Notes on Sterrha ochrata, a moth new to the Danish fauna (Lep., Geometridae).

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During an examination of the Danish material of the Geometrid moth *Sterrha* (*Acidalia* auct. p.p.) *serpentata* (Hufnagel, 1767) (*perochraria* auct., *similata* auct.) in the collection of the Zoological Museum, Copenhagen, a series of misidentified specimens of the superficially similar *S. ochrata* (Scopoli, 1763) was found. This species has not previously been recorded from Denmark, however, owing to its occurrence in Northern Germany the finding is not unexpected (vide Juul 1944, Hoffmeyer 1952). The series which comprises 16 specimens was collected at Ulfshale, Møn, in July 1949 (19. VII: 1 ♀; 21. VII: 11 ♂♂, 4 ♀♀) by the late Dr. T. Feddersen.

Characteristics. The external similarity between *S. ochrata* and *S. serpentata* has caused many erroneous statements on the North European distribution of the two species (Allan 1955, Ander 1937, Urbahn 1939). However, they are morphologically quite widely separated. Owing to the structure of the ♂-hind-tibia, *S. ochrata* belongs to the section *Sterrha* s. str., while *S. serpentata* belongs to the section *Ptychopoda*. Furthermore, the genitalia in both sexes show very important differences. As mentions of the diagnostic characters are rather scattered in the literature, it might be useful to present here, a survey of the most important of these. It should be noted that in both species, the distinctness of the wing-pattern is rather variable.

S. ochrata.

Setae-bearing processes of ♂-antennae in lateral aspect not markedly protruding from scale-covering (fig. 8).

S. serpentata.

Setae-bearing processes of ♂-antennae in lateral aspect markedly protruding from scale-covering (fig. 9).

In subsp. *ochrata* length of forewing generally greater (10 ♂♂: 9,6-10,9 mm, mean 10,3 mm; 5 ♀♀: 9,8-10,5 mm, mean 10,1 mm). Concerning subsp. *cantiata* Prout see below.	Length of forewing generally smaller (38 ♂♂: 8,6-10,0 mm, mean 9,3 mm; 2 ♀♀: 8,8-9,0 mm).
Ground-colour of wings generally less bright ochreous (markedly so in subsp. *cantiata*).	Ground-colour of wings generally brighter ochreous.
Fringes usually with dark spots at vein-ends.	Fringes usually without dark spots at vein-ends.
Discal spot on hindwing, when present, proximal of (or in) the inner cross-line.	Discal spot on hindwing, when present, distal of (or in) the inner cross-line.
Hind tibia of ♂ with paired apical spurs.	Hind tibia of ♂ without apical spurs. (The author has seen a single specimen with small, unpaired spurs; cf. also Gaede (1929) and Hering (1932)).
In ♀-genitalia ductus bursae long. Bursa copulatrix rounded, membraneous, inner surface with many small sclerotized spines (fig. 12).	In ♀-genitalia no differentiated ductus bursae present. Bursa copulatrix pyriform, proximal half very heavily sclerotized (fig. 13).
In ♂-genitalia uncus slender, pointed. Valvae of unequal length, apically produced in a ventrally bent tip; ventral margin simple. Phallus slender, with a single long, nearly straight cornutus (fig. 10).	In ♂-genitalia uncus broad, blunt. Valvae of equal length, apically rounded; ventral margin with a process, apically covered with short, stout setae. Phallus bulbed, with two long, curved cornuti (fig. 11).

Note. The marked asymmetry in the male genitalia has apparently escaped the notice of Pierce (1914). That this character is present also in subsp. *cantiata* was ascertained from an examination of Pierce's original slide and a series of British specimens placed at the author's disposal through the kindness of Messrs. A. L. Goodson and D. S. Fletcher, British Museum (Natural History). The valvae are stated by Pierce to be proximally fused and this condition is indicated in his drawing (pl. XVII) and in that of Bleszynski (1960, fig. 352). The distal parts of the valvae are in these figures shown laterally bent in a way which is absolutely unnatural. As a matter of fact the bases of the valvae are not fused but they are kept tight together by being inserted in a ventro-caudal cuticular pouch which probably does

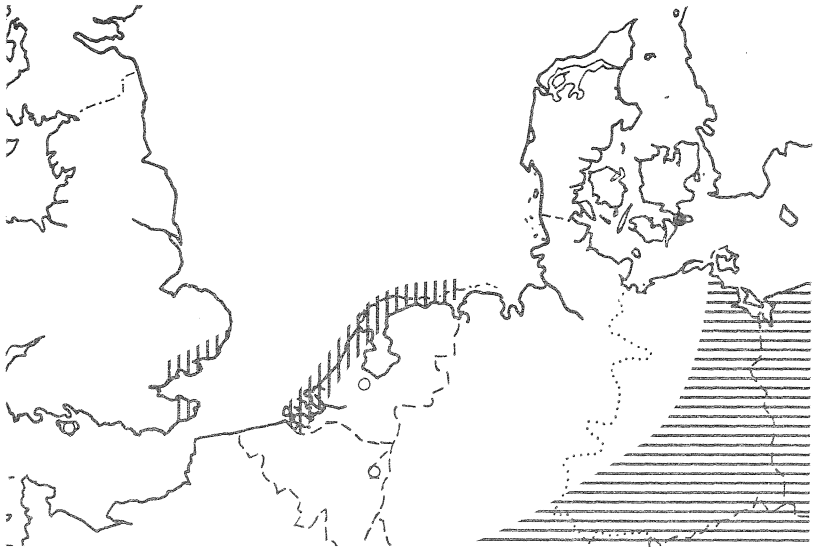


Fig. 1. Distribution of *Sterrha ochrata* in North-Western Europe. Horizontal hatching and solid circle: *S. o. ochrata;* vertical hatching and open circles: *S. ochrata cantiata.* Somewhat simplified (cf. text).

not permit great lateral valval movements in the living animal.

Early stages (Stokoe 1948). The egg of *S. ochrata* is oval with blunt ends, strongly ribbed and reticulated. The larva is stated to be pale ochreous-brown or greyish-ochreous with three dorsal broken greyish lines, tapering towards the head and closely wrinkled. The pupa is shining, light chestnut-brown, cremaster

Fig. 2. *Sterrha o. ochrata* ♂. Dania. Ulfshale 21. VII. 1949. Coll. Zool. Mus. Copenhagen. (x 2,5).

Fig. 3. *Sterrha o. ochrata* ♀. Dania. Ulfshale 19. VII. 1949. Coll. Zool. Mus. Copenhagen. (x 2,5).

Fig. 4. *Sterrha ochrata cantiata* ♂. Anglia. Sandwich 3. VII. 33. Coll. British Museum (Natural History). Tring. (x 2,5).

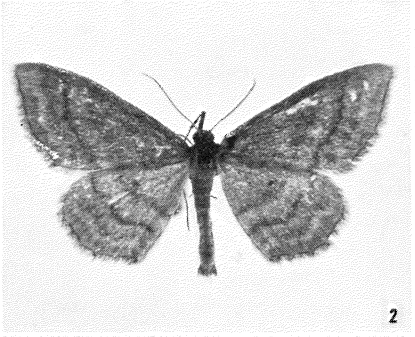
Fig. 5. *Sterrha ochrata cantiata* ♀. Anglia. Sandwich 3. VII. 33. Coll. British Museum (Natural History). Tring. (x 2,5).

Fig. 6. *Sterrha s. serpentata* ♂. Dania. Asserbo 28. VI. 1961. Coll. Zool. Mus. Copenhagen. (x 2,5).

Fig. 7. *Sterrha s. serpentata* ♀. Dania. Emmedsbo 12. VII. 1935. Coll. Zool. Mus. Copenhagen. (x 2,5).

Fig. 8. Antenna of 2. (x 20).

Fig. 9. Antenna of 6. (x 20).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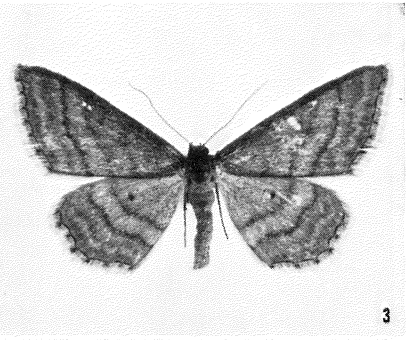
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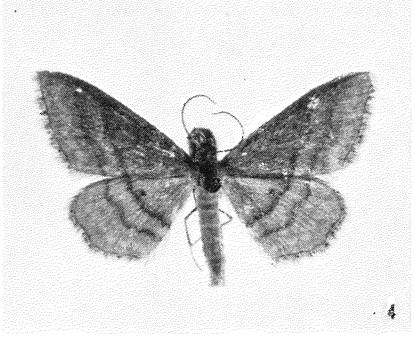
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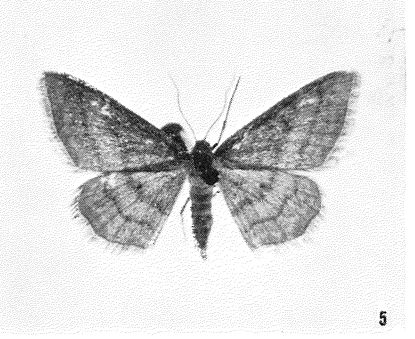
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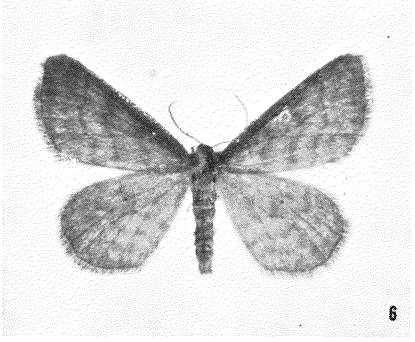
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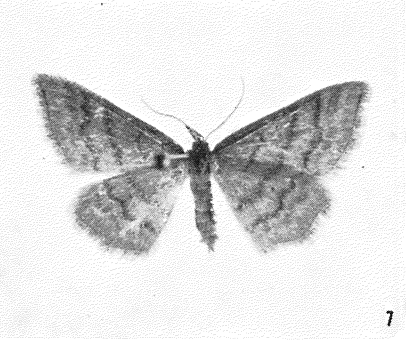
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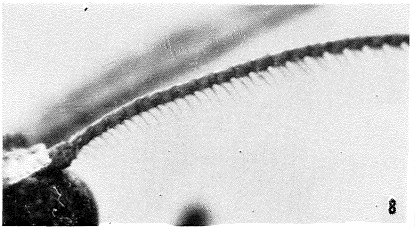
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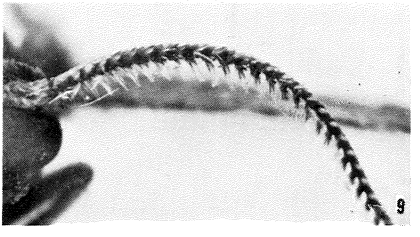
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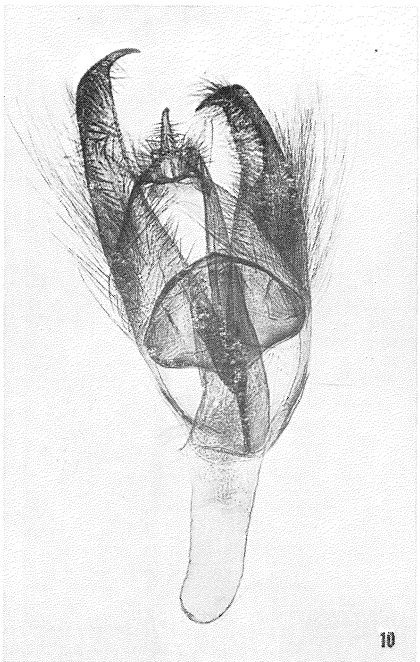

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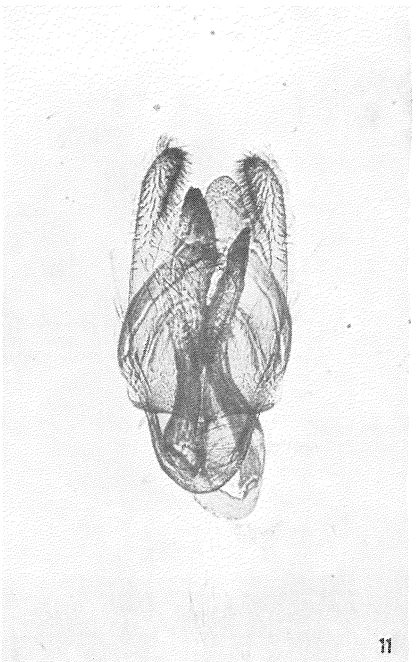

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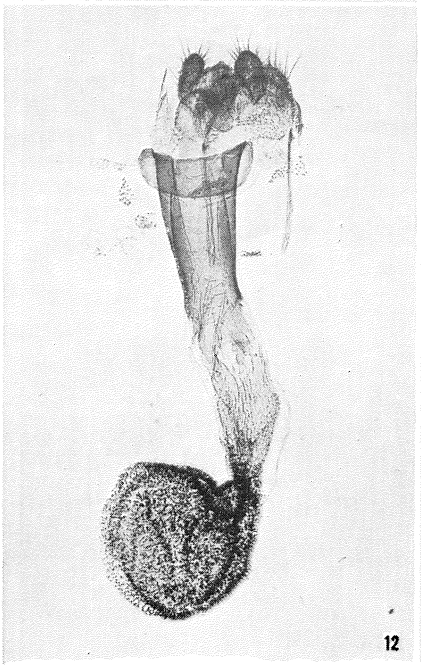

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rounded with two longer and two shorter fine curly-tipped bristles. It is placed in an openwork cocoon on the foodplant.

E c o l o g y. *S. ochrata* is known to be a pronounced xero- and thermophile species. Its habitats are primarily the steppe-vegetation of sunny hills and southfacing slopes on sandy or chalky ground in xerothermic areas (Bergmann 1955). The larva is polyphagous (Compositae, Rubiaceae, Cruciferae etc.). The species normally hibernates in the larval stage. The imago is found from the end of June to the beginning of August.

D i s t r i b u t i o n. The distribution of *S. ochrata* in Northern Europe (fig. 1) is that of a typical "continental" faunal element. The main range of the species extends at the Baltic coast to Stralsund, further south the limit is displaced westwards. Within this area it is very local, however, and only at few places found in greater numbers. In some provinces it seems to be quite absent (e.g. in Saxony).

Outside its main territory *S. ochrata* occurs in restricted areas on each side of the North Sea. In England it has been recorded from the coasts of Suffolk, Essex, Kent, and from the Isle of Wight (South 1961) but it is very local and its abundance apparantly somewhat fluctuating. In recent years it has been regularly reported from Thorpeness near Aldeburgh (vide e.g. Chalmers-Hunt & Wakely 1964, Leech 1963). Particularly important localities for it are found in the Deal district in Eastern Kent. Yet, at some places within this area it is near extinction because its natural habitats have been altered through human activity (Goodson in litt.). On the continental side it inhabits the dune-areas from the extreme south of the Netherlands to the German island Borkum. Two Dutch inland-specimens are known (Utrecht, Maastricht) (Lempke 1949). The British populations have been described as a distinct race, subsp. *cantiata Prout,* 1915, and it has been shown that the Dutch specimens (Lempke 1949) and those from Borkum (Warnecke 1935, 1938, 1952) belong to the

Fig. 10. *Sterrha o. ochrata.* ♂-genitalia. Genit. no. 473. N. P. Kristensen. (x 25).

Fig. 11. *Sterrha s. serpentata.* ♂-genitalia. Genit no. 534. N. P. Kristensen. (x 25).

Fig. 12. *Sterrha o. ochrata.* ♀-genitalia. Genit. no. 452. N. P. Kristensen. (x 25).

Fig. 13. *Sterrha s. serpentata.* ♀-genitalia. Genit. no. 455. N. P. Kristensen. (x 25).

same form. *S. ochrata cantiata* (figs. 4-5) differs from the Central European *S. ochrata ochrata* (figs. 2-3) in being smaller (7 ♂♂: 8,7-10,1 mm, mean 9,4 mm; 3 ♀♀: 8,7-9,3-10,1 mm) and having a more dingy ground-colour.

The Danish population from Ulfshale definitely belongs to *S. ochrata ochrata.* It is the northernmost colony of the species known. Previous records from Sweden are due to confusion with *S. serpentata* (Ander, 1937).

The interesting occurrence of this decidedly continental species in "Atlantic" areas has been commented upon by Warnecke (1935, 1939). It was pointed out that concerning the microclimate its habitats in dunes and on sandy or chalky coastal hills in North-Western Europe are in fact really xerothermic in summer (low moisture due to porosity of substratum, considerable heating up of surface). In the Deal district it occurs together with several other Lepidopterous species which are otherwise very rare in the British Isles e.g. the Arctiid *Lithosia pygmaeola* Dbld. (Ford 1955). The Danish island of Møn is biogeographically located in the subcontinental area of the country, a climatically determined area in which occurs a series of plants and animals with a predominantly continental distribution (vide e.g. Pedersen 1962).

Warnecke (1938) suggested that the isolated populations of *S. ochrata* along the coasts of the North Sea should be considered relicts from the warm boreal period. This explanation might of course also apply to the Danish population (thus it would be an analogue of e.g. *Boarmia ilicaria* H. G. and the rodent *Muscardina avellanarius* L. (Spärck 1942)). The absence of a racial difference between the Danish specimens and those from Central Europe is no absolute proof of their separation being a more recent one. On the other hand it is still perfectly possible that the 16 specimens belonged to a colony established by an immigration at a later date. In any case, further investigations are needed to show whether the species is still resident in Denmark.

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lands and Germany respectively and to Mr. B. W. Rasmussen for the careful photographic work.

Summary.

The first Danish specimens of *Sterrha ochrata* (Scopoli, 1763) are recorded. A series of characters separating this species from the similiar *S. serpentata* (Hufnagel, 1767) is given. Errors in previous interpretations of the male genitalia of *S. ochrata* are pointed out. An account of the informations on the ecology and life-history in literature is given. The distribution of the species in North-Western Europe is discussed.

Resumé.

16 eksemplarer af den for Danmarks fauna nye måler *Sterrha ochrata* Scop. fandtes blandt materialet af den habituelt meget lignende *S. serpentata* Hfn. på Zoologisk Museum i København. Dyrene stammede alle fra Ulfshale, Møn, juli 1949 (T. Feddersen leg.). Fra *S. serpentata* adskilles arten ved anderledes byggede ♂-antenner (fig. 8-9), betydeligere størrelse (dette gælder kun den centraleuropæiske race *S. ochrata ochrata,* hvortil de danske eksemplarer hører), mindre klar grundfarve, tilstedeværelsen (i reglen) af mørke punkter i frynserne ved ribbeenderne, placeringen af bagvingemidtpletten (når den findes) inden for (eller i) den inderste tværlinie, tilstedeværelsen af parrede sporer ved skinnebenspidsen hos ♂ samt ved genitalorganernes bygning (fig. 10-13). Larven er temmelig polyfag; den overvintrer. Arten er udpræget varme- og tørkeelskende. Den nordeuropæiske udbredelse i store træk er vist i fig. 1. De isolerede populationer fra kystområder i det sydøstlige England og klitområdet Sydholland-Borkum tilhører den mindre og blegere subsp. *cantiata* Prout. Den danske bestand er muligvis en relikt fra borealtiden, men kan dog også tænkes at stamme fra en senere indvandring.

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