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SPECIES OF THE GENUS *SAEMUNDSSONIA* (MALLOPHAGA) FROM THE STERNINAE

By Theresa Clay

The species of *Saemundssonia* from the Sterninae, owing to their general uniformity of appearance, have been regarded by many authors as belonging to one species; Harrison, 1916, placed all the species from the European terns as synonyms of *S. melanocephalus* (Burmeister). However, an examination of the male genitalia shows that there are a number of distinct and easily recognizable species, making it necessary to reëstablish the earlier names. The descriptions of the early authors did not include the characters of the male genitalia, and in general their species are only referable to the genus. It is reasonably certain that the material on which Linné's species was based is no longer in existence. Dr. Kéler informs me that there is no doubt that the Halle collection which contained the greater part of the type material of the Nitzsch, Giebel, Taschenberg, Burmeister, and some of the Rudow species was, with the exception of the Goniodidae, *sensu lato*, and Trichodectidae, *sensu lato*, totally destroyed during the late war. Through the kindness of Dr. Eichler and Signor Conci I understand that the material on which Olfers and Picaglia based their descriptions is unlikely to be found; the Piaget material is virtually complete. This inadequacy of the descriptions and loss of the type material mean that the only satisfactory method of fixing the earlier names is to select a species from the original host, the characters of which do not conflict with the original description, and to erect neotypes. It is important that the neotypes should be selected from a subspecies of the host that could have been the original one, and for this reason no erection of neotypes for *brevicornis* Giebel (see below) has been made. At the present

time it is impossible to give a name to a specimen of *Saemundssonia* from any tern which makes it generally recognizable, and thus all previous records of *Saemundssonia* are valueless. *S. melanocephalus* (Burmeister), as restricted below, is a distinctive species known only from *Sterna albifrons*, but it has been recorded from nearly all the European, South African, and New World terns in addition to many of the gulls. For this reason references to the species in the early literature are discussed only where these are relevant to the fixing of the name. An exception is made in the case of Piaget, for the reason that this author has been and still is taken as an authority on the synonymy of the Nitzsch-Burmeister-Giebel names. In fact, in the majority of cases Piaget merely made his deductions from the published descriptions, often redescribed and figured species from the wrong host, and in some cases the fact that he mentions the correct host does not necessarily mean that he had seen material from it. His interpretations are often incorrect and cannot be accepted. A glance through the specimens in the Piaget collection listed below under the species shows many cases of straggling and misdetermination; his host records should not, therefore, be accepted without further confirmation.

Paratypes and examples of all the species available have been deposited in the American Museum of Natural History.

VARIATION: The *Saemundssonia* species here considered are heavily sclerotized forms, and such species are liable to show considerable variation in the extent and shape of the sclerites from specimen to specimen, and from side to side of the same specimen. In these species, in addition to and surrounding the definite sclerites of the thorax and abdomen, there are further sclerotized areas. The extent and pigmentation of these secondary areas appear variable, and in some specimens examined the true sclerites may have their outline obscured, resulting in the apparent fusion of sclerites which are actually distinct. For this reason the exact outlines of the sclerites cannot be used as diagnostic characters.

An indication of the range of variation found throughout one species is shown under *sternae*, of which a good series has been examined; it is probable that other species show a comparable range of variation.

HOST DISTRIBUTION: The distribution of the species of *Saemundssonia* found on the Sterninae will be discussed elsewhere.[1]

[1] Paper in press.

Here attention can be drawn to the anomalous occurrence of *S. sternae* (Linné) on *Gelochelidon nilotica*, which cannot be explained by either contamination or misidentification of hosts (three different hosts from three localities), and the close relationship of the species from *Sterna aurantia* and *Chlidonias* sp. Specimens from all species of *Thalasseus* examined (with the exception of those from *T. maximus* and *T. eurygnatha*) appear to be conspecific, and similarly with those from all the species of *Chlidonias*. It is possible that when large series of specimens are available, it will be found that each host species has a distinct subspecies of *Saemundssonia*. For this reason the measurements of the head breadth (tables 6 and 7) of specimens from the different host species are given separately.

There is an interesting correlation between size of parasite and size of host. Harrison (1915, p. 96) was the first author to draw attention to the principle which appears to have a wide application. If the three related species of *Saemundssonia* (*sternae*, *melanocephalus*, and *laticaudata*) are considered (tables 6 and 7), it is seen that the smallest parasite, *melanocephalus*, is found on the smallest host, *Sterna albifrons;* and the largest, *laticaudata*, on the largest host, *Thalasseus sandvicensis;* the parasite of intermediate size, *sternae*, being found on *Sterna hirundo*, which is intermediate in size between the two former hosts.

Owing to the great similarity between some of the species of *Sterna* (e.g., *hirundo*, *paradisaea*, and *vittata*) considerable caution must be used in accepting host identifications; only those specimens about the host of which there is no doubt have been used for types or neotypes. The host name as given in the original description is used for the first mention of the parasite followed by its present equivalent and author according to Peters (1934, p. 327).

MEASUREMENTS: It has been found that the breadth of the head at the temples in *Saemundssonia* species remains fairly constant under different treatments in mounting. This measurement is relatively constant for the species and in one case forms the most satisfactory character by which two species can be separated in the females. It is a more useful criterion of specific differences than the caphalic index, as (except in the case of male *hopkinsi*, new species) the proportions of head breadth to length are relatively constant. The measurements for the main divisions of the body are given only for the type specimens as a

general indication of size and should not be used as a basis for erecting new subspecies. Length measurements are taken along the midline for the head (including the hyaline margin), and from the most anterior lateral dorsal point to the most posterior point for the thorax and abdomen; the cephalic index (C.I.) is breadth:length.

KEY TO SPECIES[1]

MALES

1. Basal plate with distal sclerotized cross bar (figs. 20, 21) 2
   Basal plate without distal cross bar 3
2. C.I. > 1.03; length of paramere > 0.24 mm ..... *lobaticeps*
   C.I. < 1.05; length of paramere < 0.28 mm ..... *hopkinsi*
3. Endomere with terminal, strongly sclerotized, tooth-like process (fig. 29) ..... *melanocephalus*
   Endomere without above process 4
4. Linear arrangement of mesosomal setae (fig. 26) ..... *laticaudata*
   Clustered arrangement of mesosomal setae (fig. 22) 5
5. Details of endomere and paramere head as in figures 16, 22, 23 ..... *sternae*
   Details of endomere and paramere head as in figures 17, 24, 25 ..... *lockleyi*

FEMALES

1. Hyaline anterior margin of head medianly emarginate 2
   Hyaline anterior margin of head not emarginate 3
2. Breadth at temples usually > 0.72; setae lateral to last abdominal sternite 5–7 in number; shape of signature as in figure 14 ..... *lobaticeps*
   Breadth at temples usually < 0.73; setae lateral to last abdominal sternite 3, occasionally 4, in number; shape of signature as in figure 15 ..... *hopkinsi*
3. Sternite VII with posterolateral angles free or partially fused to subgenital plate ..... *sternae, vittata*
   Sternite VII with posterolateral angles fused to subgenital plate 4
4. Breadth at temples > 0.60 mm ..... *melanocephalus*
   Breadth at temples < 0.63 mm ..... *laticaudatus*

Saemundssonia sternae (Linné), 1758

Figures 1–6, 16, 22, 23

Pediculus sternae LINNÉ, 1758, p. 612. Hosts: "Habitat in Sternis, Laris."
Nirmus fornicatus OLFERS, 1816, p. 89. Hosts: "Hab. in laris et sternis."
Docophorus 5-maculatus PIAGET, 1885, p. 9. Host: *Hirundo urbica* = *Chelidon u. urbica* (Linné).

Pediculus sternae Linné (1758, p. 612) has no description but a reference to "Fauna Suecica" (1746, p. 339) and to Redi (1668), plate 9, figure 2. The description in "Fauna Suecica" mentions a

[1] *Saemundssonia peristicus* and *S. snyderi* omitted.

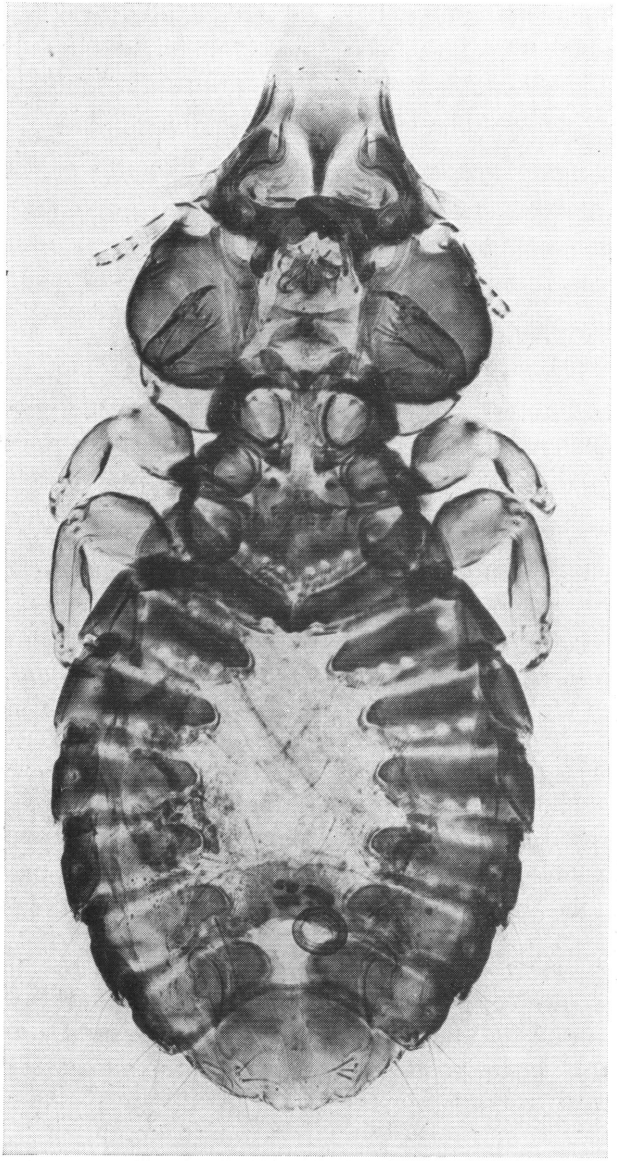


FIG. 1. *Saemundssonia sternae*, female.

triangular head which is only applicable to *Saemundssonia* or *Quadraceps* among the species found on *Sterna*. The description suggests the former, an interpretation confirmed by Redi's

figure, which although poor must be taken to represent a *Saemundssonia*. The host record in 1758 is "habitat in Sternis, Laris." Linné always gave a secondary appellation to his species, derived from a specific name of a host, before he gave the host record, such as "habitat in Sternis." This secondary appellation is taken to be a definite restriction of type host. In the case of *sternae*, the secondary appellation is *P. sternae hirundinis;* the only host given in "Fauna Suecica" is "*Sterna secunda* 128" (= *Sterna h. hirundo* Linné). *Pediculus sternae* Linné is therefore considered to be the earliest name for the *Saemundssonia* species described below, with *Sterna h. hirundo* as type host.

Nirmus fornicatus Olfers is a composite species; the description undoubtedly refers to a *Saemundssonia*. The host record is "Hab. in laris et sternis," and there are references to *P. sternae* Linné, the left-hand figure of Redi's plate 9, and to *Ricinus lari* De Geer, excluding the figure. As there is no restriction of type host in the original description, the name *fornicatus* Olfers is here restricted in such a way as to make it a synonym of *Saemundssonia sternae* (Linné).

Docophorus 5-maculatus Piaget was described from specimens alleged to have come from *Hirundo urbica* [= *Chelidon u. urbica* (Linné)]. These specimens are in the Piaget collections (one male, one female in the British Museum, one male, one female in the Rijksmuseum, Leiden) and prove to be *Saemundssonia sternae* (Linné). The specimens must have come from *Sterna hirundo*, and the explanation of the error is probably confusion between the names *Hirundo urbica* and *Sterna hirundo*.

MALE: Head (fig. 2) with general arrangement of sclerotized bands typical for the genus. Anterior hyaline margin flattened; clypeal signature with anterior margin flattened or slightly concave, and projecting beyond point of fusion of internal and marginal bands. The median dorsal pre-antennal suture varies in the extent of its posterior prolongation. In some specimens it may reach to the level of the posterior margin of the coni. The chaetotaxy shows no individual variation except in the number and position of the minute setae on the dorsal postantennal region. The number and arrangement of the larger setae are constant for all the species described below.

Thorax as shown in figure 2. There is variation in the extent of the sclerotization, and hence in the shape, of the sternal plates. The number of elongate setae on the dorsal posterior margin of

the pterothorax varies from seven to 10 each side in the specimens examined, and the number is not necessarily symmetrical each side of the same specimen.

Abdomen as shown in figure 2. Segment II with tergal plates

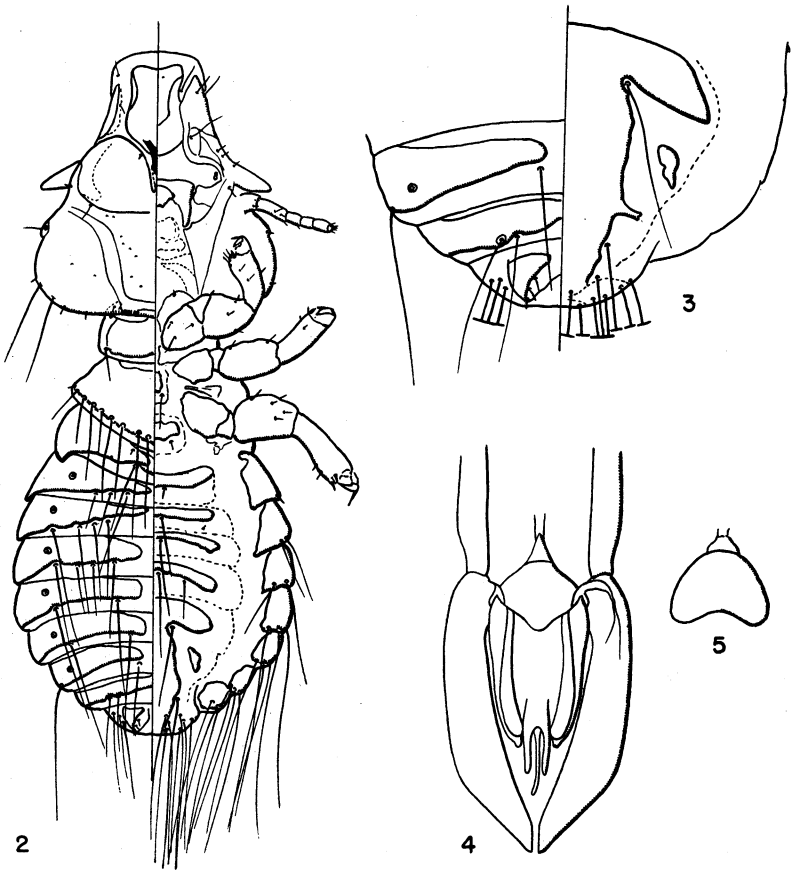


FIG. 2. *Saemundssonia sternae*, male.
FIG. 3. Terminal segments of abdomen, male.
FIG. 4. Male genitalia.
FIG. 5. Uncus.

approximate or in contact medianly, and joined together by well-marked secondary sclerotization. As mentioned above, there is considerable variation in the area and thickness of the primary sclerites and of the surrounding secondary sclerotization. This, together with a varying amount of overlapping of the segments,

probably owing to different methods of treatment, results in a certain amount of variation in the general appearance of the abdomen. The subgenital plate has an irregular and variable outline (cf. figs. 2 and 3). The ventral posterior margin of the abdomen may have a rounded or flattened appearance. The normal variation of the abdominal setae is shown in table 1, but there may be plus or minus one to two setae each side; specimens are rarely symmetrical on each side in respect to the chaetotaxy. There are, in addition, a number of minute setae on the dorsum of some specimens which are not included in the table. On the venter there are fewer setae and less variation in number. One specimen examined had the minute setae on segment III elongate and reaching to segment V. One specimen lacked the elongate setae on segment VII. In some specimens the minute setae (not shown in table), usually present on segments III–V, lateral to the normal one on each side, become enlarged and elongated on one or more segments. The pleural setae appear to be more constant in number than those of the dorsum and venter.

Genitalia as shown in figures 4, 5, 16, 22, and 23. Specific characters are the absence of a sclerotized cross bar at the distal end of the basal plate, endomeral projections not fused medianly, details of the proximal head of the paramere, and the extension of the penis well beyond the telomeres. There appears to be little true variation in the parts, but owing to distortion in mounting there may be considerable apparent variation, especially in the shape of the distal end of the endomeres. The anterior margin of the sclerotized mesosomal plate at the distal end of the basal plate (the *uncus* of Waterston, 1915, p. 172) varies in outline (as shown in figs. 4 and 5). It may have a flattened or concave posterior margin.

FEMALE: Head and thorax (fig. 1) as in male, but the measurements are greater (tables 4, 5, and 7).

Abdomen is longer and broader than in the male (fig. 1). Segment II with tergal plates as in male. Segments III–VIII with tergal plates separated widely medianly; IX and X with fused transverse plate; XI with distinct tergal plate each side. Segment II with median sternal plate, irregular in outline and varying in area; in some specimens it is not apparent. Segments III–VI with small, well-marked lateral plates and narrow median plates showing variation in extent, and not apparent in all specimens. The unpigmented parts of the venter of the abdomen show the

ornamented appearance as figured by Ferris (1932, fig. 20c) for the species he calls *snyderi*. Pleurites as in male. As in the male there is variation in the thickness and extent of the sclerites and

FIG. 6. *Saemundssonia sternae*, subgenital plates, female.
FIG. 7. *Saemundssonia laticaudata*, subgenital plates, female.
FIG. 8. *Saemundssonia melanocephalus*, last abdominal sternite, female.
FIG. 9. *Saemundssonia lobaticeps*, last abdominal sternite, female.
FIG. 10. *Saemundssonia hopkinsi*, last abdominal sternite, female.
FIG. 11. *Saemundssonia melanocephalus*, sternite VII, female.
FIG. 12. *Saemundssonia lobaticeps*, sternite VII, female.
FIG. 13. *Saemundssonia hopkinsi*, sternite VII, female.

the areas of secondary sclerotization. This fact is especially important in comparing the subgenital plates of the different species. The following characters of the subgenital plate appear to be rel-

atively constant for *sternae:* anterior and posterior margin of sternite VIII flattened, not curved into an arch-like effect; however, in the series of *S. lockleyi*, new species, there are some specimens with sternite VII flattened and some with it arch-like. This may therefore not be a reliable character in *sternae.* In *sternae* the posterior margin of sternite VII is not fused laterally to the subgenital plate (cf. figs. 6 and 7). There is, however, a band of secondary sclerotization which runs across the gap between sternite VII and the plate, and in heavily pigmented specimens this may give the superficial appearance of fusion. In one specimen on one side, the posterior margin of sternite VII is drawn out as a narrow strip and fused to the subgenital plate, and in one specimen of *lockleyi*, sternite VII has a narrow strip each side fused to the plate, thus resembling the condition in figure 7. The chaetotaxy and its normal variation are shown in table 1.

TABLE 1
ABDOMINAL CHAETOTAXY

	Male			Female		
	T	S	P	T	S	P
II	2–6	2	0, 0	2–6	2	0, 0
III	6–10	2	1, 1	6–12	2	1, 1
IV	8–12	2	2, 2	8–12	2	2, 2
V	10–12	2	2, 2	8–12	2	2, 2
VI	8–10	4	3, 3	8–12	4	3, 3
VII	4–6	2	3, 3	4–10	2	3, 3
VIII	4	fig.	3, 3	4–6	fig.	3, 3
IX–X	4	fig.	3, 3	4	fig.	3, 3

MATERIAL FROM TYPE HOST EXAMINED: Fifty-six males, 50 females from *Sterna h. hirundo* Linné, from Sweden, Estonia, Great Britain, Eire, Syria, and South Africa.

OTHER MATERIAL EXAMINED: Eight males, nine females from *Gelochelidon n. nilotica* (Gmelin) from Sudan, Ceylon, and Rajputana, India.

TYPE MATERIAL: Neotype (male) and neallotype (female) of *Saemundssonia sternae* (Linné), slide No. 16151 in the Meinertzhagen collection, from skin of *Sterna h. hirundo* Linné, Sweden. Neoparatypes: Fifty-four males and 48 females from the same host species, localities as listed above.

Neotype (male) and neallotype (female) (agreeing with description and figures of *sternae*) of *Saemundssonia fornicatus* (Olfers),

slide No. 1340 in the Meinertzhagen collection, from *Sterna h. hirundo*, Estonia.

Lectotype of *Saemundssonia 5-maculatus* (Piaget), male, slide No. 597 in the British Museum Piaget collection, from *Hirundo urbica* (in error).

Saemundssonia lockleyi, new species

Figures 17, 24, 25

This species is close to *S. sternae*, from which it can be distinguished only by the male genitalia.

MALE: Head, thorax, and abdomen as in *sternae*. Male genitalia (figs. 17, 24, 25) with following characters distinguishing *lockleyi* from *sternae:* details of proximal head of parameres, shape of endomeres and telomeres, and details of mesosome.

FEMALE: No reliable character can be found on which to separate the females of this species from those of *sternae*.

Described from two males and six females from *Sterna vittata georgiae* Reichenow from Wiencke Island, Palmer Archipelago.

OTHER MATERIAL EXAMINED: Fourteen males, 25 females from *Sterna vittata bethunei* Buller from Campell Island; 10 males, 12 females from *Sterna paradisaea* Pontopiddan from East Greenland, Spitzbergen, Scotland, and the Antarctic.

TYPE MATERIAL: Holotype (male) and allotype (female), slides Nos. 314 and 315 in the British Museum collection, from *Sterna vittata georgiae* Reichenow, locality as above. Paratypes: One male and five females from the same host species and locality.

The type material was presented to the British Museum by the Falkland Islands Dependencies Survey Committee. The species is named in honor of Mr. G. J. Lockley who collected the specimens. The material from *S. v. bethunei* was seen through the kindness of Dr. Falla, Canterbury Museum, Christchurch, New Zealand.

Saemundssonia melanocephalus (Burmeister), 1838

Figures 8, 11, 19, 28, 29

(*Docophorus melanocephalus* NITZSCH, 1818, p. 290, *nomen nudum.*)

Docophorus melanocephalus BURMEISTER, 1838, p. 426. Hosts: "Auf mehreren *Sterna* und *Larus* Arten."

Nirmus melanocephalus GIEBEL, 1861, p. 315. Host: *Sterna minuta* = *Sterna a. albifrons* Pallas.

The first appearance of this name (Nitzsch, 1818, p. 290) is as a *nomen nudum*. Burmeister (1838, p. 426) gives a description

which can be taken to apply to a *Saemundssonia*, but without exact host. As he was the first to describe the species he is the author of the name. Giebel (1861, p. 315) lists the name under *Nirmus*, without a description but with the host *Sterna minuta* (= *Sterna a. albifrons*). He refers to Nitzsch, 1818, Burmeister and Nitzsch MS. These references undoubtedly mean that the species he mentions is the one previously described by Burmeister, and the placing of the species in *Nirmus* must have been an error. Giebel (1874, p. 110) described and figured *D. melanocephalus*, giving as hosts *Larus ridibundus*, *Sterna caspia*, and *S. cantiaca*, with the remark "auf letzen beiden mit besonderen, wenn auch nur geringfügigen Eigenthümlichkeiten." This would seem to be a clear restriction of host to *Larus ridibundus*, but it is considered, as further discussed below, that the 1861 reference must take precedence and that *Sterna a. albifrons* is the type host of *melanocephalus*. Mr. G. H. E. Hopkins, in a private communication, has pointed out that this name cannot be discussed apart from *Docophorus karicola* and states "this latter name makes its first appearance in 1861 [Giebel, 1861, p. 315] as a *nomen nudum*, the hosts mentioned being *Sterna leucoparia* and *Larus ridibundus;* in 1866 [p. 363] Giebel again mentions it, the hosts being '*Sterna canthiaca, leucoparia, Larus ridibundus.*' His treatment of the name in 1874 (p. 110) is most extraordinary. He first sinks it to *melanocephalus* Burmeister, then immediately afterwards describes it as a good species from *Sterna leucoparia*. As this is the first valid appearance of the name, there is no doubt that (whatever may have been Nitzsch's original intentions) *Saemundssonia laricola* must have *Sterna leucoparia* [= *Chlidonias h. hybrida* (Pallas)] as its type host. Reverting to *melanocephalus*, it is perfectly clear that Giebel's 1874 list of hosts is complicated by the addition of two hosts (*Larus ridibundus* and *Sterna "canthiaca"*) which had been attributed to *laricola*, while it remained a *nomen nudum*, and the apparent restriction to the *Larus* therefore cannot be accepted. The third host mentioned, *S. caspia*, is the type host of Giebel's own *nomen nudum*, *Docophorus caspicus* (1866, p. 362). But can we accept the fact that in 1861 Giebel mentioned *Sterna minuta* as the sole host as a legitimate restriction of *melanocephalus?* It seems to me that we can and must. A most important fact in this connection is that Nitzsch, Burmeister, and Giebel all worked on the same material, though additions were made to the collection after Nitzsch's death. Giebel's 1861 paper

is a list of the material then in the Nitzschian collection, and it seems clear that the only specimens of *melanocephalus* which were labeled with this name were those from *Sterna minuta.* These specimens must, therefore, be regarded as Burmeister's type series."

MALE: General characters of head, thorax, and abdomen as in *sternae.* The breadth of the head tends to be smaller (table 6), but the proportions are the same (table 5). The genitalia (figs. 19, 28, 29) are distinguished from all other species mentioned here by the characters of the paramere head, endomeres, and mesosome.

FEMALE: General characters as in *sternae,* but measurements tend to be smaller (tables 4, 5, 7). Sternite VII is fused to the subgenital plate as in *laticaudata;* the inner anterior angle of the last sternal plate each side is pointed and more heavily sclerotized (fig. 8). The females can also be distinguished from *laticaudata* by the considerably smaller measurements of the head and by the greater length of sternite VII in the midline, usually actually, and always proportionally to length of abdomen (fig. 11).

MATERIAL FROM TYPE HOST EXAMINED: Twenty-two males and 18 females from *Sterna a. albifrons* Pallas from Egypt and Scotland.

TYPE MATERIAL: Neotype (male) and neallotype (female) of *S. melanocephalus* (Burmeister), slide No. 4674 in the Meinertzhagen collection, from *Sterna a. albifrons,* Egypt. Neoparatypes: Twenty-two males and 17 females from the same host species, localities as listed above.

Piaget (1880, p. 109, pl. 9, fig. 5) described and figured a *Saemundssonia* under the name *Docophorus melanocephalus* Nitzsch from *Sterna cantiaca* (= *Thalasseus s. sandvicensis*) and recorded it also from *Larus cirrhocephalus.* The Piaget collection at Leiden contains one female *Saemundssonia* (not examined critically) from *Sterna cantiaca.* The British Museum Piaget collection contains two males and four females of *Saemundssonia laticaudata* (Rudow) (slides Nos. 900, 901) from *Sterna cantiaca,* one male and one female of *S. sternae* (Linné) (slide No. 902) from *Sterna cantiaca* (presumably stragglers from *Sterna hirundo*), and one male of a *Saemundssonia* not dealt with in this paper (slide No. 903) and presumably a straggler. The specimen from *Larus cirrhocephalus* is missing.

Saemundssonia laticaudata (Rudow), 1869

Figures 7, 18, 26, 27

Docophorus laticaudatus RUDOW, 1869, p. 12. Host: *Sterna cantiaca* = *Thalasseus s. sandvicensis* (Latham).

?*Docophorus brevicornis* GIEBEL, 1874, p. 112. Host: *Sterna acuflavida* = *Thalasseus sandvicensis acuflavidus* (Cabot).

There is nothing in Rudow's original description which prevents this name's being used for the *Saemundssonia* species on *Thalasseus s. sandvicensis* (Latham). No specimens have been seen from the type host of *brevicornis* = *Thalasseus sandvicensis acuflavidus* (Cabot), but it is probable that the two subspecies of *sandvicensis* have the same subspecies of *Saemundssonia*. As the type of *brevicornis* is no longer in existence, the name is placed provisionally as a synonym of *laticaudata* but remains available for the species from the type host if this should prove to be distinct from that on *T. s. sandvicensis*.

MALE: General characters of head, thorax, and abdomen as in *sternae*. All measurements tend to be larger, especially of the head, but the proportions are the same (tables 4–6). The genitalia are distinguished from *sternae* by the characters of the paramere head, endomeres, and mesosome (figs. 18, 26, 27).

FEMALE: General characters of head, thorax, and abdomen as in *sternae*, but, as in the male, all measurements tend to be greater. Sternite VII is fused to the subgenital plate (fig. 7).

MATERIAL FROM TYPE HOST EXAMINED: Four males and eight females from *Thalasseus s. sandvicensis* (Latham) from England and Mauretania.

OTHER MATERIAL EXAMINED: Six males and three females from *Thalasseus benghalensis par* (Mathews and Iredale), Aden and Port Sudan; 12 males and 10 females from *Thalasseus bergi velox* (Cretzschmar), Red Sea; and two males and two females from *Thalasseus b. bergi* (Lichtenstein), southwest Africa.

TYPE MATERIAL: Neotype (male) and neallotype (female) of *S. laticaudata* (Rudow), slide No. 313 in the British Museum collection (presented by G. H. E. Hopkins) from *Thalasseus s. sandvicensis*, Norfolk, England. Neoparatype: Three males and eight females from the same host species, localities as listed above.

Specimens from two South American species of *Thalasseus*, *T. m. maximus* (Boddaert) and *T. eurygnatha* (Saunders), do not appear to be quite typical of the above and may prove to be new subspecies.

Saemundssonia peristica (Kellogg and Kuwana), 1902

Docophorus peristicus KELLOGG AND KUWANA, 1902, p. 462. Host: *Sterna fulginosa* = *Sterna fuscata crissalis* (Lawrence).

This species was described from material taken from *Sterna fuscata crissalis* (Lawrence), and allegedly from *Dendroica aureata* = *D. petechia aureola* Gould and *Nesomimus carringtoni* = *N. barringtoni* Rothschild. The figure is undoubtedly that of a *Saemundssonia*, and the occurrence of this species on the two passerine hosts must have been due to contamination. This species is discussed below under *S. snyderi*.

Saemundssonia snyderi (Kellogg and Paine), 1910

Docophorus snyderi KELLOGG AND PAINE, 1910, p. 124. Host: *Sterna lunata* Peale.

No information is available on the types of *S. peristica* or *S. snyderi*, nor have specimens been seen from the type hosts. It is not, therefore, possible to resolve the present confusion which has arisen over these two names, resulting from the redescription of alleged *snyderi* from the type host of *peristica* (see Ferris, 1932, p. 71). In this redescription no mention is made of *peristica* or whether or not the types of *snyderi* were examined. *S. snyderi* (*sensu* Ferris, 1932) appears from the figures to be near *laticaudata*.

Saemundssonia lobaticeps (Giebel), 1874

Figures 9, 12, 14, 20, 30, 31

Docophorus lobaticeps GIEBEL, 1874, p. 109. Hosts: *Sterna hirundo* and *Sterna fissipes* = *Chlidonias n. nigra* (Linné).

?*Docophorus pustuliferus* PICAGLIA, 1885, p. 3. Host: *Hydrochelidon surinamensis* = *Chlidonias nigra surinamensis* (Gmelin).

(*Docophorus laricola* Nitzsch, GIEBEL, 1861, p. 315, *nomen nudum.*)

(*Docophorus laricola* Nitzsch, GIEBEL, 1866, p. 363, *nomen nudum.*)

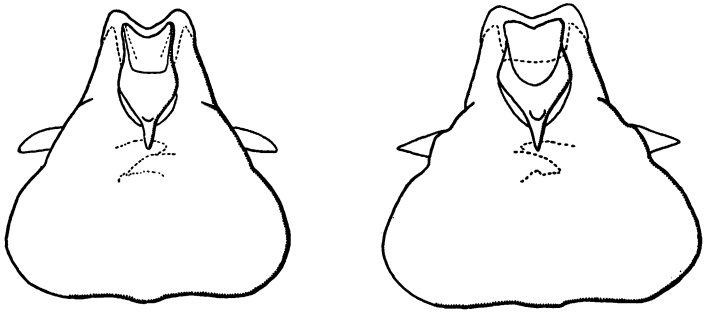
Docophorus laricola Nitzsch, GIEBEL, 1874, p. 110. Host: *Sterna leucoparia* = *Chlidonias h. hybrida* (Pallas).

Docophorus lobaticeps was described from specimens alleged to have come from *Sterna hirundo* and *Chlidonias nigra*. However, there seems little doubt that the original description must have been made from a specimen from *Chlidonias nigra*. The characters separating *Saemundssonia sternae* (from *Sterna hirundo*) from the *Saemundssonia* of *Chlidonias nigra* are the emarginated hyaline

margin of the head in the latter species, and (in the male) the usually greater width of the head proportional to its length. As attention is drawn to both these characters in the original description of *lobaticeps*, this name must be used for the *Saemundssonia* from *Chlidonias nigra*.

No specimens have been seen from the type host of *pustuliferus*, but it is probable that the *Saemundssonia* from this host would be conspecific with that from *C. n. nigra*. *S. pustulifera* is therefore placed provisionally as a synonym of *lobaticeps*.

The history of the name *laricola* has been discussed above, and it is accepted as the name for the species of *Saemundssonia* from *Chlidonias h. hybrida*. Specimens from this host appear to be



14 15

FIG. 14. *Saemundssonia lobaticeps*, head, male.
FIG. 15. *Saemundssonia hopkinsi*, head, male.

conspecific with *lobaticeps; laricola* is therefore placed as a synonym of this latter name.

MALE: Head (fig. 14) with general characters as in *sternae*, but distinguished from all preceding species by the emarginated hyaline margin of the head and by the clypeal signature which is deeply emarginated anteriorly and scarcely projects beyond the anterior point of the marginal bands.

Thorax as in *sternae*.

Abdomen with general characters as in *sternae*, but is distinguished by having both the tergal plates and secondary sclerotization of segment II separated medianly. Segments II–IV tend to have a greater number of dorsal setae (see table 2).

Genitalia (figs. 20, 30, 31) are distinguished from those of the preceding species by the presence of a sclerotized cross bar at the distal end of the basal plate and by the median fusion of the endomeral projections.

FEMALE: Head and thorax with characters as in male but larger.

Abdomen with general characters as in *sternae;* tergites and secondary sclerotization of segment II separated medianly. Sternite VII and subgenital plate as in *laticaudatus* (fig. 12); last sternites more elongate (fig. 9). Chaetotaxy as in *sternae,* but dorsal setae are more numerous (table 2), and there are five to seven setae instead of three each side of the last sternite.

TABLE 2

DORSAL ABDOMINAL CHAETOTAXY[a]

	Male	Female
II	8–10	8–10
III	9–14	12–18
IV	13–15	16–18
V	11–13	14
VI	6–8	14–16
VII	5–6	10–14
VIII	4	4
IX–X	4	4

[a] Specimens from *Chlidonias h. hybrida* included.

MATERIAL FROM TYPE HOST EXAMINED: Three males and two females from *Chlidonias n. nigra* (Linné) from Wales, north Greece, and no locality (Piaget collection).

OTHER MATERIAL EXAMINED: Four males and three females from *Chlidonias h. hybrida* (Pallas), Khartoum, Sudan; one male and one female from *Chlidonias hybrida indica* (Stephens), Afghanistan; 16 males and 22 females from *Chlidonias leucoptera* Temminck, Egypt, Sudan, Uganda, and Kenya.

TYPE MATERIAL: Neotype (male) of *S. lobaticeps* (Giebel), slide No. 14035 in the Meinertzhagen collection, from *Chlidonias n. nigra,* south Wales. Neoparatypes: Two males and two females from the same host species, localities as listed above.

Neotype (male) and neallotype (female) (agreeing with descriptions and figures of *lobaticeps*) of *S. laricola* (Nitzsch), slides No. 311 and 312 in the British Museum collection, from *Chlidonias h. hybrida* (Pallas), Khartoum, Sudan.

There are four slides labeled *Docophorus lobaticeps* (see Piaget, 1880, p. 110). In the Leiden portion of the Piaget collection there is one male *Saemundssonia* (not examined critically) from *Sterna*

hirundo. In the British Museum Piaget collection are one male, one female, and one nymph of *S. laticaudata* (Rudow) (slide No. 965) from *Sterna gracilis* = *S. dougallii gracilis* Gould (host record not reliable); one male and one nymph of *S. sternae* (slide No. 964) from *Sterna hirundo;* and one male and one female of *S. sternae* (slide No. 966) from *Sterna* sp. Piaget described and figured (1880, p. 110, pl. 9, fig. 6) *Docophorus laricola* Nitzsch, giving as hosts: *Sterna minuta* = *Sterna albifrons*, *Sterna nigra* = *Chlidonias n. nigra*, and *Sterna hirundo*. The figure shows the emarginated hyaline margin of the head characteristic of this species. The Leiden collection contains three slides labeled *D. laricola* (not examined critically): one male, one female, and one nymph (slide No. 66) and one male and two nymphs (slide No. 67) of *Saemundssonia* from *Sterna minuta;* and one male of *Saemundssonia* (slide No. 68) from *Sterna nigra*. In the British Museum collection there are four slides labeled *D. laricola:* three females of *Saemundssonia* sp.? (slides Nos. 904, 905) from *Sterna minuta;* one male and one female of *S. lobaticeps* from *Sterna nigra* (slide No. 906); one male *S. lobaticeps* from *S. hirundo* (slide No. 908); and one male and one female of *S. sternae* from *S. hirundo* (slide No. 907).

Saemundssonia hopkinsi, new species

Figures 10, 13, 15, 21

This species is nearest *lobaticeps*, from which it is distinguished in both sexes by the clypeal signature; in the male by the characters of the head of the paramere, and in the female by the breadth at the temples (specimens of *lobaticeps* and *hopkinsi* will probably be found showing an overlap in this measurement), the characters of the genital plate, and by the smaller number of setae lateral to the last sternite.

MALE: Head (fig. 15) resembles that of *lobaticeps* in the characters of the emarginated anterior hyaline margin and in the position of the anterior margin of the clypeal signature. It is distinguished by the shape of the signature and by the greater breadth at temples, both actually and proportionally to length of head (tables 4–6).

Thorax as in *lobaticeps* but tends to have more marginal pterothoracic setae (10–12 each side).

Abdomen as in *lobaticeps* but the dorsal setae are more numerous (see table 3).

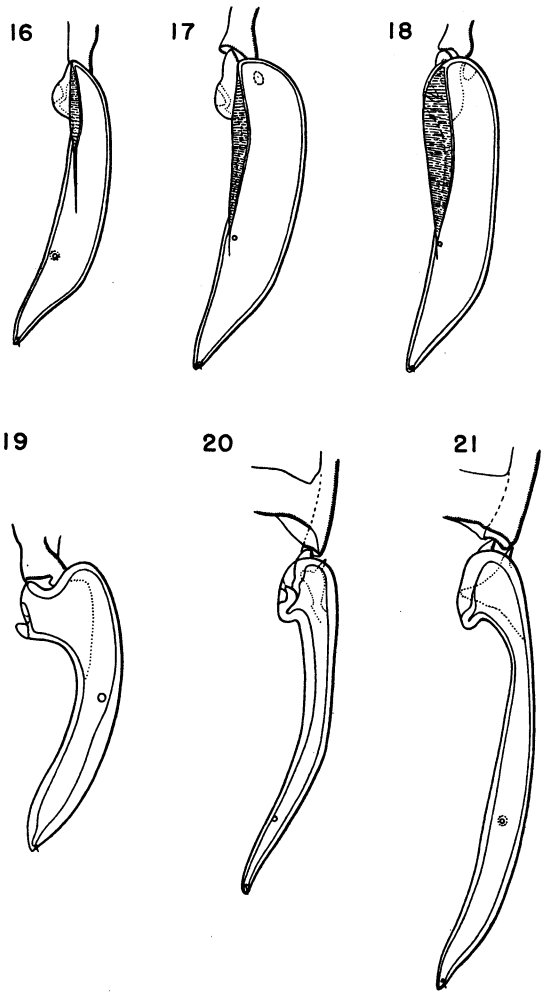


FIG. 16. *Saemundssonia sternae*, parameres.
FIG. 17. *Saemundssonia lockleyi*, parameres.
FIG. 18. *Saemundssonia laticaudata*, parameres.
FIG. 19. *Saemundssonia melanocephalus*, parameres.
FIG. 20. *Saemundssonia lobaticeps*, parameres.
FIG. 21. *Saemundssonia hopkinsi*, parameres.

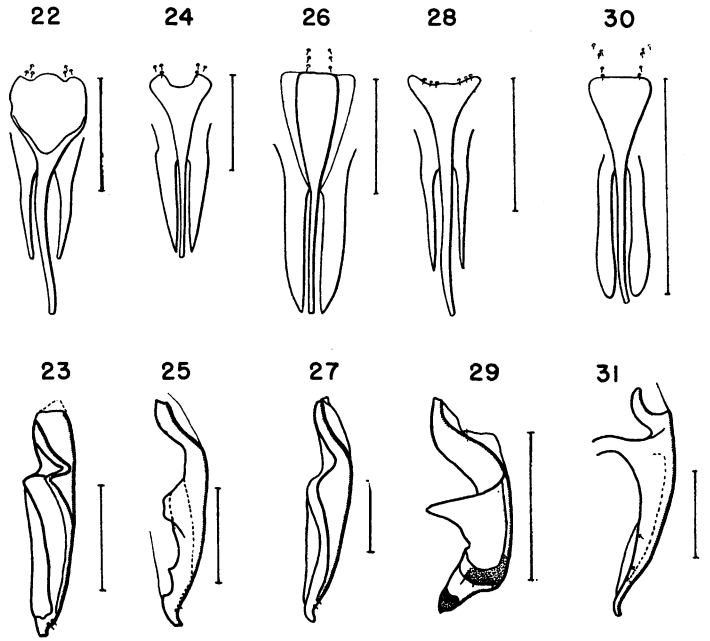
Genitalia of the same type as *lobaticeps* but the parameres are longer and the details of the head different (fig. 21); endomeres and mesosome as in *lobaticeps* but stouter in form.

TABLE 3

DORSAL ABDOMINAL CHAETOTAXY

	Male	Female
II	10–14	10–16
III	16–20	18–22
IV	18–20	18–26
V	14–16	18–22
VI	10–12	20–22
VII	6–8	14–18
VIII	4	6–8
IX–X	2–4	4

FEMALE: General characters of head and thorax as in male, but all measurements greater. The females cannot be distinguished from *lobaticeps* by the proportions of the head.



FIGS. 22, 23. *Saemundssonia sternae*, mesosomal parts of male genitalia.
FIGS. 24, 25. *Saemundssonia lockleyi*, mesosomal parts of male genitalia.
FIGS. 26, 27. *Saemundssonia laticaudata*, mesosomal parts of male genitalia.
FIGS. 28, 29. *Saemundssonia melanocephalus*, mesosomal parts of male genitalia.
FIGS. 30, 31. *Saemundssonia lobaticeps*, mesosomal parts of male genitalia.
Lines represent 0.05 mm.

TABLE 4

MEASUREMENTS OF TYPES

	Male									
	Length					Breadth				
	A	B	C	D	E	A	B	C	D	E
Head	0.57	0.55	0.67	0.58	0.60	0.53	0.52	0.63	0.59	0.65
Prothorax	0.14	0.12	0.19	0.14	0.16	0.28	0.28	0.35	0.31	0.33
Pterothorax	0.19	0.18	0.21	0.17	0.21	0.40	0.38	0.48	0.43	0.46
Abdomen	0.67	0.75	1.02	0.62	0.77	0.62	0.61	0.86	0.67	0.73
Total	1.40	1.47	1.88	1.45	1.59					
Paramere[a]	0.25	0.18	0.29	0.23	0.29					

	Female									
	Length					Breadth				
	A	B	C[b]	D	E	A	B	C[b]	D	E
Head	0.64	0.58	0.71	0.62	0.63	0.65	0.58	0.70	0.67	0.72
Prothorax	0.17	0.15	0.20	0.19	0.16	0.35	0.32	0.37	0.35	0.36
Pterothorax	0.25	0.24	0.23	0.26	0.24	0.50	0.45	0.56	0.50	0.51
Abdomen	1.12	1.03	1.24	0.99	0.89	0.90	0.80	1.01	0.84	0.87
Total	2.00	1.81	2.18	1.86	1.76					
St. VII (mid-line)	0.09	0.11	0.08	0.09	0.07					

A, *sternae;* B, *melanocephalus;* C, *laticaudata;* D, *lobaticeps* (female is not the type); E, *hopkinsi* (female is not the type).

[a] Length from dorsal view.

[b] Specimen slightly distorted.

TABLE 5

CEPHALIC INDEX

Species	No. of Specimens		C.I. Range	
	Male	Female	Male	Female
sternae	12	20	0.90–0.94	0.97–1.05
lockleyi				
(a)	2	6	0.92–0.95	0.92–0.98
(b)	5	14	0.92–0.95	0.93–0.99
melanocephalus	18	18	0.88–0.96	0.94–1.00
laticaudata				
(c)	3	5	0.93–0.95	0.92–0.96
(f)	3	8	0.91–0.95	0.93–1.00
lobaticeps				
(i)	3	2	0.97–1.02	1.08–1.11
(j)	4	3	0.99–1.03	1.08–1.10
(l)	4	11	0.96–1.00	1.05–1.12
hopkinsi	15	15	1.06–1.11	1.10–1.17

See table 6 for list of hosts.

TABLE 6

BREADTH (IN MILLIMETERS) OF HEAD AT TEMPLES OF MALES, IN NUMBERS OF SPECIMENS

	.49	.50	.51	.52	.53	.54	.55	.56	.57	.58	.59	.60	.61	.62	.63	.64	.65	.66	.67	.68	.69
sternae		1		2	1	4	6	5	1												
lockleyi																					
(a)								1		1											
(b)						1	3	3	4	1											
Totals						1	3	4	4	2											
melanocephalus	4	5	2	11																	
laticaudata																					
(c)								1				1				1					
(d)										1	1	3		1							
(e)										1		1									
(f)												2	1	4	3	1					
(g)[a]											2	1	1	1		1					
(h)[a]											1										
Totals								1		2	4	8	2	6	3	3					
lobaticeps																					
(i)									1	1	1										
(j)										1	2			1							
(k)												1									
(l)									4	3	3	4	1								
Totals									5	5	6	5	1	1							
hopkinsi																	5	2	3	3	2

(a) *S. vittata georgiae*
(b) *S. v. bethunei*
(c) *Thalasseus s. sandvicensis*
(d) *T. benghalensis par*
(e) *T. b. bergi*
(f) *T. b. velox*
(g) *T. m. maximus*
(h) *T. eurygnatha*
(i) *Chlidonias n. nigra*
(j) *C. h. hybrida*
(k) *C. h. indica*
(l) *C. leucoptera*

[a] Not *laticaudata, sensu stricto.*

TABLE 7

BREADTH (IN MILLIMETERS) OF HEAD AT TEMPLES OF FEMALES, IN NUMBERS OF SPECIMENS

	.55	.56	.57	.58	.59	.60	.61	.62	.63	.64	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	.76
sternae								2	2	3	3	4	5									
lockleyi																						
(a)					1	1			2	1	1											
(b)						2	1	4	2	3	2											
Totals					1	3	1	4	4	4	3											
melanocephalus	5	2	7	1	5																	
lacticaudata																						
(c)										2	2		1			1						
(d)														1								
(f)											1		2	3	1	1						
(g)[a]													2		1							
Totals										2	3		5	4	2	2						
lobaticeps																						
(i)													1			1						
(j)														1		1		1				
(k)																1						
(l)												1	5	3	1	2						
Totals												1	6	4	1	5		1				
hopkinsi																		2	1	4	4	3

See table 6 for list of hosts.

[a] Not *laticaudata, sensu stricto.*

Abdomen as in *lobaticeps*. General characters of sternite VII and subgenital plate as in *lobaticeps*, but sternite VII is narrower medianly and strongly arched (fig. 13). Last sternal plate may prove to be diagnostic in general form (fig. 10); setae lateral to this plate three to four each side. Setae tend to be more numerous than in male (table 3).

Described from 15 males, and 17 females from *Sterna aurantia* J. E. Gray from Deccan and Nepal, India, and Myitkyina, Burma.

Holotype (male), slide No. 8730 in the Meinertzhagen collection, from *Sterna aurantia* Gray, Deccan, India. Paratypes: Fourteen males and 17 females from the same host species, localities as listed above. No allotype has been designated, as the only female in good condition from the Indian specimens is deformed, tergite V and VI on one side being partially fused. The Burmese material was examined shortly before going to press after the figures and measurements had been made. This latter material was seen through the kindness of Dr. Henry S. Fuller of the Bowman Gray School of Medicine, Winston-Salem, North Carolina.

The species is named in honor of Mr. G. H. E. Hopkins, to whom I am greatly indebted for the loan of some notes on the nomenclature of these species and for further advice on the same subject.

Saemundssonia atlantica (Kellogg), 1914

Docophorus atlanticus KELLOGG, 1914, p. 81. Hosts: *Stercorarius crepidatus* = *S. parasiticus* (Linné) and *Sterna paradisea* Pontoppidan.

This species must be mentioned, as it was described from material alleged to have been collected from *Stercorarius parasiticus* and *Sterna paradisea*, and as Harrison (1916, p. 88) gives only the second host. The species of *Saemundssonia* on these two hosts are quite distinct, and there is no doubt that the figure represents the type of *Saemundssonia* found on *Stercorarius* and not that on *Sterna*. The record on the latter host must therefore be due to some error.

SUMMARY

All the known species of *Saemundssonia* from the Sterninae are discussed, and two new species are described. The species of previous authors described from more than one host, and therefore

usually composite, are restricted to one type host and redescribed and figured. Neotypes have been erected for species of which the original type material is presumed to be lost and where material from the type host is available.

LIST OF SPECIES DISCUSSED, WITH TYPE HOSTS
(Synonyms in brackets)

Saemundssonia	
atlantica (Kellogg), 1914.....	*Stercorarius parasiticus* (Linné)
hopkinsi, new species.....	*Sterna aurantia* J. E. Gray
laticaudata (Rudow), 1869.....	*Thalasseus s. sandvicensis* (Latham)
[*brevicornis* (Giebel), 1874.....	*Thalasseus s. acuflavidus* (Cabot)]
lobaticeps (Giebel), 1874.....	*Chlidonias n. nigra* (Linné)
[*pustuliferus* (Picaglia), 1885....	*Chlidonias nigra surinamensis* (Gmelin)]
[*laricola* (Giebel), 1874.....	*Chlidonias h. hybrida* (Pallas)]
lockleyi, new species.....	*Sterna vittata georgiae* Reichenow
melanocephalus (Burmeister), 1838.	*Sterna a. albifrons* Pallas
peristica (Kellogg and Kuwana), 1902.....	*Sterna fuscata crissalis* (Lawrence)
snyderi (Kellogg and Paine), 1910..	*Sterna lunata* Peale
sternae (Linné), 1758.....	*Sterna h. hirundo* Linné
[*fornicatus* (Olfers), 1816.....	*Sterna h. hirundo* Linné]
[*5-maculatus* (Piaget), 1885.....	(*Chelidon u. urbica* (Linné)]. In error

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