

***Philonotis capillaris* Lindb. and *P. arnellii* Husn.; one moss, two names**

Timo KOPONEN* & Pekka ISOVIITA

Botanical Museum (bryology), P.O. Box 7,
FI-00014 University of Helsinki, Finland

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Abstract – *Philonotis capillaris*, described by S. O. Lindberg in 1867, has been variously treated. Some authors considered it to be a small form of *P. marchica*, but Lindberg himself combined it as *P. fontana* var. *capillaris* on the basis of its spreading perigonal leaves, which are erect in *P. marchica*. P. T. Husnot was confused by Lindberg's solution and described the same taxon as *P. arnellii* in 1890. Many new related species were soon described, and for a while some authors accepted both *P. capillaris* and *P. arnellii*. H. N. Dixon provisionally synonymised *P. arnellii* with *P. capillaris* in 1896, while L. Loeske (1906) and M. G. Dismier (1908) did this definitively. Nonetheless, while North American floras and checklists unanimously use the correct name *P. capillaris*, the name *P. arnellii* is still used in almost all recent European floras and checklists. The latter name has until now been cited from Husnot's "Muscologia Gallica" (Jun-Jul 1890), but the valid publication by Husnot in *Revue Bryologique* (Apr-Mai 1890) antedates this. Here we clarify, based on that correct protologue and Husnot's letters to S. O. Lindberg and V. F. Brotherus, why Husnot described *P. arnellii*.

V. F. Brotherus / History / T. Husnot / S. O. Lindberg / Mosses / *Philonotis arnellii* / *Philonotis capillaris* / Nomenclature / Synonymy

INTRODUCTION

This circumpolar, temperate and boreal moss was described and named *Philonotis capillaris* by Lindberg (1867) from Danish and Swedish material; however, the validity of that first publication has been questioned. Crum *et al.* (1973) attributed the name to Lindb. ex C.J.[sic] Hartm. (1871), while Crum & Anderson (1981) and Allen (2002) explained that *Philonotis capillaris* Lindb. (1867) is a *nomen nudum* and that the name was only validated by Hartman (*i.e.* C. Hartman, 1871).

A later name, *Philonotis arnellii*, was published by Husnot (1890a, b) on the basis of specimens from Sweden. *P. arnellii* Husn. has been synonymized with *P. capillaris* by numerous contemporary European (e.g. Dixon & Jameson, 1896 provisionally; Dismier, 1908, 1910; Brotherus, 1909, 1923, 1924; Mönkemeyer, 1927) and recent, especially American, authors (Anderson *et al.*, 1990; Allen, 2002), doubtless on taxonomically good and nomenclaturally correct grounds. In spite of the unanimous acceptance of *P. capillaris* by American bryologists, the

* Correspondence and reprints: timo.koponen@helsinki.fi

name *P. arnellii* is still used by the majority of recent European authors. The present article aims to elucidate the reasons for this confusing practice and to encourage a uniform usage on both continents.

***PHILONOTIS CAPILLARIS* LINDB.**

In the protologue of *Philonotis capillaris*, Lindberg (1867) did not cite specimens accurately, stating only that the plant grows in Denmark and Sweden. The description of *P. capillaris* is similarly very short. In the same paragraph Lindberg first states that the moss named by him as *P. parvula* [*nomen nudum*] in 1859 must be regarded as a variety of *P. muehlenbergii* (Schwägr.) Brid. and then continues as follows:

“Ob aber *Ph. Muehlenbergii* von *Ph. marchica* hinlänglich verschieden sei, wage ich noch nicht zu entscheiden; es scheint mir jedoch so. Desgleichen ist mir noch eine andere Art derselben Gattung etwas unklar, welche auf nacktem Boden Schwedens und Dänemarks wächst; sie ist beinahe haarfein mit äusserst schmalen Trieben und sehr ausgezeichnet, steht aber unter europäischen Formen der oben genannten am nächsten. Von dieser, welche ich in meinem Mss. von 1865 als *Ph. capillaris* beschrieben habe, besitze ich leider nur ein einziges und unvollständiges Fruchtexemplar und sehr wenig männliche, dagegen sind die sterilen weiblichen minder selten.”

Lindberg's (1867) characterisation of *Philonotis capillaris*, “sie ist beinahe haarfein mit äusserst schmalen Trieben und sehr ausgezeichnet”, is a sufficient description, and the name was accepted in “Index Muscorum” (Wijk *et al.*, 1967, 1969) as the basionym of *P. fontana* (Hedw.) Brid. var. *capillaris* (Lindb.) Lindb. Crosby *et al.* (1999) also attributed *P. capillaris* to “Lindberg, 1867”, and it is certainly not a bare *nomen nudum*. Nonetheless, the name is not validly published if it is obvious that “it is not accepted by the author [Lindberg] in the original publication” (see Art. 34.1(a) of the Code, McNeill *et al.* 2006). As to this nomenclatural point of view, instead of directly presenting his current opinion Lindberg stated that in a manuscript of 1865 he had described the species as *P. capillaris*. Similar expressions of names newly established in his earlier manuscripts are not unusual in Lindberg's protologues. He was an absolute defender of the priority principle and approved *nomina nuda* and other invalidly published names as well as manuscript names (Isoviita, 1966: 209). Lindberg's reference to his “Mss. von 1865” is intended to show that the name *P. capillaris* got priority in 1865. There is no doubt that Lindberg still accepted it in the 1867 publication. On the other hand, his slight taxonomic hesitation in 1867 concerning the somewhat unclear (“etwas unklar”) species status seems to be due merely to him not having available a specimen with complete sporophytes, *i.e.* with old capsules. In any event, the last sentence of the Article cited above states: “Art. 34.1(a) does not apply to names published with a question mark or other indication of taxonomic doubt, yet accepted by their author”. This provision confirms that such a hesitation alone cannot invalidate the 1867 publication.

Even if Lindberg's (1867) first publication is not considered acceptable, *Philonotis capillaris* was validated as *Bartramia capillaris* “S. O. Lindberg (in litt.)” by T. Jensen (1868) and, independently, as *Philonotis capillaris* (Lindb. *ex* T. Jensen) Milde by Milde (1869). In spite of the latter not citing T. Jensen (1868), under Art. 33.3 of the Code Milde's name can be regarded as a validly published combination based on *Bartramia capillaris*. Furthermore, Milde also ascribed

P. capillaris to Lindberg and evidently knew Lindberg's (1867) original publication. In his letter to S. O. Lindberg (in the archives of Finnish National Library, see Koponen & Isoviita, 2005), dated in Breslau "d. 16. Febr. 68.", Milde wrote: "*Hylocomium subpinnatum* und *Philonotis capillaris* haben wir jetzt auch in Schlesien."

The citation *Philonotis capillaris* Lindb. ex C.J. Hartm. or *P. capillaris* Lindb. ex Hartm., frequently used by American authors, refers to C. Hartman's (1871) treatment in the 10th edition of the Scandinavian flora founded by his father, C. J. Hartman (1790-1849). This publication of *P. capillaris* has no nomenclatural standing since a mere homotypic isonym (as defined in Art. 6 Note 2 of the 2006 Code) is involved.

After Hartman's (1871) flora, and before the description of *Philonotis arnellii* (see below), different opinions of the status of *P. capillaris* were published. In their list of all of the mosses of the world, Jaeger & Sauerbeck (1875) cited Lindberg (1867) with a question mark, and mentioned also Milde (1869). Schimper (1876) thought that specimens from Germany and Scotland are different from the Danish plant, which is a gracile form of *P. marchica* (Hedw.) Brid. Limpricht (1876) and Molendo (1875) considered *P. capillaris* to be a variety of *P. marchica*, and Geheeb (1878) did not accept *P. capillaris* as a species. Zetterstedt (1876) maintained the specific status and presented *P. parvula* Lindb. [*nom. inval.*] as its synonym. Gravet (1883) marked *P. capillaris* Lindb. as an uncertain and insufficiently known taxon.

PHILONOTIS ARNELLII HUSN.

In standard indices such as "Index bryologicus" (Paris, 1896, 1905) and "Index muscorum" (Wijk *et al.*, 1967), as well as early and later floras (e.g., Limpricht, 1893; Warnstorf, 1905; Möller, 1925; C. Jensen, 1939; Nyholm, 1960, 1998; Lawton, 1971; Smith, 1978, 2004), the name *Philonotis arnellii* is cited from the 9th part ("livraison") of Husnot's "*Muscologia Gallica*" (1890b). However, in the same year Husnot published an article on dioicous species of *Philonotis* (Husnot, 1890a) in *Revue Bryologique* 17(3): 42-47, and *P. arnellii* is described also in that article. If published earlier than "*Muscologia Gallica*", the article in *Revue Bryologique* constitutes the real protologue. Podpěra (1954) cited also the article in the "*Revue*" and Möller (1925) mentioned it in the text.

In TL-2's entry "**3154. *Muscologia Gallica***", Stafleu & Cowan (1979) state: "Dates based on notes in Nat. Nov., Hedwigia, Bot. Gaz., Bot. Zeit, and Rev. Bryol.". The date TL-2 provides for Livraison 9 and for p. I-VIII of the entire volume including its reissued Plates 1-10 is Jun-Jul 1890, whereas all of the other 13 parts have more precise dates. Among the sources mentioned above, only *Bot. Gaz.* 15: 275 (Oct 1890), *Nat. Nov.* 12: 360 (2nd half of Aug 1890), and *Rev. Bryol.* 17(4): 60-61 (*ca* Jul-Aug 1890) can serve for dating the 9th livraison; and apparently it is the latter from which the approximate date Jun-Jul 1890 has been drawn. In the context involved, a review of Husnot's new contribution, the pages I-VIII are also mentioned and the following information is provided: "Les souscripteurs recevront en même temps que cette livraison un nouveau tirage des 10 premières planches..." (Husnot, 1890c). After all, it is quite logical that the first review of Husnot's book was published in the journal founded and edited by Husnot himself, *Revue Bryologique*, and as soon as the complete book became available.

Cahenle 14 Janvier 1883

mon cher ami

Je vous envoie aujourd'hui par la poste l'année
1884 de la Revue puisque vous avez
reçu plusieurs n^{os} en mauvais état.
Je pourrai commencer dans le n^o 2 à
publier les nouvelles que vous m'avez
(le n^o 1 paraîtra dans 8 jours).

Je vous trouverai probablement de
végétologistes désirant vous acheter des
nouveau, mais comment vous faire
parvenir l'argent ? il y a pas en
France, je crois, de mandat-poste
pour la Russie (il y en a pour la Sicile)
Je ~~ne~~ trouve ~~pas~~ que le contenu n'est
pas trop cher pour des nouveautés provenant
d'un botaniste très connu.

Si vous pouvez me fournir un
specimen de *Spica*, de la liste ci-jointe,

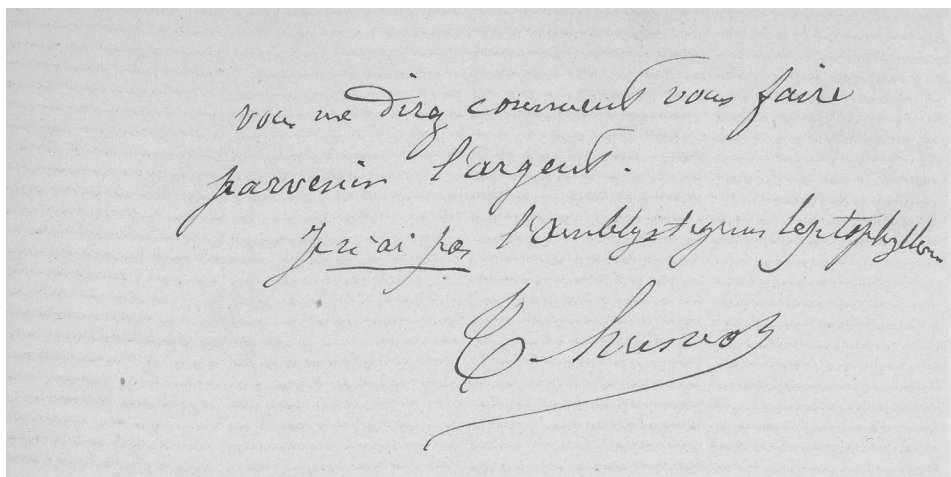


Fig. 1. P. T. Husnot's letter to S. O. Lindberg. Original in the Archives of the National Library of Finland. All letter copies are the courtesy of the National Library of Finland.

If we suppose that the six parts of each journal volume were published at regular intervals, then the publishing date of *Revue Bryologique* 17(3) might be May-June. However, the death of the Hungarian Prof. Ch. Demeter on 12th March was announced therein. Based on this, the dating of part 3 would be: 1890 (post 12 Mar). To confirm the exact publishing date, we checked 10 referring journals of those times. Many of them do not mention the volume or journal at all. Some other journals published a review or list of contents, but on rather late dates, from September-December. However, *J. Bot. (Morot)* 4(suppl. Bull. Bibliogr. 11): XLIV, published on 1st of June 1890, mentions *Rev. Bryol.* 17(3) and lists the articles by different authors, including "T. Husnot. Les *Philonotis* dioïques". Accordingly, the rather exact date of *Revue Bryologique* 17(3), and hence *Philonotis arnellii* Husn., is 12 Mar-1 Jun 1890, or in practice Apr-Mai 1890.

Husnot's protologue (1890a) is more accurate than the description in "*Muscologia Gallica*" and explains why he described *Philonotis arnellii*. One reason is that Husnot thought that Lindberg's (1867) description was not sufficient. Lindberg only mentioned that he had one fruiting specimen and a few male plants, and he did not describe them. Husnot (1890a) cited also Hartman's (1871) flora but did not give the complete citation of the text which was translated into French for him by M[onsieur] Kindberg (K. Kindberg). Husnot only repeated that the perigonal leaves of *P. capillaris* are ovate, acuminate with a strong costa and subsquarrose, and that the author was not sure whether it was a species in its own right or rather a gracile form of *P. marchica*. The author concerned in this context is S. O. Lindberg himself, who helped in writing the moss part of Hartman's flora (see Koponen & Isoviita, 2005).

Husnot's letters to S. O. Lindberg and V. F. Brotherus

In the archives of the Finnish National Library are four of T. Husnot's letters to S. O. Lindberg and seven of his letters to V. F. Brotherus (see Koponen & Isoviita, 2005; Koponen & Piippo, 2002). These letters explain what actually happened.

Lindberg (1879) published the combination *Philonotis fontana* var. *capillaris* in his “*Musci Scandinavici*”. The work was reviewed for “*Revue Bryologique*” by Venturi (1880). Husnot clearly received a letter from S. O. Lindberg, and answered (original French, Fig. 1):

Cahan, January 14, 1885

I send to you to-day in mail the volume 1884 of *Revue*, since you have received several numbers in bad shape.

I could begin publishing in number 2 the manuscript, which you will mail to me (number 1 will be published after 8 days). (Note 1)

I will probably find to you bryologists, who want to buy bryophytes from you; and how to send the money to you? In France does not exist, as far as I know, postal order to Russia (such exist to Sweden). (Note 2)

To my mind 42 cents is not too expensive for rare bryophytes, which are coming from a well-known bryologist.

If you can send to me specimens according to enclosed list, you tell me how to forward the money to you. (Note 3)

I do not have *Amblystegium leptophyllum*.

T. Husnot

(Note 1) Lindberg sent to Husnot a manuscript dated 17.9.1885 (Lindberg 1886a). However, the manuscript mentioned in Husnot’s letter was probably a longer one, “*Sur la morphologie des mousses*”, divided between three numbers of “*Revue*” (Lindberg 1886b).

(Note 2) S. O. Lindberg held a large duplicate collection of hepatics collected by himself and his students and collaborators. The aim was to continue publishing the exsiccate collection “*Hepaticae Scandinavicae*” (Lindberg & Lackström 1874). Arnell (1884a) stated in his review of the exsiccate: “As Professor Lindberg has rich materials for following fasciculi in store, it is to be hoped that the continuation will soon appear.” However, this project did not materialize during Lindberg’s lifetime. The collection was distributed more than a century after his death (Piippo 1993-1997). Before achieving independence in 1917, Finland was a Grand Duchy of Imperial Russia.

(Note 3) In the enclosed list, “*Musci desiderati*” (Fig. 2), 45 mosses are enumerated. Most of them are species described or dealt with by Lindberg, and cited by him in “*Musci Scandinavici*” or reported by Arnell (1882, 1884a, b). *Philonotis capillaris* and *P. parvula* are on Husnot’s list. Lindberg evidently did not mail the specimens requested.

During most of his life Lindberg was in poor health and in his last years he worked keenly on a number collections, such as those from Siberia (Koponen & Isoviita, 2005). He died on 20 February 1889. At that time Husnot was completing the first volume of “*Muscologia Gallica*”. He was completely confused by Lindberg’s (1879) treatment of *Philonotis capillaris* as a variety of *P. fontana*. The inner pergonial leaves of *P. fontana* are short acute to obtuse and the costa is weak, while those of *P. marchica* are long acuminate, ± erect with the costa percurrent. Husnot had not yet seen the original specimens of Lindberg’s *P. capillaris*. He sent a letter to V. F. Brotherus (Fig. 3):

Cahan, par Athis (Orne) 9 October, 1889

Dear Sir,

I ask from you if you can give me a specimen from Lindberg’s *Philonotis capillaris* with male leaves (♂). I have one M. Arnell’s specimen, but it does not correspond to what M. Lindberg, who has it only a variety of *P. fontana*, is saying. M. Arnell’s *P. capillaris* has very long and very acuminate male leaves.

Very truly yours

T. Husnot

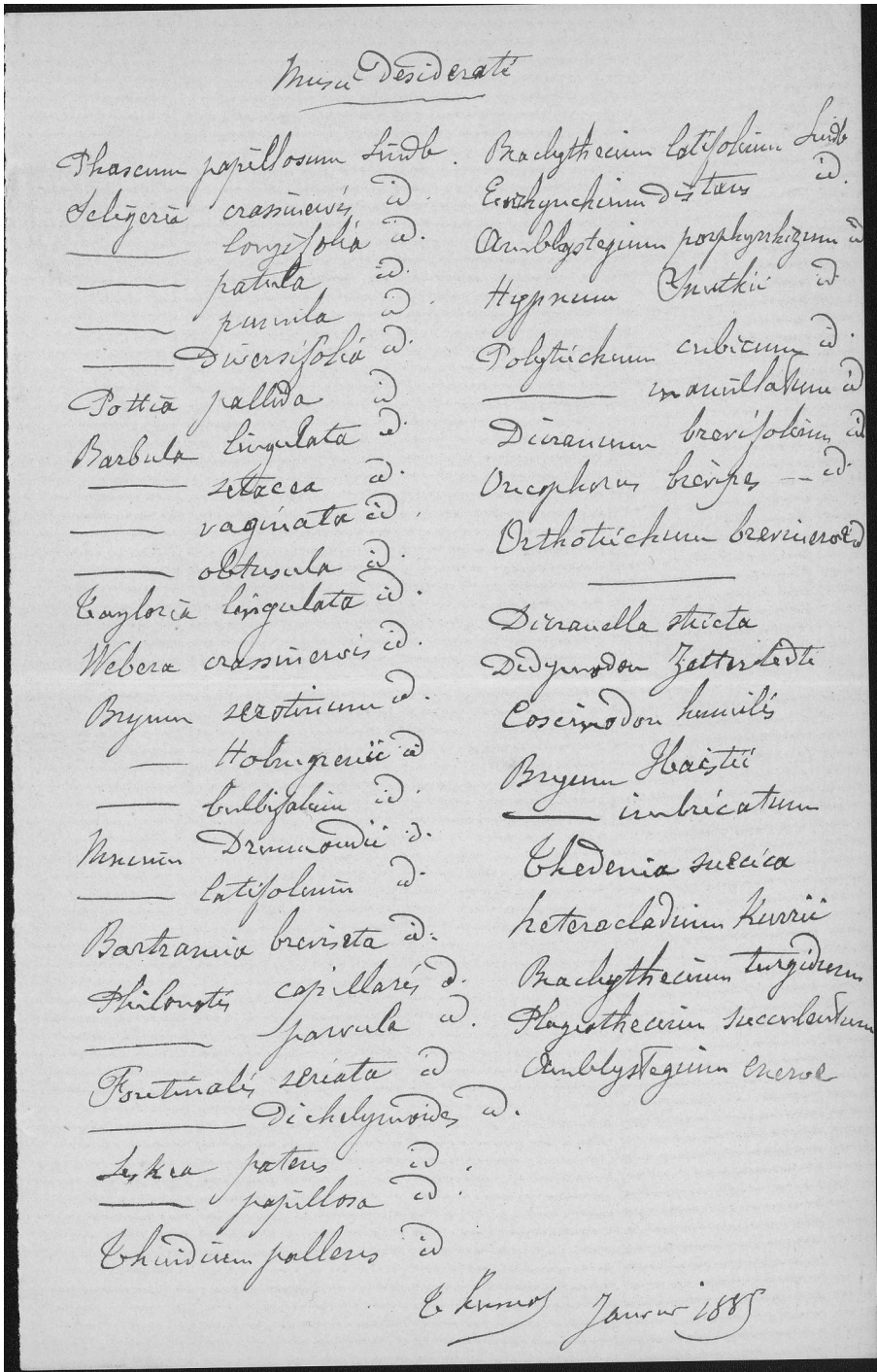


Fig. 2. Appendix "Musci desiderati" of P. T. Husnot's letter to S. O. Lindberg.

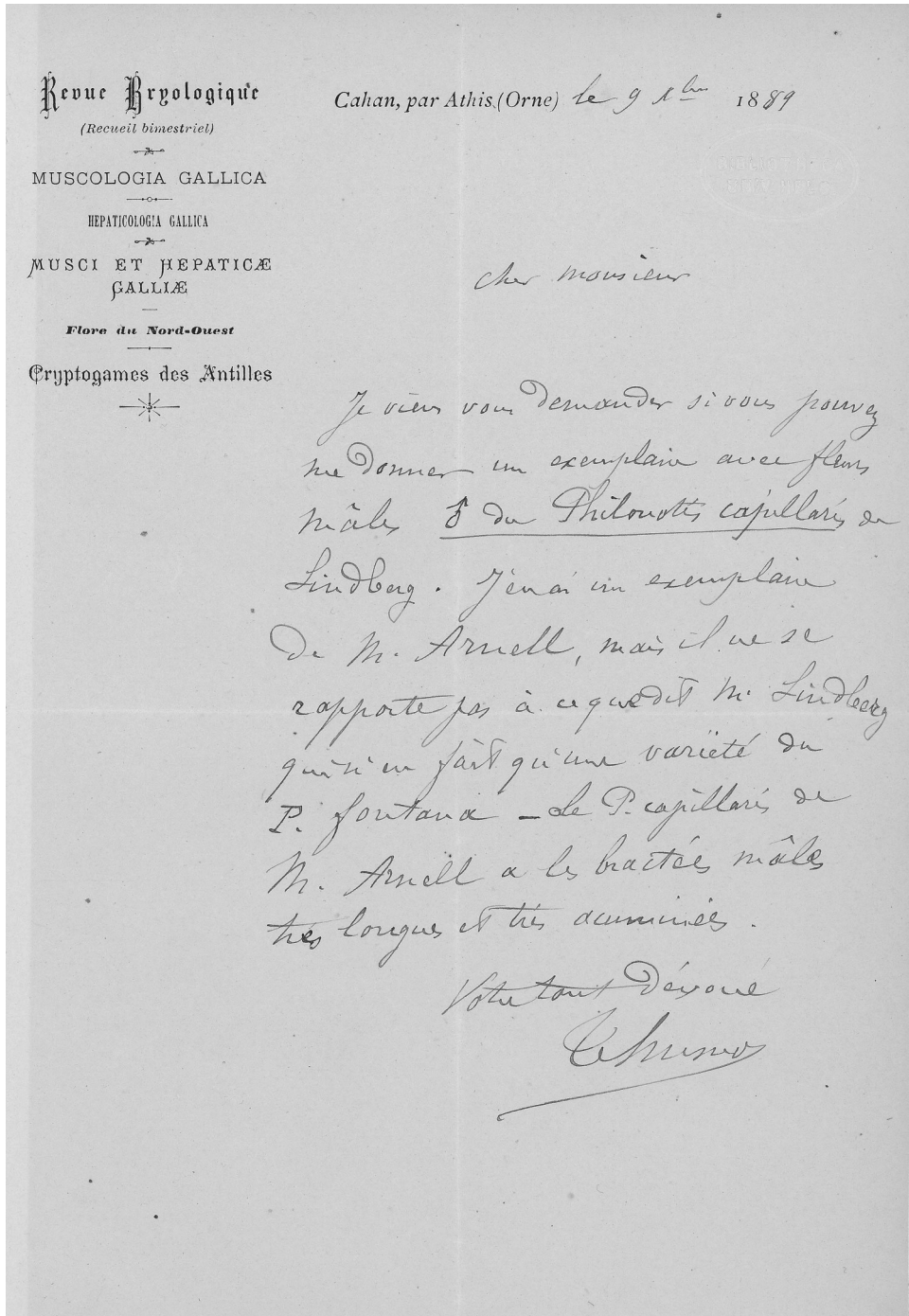


Fig. 3. P. T. Husnot's letter to V. F. Brotherus. Original in the Archives of the National Library of Finland.

Brotherus answered that the herbarium was not available (see Husnot, 1890a). The reason was probably that Lindberg kept his herbarium in three different collections: Scandinavian, European and extra-European, and Brotherus could not find the Danish and Swedish specimens. Instead, Brotherus sent to Husnot a specimen collected by R. Spruce in the Pyrenees (see the citation below) and identified by Lindberg as *Philonotis capillaris*. It may be added that V. F. Brotherus never belonged to the staff of the Botanical Museum of the University of Helsinki, but worked at home (Koponen, 1984; Koponen & Piippo, 2002).

Husnot (1890a) explained that to solve the problem of Lindberg's *Philonotis capillaris*, he had only the Spruce specimen identified by Lindberg and his note in *Musci Scandinavici* (1879). Husnot found the Spruce specimen to be different from the Swedish specimens sent to him by H. W. Arnell, and he wrote on *P. arnellii* (1890b):

“**P. Arnellii.** *P. fontana* var. *capillaris* Arnell”

“--- Je n'ai vu que des exemplaires suédois de cette variété; elle est très distincte de l'échantillon de *P. capillaris* des Pyrénées déterminé par Lindberg lui-même et qu'il considère comme une variété du *P. fontana*, je ne puis donc l'appeler *capillaris* et je lui donne le nom mon ami Arnell qui m'en a envoyé de beaux exemplaires.”

H. PHILIBERT'S STUDIES

Philonotis capillaris and *P. arnellii*

Philibert (1894) discussed *Philonotis capillaris* and *P. arnellii* at some length, and came to the conclusion that they are different taxa. He also described a third species, *P. ryanii*, in this group of mosses.

Later Philibert (1897a), after receiving more specimens, returned to the topic. He thought that a French specimen from Vals in Ardèche represented a typical plant of *Philonotis capillaris* (T. Jensen collection from Denmark), and found that the other French specimens from Normandy and Brittany, as well as Belgian and German populations of *P. capillaris*, were rather similar. Some Scandinavian plants were a little different. Philibert (1897a) solved the problem by giving different populations varietal names. The plant from Ardèche and other French specimens were named var. *gallica* and a specimen from Sweden was named after its collector as var. *thedenii*. Philibert had also received more specimens collected by Ryan in 1895 and found them rather similar to *P. capillaris*. These were named *P. capillaris* var. *norwegica*, and the T. Jensen specimen var. *danica*.

Philibert's (1894, 1897a) problem seems to be the same one Husnot had: he had not seen Lindberg's original material. Nevertheless, the original specimens of *Philonotis capillaris* and *P. parvula* had not been lost. H. Philibert asked for them on loan and published (1897b) an article “Les *Philonotis* de l'herbier de Lindberg”. The material was sent to him by Harald Lindberg, the son of S. O. Lindberg. The specimens studied by Philibert (1897b) were two sterile syntypes of *P. capillaris* (Nacka, 1861; Huddinge, 1863; see below). The third specimen contained male plants and was collected on 21 June 1874 by S. O. Lindberg in “Fennia, Ladoga, Kirpadalaks [sic, = Kirjavalaks], in fissuris latis

[sic, = satis] humosis montis Kolanaki [sic, = Kotomäki], 21. junii 1874” and named by Lindberg “*Philonotis capillaris*!! = var. *Philonotis fontanae*”. Two other specimens had sporophytes: the T. Jensen collection from Denmark (= syntype, see below) and one of the specimens collected by I. Hagen in Norway “Smålenene, Torp i Borge” in 1887 (H-SOL; S ex herb. H. Lindberg, one of the syntypes of *P. ryanii*). Philibert’s final conclusion was that the specimens from France, Sweden, Norway, Denmark and Finland belong to the same species, *P. capillaris*, except for *P. arnellii*, which occurs in a limited area in Sweden. In this way he informally synonymized *P. marchica* var. *tenuis* Boulay, *P. boulayi* Corb., and *P. ryanii* H. Philib.

***Philonotis parvula* Lindb. ex H. Philib.**

Lindberg himself was not quite sure of the identity of *Philonotis parvula*. Most of the specimens named in his herbarium as “*Philonotis fontana* var.” are *P. fontana* s.str. Two specimens named by him “var. *parvula*” are *P. capillaris*, and one is *P. tomentella* Mol. (see the list of synonymy below). A fourth specimen, “*Philonotis fontana* ! forma ad var. *parvulam* Lindb. – [Finland.] Lojo, Skraatila, ad rup. fiss., 2.VIII.1878 S.O.L.”, is *P. fontana* s.str. Philibert (1897b) had these four specimens at hand and discussed them at length, finally describing *P. parvula* and *P. parvula* var. *bomanssonii*.

THE USE OF THE NAMES *PHILONOTIS CAPILLARIS* AND *P. ARNELLII*

Philonotis capillaris and *P. arnellii* have been accepted differently in different areas and at different times. In continental European literature the name *P. arnellii* has been most frequently used. Limpricht (1893) seems to have been the first to accept *P. arnellii* and, at the same time, Lindberg’s (1879) own solution at the varietal level as *P. fontana* var. *capillaris*. Accordingly, Limpricht has the same taxon as a species and as a variety of another species. Bryhn (1899) accepted *P. capillaris*, *P. arnellii* and *P. ryanii* and described a fourth taxon in the group, *P. media*. In common with a few other bryologists, Paris (1896, 1905) cited *P. capillaris* from Lindberg (1867) and accepted Husnot’s *P. arnellii* as a separate species. Several early writers (e.g. Roth, 1904; Warnstorf, 1905) as well as a great number of more recent floras and checklists (e.g. Podpěra, 1954; Pilous & Duda, 1960; Gams, 1973; Corley *et al.*, 1982; Frahm & Frey, 1983; Ochyra *et al.*, 2003) called this moss *P. arnellii*. Some new floras and checklists (Casas *et al.*, 2006; Aleffi *et al.*, 2008) refer to the latest European checklist of mosses (Hill *et al.*, 2006) where the name *P. arnellii* is used.

To replace *Philonotis capillaris*, Möller (1925) eventually introduced the name *P. arnellii* into the Fennoscandian literature. Subsequently its usage has been consistent (e.g. Weimarck, 1937; C. Jensen, 1939; Nyholm, 1960, 1998; Koponen *et al.*, 1977; Hallingbäck *et al.*, 2006, 2008). In Russian moss floras and checklists the name *Philonotis arnellii* has also been used (Abramova *et al.*, 1961; Savich-Lyubitskaya & Smirnova, 1970; Abramov & Volkova, 1998; Ignatov *et al.*, 2006).

However, Loeske (1906) had already synonymized *Philonotis arnellii* with *P. capillaris*, although maintaining the name *P. arnellii*, since “der Name *capillaris* durch seine Vieldeutigkeit aufs äusserste kompromittiert ist, so nenne ich die in Rede stehende Formenreihe *Philonotis Arnellii* Husn. emend.” After Dismier (1908, 1910) had definitively synonymized *P. arnellii* Husn. and many other names with *P. capillaris* Lindb. (see below), for a century European authors such as Rancken (1914), Brotherus (1923, 1924), Mönkemeyer (1927), Szafran (1957), Landwehr & Barkman (1966), Allorge (1974), Raeymaekers (1981), Margadant & During (1982), Orbán & Vajda (1983), Touw & Rubers (1989) and Frahm (2005) continued to use the name *P. capillaris*.

In Britain, Braithwaite (1893, 1905) treated *Philonotis capillaris* respectively as *P. fontana* var. *capillaris* and as a species. Dixon & Jameson (1896) also accepted *Philonotis capillaris* at the specific level and discussed the status of *P. arnellii* and *P. ryanii*. The taxa are separated mainly on the basis of the position of the perigonal leaves and their costa. They came to the conclusion that “It seems probable that after all these forms will eventually have to be reunited”. Subsequently British bryologists, e.g. Dixon & Jameson (1904), Ingham (1907), Duncan (1926), Warburg (1963) and Field (1963, 1975, 1976, 1977, 1985), used the name *P. capillaris* continuously. However, recent British floras (Smith, 1978, 2004) accepted *P. arnellii*.

In North America the name *Philonotis capillaris* has been unanimously in use (Flowers, 1935; Grout, 1940; Crum *et al.*, 1965, 1973; Lawton, 1971; Ireland *et al.*, 1980, 1987; Crum & Anderson, 1981; Anderson *et al.*, 1990; Allen, 2002).

THE NOMENCLATURE OF *PHILONOTIS CAPILLARIS* LINDB.

We list below the nomenclature of *Philonotis capillaris* Lindb., including the other possibilities if that name is not accepted. We did not study all of the types involved but trust Dismier’s (1908, 1910) synonymizations and cite them. The label information is copied directly and information from the protologues is in square brackets [].

Philonotis capillaris Lindb.

Hedwigia 6: 40. 1867. — *Bartramia capillaris* (Lindb.) Lindb. ex T. Jensen, *Bot. Tidsskr.* 2: 272. 1868. — *Philonotis marchica* var. *capillaris* (Lindb.) Limpr. in Cohn, *Krypt.-Fl. Schlesien* 1: 117. 1876. — *P. fontana* var. *capillaris* (Lindb.) Lindb., *Musci Scand.* 15. 1879. — *P. fontana* subsp. *capillaris* (Lindb.) Hérib., *Mém. Acad. Sci. Clermont-Ferrand sér. 2*, 14: 284. 1899. — **Lectotype** (here designated): “359. *Bartramia*, flos masc? et foem.” Denmark. “Mellem Björnsholm og Lundgård i vejgrøft, skjult under lyng og pors, i skygge. Logstor, IV.1863” T. Jensen (“*Philonotis capillaris* Lindb. n. sp.”, H-SOL, Fig. 4a). — G. Raeymaekers marked the specimen in H-SOL as the lectotype in 1980. — **Syntypes**: Denmark. “*Philonotis capillaris* Lindb. c.fr., Maj m. 1863 lecta a Jensen” (H-SOL, Fig. 4b); “Dania, Jylland, paroecia Lögstör, in ericeto arenaceo sub *Myrica* et *Erica*, inter Lundgård et Björnsholm, unam et singulam capsulam!, Sept.

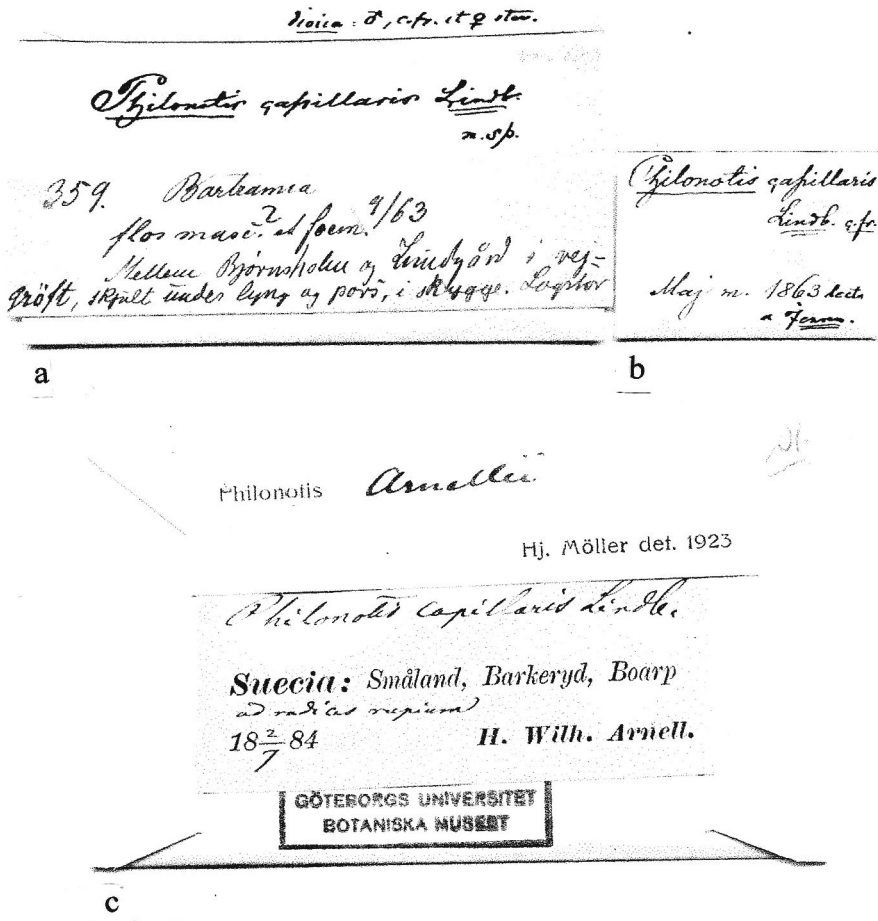


Fig. 4. Labels of the types. – a. Lectotype of *Philonotis capillaris* Lindb. – b. The tiny syntype with young sporophytes inside the lectotype cover. – c. Lectotype of *P. arnellii* Husn.

1863 leg. Th. Jensen" (S, ex herb. S. O. Lindberg). Sweden. Stockholm, Nacka in declivo arenoso, VIII.1861 S. O. Lindberg (H-SOL; fragment in S); Huddinge in abrupto argillaceo ad viam vaporariam, IX.1863 S. O. Lindberg (H-SOL); Drottningholm, foss. argil., inter *Br. annotin.*, V.1865 S. O. Lindberg (as *Philonotis fontana* var. *capillaris* Lindb.! ♂) (H-SOL; fragment in S). – Note 1.

[*Bartramia capillaris* Lindb. ex T. Jensen, *Bot. Tidsskr.* 2: 272. 1868. – *Philonotis capillaris* (Lindb. ex T. Jensen) Milde, *Bryol. Silesiaca* 242. 1869.] – Note 2.

P. fontana var. *tenuis* Boulay, *Musc. France* 1: 217. 1884, nom. illeg. incl. var. prior, *P. marchica* var. *capillaris* (Lindb.) Limpr. – **Type:** Homotypic with *P. capillaris* Lindb. – Synonymized by Dismier (1908).

P. macounii Lesq. et James, *Man. Mosses N. Amer.* 208. 1884. – **Type:** Vancouver Island, *Macoun*. – Synonymized by Dismier (1908). – Note 3.

Philonotis arnellii Husn., *Rev. Bryol.* 17: 45. Apr-Mai 1890; Muscol. Gall. 268. Jun-Jul 1890. — **Lectotype** (here designated): Sweden. Småland, Barkeryd, Boarp, ad radices rupium, 2.VII.1884 *H. Wilh. Arnell* (GB ♂, isolectotype in S ♂, “vid skuggade bergsrötter”) (Fig. 4c). — Synonymized with *P. capillaris* by Loeske (1906), Dismier (1908, 1910), Brotherus (1923), Mönkemeyer (1927), and Field (1985). — Note 4.

P. capillaris Lindb. *sensu* Husnot, Muscol. Gall. 269. 1890. — Based on: Pyrenees, Lesperou, *Spruce* (H-SOL, H; S, ex herb. S. O. Lindberg). — Synonymized by Dismier (1908). — Note 5.

P. ryanii H. Philib., *Rev. Bryol.* 21: 8. 1894. — **Type**: Norway. Skaare, Onsö, des rochers humides couverts de terre, 10.X.1893 *Ryan* (not seen). — Synonymized by Philibert (1897a) and Dismier (1908).

P. boulayi Corb., *Mém. Soc. Sci. Nat. Cherbourg* 30: 287, 1897. — Homotypic with *P. marchica* var. *tenuis* Boul. and *P. capillaris* Lindb. — Synonymized by Dismier (1908).

P. capillaris var. *thedenii* H. Philib., *Rev. Bryol.* 24: 9. 1897. — **Isotype**: Sweden. Bohuslän, Hede soldattorp i Tanums socken, VI.1878 *Hugo Thedenius* (S, ex herb. A. E. Jäderholm). — Synonymized with *P. arnellii* by Möller (1925). — Note 6.

P. capillaris var. *gallica* H. Philib., *Rev. Bryol.* 24: 9. 1897. — **Syntypes**: France. Ardèche, Vals, 1884 *Philibert* (not seen) and specimens from “des autres localités francaises”. — Note 7.

P. capillaris var. *danica* H. Philib., *Rev. Bryol.* 24: 14. 1897, nom. inval., incl. *P. capillaris* Lindb. ≡ *P. capillaris* var. *capillaris*. — Note 8.

P. capillaris var. *norwegica* H. Philib., *Rev. Bryol.* 24: 14. 1897. — **Syntypes**: The type of *P. ryanii* (not seen); Norway, 1895 *Ryan* (not seen); Norway. 1895 Norge. Smålenene, Torp i Borge, 17.V.1887 *I. Hagen* (H-SOL; S, ex herb. H. Lindberg, ex herb. S. O. Lindberg [sic!]). — Note 9.

P. parvula Lindb. ex H. Philib., *Rev. Bryol.* 24: 86. 1897 (syn. nov.). — *P. parvula* Lindb., *Hedwigia* 6: 40. 1867 (nom. nud.). — **Lectotype** (here designated): Sweden. Västergötland, inter *Amphidium Mougeotii* in fiss. rupis diabas. m. Hunneberg, VI.1859 *S. O. Lindberg* (H-SOL). — **Syntypes**: Sweden, Stockholm, arena nuda abrupta ad Petersberg, 10.VII.1869 *S. O. Lindberg* (H-SOL as *P. fontana* var. *parvula* Lindb; S); Finland. Ladoga. ins. Puutsalo, in fissum rup. 30.VI.1874 *S. O. Lindberg* (H-SOL as *P. parvula* ! Lindb.). — Note 10.

P. parvula var. *bomanssonii* H. Philib., *Rev. Bryol.* 24: 86. 1897 [& H. Philib. in Bomansson, *Acta Soc. Fauna Fl. Fenn.* 18(4): 97. 1900.] — **Type**: Finland. Ahvenanmaa (Åland). [Sund, Jussböle, fuktig jord å en klippta vid Bromans torp, 15.VIII.1865] *J. O. Bomansson* (not seen).

P. vancouveriensis Kindb., *Eur. N. Amer. Bryin.* II: 326. 1898. — **Lectotype** (here designated): N. Amer., Vancouver Island, wet rocks 26.4.1887 *J. Macoun* 192 (S, ex herb. N. C. Kindberg). — **Syntype**: Alaska, Nagai-ön, 18.IX. 1892 *J. M. Macoun* 132 (S, ex herb. N. C. Kindberg). — Synonymized by Dismier (1910). — Note 11.

P. media Bryhn, *Kongel. Norske Vidensk. Selsk. Skr.* 1899(3): 39. 1899. — **Syntypes**: Norway. Sättersdalen, Frøisnäs, i Bygland sn [ad murum viæ terra obtectum], 24.VII.1894 *N. Bryhn* (S); Prope prædium Ose, vallis Sättersdalen, Lat. sept. 59°, Alt. supra mare 300 m, [ad declivia public arenacea], VII.1895 *N. Bryhn* (S, Musci Norvegici ex herb. N. Bryhn, original!); Nedenaes amt, Kjøndalen ad terram silvaticam, 8.VIII.1891 *I. Hagen* (S). — Synonymised by Dismier (1908).

Note 1. The syntypes of *Philonotis capillaris* were collected before 1867 and the lectotype must be selected from them. One T. Jensen gathering of 1863 is the only collection having sporophytes, which were mentioned in the protologue. However,

two specimens with different dates are kept inside the specimen cover. According to T. Jensen's letter to S. O. Lindberg, dated on 2. October 1863 (in the Archives of Finnish National Library), Jensen sent several specimens collected at different times. Lindberg obviously first received a specimen collected in April 1863 without sporophytes (Fig. 4a) and later got a tiny specimen collected from the same locality in May 1863 having young sporophytes (Fig. 4b). We select the larger specimen marked as "new species" by Lindberg himself, although it has no sporophytes. A third Jensen collection originating from S. O. Lindberg's herbarium, collected in September 1863 and showing more correctly spelled locality names, is in S.

Note 2. This paragraph shows the basionym and author citation of *Philonotis capillaris* if, our argumentation notwithstanding, the validity of Lindberg's (1867) publication is not accepted. In that case, a specimen seen by T. Jensen should be designated as the lectotype. We asked for the Jensen collections of *P. capillaris* on loan from C, but have not yet received them. However, the Danish specimens used for the typification of *P. capillaris* Lindb., lectotype (Fig. 4a) and two syntypes, form quite essential part of T. Jensen's (1868) *Bartramia capillaris* material.

Although Milde did not cite T. Jensen (1868), under Art. 33.3 of the Code Milde's name can be regarded as a validly published combination based on *Bartramia capillaris* (the same applies to the subsequently published infraspecific combinations involved).

Note 3. Macoun (1892) gave the details of the type locality: "Wet places near Victoria, Vancouver Island, May 9th, 1875".

Note 4. No specimens are listed in Husnot's (1890a, b) description of *Philonotis arnellii*. According to the protologue, *P. arnellii* is based on specimens collected by H. W. Arnell in Sweden and sent by him to T. Husnot. We asked for the type of *P. arnellii* on loan from Muséum National d'Histoire Naturelle, Laboratoire de Cryptogamie (PC), where Husnot's original herbarium is kept, but it could not be located there. Fortunately, in the bryological literature the probable type gathering has been cited several times. Limpricht (1893) cited one specimen: "Wurde von Dr. H. Wilh. Arnell am 2. Juli 1884 am Fusse der Felsen bei Boarp, Barkeryd Smaland in Schweden entdeckt und als *Philonotis capillaris* Lindb. vertheilt."

Roth (1904) cited the same *Philonotis arnellii* specimen, but gave the wrong date "am 2. Juni 1884". Möller (1925) confirmed that the specimens H. W. Arnell sent to T. Husnot were mostly collected in 1884 in Småland at Boarp, in Barkeryd parish. We have seen three Arnell specimens collected in that area in 1884. Husnot's letter to V. F. Brotherus tells us that Husnot had only one Arnell specimen with male plants, which Husnot described. The preferred type on the basis of the protologue would be such a specimen. The specimen cited by Limpricht has only male plants, and, therefore, is selected as the lectotype (Fig. 4b). The other specimens collected in 1884 are syntypes.

Note 5. It is confusing that Husnot (1890b) in "Muscologia Gallica" also has *Philonotis capillaris* Lindb. As explained above, he had not seen the original specimens of *P. capillaris* Lindb. and V. F. Brotherus sent him a different specimen. As Lindberg's original type was not definitely excluded, Husnot's *Philonotis capillaris* cannot be treated as a later homonym (cf. Art. 48.1); and, moreover, its material is conspecific with *P. capillaris* Lindb. Husnot (1890b) also cited *P. marchica* var. *tenuis* Boulay as a synonym. The Spruce specimen consists of very slender plants with short, not long acuminate, leaves with a weaker costa than

is found in typical *P. capillaris*. This variety was synonymized directly with *P. capillaris* Lindb. by Dismier (1908).

Note 6. Philibert (1897a) states that he got the specimen of *Philonotis capillaris* var. *thedenii* from “M. Jaderholm”. On the label of the isotype, “*Philonotis capillaris* var. *Thedenii* Philib. Rev. Bryol. 1897 pag. 9” is cited.

Note 7. *Philonotis capillaris* var. *gallica* is not listed in Index Muscorum (Wijk *et al.*, 1967, 1969) nor in subsequent lists of moss names (Crosby *et al.*, 1992 etc.).

Note 8. *Philonotis capillaris* var. *danica* is not listed in Index Muscorum (Wijk *et al.*, 1967, 1969).

Note 9. *Philonotis capillaris* var. *norwegica* is not listed in Index Muscorum (Wijk *et al.*, 1967, 1969) nor in subsequent lists of moss names (Crosby *et al.*, 1992 etc.). — Hagen had named his specimen as *P. marchica*, but S. O. Lindberg identified it as *P. capillaris*. Philibert (1897a) mentioned the specimen and Lindberg’s opinion. On the H-SOL specimen probably H. Lindberg added: “is according to Philibert *Ph. Ryani* Philib. in litt. 18.10.97” (original Swedish).

Note 10. The name *Philonotis parvula* Lindb. *nom. nud.* (1867) had appeared in the literature many times (e.g. Hartman, 1871; Schimper, 1876; Zetterstedt, 1876; Lindberg, 1879; Venturi, 1882; Bomansson & Brotherus, 1894). The specimen of *P. parvula* collected on 10.VII.1869 was listed under *P. capillaris* by Hartman (1871). Norrlin’s (1878) *P. parvula* from Lake Ladoga is *P. tomentella*.

Note 11. The lectotype of *Philonotis vancouveriensis* was identified as *P. tomentella* by L. Loeske and H. Möller (in 1923). The plants have smooth lower leaf cells and distal leaf cells with papillae at the upper cell ends. The serration of the leaf margins comprises single teeth or else they are partially biserrate. The double mammillate marginal teeth present in the species of section *Philonotis* are lacking. The syntype from Alaska is *P. tomentella*, also so identified by H. Möller in 1923. W. M. Zales identified the specimen as *P. fontana* var. *fontana* in 1973.

Identification of *Philonotis capillaris*

The characteristics by which *Philonotis capillaris* has traditionally been separated from other species of *Philonotis* are the small size, shape and position of the perigonal leaves, narrow vegetative leaves gradually tapering to filiform apex, the serration of the leaf margin and the position of the papillae or mammillae on leaf cells. It has mostly been compared and mixed with *P. marchica*, *P. caespitosa* and *P. tomentella*. The latter two taxa have the papillae or mammillae of the leaf cells at the proximal cell end and usually have double mammillate teeth on the lower leaf border (see Koponen 2003), while in *P. capillaris* the lower leaf margin is smooth and the margin in the mid to upper leaf is serrate or indistinctly biserrate. The papilosity in *P. capillaris* is variable. In most specimens studied the leaf cells in the lower half of the leaf are smooth and the cells of the narrow leaf apex have distinct papillae at the distal cell end or else the distal ends are bulging. However, in some specimens (e.g. in the lectotype of *P. vancouveriensis*) the leaf cells in the lower half of the leaf have distinct papillae, which may be at the proximal cell end or else central on the cell.

In the standard floras (Crum & Anderson, 1981; Nyholm, 1998; Smith, 2004) *Philonotis capillaris* is separated from *P. marchica* by its smaller size. *P. capillaris* is 0,5-1,0 cm tall with leaves 0,5-1.1 mm long; *P. marchica* is 1-5 cm tall with 1,3-2,3 mm long leaves. The cell shape at the leaf apex is oblong or rectangular, 2-4:1 in *P. capillaris*, while the cells in *P. marchica* are linear. The most reliable diagnostic character seems to be that only the distal leaf cells are papillose in *P. capillaris* (see above however), while cells are linear and distinctly mammillose throughout or almost throughout the leaf in *P. marchica*.

Selection of illustrations

Möller 1925: 11-15, figs. 4-10, as *Philonotis arnellii*; Landwehr & Barkman, 1966: 360, fig. 311; Lawton, 1971: Pl. 115: 12-16; Smith, 1978: 460, figs. 10-13, as *P. arnellii*; Crum & Anderson, 1981: 652, fig. 309 A-C; Raeymaekers, 1981: 22, figs. 11-14; Nyholm, 1998: 259, fig. 217 B, as *P. arnellii*; Smith, 2004: 648, figs. 10-13, as *P. arnellii*.

Selection of specimens studied

In addition to the type specimens cited above, we here list some *Philonotis capillaris* specimens which have been discussed in the literature.

Sweden. Småland. Boarp i Berghagen. Vid bergsrötter, 25.VII.1884 H. W. Arnell (S ♂, ♀, UPS ♂, ♀); Boarpsberget vid Karlstorp. I en fuktig skrefva, 16.VIII.1884 H. W. Arnell (UPS ♂). — These might be among specimens sent by Arnell to Husnot and possible syntypes, but there is no evidence of that. In addition, there are three specimens collected by Arnell in the same area in 1885 (H, S, UPS),

Sweden. “Vg. Hunneberg, ofvan Nygård, rarissime” 22.VII.1875 J. E. Zetterstedt. — Zetterstedt (1876) gave the collection as *P. capillaris* and considered it identical to *P. parvula*, which S. O. Lindberg had collected and published (in Hartman, 1871) from the same locality. Husnot (1890a) referred to Zetterstedt’s opinion.

Germany. Rhöngebirge, auf sandigen Waldboden der Stellberge bei Bocklet, 14.VIII.1871 G. Geheeb (S). Esterfeld (Vorder-Rhön) an Waldweg im Hisselswald (Sand), 13.X.1870 G. Geheeb (S, ex herb. S. O. Lindberg). — Geheeb (1878) came to conclusion that his specimens and many others represent a variety of *P. marchica*.

France. Sur un rocher humide, près lagare de Berjou-Cahan (Orne), Husnot, Musci Galliaë 733 (as *Philonotis marchica* Brid. Var. *tenuis* Boul.) (S).

NOMENCLATUREAL RECOMMENDATION

The reason for using the name *Philonotis arnellii* was that the epithet *capillaris* was considered confusing, having been used in different senses (e.g. Loeske, 1906). Yet, if the type method is applied such old usages are no longer important and, furthermore, morphotypes of a single species are involved in this case. We do not consider it reasonable under the current Code (McNeill *et al.*, 2006: Arts. 14 and 56) that *P. arnellii* should be proposed for conservation against *P. capillaris*, nor that the latter name could be formally rejected. There would be no logic in either of these actions and they are unrealistic since, due to the clearly increasing role of *P. capillaris* during past two years in particular, the competing

names are about equally used in the literature. As *P. capillaris* Lindb. is the correct name for this species under the Code, we absolutely recommend its use.

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