calcarenitic beds abound in cystoids (Fig. 5) occasionally forming thin beds of coquinooid limestone. Only few identifiable macrofossils have been found, and also ostracodes are less numerous than, for instance, in the Böda Hamn core. The characteristic species is \textit{Euprimites locknensis} (Thorsl.). The thickness of the infrabentonitic part of the Dalby Limestone, 18.70 m, is of the same order of magnitude as in the Siljan district (Jaanusson & Martna, 1948). The complex of bentonitic beds will be treated, for practical reasons, in connection with the Upper Viruan sequence of the core.
Table 1. List of the species found in the cores. $L$ and $U$ denote that the species has been found only in the lower and upper part of the division, respectively.

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<th>Aseri Stage</th>
<th>Lasnamägi Stage</th>
<th>Uhaku Stage</th>
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<tbody>
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<td>Segerstad Limestone</td>
<td>Skadov Limestone</td>
<td>Seby Limestone</td>
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<td>Asaphus (<em>Neosaphus</em>) platyurus ANg.</td>
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<tr>
<td>Plectasaphus plicicostis (TÖRNQ.)</td>
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<td>Pseudobasilicus ? brachyrachis (TÖRNQ.)</td>
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<tr>
<td>Nileus sp.</td>
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<tr>
<td>Remopleurides sp. sp.</td>
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<td>Illaenus schoeferi (SCHLOTH.)</td>
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<tr>
<td>Panderia parvula (HOLM)</td>
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<td>Sphaerocoryphe sp.</td>
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<tr>
<td>Trinodus sp. sp.</td>
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<td><strong>Ostracoda Palaeocopa</strong></td>
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<tr>
<td>Chilobolbina lativelata JAAN.</td>
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<tr>
<td>Chilobolbina n. sp.</td>
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<tr>
<td>Laccochilina (L.) paucigranosa JAAN.</td>
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<tr>
<td>Laccochilina (L.) cf. sp. C JAAN.</td>
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<tr>
<td>Laccochilina (L.) bulbata JAAN.</td>
<td></td>
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<td>L</td>
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<tr>
<td>Laccochilina (L.) n. sp.</td>
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<tr>
<td>Laccochilina (Prochilina) ostrogothica JAAN.</td>
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<tr>
<td>Laccochilina (Prochilina) decumana (BONN.)</td>
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<tr>
<td>Plantybolbina sp.</td>
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<tr>
<td>Piretella tridactyla JAAN.</td>
<td></td>
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</tr>
<tr>
<td>Piretella sp.</td>
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<tr>
<td>Piretia geniculata JAAN.</td>
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<tr>
<td>Piretia sp.</td>
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<tr>
<td>Piretia clypeolaria JAAN.</td>
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<tr>
<td>Uhabiella aequigranosa JAAN.</td>
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<td>Uhabiella cf. coelodesma ÖPIK</td>
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<td>Euprimites effusus JAAN.</td>
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<td>Euprimites anisus JAAN.</td>
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<td>Euprimites bursellus JAAN.</td>
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<td>Euprimites cf. eutropis (ÖPIK)</td>
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<tr>
<td>Euprimites locknensis (THORSL.)</td>
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<tr>
<td>Tallimella cf. dimorpha ÖPIK</td>
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<tr>
<td>Tallimella sebyensis JAAN.</td>
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<tr>
<td>Tallimella sp. sp.</td>
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<td>+</td>
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<tr>
<td>Steusloffia linnarssoni (KRAUSE)</td>
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<tr>
<td>Steusloffia multimarginata ÖPIK</td>
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<tr>
<td>Heslandella n. sp.</td>
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<tr>
<td>Sigmobolbina sigmoidea JAAN.</td>
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<td>cf.</td>
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Table 1 (continued)

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<th>Aseri Stage</th>
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<th>Brachioidea</th>
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<td>Sekir Limestone</td>
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<td><strong>Cystoidea</strong></td>
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<td><strong>Echinosphaerites sp.</strong></td>
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<td><strong>Heliocrinites granatum (WAHL.)</strong></td>
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<td>+</td>
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<td><strong>Brachiooda Articulata</strong></td>
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<td><strong>Nicolella sp. sp.</strong></td>
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<td><strong>Onniella sp.</strong></td>
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<td><strong>Christiania sp.</strong></td>
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<td><strong>Bimuria peregrina JAAN.</strong></td>
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<td><strong>Tetraodontella biseptata JAAN.</strong></td>
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Table 2. Particle size of the limestone (JAANUSSON, 1952) in the uppermost part of the Ekön core.

<table>
<thead>
<tr>
<th>Horizon, m</th>
<th>Particle size of the limestone, %</th>
<th>Horizon, m</th>
<th>Particle size of the limestone, %</th>
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<td>99.65–99.68</td>
<td>15</td>
<td>104.00–104.03</td>
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<tr>
<td>100.42–100.45</td>
<td>20</td>
<td>104.40–104.43</td>
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<td>100.66–100.69</td>
<td>19</td>
<td>104.62–104.65</td>
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<td>101.41–101.44</td>
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<td>105.75–105.78</td>
<td>8</td>
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<td>101.95–101.98</td>
<td>4</td>
<td>106.41–106.44</td>
<td>10</td>
</tr>
<tr>
<td>103.07–103.10</td>
<td>9</td>
<td>107.17–107.20</td>
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</table>
Table 3. Particle size of the limestone in the lower part of the Smedsby Gård core.

<table>
<thead>
<tr>
<th>Horizon, m</th>
<th>Particle size of the limestone, %</th>
<th>Horizon, m</th>
<th>Particle size of the limestone, %</th>
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</thead>
<tbody>
<tr>
<td>90.30–90.33</td>
<td>28</td>
<td>105.65–105.68</td>
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<td>90.99–91.02</td>
<td>32</td>
<td>105.82–105.85</td>
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<tr>
<td>91.87–91.90</td>
<td>15</td>
<td>106.52–106.55</td>
<td>41</td>
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<tr>
<td>92.34–92.37</td>
<td>34</td>
<td>107.25–107.28</td>
<td>Recrystallized</td>
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<tr>
<td>93.04–93.07</td>
<td>27</td>
<td>107.97–108.00</td>
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<td>93.65–93.68</td>
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<td>108.47–108.50</td>
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<td>94.25–94.28</td>
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<td>109.11–109.14</td>
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<td>95.03–95.06</td>
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<td>109.07–110.00</td>
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<td>110.03–110.06</td>
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<td>96.23–96.36</td>
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<td>112.07–112.10</td>
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<td>96.72–96.75</td>
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<tr>
<td>96.87–97.90</td>
<td>Recrystallized</td>
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<td>99.82–99.87</td>
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<td>100.45–100.48</td>
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<td>102.62–102.65</td>
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<td>118.39–118.42</td>
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<td>103.55–103.58</td>
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<td>119.05–119.08</td>
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<td>104.36–104.39</td>
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<td>105.26–105.29</td>
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References