MOKSLO IR TECHNIKOS RAIDA/EVOLUTION OF SCIENCE AND TECHNOLOGY
Mokslo istorijos žurnalas/Journal on History of Science
2009
1(2): 146–167
http://www.est.vgtu.lt

THE GEO-ECOLOGICAL FINLAND: NATURAL HISTORY DEFINING THE BOUNDARIES OF A NATION

Anto Leikola

Professor emeritus of History of Science, University of Helsinki, Temppelikatu 14A 5, FIN-00100 Helsinki, Finland

Abstract. When Finland in 1809 was separated from the Swedish Kingdom and became an autonomous Grand Duchy in the Russian Empire, research on national flora and fauna and consequently on geology was intensified in the country's only university, the Academia Aboensis, which in 1828, became the University of Helsinki. Already in 1837, the area to be studied as 'Finland' was considered to comprise not only the Grand Duchy but also the East Karelian territory and Kola Peninsula in the east of Finnish Lapland. During the 19th century, applying botanical and geological criteria, several attempts were made to determine the boundaries of this 'Geo-Ecological Finland', especially in its SE corner. Although from 1917, with the Russian Revolution and independence of Finland, research was no more possible for Finnish naturalists and geologists in East Karelia and Kola, the concept remained in handbooks and maps for several decades even after 1944 when a great part of Finnish Karelia was ceded to the Soviet Union as a result of the war. Nowadays, the concept has gained new impact as collaboration of Finnish researchers with colleagues from Petrozavodsk, the capital of the Karelian Republic (earlier East Karelia), has again become possible.

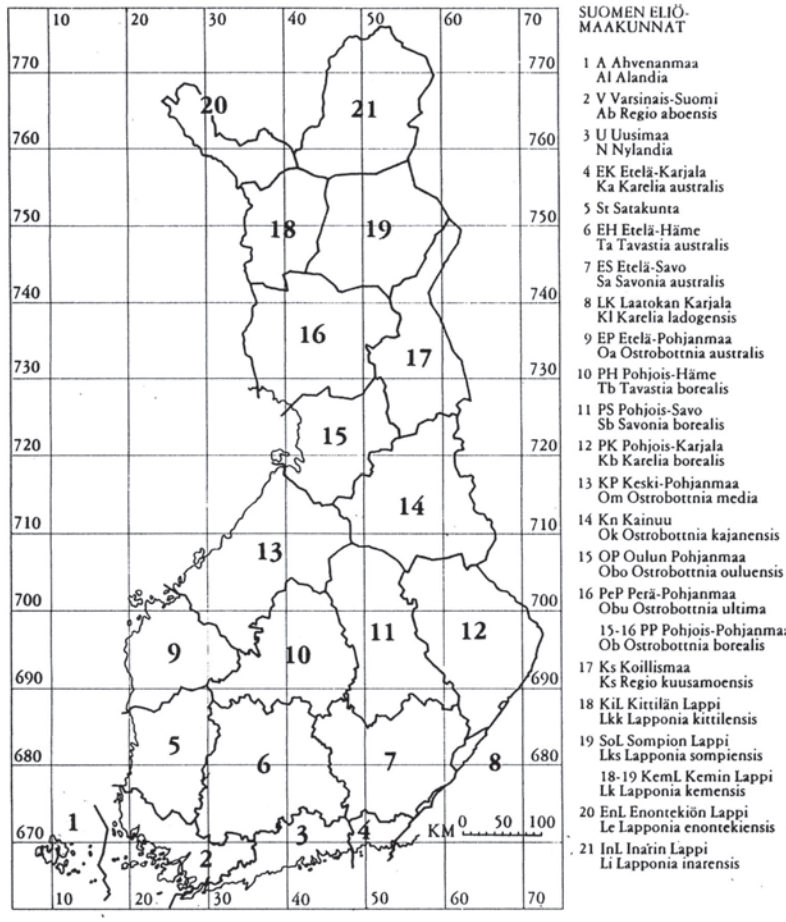
Keywords: Botany, East Karelia, fauna, Fauna and Flora Society, Fennoscandia, Finland, flora, geo-ecological provinces, geology, Kola Peninsula, Lapland, zoology.

1

The latest complete flora of Finland, *Retkeilykasvio* ("Flora for Excursions", Hämet-Ahti *et al*. 1984) shows the country divided in 21 "natural history provinces" *(Map 1).* Of these, the *Karelia ladogensis* at the SE border, comprises only two narrow stretches, which as such would not deserve the status of a province. In fact, they represent what after the World War II was left, in political Finland, of a province which extends westwards and northwards from lake Ladoga, formerly a partly Finnish, partly Russian lake and now entirely in Russian territory. If one compares the map of *Retkeilykasvio* with a similar map in its predecessor, the *Suomen kasvio* ("Flora of Finland", Hiitonen 1933), one sees immediately that three of the easternmost provinces were earlier larger than now, and two of the provinces, the *Lapponia petsamoënsis* in NE, and *Isthmus karelicus* in SE, are totally absent from present Finland *(Map 2).*

These examples illustrate the fact that the politicians with their wars and peace treaties usually do not respect the boundaries that the naturalists have drawn on their

ISSN 2029-2430 print / 2029-2449 online DOI: 10.3846/est.2009.12



Map 1. The geo-ecological provinces of Finland (Hämet-Ahti *et al*. 1984)

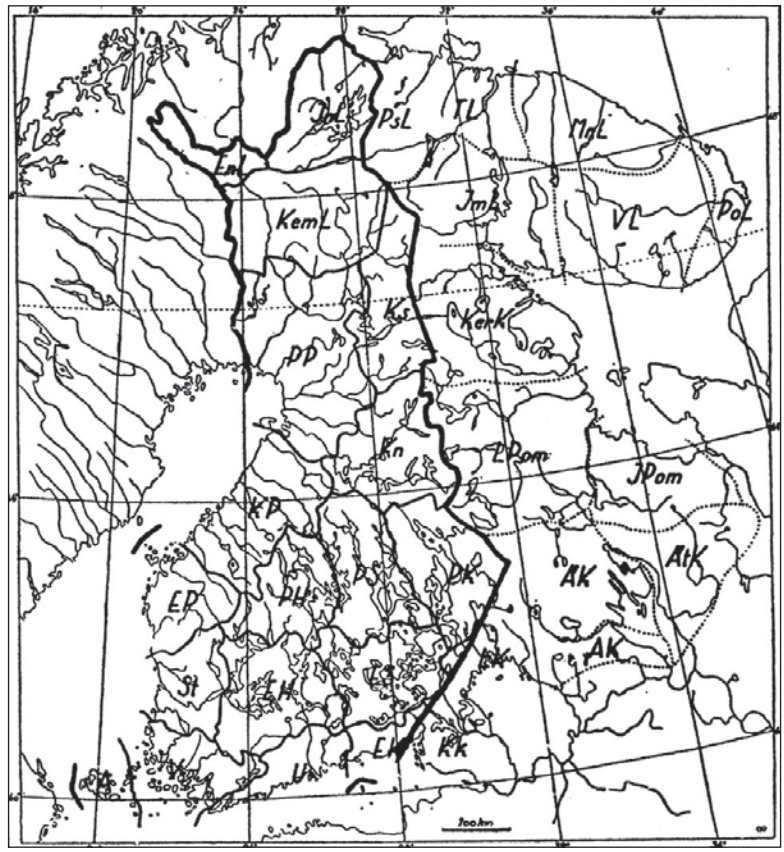
floristic and faunistic maps. Political entities have seldom "natural" frontiers, and even when one can speak of a natural frontier it is often not so natural in the eyes of a naturalist: a river or a mountain chain can unite more than divide the geological structure or the plant and animal life.

A curious attempt to overcome this problem of discrepancy between political frontiers and natural boundaries, i. e. boundaries which would make sense in natural history, was the concept of "Geo-Ecological Finland", or "Finland of natural history".

Looking at the map in Hiitonen's flora, or in any of the faunistic handbooks of the Vanamo Society in the series *Suomen eläimet – Animalia Fennica* – and this applies not only to the books of the 1930s and 1940s, but even to works like Rauno Linnavuori's handbook on Finnish Hemipterans, published in the 1960s (Linnavuori 1966–1969) – beyond the Eastern border of Finland, one finds a number of geo-ecological provinces

Al = Ahvenanmaa (Alandia).
Ab = Varsinais-Suomi (Regio aboënsis).
N = Uusimaa (Nylandia).
Ka = Etelä-Karjala (Karelia australis).
Ik = Karjalan kannas (Istmus karelicus).
St = Satakunta.
Ta = Etelä-Häme (Tavastia australis).
Sa = Etelä-Savo (Savonia australis).
Kl = Laatokan Karjala (Karelia ladogensis).
Kol = Aunuksen Karjala (Karelia olonetsensis).
[Ksv = Syvärin Karjala (Karelia svirensis)].
Oa = Etelä-Pohjanmaa (Ostrobottnia australis).
Tb = Pohjois-Häme (Tavastia borealis).
Sb = Pohjois-Savo (Savonia borealis).
Kb = Pohjois-Karjala (Karelia borealis).
Kon = Äänisen Karjala (Karelia onegensis).
Kton = Äänisen takainen Karjala (Karelia transonegensis).
Om = Keski-Pohjanmaa (Ostrobottnia media).
Ok = Kainuu (Ostrobottnia kajanensis).
Kpoc = Länsi-Pomoria (Karelia pomorica occidentalis).
Kpor = Itä-Pomoria (Karelia pomorica orientalis).
Ob = Pohjois-Pohjanmaa (Ostrobottnia borealis).
Ks = Kuusamo.
Kk = Kieretin Karjala (Karelia keretina).
Lk = Kemin Lappi (Lapponia kemensis).
Lim = Imandran Lappi (Lapponia Imandrae).
Lv = Varsugan Lappi (Lapponia Varsugae).
Lp = Ponoin Lappi (Lapponia ponojensis).
Le = Enontekiön Lappi (Lapponia enontekiensis).
Li = Inarin Lappi (Lapponia inarensis).
Lps = Petsamon Lappi (Lapponia petsamoënsis).
Ll = Tuloman Lappi (Lapponia tulomensis).
Lm = Muurmannin Lappi (Lapponia murmanica).

Map 2. The provinces of geo-ecological Finland (Hiitonen 1933)



A = Ahvenanmaa
V = Varsinais-Suomi
U = Uusimaa
EK = Etelä-Karjala
Kk = Karjalan Kannas
St = Satakunta
EH = Etelä-Häme
ES = Etelä-Savo
LK = Laatokan Karjala
EP = Etelä-Pohjanmaa
PH = Pohjois-Häme
PS = Pohjois-Savo

PK = Pohjois-Karjala
KP = Keski-Pohjanmaa
Kn = Kainuu
Pp = Pohjois-Pohjanmaa
Ks = Kuusamo
KemL = Kemin Lappi
EnL = Enontekiön Lappi
InL = Inarin Lappi
PsL = Petsamon Lappi
AK = Aunuksen Karjala
ÄK = Äänisen Karjala
ÄtK = Äänisen takainen Karjala

LPom = Läntinen Pomoria l. Länsi-Viena (LV)
IPom = Itäinen Pomoria l. Itä-Viena (IV)
KerK = Kieretin Karjala l. Pohjois-Viena (PV)
ImL = Imanteron Lappi
VL = Varsugan Lappi
TL = Tuloman Lappi
MrL = Muurmannin Lappi
PoL = Ponoin Lappi

Map 3. The provinces of geo-ecological Finland in the standard map of the zoological handbooks of the *Vanamo* Society (Linnavuori 1966)

which cover all East Karelia and the Kola peninsula *(Map 3).* Two of the easternmost, *Karelia pomorica orientalis*, and *Karelia transonegensis*, extend more than the river Onega, more than 400 km from the present frontier and well over the longitude of Moscow. In the Kola peninsula, the limits are still further to East: most of the province *Lapponia ponojensis* lies east of the longitude 40°E, and the distance from Finland to the east cost of the peninsula is about 500 km. These provinces, together with politically defined

Finland, form the entity, called the "Geo-Ecological Finland". In Hiitonen's flora, all plant species and subspecies found in this area were described; however, information about those species which were only found in East Karelia or Kola peninsula was printed in smaller characters.

It makes here no difference whether we regard as the eastern border of Finland the pre-war one or the present one. In any case, East Karelia was never politically under Finnish rule, except for the short wartime occupation period from 1941 to 1944, and even then it was not formally annexed to Finland. The notion of "Finnish natural territory", or "Geo-Ecological Finland" had for a long time been dear and natural to Finnish geologists and plant geographers. Thus, it is easy to understand how they enjoyed the succesful conquests of the Finnish army during the summer and autumn of 1941. The journal of the biological society "Vanamo", called *Luonnon Ystävä* ("Friend of Nature"), wrote in its last editorial of 1941:

"A Finnish naturalist now looks at his map with a moved, enthusiastic mind: The Olonets-Karelia, Onega-Karelia, West Pomoria, Kieretti-Karelia, Imandra-Lapland... Whatever is contained in these well-known but still foreign names, which have been faithfully included in the data of our plant and animal geography and thus have kept in our minds the picture of a great, naturally and geographically united Finland!"

Ever since that time, in nearly every issue of *Luonnon Ystävä* there were articles and news about East Karelia, "the promised land of the Finnish naturalist", as the botanist Niilo Söyrinki would characterize it (Söyrinki 1941). One feature was common in these articles: one wanted to show that the natural history of East Karelia as a whole was similar to that of Finland, and that these two areas belonged together, especially when compared to actual Russia beyond Onega and Svir. In spring 1942 the plant geographer and State nature conservation inspector Reino Kalliola held at the Finnish Nature Protection League a lecture under the heading "The Finnish face of the East Karelian nature" (Kalliola 1942). Right in the beginning he quoted three sentences from the 1941 issues of the geographers' magazine *Terra*: "As to its geological basis, East Karelia belongs to Finland...", "The Finnish plant life extends much further to East...", "The Kola Lapland and East Karelia are faunistically most tightly connected to Finland". Somewhat later he stated:

"The Greater Finland of a naturalist, in which one, without any doubt, has included not only East Karelia but also the Kola peninsula, has for a long time been a reality. Our researchers frequented Olonets and Far Karelia just as our own country, until the Bolshevik Russia made it impossible. Even after that, the eastern provinces of the Geo-Ecological Finland, Fennokarelia, have faithfully been included in all data representing the occurrence of our plant and animal species. ... These studies have deepened the old concept: as to its nature, East Karelia is a purely Finnish area."

Kalliola noted, not without reason, that the borderline between Fennokarelia and Russia would probably be the sharpest geo-ecological borderline in whole Northern Eurasia.

All this has sometimes been conceived as a part of the war propaganda, and it is self-evident that to a certain extent it reflects the wartime feelings (Savola 2000). But the notion of a geo-ecological Finland had even than a century-long history, and this history had nothing to do with military conquests.

2

Johan Ernst Adhemar Wirzén, from 1839 to 1852 the *botanices demonstrator* at the Alexander University in Helsinki (presently the University of Helsinki), is usually mentioned as the earliest protagonist of the idea of a Geo-Ecological Finland, extending well over the political frontier. He was an enthusiastic naturalist and intendent for the botanical collections of the *Societas pro Fauna et Flora Fennica*, still Finland's oldest scientific society. As a young student, he had made an excursion to Lapland and two years later another to Eastern Finland, the provinces of Savonia and Karelia, after which he stayed in Kazan, East Russia, during the years 1833–1835, collecting plants from Volga and Ural, from the Kirgisian steppes and the shores of the Caspian Sea. In 1837 he published a list of Finland's wild medicinal plants, as a specimen for his M. D. degree (Wirzén 1837). In his short preface Wirzén mentioned that there had been much discussion about the natural borders of the fatherland. For his part, he wanted to draw them in the following way:

"Occidentem versus maria, balticum et alandense sinusque bottnicus, fluvii Torneå, Muonio, Köngämä, lacus Kilpisjaur, alpes Moskana et Tschjatsekajse, sinusques maris glacialis Lyngenfjord. Versus septentrionem mare glaciale. Orientem versus mare album, fluvius Vig, lacus Vigosero et Onega. Meridionalem constituunt finem amnis Svir, lacus Ladoga, flumen Neva sinusque Fennicus."

That was all. Wirzén gave no explanations, why he had come to these lines, but it seems evident that the matter was under discussion – probably in the Fauna and Flora Society – and that Wirzén himself had noticed that the East Karelian flora was much closer to the Finnish flora than to the Russian one, with which he had made personal acquintance. Ilmari Hiitonen has characterized Wirzén's statement about Finland's "natural boundaries" as bold (Hiitonen 1958), and bold it was, especially when one thinks that not only Kola and East Karelia but also whole Finmark – northernmost Norway – east of Lyngefjord, as well as the west side of river Neva – where St Petersburg lies – were included inside the *fines patriae naturales*.

Wirzén repeated his definition of borderlines in 1843, again with no further explanations (Wirzén 1843). In the same year, Fredrik Nylander, later known as a respected physician in his home town Oulu, published a treatise, where he could report of several new plants from the Kola peninsula, as a result of his excursion to East Karelia and Kola in the previous year (Nylander 1843). After a couple of new excursions he could continue his *Spicilegium* with two new parts. What is important here is that Nylander evidently considered his new findings as Finnish plants, in the spirit of Wirzén. According to the statutes of the Fauna and Flora Society, its purpose was "to build a Finnish Museum Naturale, and to collect the necessary materials for as complete Fauna and Flora Fennica as possible" (Elfving 1921). With Wirzén's list and Nylander's travels the word "Fennica" had obtained an enlarged meaning in a very concrete way.

William Nylander was two years younger than his brother Fredrik. He began his career as an entomologist and published in the 1840s two studies about the ants and bees

of Northern Europe. At the same time he studied medicine, like his brother; however, he never became a practising physician but was appointed in 1857 to the new professorship of Botany at the Alexander University. Before that, he had studied lichens in both Helsinki and Paris and gained an international fame, which grew steadily during his four last decades as a Privatgelehrter in Paris.

In the 1850s, William Nylander made a very valuable contribution to the knowledge of Finnish flora. Sponsored by the Fauna and Flora Society, he made in the summer 1850 an excursion to the confines of Karelia in order to find our where the botanical borderline between the "Finnish" and "Russian" areas would actually be located. This problem remained unsettled for another half century, but Nylander had anyway by personal experience understood how closely the Karelian nature was connected with the Finnish one. At a dramatic meeting of the Society in December 1849 Nylander had been one of those younger members who opposed professor Alexander von Nordmann's proposal to organize a floristic and faunistic expedition to the shores of White Sea and Archangelsk. One of the arguments of the opposition was that the Society's funds were intended to domestic, not foreign purposes. On the other hand, there was, since the publication of the Finnish national epic *Kalevala* in 1835 (an enlarged version in 1849) and its counterpart of lyrical folk poems, the *Kanteletar* in 1840, a general opinion that collecting folklore from Russian Karelia had served a patriotic purpose, as this folk poetry was accepeted as Finnish regardless of which side of the political border its poems had been originated.

Combining ethnology and folklore to natural history in the theoretical extension of Finland eastwards was a relatively early phenomenon. It is important to realize that Russian Karelia and Russian Lapland – East Karelia and Kola peninsula – had no cultural centre which could have directed humanistic or scientific research in the area. Petrozavodsk, the seat of the governor of the Olonetsk province since 1802 and nowadays the capital of the Karelian Republic, had no university or academy until 1940s, and the St Petersburg Academy of Sciences did not show any remarkable interest towards north, i. e. East Karelia, a region with practically no scientific or economic value for the Russian Empire. So it became in many respects quite natural in Finland to think of the eastern areas as a kind of cultural and geo-ecological annex to Finland proper. The political frontier between Finland and Russia was of different character as the frontier between Finland and Sweden, or Finland and Norway; Finland was, after all, since 1809, a more or less autonomous Grand Duchy in the Russian Empire. Otherwise both ethnological and geo-ecological conditions could have provided good grounds to a similar "annexation" in the direction of Sweden and Norway, which to some extent actually happened in the naturalists' maps. People in Norwegian Lapland spoke – and speak – mainly Finnish and Samish, and the same applies to the eastern parts of Swedish Lapland, whereas those East Karelians who were not Russian spoke – and to certain extent still speak – mainly the Karelian language which is closely related to Finnish.

Towards the end of the 1850s the domestic collections of the Fauna and Flora Society were united with those of the University. In this connection, William Nylander, together with a young botanist, Thiodolf Saelan – later a well-known psychiatrist – compiled a "Checklist of the botanical collections of the Finnish Museum", which in June 1859 was published as *Herbarium Musei Fennici* (Nylander; Saelan 1859). For the authors of this checklist it was not enough to deal with

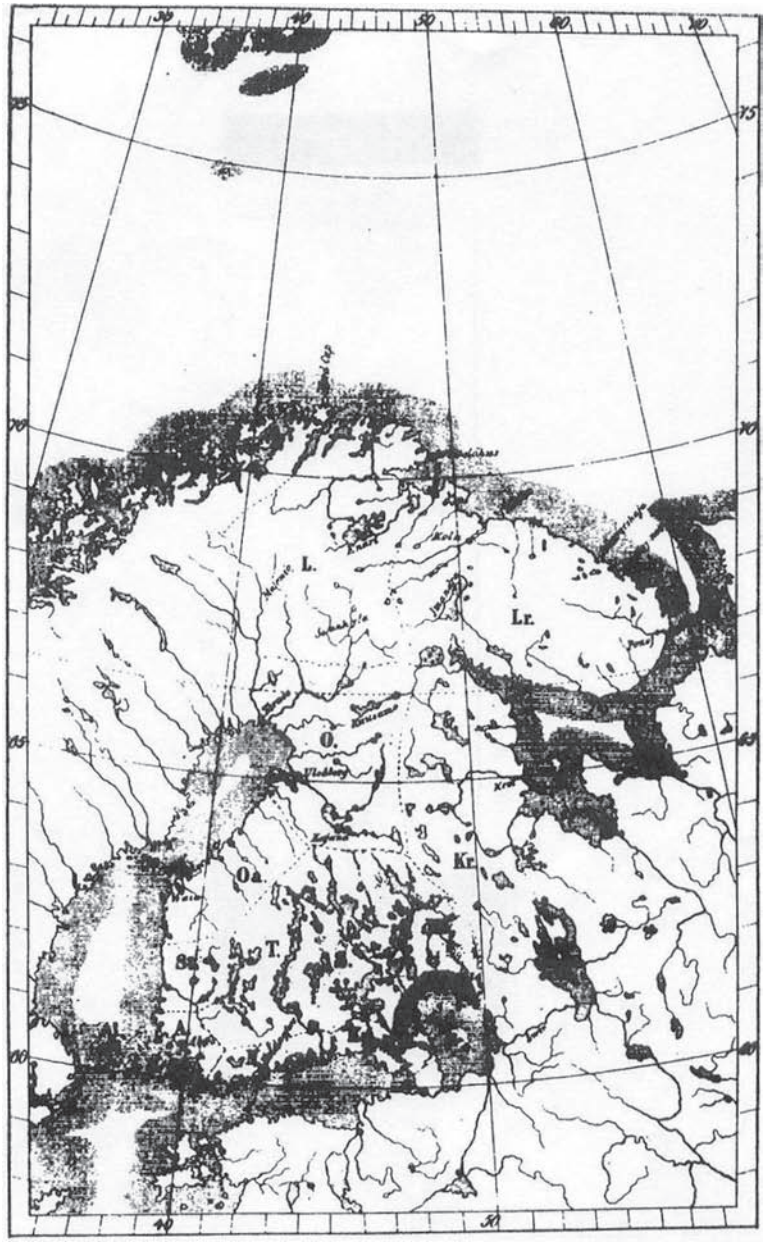
the traditional nine provinces of the country, but some of them were divided, e. g. Ostrobotnia in two and Karelia in three parts. What is here most important, Russian Karelia and Russian Lapland were included, and the map in the publication represented thus the first time the whole "Geo-Ecological Finland *(Map 4).* To quote Fredr. Elfving's words in the history of the Fauna and Flora Society, the "annexation" of Russian Karelia and Russian Lapland had become established (Elfving 1921). But also a great part of the Norwegian north coast between Porsangerfjord and Pasvik had been "annexed" as well.

The *Herbarium Musei Fennici* had a crucial importance for botanical research in Finland, for it was the first complete description of the Finnish flora. When Elias Lönnrot, the famous compiler of *Kalevala* and *Kanteletar*, published his flora *Suomen Kasvisto* (Lönnrot 1860) – the first of its kind in Finnish, he expressedly relied on Nylander and Saelan not only in systematics but also in geographical definitions, i.e. division of provinces, including the eastern "annexes", among which many parts of East Karelia were personally well-known to him.

The next flora was Otto Alcenius' *Finlands kärlvexter* (Alcenius 1863), intended for Swedish-speaking schools. The author mentioned in his preface that "those plant species, which belong only to Lapland and Russian Karelia, can with reason be excluded from this flora", which meant that although those regions belonged to the Geo-Ecological Finland – and Finnish Lapland, of course, also to political Finland, these peculiarities were not needed in a school flora. Otto Alcenius was a pioneer of Darwinism in Finland, and in the first edition of his flora he even tried to formulate a new system on phylogenetic basis, but although this attempt was not succesful, the flora was used in many new editions through generations, the last edition being printed as late as 1958 (see Leikola 2006).

3

The zoologists were, in general, ready to accept the guidelines drawn by the botanists. There was, though, no complete list on the Finnish fauna, caused to some extent by the fact that there was no unified Finnish collection of animals. As Elfving has noticed, there was no attempt to create such a collection at the museum of the University in the beginning of the 1860s. Archiater E. J. Bonsdorff, professor of anatomy and physiology, had created his own bird collection with the help of Magnus von Wright, known to posterity as a pioneering artist in Finnish painting (see Leikola 2008). Magnus von



Map 4. The earliest map of geo-ecological Finland (names of provinces in Latin, Finnish and Swedish). A: Alandia (Åland); N: Nylandia (Uusimaa, Nyland); Ka: Karelia australis (Etelä-Karjala, Södra Karelen); St: Satakunta; T: Tavastia (Häme, Tavastland); S: Savonia (Savo, Savolax); Kl: Karelia ladogensis (Laatokan Karjala, Ladoga-Karelen); Oa: Ostrobotnia australis (Etelä-Pohjanmaa, Södra Österbotten); Kr: Karelia russica (Venäjän Karjala, Ryska Karelen); O: Ostrobotnia (Pohjanmaa, Österbotten); L: Lapponia (Lappi, Lappland); Lr: Lapponia russica (Venäjän Lappi, Ryska Lappland). (Nylander, Saelan 1859)

Wright worked as a conservator at the University during the latter part of the 1840s, and he stuffed most of Bonsdorff's birds, but Bonsdorff wanted to keep his collection separate from the University's museum and also from the collections of the Fauna and Flora Society. Magnus von Wright was certainly the keenest ornithologist in Finland, comparable only to his brothers Wilhelm, Julius and Ferdinand von Wright. The first volume of his *Finlands Foglar* was published in 1859, and there he used consistently the notion of a Geo-Ecological Finland:

"The boundaries for our Bird fauna I have, similarly to several others, considered as follows: from the end of the Gulf of Finland through Ladoga, Onega and the White Sea to Varangerfjord; from there following the river Tana and then along the political frontier towards Norway and Sweden, and through the Gulf of Botnia and Gulf of Finland to the starting point" (von Wright 1859).

Somewhat later Bonsdorff himself could touch the question of the boundaries of the Geo-Ecological Finland, and in the preface to his monography on Finnish Dipterans he defined them very clearly: "As to the boundaries of our country in natural history I shall without any doubt agree with the view that has been proposed by Drawing-master M. von Wright in his recent book on Finnish birds, i. e. that this boundary in the East consists of those waterways which, through Neva and Ladoga, go up to the White Sea, and in the North it consists of the Arctic Ocean as far as Varangerfjord, thereafter westwards along the river Tana and the political frontier between Sweden and Finland, Gulf of Botnia, etc. Few countries can show so well-defined a limit in natural history for the fatherland as Finland, and this gets more importance, as the geological conditions on both sides of such boundary are rather different from each other. A boundary which thus consists mainly of waterways is from the point of view of natural history quite natural for a local fauna, and even if one here somewhat violates the political frontier, which can be variable, this violation is of an entirely peaceful nature and completely justified from the scientific point of view" (Bonsdorff 1861).

Bonsdorff could add in a footnote, referring to the outstanding Swedish botanist Elias Fries, that "the excellent Professor Friis in Upsala" had used the same boundaries for the Finnish area in natural history.

It may be worth noticing that the Geo-Ecological Finland as defined by von Wright and Bonsdorff included much less of the Norwegian North coast than the map of Nylander and Saelan, and this pointed to future ideas: Norway could keep nearly the whole Finmarken, including Varanger peninsula, and the "annexation" only applied to the South coast of Varangerfjord and the Neiden area.

A couple of years after Bonsdorff's dipterology, Anders Johan Malmgren – later professor extraordinarius, inspector of fishing, and finally governor of Oulu – published his ichthyological thesis *Kritisk öfversigt af Finlands Fisk-fauna* (Malmgren 1863). He was more particular than Bonsdorff in his definition of the boundaries of Geo-Ecological Finland. In the beginning he pointed out that the subject of the treatise was "not limited

by the arbitrary lines which politically separate Finland from surrounding countries but by the so-called natural boundaries of the country". As it was not possible to draw any natural frontiers between Gulf of Botnia and Varangerfjord, one had to content oneself with the political boundaries. But in the East the situation was different:

"In the East, from the White Sea to Ladoga, the natural frontiers are formed by the wide forest-covered heaths and sand ridges, with marshlands and bogs between them, which extend from the SW corner of the White Sea towards south-west along the western side of Lake Onega and towards the eastern shore of Ladoga."

In its closer details the borderline was as follows: East from the mouth of the river Vig, the eastern shore of the Lake Vig, from there directly towards the eastern shore of Ladoga – Lake Onega was thus entirely left on the Russian side, then over Ladoga along the political frontier, and finally over the Karelian isthmus to the Gulf of Finland:

"River Neva, the Svir valley and Lake Onega cannot be counted inside the natural boundaries of Finland, because one meets here in both fauna and flora such a mighty Central European and Russian-Asiatic element that such a boundary does not become sharp nor natural... River valleys and lakes cannot in general serve as natural boundaries, whereas wide sand fields with deep and mighty forests form a much more certain wall separating different faunistic and floristic regions."

It was, of course, evident to an ichthyologist that lakes and rivers could not serve as boundaries between different types of fish populations! But Malmgren asserted that he had not come to this borderline by an arbitrary whim or comfortable trust in authorities but by a necessity of nature itself, because everything that was found westwards of this limit was both geognostically, zoologically and botanically, and even ethnologically, typical to Finland and Scandinavia, whereas everything eastwards was Russian or Siberian. Malmgren also wanted to emphasize that he was not alone with his ideas, but all Scandinavian and Finnish naturalists who had dealt with the Finnish natural history had postulated approximately the same natural boundaries towards East. Malmgren could here mention the names of William Nylander, W. Lilljeborg, Th. Saelan, E. J. Bonsdorff and Magnus von Wright.

P. U. Sadelin had in the 1810s published, in Latin, a short checklist of Finland's vertebrate fauna (Sadelin 1810–1819), but he did not try to delineate its area; the first part of the checklist was printed only a year after the Grand Duchy of Finland had been separated from Sweden and incorporated in the Russian Empire. The next one was published more than sixty years later, and now in Finnish; that was the *Fauna Fennica – Suomen Eläimistö*, by Johan August Malmberg (Malmberg 1872), later known as Aukusti Juhana Mela, who towards the end of the century became a leading figure in Finnish biology teaching and popular biology writing, and also the founding father of the Vanamo Society. In the preface to his book, Malmberg wrote that he had included all animals which had with certainty been found in our country, but about its boundaries he said nothing. In practice, he seems, however, to have accepted the Geo-Ecological Finland as a fact. He described e. g. the common frog's geographical distribution: "From South Finland up to

the utmost Lapland (Schuretskaja)", and about the moor frog he knew that it existed in South and Central Finland and Russian Karelia. So was also the case of the wild reindeer, which was found in "Lapland, North Botnia, Russian Karelia, and also in Finnish Karelia along the Russian border." When the botanist Johan Petter Norrlin, Malmberg's close friend, reviewed the book, he noted: "There is often information about animals from Russian Karelia and Russian Lapland; the author has not defined the boundaries of our country along the political borderline but, as is common to our naturalists, removed it somewhat eastwards to Lake Onega and White Sea, where the more noticeable natural boundaries are to be found. To an experienced reader this fact about the extent of the Finnish fauna is well-known, but as the book is intended to younger readers, there should have been an explanation of it in the beginning" (Norrlin 1871). In the next edition of his book, which was considerably larger and more detailed than the first one, and where in addition to mammals, birds, reptiles and amphibians also fishes had been included, Mela explained more in detail what was meant by the Geo-Ecological Finland (Mela 1882).

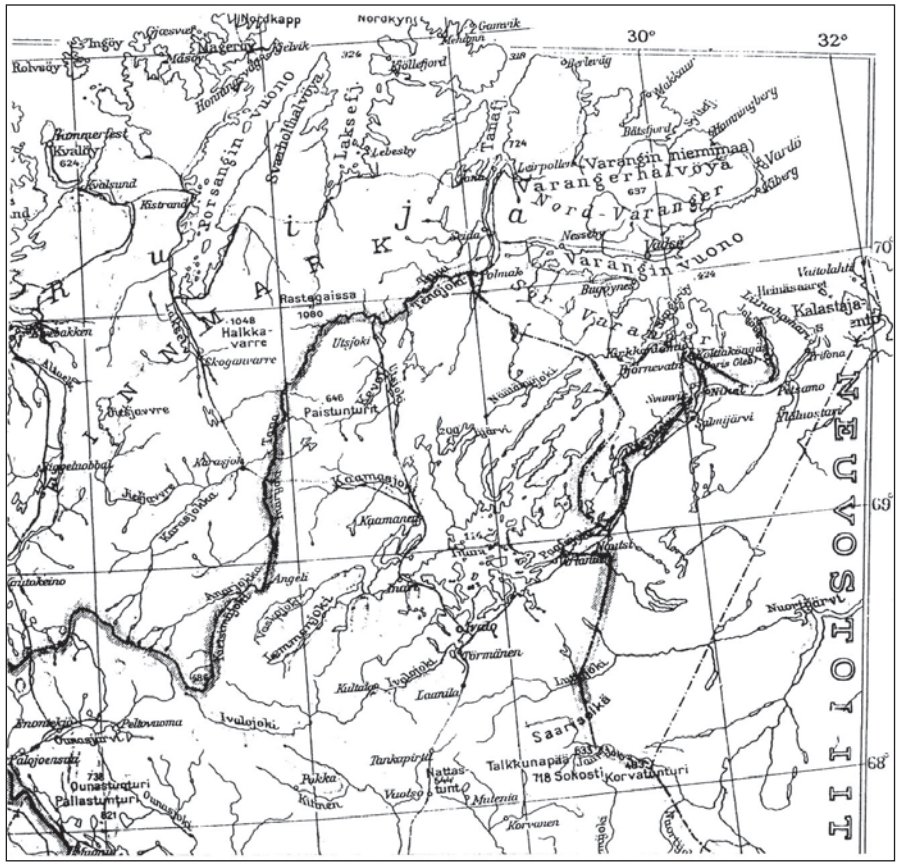
The "natural boundaries" of Finland were thus already during the 1860s generally accepted among the naturalists, and it became a commonplace for the Fauna and Flora Society to support research also on the other side of the political border. Already in 1861 Petter Karsten, the eminent mycologist, organized an expedition to Kola, supported by the Society. Two years later one of its participants, N. I. Fellman, received a grant from the University for another excursion to Kola, and at the same time two students, Th. Simming and H. Kullhem, made excursions to Onega region with the support of the Fauna and Flora Society. East Karelia and Kola peninsula became more and more conquered both floristically and faunistically by Finnish researchers, and this peaceful conquest culminated in the "Great Kola Expedition" in 1887, under the leadership of J. A. Palmén, a well-known ornithologist and the professor of zoology at the University. Among the participants were the bryologist V. F. Brotherus and the botanist A. O. Kihlman (later Kairamo), as well as the geologists Wilhelm Ramsay and A. G. Petrelius (see Hiitonen 1958, Rikkinen 1980).

It has to be admitted that not all naturalists were unanimous about the notion of Geo-Ecological Finland. Especially the entomologist F. W. Mäklin, professor of zoology from 1867 to 1883, was critical. Already in the early 1860s he declared in a lecture that as there was no "natural boundary" for the Finnish fauna and flora, one should content oneself with the political frontiers (Mäklin 1863). He pointed out that different habits and laws on both sides of the frontier also have an influence on nature – as a zoologist he had in his mind primarily the animal world – and that there were no endemic species in Finland but its flora and fauna consisted of a combination of Central European and Siberian elements. Therefore it was not so necessary that Finland should stand as a separate geo-ecological region. The majority of Finnish naturalists, however, did not agree with Mäklin's arguments.

4

In the beginning of the 1870s the northern limit of Geo-Ecological Finland was no more problematic: since there was no natural boundary, one could do with the political one. Only at the end of Varangerfjord did the political frontier come rather close to the sea, and one could thus, so to speak, legitimize a twelve kilometres long straight line from Varangerbotn westwards to river Tana (Teno), approximately along the present Norwegian highway *(Map 5).* The eastern frontier, from the White Sea to Ladoga, was much longer and more difficult, but also more important, because it was the natural boundary of the whole Scandinavian-Finnish region, and actually its only land frontier.

It was the young botanist J. P. Norrlin, one of the great names of the plant topographical research, who now took the task of finding the definitive boundary line in southeast. John Sahlberg, later a well-known entomologist and professor extraordinarius at the



Map 5. Northernmost parts of Norwegian and Finnish Lapland. The present frontiers are shown in thick lines, the frontier of Petsamo (Pechenga) towards the Soviet Union in 1920–1944 in a dotted line

University, had already in 1869 collected insects and plants in Russian Karelia and confirmed the general notion that "the whole Russian Karelia as far as to the Lake Onega and to the White Sea can most comfortably be counted as a part of Finland's geo-ecological area, because it cannot be separated from Finnish Karelia on the basis of natural conditions" (Sahlberg 1871). In 1870 it was Norrlin's turn to botanize in the Onega region, and in the first part of his *Flora Kareliae Onegensis* (Norrlin 1871) he could consider the problem of the boundary in detail, beginning with a historical introduction from Wirzén till Sahlberg. Norrlin's views were similar to those of his predecessors: the whole northeastern Europe could be divided into two regions, Scandinavia and Northern Russia. The eastern part of the first one consisted of Finland, together with Russian Karelia and Russian Lapland, of which Norrlin used the name "Russian Finland". In a footnote he noticed that the question whether the name of Finland could be extended so far eastwards had become a sensitive question, but he saw evidently no obstacles to this practice, as it was anyway scientifically quite a marginal and completely formal question.

After thorough and detailed investigations, which were of great importance to the knowledge about East Karelian flora in general, Norrlin thought that he was ready to confirm the borders of Russian Karelia. He acccepted the idea of the Baltic researcher Trautvetter that the eastern border of whole Scandinavia coincided with the western limit of the larch tree, but as this limit was located rather near the lake Onega, it was suitable to have the lake itself as borderline. From the northern shore of Onega (east from Povenets) the border should be drawn straight to Onega Bay, keeping it east from the river Vig. In southeast it was natural to have the river Svir as the border, although this area was not directly discussed by Norrlin, to whom, as he admitted himself, the Olonetsian Karelia was a relatively unknown area.

To Norrlin, Onegan Karelia and Olonetsian Karelia were two different geo-ecological provinces, and although these provinces belonged to the Geo-Ecological Finland, there was no need to draw their western borderlines exactly along the political border. A similar study was undertaken some years later by Edward Wainio, with a grant from the Fauna and Flora Society in 1875 and from the University in 1877. His results were published in his Finnish-language thesis about botanical conditions in the frontier areas of Northern Finland and Russian Karelia (Wainio 1878). Wainio, who later followed William Nylander's footsteps and became an internationally known lichenologist, divided his research area in six "regions", of which three lied on the Finnish side and three on the Russian side. But the longitudinal dividing line between these did not follow in detail the political borderline. This was again an example of how little the naturalists cared about the lines which the authorities had drawn on maps and cut down in the forests: it was far more interesting to try to find those borderlines that nature itself had created in the geology and in the vegetation.

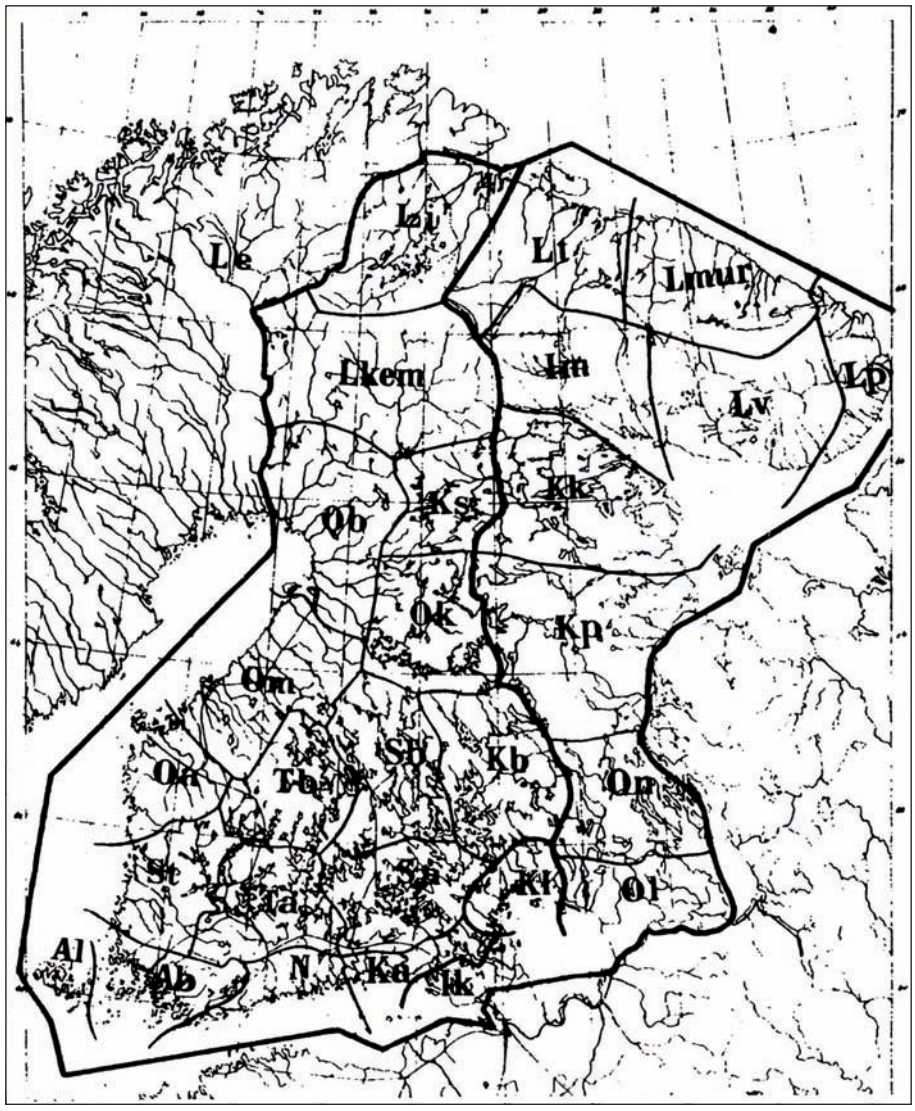
In the big map, *Mappa Provinciarum Florae Fennicae*, which was issued as supplement to the second and completely revised edition of *Herbarium Musei Fennici* (Saelan *et al.* 1889), the division of Finland into geo-ecological provinces was already nearly complete. The work for making the division as natural as possible had begun already in

1870 by a special committee consisting of six botanists and zoologists. The committee never published the map they had worked out, but the map in the *Herbarium* did not substantially differ from it, nor from the map in the first edition. The eastern part of Finmarken was, however, given back to Norway (with the exception of the Neiden area), and, what was new, the Lappish region of Enontekiö *(Lapponia enontekiensis),* which belonged, and still belongs, to Finland, was excluded from the Geo-Ecological Finland. There were valid grounds to this exclusion: the part of Enontekiö which lies north of the spruce limit was more naturally included in the adjoining parts of the Scandinavian peninsula. There are still several alpine species which, within the political boundaries of Finland, have been only found in Enontekiö, in many cases only in its NW tip, the Kilpisjärvi area, so that the present biological station of the University of Helsinki at Kilpisjärvi would stand, in the geo-ecological sense, actually outside Finland!

The eastern borderline on the *Herbarium* map was the old and safe one: from White Sea along the river Vig to the lake Onega, then along Svir to Ladoga, and over the Karelian Isthmus along the political border to the Gulf of Finland. Finland had now been divided into 19 provinces, East Karelia into 4 and Kola peninsula into 5 provinces. This division appeared also in the map which in the years 1901–1903 was included in each volume of the *Meddelanden* series of the Fauna and Flora Society *(Map 6).*

The time was now ripe for the last steps. Wilhelm Ramsay, who later became professor of geology at the University of Helsinki, had, as a graduate student, been the youngest participant in the Great Kola Expedition in 1887. He became so enthusiastic about the region that he later made no less than six different excursions to Kola peninsula and became intimately acquainted with its geology. During the 1890s he could show that Kola in fact belonged to the Scandinavian-Finnish area. Towards the end of the century he published a paper about the geological development of Kola during the Quaternary period (Ramsay 1898), and right in the beginning of his paper he proposed a common name *Fenno-Scandia* (or *Fennoscandia*) for the area which covered Norway, Sweden, Finland, Russian Karelia, the northern part of the Olonets administrative province and western part of the Archangelsk province. The name was immediately widely accepted, and it is still in common use, not least in the daily weather forecasts of Finnish radio and TV.

When Norrlin in 1897, now as a senior professor, made a long excursion to East Karelia, he became still more convinced than in 1870 that the geo-ecological boundary between White Sea and the lake Onega should be drawn east on the river Vig. During two following summers a young student, A. K. Cajander, later a pioneering forest researcher and top politician (he was Prime Minister of Finland in 1937–1939) was sent together with the somewhat older graduate student J. I. Lindroth (later Liro), who became an eminent botanist, mycologist and plant patologist, to Onegan Karelia, in order to establish once more the important boundary. The two young men travelled as far as to the river Onega and down to its mouth at the White Sea. In the annual meeting of the Fauna and Flora Society in 1900 Cajander was able to draw still another borderline for eastern Fennoscandia (Cajander 1900). He began with the old idea of the western limit of the larch tree and showed that there were quite a number of other plant species which followed the same limit. They were common in the Onega valley but seldom if



Map 6. The provinces of geo-ecological Finland in *Fauna et Flora* Society's *Meddelanden* in 1901

Map 7. The proposal of A. K. Cajander for the eastern border between Fennoscandia and North Russia (Cajander 1900)

ever seen west from it. Cajander thought therefore that the borderline should be drawn along the SE side of the Vadla valley and then northwards along the west side of the Onega valley *(Map 7).* The river Vadla was thus included but the river Onega not; the Kio island near its mouth had, however, such a Finnish nature that it could not be left outside Fennoscandia. In SE, between the lakes Onega and Ladoga, the situation was different, and casual observations, together with Fredr. Elfving's earlier description of the vegetation of the Svir valley (Elfving 1878), were enough to convince Cajander that the Svir valley should be excluded from the Fennoscandian area. "A much more natural borderline for Fennoscandia can be found a bit north from the Svir valley, at places where common moraine ridges and numerous hills and rocks give the landscape a typically Finnish character."

It did not take long before the Fauna and Flora Society accepted Cajander's new borderlines on its maps; the first one with these borderlines was printed in 1904. The Geo-

Ecological Finland consisted now of 31 provinces. Enontekiö had been smuggled back, and in the East there were two new provinces, *Karelia pomorica orientalis* and *Karelia transonegensis*. But *Karelia svirensis*, proposed by some earlier researchers, had been omitted, and the boundary went from the SW end of the lake Onega nearly straight westwards, to join the political frontier on the NE shore of Ladoga.

5

Things remained so for a decade and even longer, although the World War and the Russian revolution put rather effectively an end to all naturalistic, geographical and ethnological excursions to Russian Karelia and Russian Lapland. After the treaty in 1920 Finland received from Russia the Petsamo, or Pechenga, area in NE Lapland, and the naturalists were keen to put it on their maps: the Geo-Ecological Finland got a new province, *Lapponia petsamoënsis*, which had just been cut out from the former *Lapponia inarensis* along a very unnatural but politically adequate line. At the same time the Neiden area was "removed" back to Norway and out from the Geo-Ecological Finland, which now had 32 provinces, 11 of them outside the country's political borders. The whole area of Finland at that time was about 380 000 sq. km, and that of East Karelia and Kola peninsula about 280 000 sq. km, so that the "annexed" provinces were far more than just a narrow strip of land east of Finland.

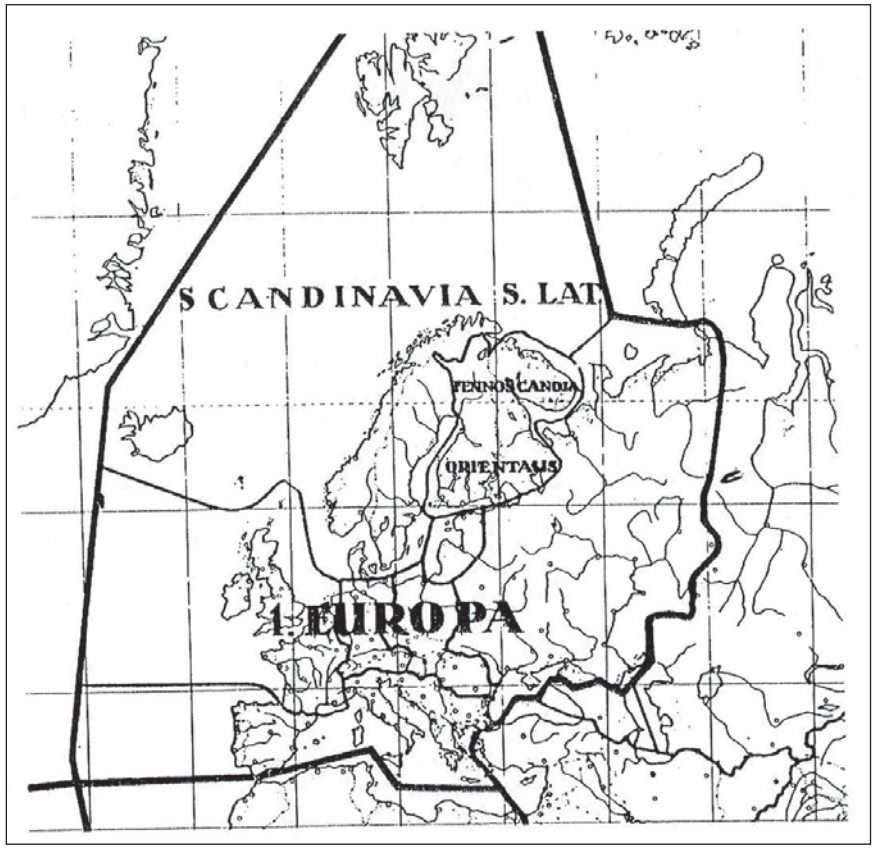
Although several Finnish, Baltic and Russian researchers had studied different aspects of the nature conditions of East Karelia and Kola peninsula during practically a century, there remained still much to do. The botanist Viljo Erkamo pointed out in the second year of the occupation of East Karelia during the World War II: "In all geo-ecological provinces of East Karelia there are still wide areas about which our floristic knowledge – even when the Russian researchers are taken into account – is very limited or completely lacking" (Erkamo 1942).

The artillery man and botanist Uuno Perttula wrote in *Luonnon Ystävä*:

"When we on the 25th July [1941] had left the fallen striped frontier poles between Käsnäselkä-Kolatselkä behind us after the burning villages and flaming forests on the Finnish side, the gates were opened to the land which had been hidden to the Finnish researchers' eyes for nearly a quarter of a century" (Perttula 1942).

The gates remained open for three years, and already during the first summer of the Continuation War (as the period from 1941 to 1944 is called in Finland, since it has been considered as a continuation of the Winter War in 1939–1940, after a year of peace 1940–1941) much biological and geographical research was performed in East Karelia, according to a program adopted by the State Scientific Committee for East Karelia. Also the Forest Research Institute began a research program in East Karelia, and the State nature conservation inspector Reino Kalliola could dream about establishing a really grand-scale national park, "Finland's Yellowstone", which would be something unique in whole Europe (Kalliola 1942).

Still in January 1944, a team of members of the Vanamo Society prepared a proposal to a stardardization of the geographical names in East Karelia and its geo-ecological provinces, and the proposal was accepted by the Society (Saalas 1946), although it never reached the Vanamo handbooks *(Map 3).* There the SE borderline had again been placed on river Svir, which was – politically – understandable, as the Finnish troops stood on the NW banks of the river until the end of June of 1944. Thereafter the guns spoke again with full force, and the last short blooming time of the Geo-Ecological Finland was over. There is, however, hope that a friendly cooperation which has already begun with good results, will continue, and Finnish, Karelian, Russian and Baltic researchers will with joint forces study the nature of Eastern Fennoscandia. (Heikkilä *et al*. 2008, Savola, Ruuhijärvi 2004, Savola 2006, Wallenius, Lavikainen 2000) This subject will certainly not become soon exhausted, although more than a hundred years have already passed since Cajander's "final word" *(Map 8)*.



Map 8. The geo-ecological division of Europe in the map *Herbarium Generale*, Library of the Department of Systematics and Ecology, Division of Botany, University of Helsinki

Conclusions

From the year 1837, Finnish naturalists considered that the area of a Geo-Ecological Finland extended far towards east from the Grand Duchy of Finland, including Russian Karelia (or East Karelia) and Kola peninsula. Several botanists, zoologists and geologists could confirm that the nature of this extension was much more like that of Finland proper but differed from the Russian nature, and the notion of Geo-Ecological Finland became a commonplace for the naturalists. In 1898 Norway, Sweden, Finland and the Russian Karelia with Kola were united to a geo-ecological whole called "Fennoscandia".

References

Alcenius, O. 1863. *Finlands Kärlvexter. Ordnade i ett naturligt system.* Helsingfors.

Bonsdorff, E. J. 1861. *Finlands tvåvingade insekter (Diptera), förtecknade, och i korthet beskrifne.* Bidrag till Finlands Naturkännedom, Etnografi och Statistik 6. Helsingfors.

Cajander, A. K. 1900. Fenno-Scandian kasvitieteellisestä kaakkois-rajasta, *Meddelanden af Societas pro Fauna et Flora Fennica* 26: 172–184.

Elfving, F. 1878. Anteckningar om vegetationen kring floden Svir, *Meddelanden af Societas pro Fauna et Flora Fennica* 2: 113–170.

Elfving, F. 1921. *Societas pro Fauna et Flora Fennica 1821–121.* Acta Societatis pro Fauna et Flora Fennica 50, Helsingfors.

Erkamo, V. 1942. Suomalaisten kasvitieteilijöiden matkareiteistä Itä-Karjalassa, *Luonnon Ystävä* 46: 134–136.

Heikkilä, R.; Ala-Risku, T.; Kondelin, H.; Laine, A. 2008. Kasvirekti Kolatselkään, Vieljärvelle ja Hiisjärvelle, *Lutukka* 24(1): 3–14.

Hiitonen, I. 1933. *Suomen kasvio.* Vanamon kirjoja n:o 32. Helsinki.

Hiitonen, I. 1958. Suomalaisten tutkijain osuus Kuollan niemimaan kasviston selvittelyssä, *Luonnon Tutkija* 69: 46–55.

Hämet-Ahti, L.; Suominen, J.; Ulvinen, T.; Uotila, P.; Vuokko, S. (Eds.). 1984. *Retkeilykasvio*. Helsinki.

Kalliola, R. 1942. Itä-Karjalan suomalaiset luonnonkasvot, *Valvoja-Aika* 20: 198–207.

Leikola, A. 2006. The First Half-Century of Darwinism in Finland. Reinhard Siegmund-Schultze, in Henrik Kragh Sórensen (Eds.). *Perspectives on Scandinavian Science in the Early Twentieth Century.* The Norwegian Academy of Science and Letters, 299–312.

Leikola, A. 2008. E. J. Bonsdorff, anatomi ja arkkiatri, *Hippokrates* 24: 51–69.

Linnavuori, R. 1966–1969. *Nivelkärsäiset. Hemiptera.* I–IV. Suomen eläimet, Animalia Fennica 10–12. Porvoo – Helsinki.

Lönnrot, E. 1860. *Suomen Kasvisto*. Koelma. Suomalaisen Kirjallisuuden Seuran Toimituksia 24. Helsinki.

Malmberg, J. A. 1872. Fauna Fennica, *Suomen Eläimistö. Nuorisolle.* I–IV. Nisäkkäät, Linnut, Matelijat ja Sammakot. Helsinki.

Malmgren, A. J. 1863. *Kritisk öfversigt af Finlands Fisk-fauna*. Akademisk afhandling. Helsingfors.

Mela, A. J. 1882. *Vertebrata Fennica – Suomen Luurankoiset.* Helsinki.

Mäklin, Fr. W. 1863. Närvarande förhållanden i vårt land, *Öfversigt af Finska Vetenskaps-Societetens Förhandlingar* 5(1857–1863): 123–143. Helsingfors.

Norrlin, J. P. 1871. Flora Kareliae Onegensis. I. *Notiser ur Sällskapets pro Fauna et Flora Fennica förhandlingar* 13 (ny serie 10) (Reprinted in Acta Forestalia Fennica 23, 1923).

Nylander, F. 1843. *Spicilegium plantarum Fennicarum. Centuria prima.* Helsingforsiae.

Nylander, W.; Saelan, Th. 1859. *Herbarium Musei Fennici.* Förteckning öfver Finska Musei Växtsamling, utgifven af Sällskapet pro Fauna et Flora Fennica. Helsingfors.
Perttula, V. 1942. Tykkimies-botanisti Aunukseen tutustumassa kesäsodassa 1941, *Luonnon Ystävä* 46: 136–142.
Ramsay, W. 1898. Über die geologische Entwicklung der Halbinsel Kola in der Quartärzeit, *Fennia* 16: 1.
Rikkinen, K. 1980. *Suuri Kuolan retki 1887.* Keuruu.
Saalas, U. 1946. *Puoli vuosisataa suomalaista luonnontiedettä. Suomalaisen Eläin- ja Kasvitieteellisen Seuran Vanamon toiminta 1896–1946.* Vanamon kirjoja 34, Helsinki.
Sadelin, P. U. 1810–1819. *Fauna Fennica sive Enumeratio Animalium, quae alit Terra Finlandiae insulaeque ei adjacentes.* Disputatio. Aboae. I. 1810. II–III. 1819.
Saelan, Th.; Kihlman, A. O.; Hjelt, H. 1889. *Herbarium Musei Fennici.* Editio secunda. Helsingforsiae.
Sahlberg, J. 1871. Hemiptera Heteroptera samlade under en resa i ryska Karelen sommaren 1869, *Notiser ur Sällskapets pro Fauna et Flora Fennica förhandlingar* 11 (ny serie 8): 277–307.
Savola, J. 2000. Sota-ajan kasvitiedettä Itä-Karjalassa, *Luonnon Tutkija* 104: 55–69.
Savola, J. 2006. Ainutlaatuisia lettosoita Lismajärven seudulla Äänisen Karjalassa, *Lutukka* 22(1): 13–16.
Savola, J.; Ruuhijärvi, R. 2004. Kasvilöytöjä Äänisen Karjalasta vuosilta 2002 ja 2003, *Lutukka* 20(1): 15–16.
Söyrinki, N. 1941. Havaintoja kyläkasvistosta Vienan Karjalassa sotakesänä v. 1941, *Luonnon Ystävä* 45: 150–164.
Wainio, E. 1878. *Kasvistonsuhteista Pohjais-Suomen ja Venäjän-Karjalan rajaseudulla.* Akatemiallinen väitöskirja. Helsinki.
Wallenius, T.; Lavikainen, A. 2000. Kuolan retki 1998, *Luonnon Tutkija* 104: 18–21.
Wirzén, J. E. A. 1837. *Dissertatio Academica Enumerationem Plantarum Officinalium Fenniam Sponte Inhabitantium Sistens.* Helsingforsiae.
Wirzén, J. E. A. 1843. *Prodromus Florae Fennicae. Periculum botanicum.* I–II. Helsingforsiae.
Von Wright, M. 1859. *Finlands Foglar, hufvudsakligen till deras drägter, beskrifna.* Bidrag till Finlands Naturkännedom, Ethnografi och Statistik utgifna af Finska Vetenskaps Societeten 5. Helsingfors.

GEOEKOLOGINĖ SUOMIJA: GEOLOGINĖS SANDAROS RIBOS

Anto Leikola

Helsinkio universiteto mokslo istorijos profesorius emeritas,
Temppelikatu 14A 5, FIN-00100 Helsinkis, Suomija

Santrauka. Straipsnyje autorius nagrinėja Suomijos geologiją. Kai Suomija buvo atskirta nuo Švedijos Karalystės ir tapo Rusijos imperijos dalimi, nuo 1828 m. ėmė veikti Helsinkio universitetas, kuriame buvo atliekami floros, faunos, o vėliau ir geologijos tyrimai. Po revoliucijos Rusijoje Suomija tapo nepriklausoma valstybe, bet didelė jos teritorijos (Karelijos) dalis atiteko Rusijai. Tolesni tyrimai čia jau buvo neįmanomi. Autorius teigia, kad Suomijoje atliktų tyrimų rezultatai taikytini Rytų Karelijai ir Kolos pusiasaliui, nes šio krašto gamta labiau būdinga Suomijai, o ne Rusijai. Tai, anot autoriaus, galėtų patvirtinti daugelis botanikų, zoologų ir geologų.

Reikšminiai žodžiai: botanika, Rytų Karelija, fauna, flora, Faunos ir floros draugija, Fenoskandija, Suomija, geoekologinė sritis, geologija, Kolos pusiasalis, Laplandija, zoologija.

Professor **Anto Leikola** made his Ph. D. as a zoologist specializing in developmental biology at the University of Helsinki in 1963. In 1972, he became a docent of developmental biology and in 1988 – a professor of the history of science at the University of Helsinki (until 1997). From 1980 to 2002, he was a docent of the history of science at the University of Oulu. He has published several books and hundreds of articles on biology and the history of science (mainly in Finnish), including the History of the University of Helsinki (as a co-author, in Finnish and Swedish, 1987–1990), *The Bird Paintings of the Brothers von Wright* (as a co-author, in Finnish and Swedish, 1986), several textbooks and translations from various languages into Finnish (including C. Darwin, W. Harvey, K. Lorenz, E. Mayr, J. Monod, D. Morris, C. H. Waddington). He is a member of several scientific and civic associations such as The Finnish Society of Sciences and Letters, The Latvian Academy of Sciences, The International Academy of the History of Science.

Prof. **Anto Leikola** 1963 m. Helsinkio universitete apgynė zoologijos mokslų (biologijos raidos specializacijos) daktaro disertaciją. 1972 m. jam suteiktas biologijos mokslų, o 1988 m. – mokslo istorijos profesoriaus vardas. Iki 1997 m. dirbo Helsinkio universitete, nuo 1980 m. iki 2002 m. – Oulu universitete. Parašė keletą knygų, kelis šimtus straipsnių biologijos ir mokslo istorijos temomis (svarbiausi – suomių kalba), taip pat Helsinkio universiteto istoriją (su bendraautoriais, suomių ir švedų kalbomis, 1987–1990), knygą „Paukščių paveikslai kraštiečių tapytojų darbuose“ (su bendraautoriais, suomių ir švedų kalbomis, 1986), išvertė keletą knygų iš įvairių kalbų į suomių kalbą (tarp jų C. Darwin, W. Harvey, K. Lorenz, E. Mayr, J. Monod, D. Morris, C. H. Waddington darbai). Jis yra kelių mokslo ir pilietinių draugijų, tokių kaip Suomijos mokslo ir literatūros draugija, Latvijos mokslų akademija, Tarptautinė mokslo istorijos akademija, narys.