ON THE LAND AND FRESHWATER MOLLUSCA OF NORWAY.

By (Miss) BIRGITHE ESMARK.

Malacological excursions may be made with the greatest ease in Norway, particularly in its southern or midland parts. You may proceed from Christiania in an easterly direction to the frontiers of Sweden, or in a northerly direction straight up to Throndhjem* ; all the way either by rail or by steamer along our coasts. In the latter case you may disembark and, if you choose, take the smaller steamers and go up whichever you please of our long and frequent fjords, and everywhere you will be sure to find forests and fields, rivers, creeks, and lakes. If you wish to proceed to the inland parts of the country you will often find the most excellent footpaths that in many instances will take you through lovely places with more or less grand scenery. The south-western part of Norway round about 'Jædderen'† has, on the contrary, quite a different appearance. It looks naked and uninteresting to the eye, but it is however not at all unlikely that you might there find a rich malacological fauna. We are led to think so from what has been found in these tracts by people who have made occasional visits there. All that is required is someone willing to sacrifice a few summer months to explore these regions.

If you go in a northerly direction you may, as stated above, proceed by rail, and you will find plenty of places very rich in malacological respects; for instance, 'Œsterdalen,' through which the river Glommen winds. Three successive summers I have visited some small part of this valley, and though I have not been able to spend more than two or three weeks each summer, I have found no less than thirty-seven species, mostly freshwater mollusca. The part between Tónset ‡ and Throndhjem is yet quite a *terra incognita* in malacological respects.

* Throndhjem = Drontheim.
† The letter "æ" is pronounced like the English "a."
‡ The "ó" is pronounced like the diphthong "œ."

From the little I have seen in 'Gudbrandsdalen,' (the valley that goes more north-westerly up to Romsdalen), I can safely say, that a careful explorer would be sure to find many interesting species ; whilst the valley of Valders is entirely unknown.

If you desire to proceed higher up towards the North, to the arctic regions of our country, you will require both time and patience, for the distance is much greater, it is no longer a question of hours but of days, when you take any excursion. From Christiania to Throndhjem by rail the distance is 560 kilometers (about 377 English miles). From the latter place you may proceed the whole way by steamer up to Vadsó, 2,134 kil. (about 1,406 miles). When going up there in 1882 I did not go further than to the parish of Lebesby in 'Laxefjord,' which is situated 2,463 kil. (1,674 miles) from Christiania, and took eight days to get there, and that seems a long time to spend merely to get to the place of your destination. These regions are however extremely attractive, not only to the tourist, but to everyone who is able to sacrifice some part of his time to study nature in one direction or another. In the latter case a visitor has also the great advantage that he can enjoy the beautiful scenery and employ his time in studying. He may do one thing, and at the same time not neglect the other ; he is even in a better position than a tourist generally is, because he gets to places where tourists seldom go.

The nature of the scenery here offered to the traveller is grand indeed. High mountains, in many places descending perpendicularly into the sea, often appearing as if they had been torn asunder. Sharp alpic peaks covered with snow, and the blue glaciers may be seen, but nowhere else illuminated by the midnight sun, which at the same time sends a play of colours on the sea and the fjords. The bottom of the valley is overgrown with trees and bushes that decrease in size the further you proceed towards the north. Our common lowland plants have frequently much greater flowers and fresher colours than in the more southern regions, and our alpic flora is grow-

ing quite down to the sea. All this must necessarily create the most vivid admiration and enthusiasm of every one who comes to see these tracts.

When you are ashore anywhere you must, however, remember that it is not an easy matter to go from one fjord to another. Even with a steamer it may take you from twelve to eighteen hours. And in places where you cannot take the steamer, but must have a boat, you will find it exceedingly wearisome in spite of the soft and pleasant couch of blankets and reindeer skins, that your boatmen have prepared for you, as the passage may last from sixteen to twenty, nay, even up to thirty hours.

In the easterly parts of Finmarken—except in the South Varanger—you must necessarily limit your excursions to the sides of the valley, on the tops of the mountains you would find nothing but naked rocks. In other places where the mountains are more cut and less cohesive, you will find greater and lesser inlands, there you may ascend higher and find *Pisidium* in the mountain lakes—in some places even *Limnæa*. But you will certainly find the road up very difficult, for to tell the truth, there is no road at all; you must proceed over rocks, through swampy moors, wade through snow and rivers to reach the lakes.

And then we must remember that the species found do not correspond with the exertions. They can, at any rate, not be compared with what we find in the more southern parts of Norway. But on the other hand, they are often of much greater interest, and sometimes you will feel rewarded for all your trouble in finding a great number of specimens.

The districts that are more or less examined, are altogether very few and of very little extent. The valley of Christiania (Christianiadalen), that is to say, the town itself and the surrounding parishes, must be said to have been examined the best, and yet, even there, a great deal is left undone. Excursions have also been made towards Drammen, to Modum, Ringerige, and the east side of Tyrifjorden. The Skiensfjord,

where the small places Langesund, Brevik, Statelle, Porsgrund, and Skien are situated, would certainly continue to reward a zealous investigator. The whole south-western country to Christiansand has only had a few day's examination, which were of great interest. In Bergen and its neighbourhood, H. Friele has now and then found something, but I do not believe that these places have been more particularly examined. In the diocese of Throndhjem nothing has as yet been done; and what has hitherto been collected on the whole long coast line of Nordland and Finmarken, is so little, and in so few places, that we may safely say, as a whole, only a good beginning has been made.

The peculiar form of Norway from 58° to 71° 25″ north lat. gives a very long coast line, which besides in many places is cut through with a very great number of small and large fjords, in most cases excelling more through their length than breath. They are in many parts surrounded by high mountains, particularly in the dioceses of Bergen, Nordland, and Tromsó Amt.

It must consequently seem to be a matter of course, that the temperature must differ very much in Norway, and that the higher you go towards the north the colder the climate must be, as we thus more and more approach the coasts of the arctic seas, and even reach them. How is it then possible to fancy anything but ice and snow in these parts? It is, however, not at all the case. On the contrary, the temperature differs very much from this supposition. As it might therefore be of interest to many of the readers who have no opportunity to study the meteorological relations of our country through annals or experience, I have copied down a table from those edited by the Metereologiske Institut in Christiania. The places have been chosen (1) according to their different degrees of latitude, (2) as lying inland or more near the coast, (3) according to the altitude of the places.

THE MEAN TEMPERATURE OF 23 DIFFERENT PLACES OF NORWAY IN DEGREES OF CELSIUS.

Month.	Karasjok	South Varanger.	Vardö.	Kistrand.	Gjesvær.	Alten.	Tromsö.	Andenes.	Bodö.	Kanen.	Brönö.	Christiansund.	Ålesund.	Florö.	Sogndal.	Bergen.	Skudesnæs.	Mandal.	Christiania.	Elidsvold.	Tönset.	Dombaas.	Röraas.
North Lat.	69°30	69°40	70°22	70°25	71°6	69°58	69°39	69°20	66°30	66°15	65°20	63°8	62°30	61°35	61°25	60°20	59°1	58°	59°49	60°25	62°20	62°13	62°35
January ...	*16 6	*11 1	*5 7	*6 6	*4 1	*8 3	*3 5	*1 5	*2 2	*4 2	*0 8	0 9	1 6	1 2	*2 5	0 6	1 4	*0 7	*4 8	*7 2	*13 3	*9 6	*11 9
February...	*16 0	*12 6	*6 5	*7 8	*5 3	*9 5	*4 3	*2 9	*3 2	*5 2	*1 7	0 3	1 2	0 6	*2 3	0 2	0 9	*0 9	*4 9	*7 7	*11 3	*9 0	*11 1
March ...	*10 6	*8 7	*5 0	*5 5	*4 2	*6 7	*3 5	*2 3	*1 9	*2 8	*0 3	1 1	1 8	1 3	*0 5	1 5	0 6	0 6	*1 6	*4 1	*7 5	*6 3	*8 2
April ...	*3 9	*3 3	*1 8	*2 0	*1 7	*1 8	*0 7	0 2	1 1	1 2	2 3	3 7	4 1	4 2	4 4	5 0	4 7	4 3	3 8	1 7	*0 6	*1 1	*2 7
May ...	2 9	2 2	1 5	2 6	2 5	3 2	3 7	4 1	5 3	5 9	6 2	7 1	7 2	7 9	9 7	9 0	8 3	9 2	9 8	7 8	5 2	4 5	3 3
June ...	9 8	8 0	5 9	7 9	6 3	8 7	8 5	8 3	9 8	10 7	10 3	10 9	10 7	11 6	14 2	12 7	11 9	13 4	14 7	12 7	10 8	9 8	9 1
July ...	13 7	12 1	8 7	11 4	10 1	12 7	11 2	10 5	12 4	13 2	12 8	12 8	12 6	13 4	15 7	14 3	13 7	15 4	16 6	14 4	12 8	11 8	11 2
August ...	12 3	11 7	9 4	10 6	10 0	11 8	10 8	11 1	12 2	12 8	12 8	12 8	12 8	13 3	14 8	14 1	14 1	14 9	15 4	13 0	10 9	10 6	10 2
September	6 5	6 4	6 8	6 7	6 9	7 5	8 1	9 0	8 9	9 10	10 1	10 1	10 8	11 3	11 1	11 5	12 1	11 8	11 2	9 1	6 6	6 4	6 0
October ...	*0 3	1 6	1 2	2 3	0 6	2 3	3 6	4 1	3 3	5 5	5 5	5 5	7 3	7 2	5 7	7 2	8 3	7 4	5 3	3 4	*0 3	0 4	*0 3
November	*6 8	*2 4	*3 2	1 5	*5 3	*1 1	0 0	*1 8	1 3	1 3	1 3	1 3	3 4	3 3	0 9	3 0	4 2	2 8	0 2	*2 0	*8 1	*5 6	*7 0
December	*10 5	*4 4	*5 5	*2 9	*8 1	*3 1	*1 2	1 9	*3 9	*0 7	0 7	2 2	2 2	1 6	2 2	1 0	2 3	0 2	*3 9	*6 1	*12 6	*9 1	*10 8
Days with degrees of cold.	207	201	187	189	179	190	168	142	110	154	110	0	0	0	118	0	0	77	132	155	186	186	197

Those figures with an asterisk (*) are degrees below zero.

'The coldest tracts of Norway, where the mean temperature of the year is below 0° is found in the highest parts of the mountains and the interior of Finmarken. Close to the sea it is only in the Varangerfjord that the mean temperature of the year is below 0°. The outer coast-line from Lister to Sognefjord has the highest mean temperature of the year. The inland part of the south of Norway and Finmarken has the longest winter and the lowest mean temperature of winter, as the coldest day and night is below ÷10°. From the interior part of the country towards the coast it always becomes gradually milder in winter. From the Throndhjemsfjord there is a long strip of the coast going southwards towards Lister, where the mean temperature day and night is above 0°.

Summer is warmest in the south-eastern parts and in the inner parts of Sognefjorden. It is colder on the coast and higher up in the heart of the country. It is coldest on the coast of Finmarken and on the mountain tops. The inner part of Finmarken has a warmer summer than the whole above-stated strip of the coast north of Skudesnæs.

As inland there is a warm summer and cold winter, and on the coast a coldish summer and a mild winter, the greatest change of temperature in the course of the year is to be found in the interior of the country (above 30° in Karasjok and above 25° in the south of Norway), whilst the least change is to be found on the coast of Romsdalen (only 11°). In Œsterdalen and in the inner part of Finmarken the mercury freezes ÷40° (in Karasjok ÷50·6). On the outer strip of the coast from Romsdalen to the island of Utsire the cold is never stronger than ÷9° to ÷11°. In the south-eastern parts of the country, in Sogndal and the interior of Finmarken there may be +30°, but on the outermost islands of the western coasts never above 25°.

Norway is chiefly a mountainous country, consisting of primitive rocks, slates and schists, eruptives, and the Silurian formation. The Gneiss and hornblende-schist extend along the

coast. Jædderen is, however, covered with glacial gravel, together with erratic blocks of all sizes, and is very infertile. Violent tempests from the sea rage there horribly in the winter time—it is also mostly snowless—and the coldish summer makes it difficult for trees and bushes to grow. It is, therefore, the more interesting to observe that mollusks can thrive there.

Higher up than the lake Mjósen are great quantities of sparagmit, sandstone, mica-shist, and quartzite, forming Œsterdalen, Gudbrandsdalen, and Dovre; the eruptives in other places forms great masses of finest granite in the southern interior parts, and gabbro in the grand mountain district of great renown, called 'Jotunheim.' In the diocese of Throndhjem, we have 'Throndhjem-schists,' that to a great extent consists of mica-schist, whilst also Silurian limestone strata are found, but they have, however, no significance as a substratum for the mollusks living on them.

In Nordland and Finmarken we have schists, sandstone, limestone, and quartzite of the primitive rocks; the limestone, as well in greater quantities as in lesser strata intermixed in mica-shist, as in the islands of Grótó and Gaasó in Nordland.

The Silurian formation is chiefly to be found in the valley of Christiania and neighbouring parishes going towards Drammen, particularly as limestone and argillaceous slates. It extends to Modum and Ringerige, and along the eastern side of Tyrifjorden as upper silurian limestone. We have also upper silurian strata on the eastern side of Skiensfjorden. The Lake Mjósen is also surrounded by silurian rocks.

How far the substratum has any influence on the appearance of mollusks is yet impossible to state, as the investigations have been too few. It is, however, a fact that the greatest number of species are found and collected on silurian rocks (in the valley of Christiania and Skiensfjord), but at the same time it must be stated that most of the species also appear in places very poorly provided with limestone, and then even in great

quantities, for instance, *Tachea hortensis*, *Arionta arbustorum*, *Clausilia laminata*, and *Cl. bidentata* in the park of Jarlsberg, where it is porphyre, and where in the course of a few hours the Countess Wedel-Jarlsberg collected thousands, particularly on *Angelica sylvatica* and *Stachys sylvestris*.

Not a few species have a different distribution from our neighbouring countries Sweden and Finland. With us they are found much higher towards the north, owing no doubt to the milder coast climate.

Of naked snails we have *Limax maximus* up to 66° 49″, whilst in Sweden and in Finland it is not found higher than 62° 6″. I have been informed that a great black snail appears on one of the islands of Lofoten 68° 6″, but whether it is this species or the next it is impossible as yet to decide, as my informer is no zoologist, and, therefore, does not know the two different genera. *Arion empiricorum* var. *ater* is found together with the preceding at 66°49′. It is not found in Siberia. *Lehmannia marginata* Müll. has been found by my friend Student Hoyer, in Porsangerfjord, in Finmarken, in Sweden to 62°—63°, but neither in Finland nor in Siberia. *A. hortensis* is not found in Finland, nor in Sweden up to about 63°, but will most likely be found further north, as it exists in Siberia, and in Norway to 69°, in Trondenæs on the Island of Hindó. *Arionta arbustorum*, both in its chief form and as var. *flavescens*, is found up to 70° 25′. *Balea perversa* in Sweden and in Finland ranges to 60°—61°, but with us to 67° 50″

Freshwater mollusks also differ somewhat in distribution. *Planorbis glaber* Jeff. seems to thrive excellently on the little island of Gaasó in Vestfjorden (68°). Of the Pisidies we find *Pisidium globulare*, *P. pulchellum*, *P. fossarinum*, *P. obtusale*, *P. pallidum*, *P. nitidum*, and *P. Scholtzii* up to 69°—70°. With *Sphærium corneum*, the inverted rule seems to exist, for in Sweden it is found to Luleä Lapmark (67°), but in Norway only in the southern parts. On the other hand *Sph. mamillanum* is much more common in Norway, and goes farther towards the north.

The most common of our new species is *Pisidium lilljeborgi*. I found it first at Tónset, which seems to be its southern limit, towards the north it goes right up to the most northerly frontier of our country. *Pisidium hoyeri* is limited to Tromsó Amt. *Anodonta* is as yet very little known. It is certainly not rarely found, but has hitherto been very little, investigated perhaps the least of all our mollusks.

Margaritana margaritifera is common from Lindesnæs to Nordkap. Dr. Erik Pontoppidan in his 'Det förste Forsóg paa Norges naturlige Historie,' 1752, speaks of *Marg. margaritifera* because they were known and fished on account of the pearls contained in them. As long as Norway was united with Denmark, the Queen had the exclusive privilege to fish and collect the pearls in many rivers in the diocese of Christiansand. Some of them must have been handsome, and a great number have also been collected, as in the possession of the Danish Royal family, are found ornaments exclusively set with Norwegian pearls. From the year 1814 when Norway was separated from Denmark, this privilege also ceased, and the pearl fishing may now be carried on by anyone. The right belongs, consequently, now solely to the proprietor of the ground where the pearl mussel is found. Very few, however, make use of this right, and still fewer understand the fishing or the value of the pearls; which, besides, are not everywhere of the same beauty. The pearls are now fished chiefly by gipsies and stragglers, who, however, proceed in such a way as completely to ruin the pearl-mussel. The colour of pearls in the diocese of Christiansand I have not seen. In the county of Jarlsberg they are found in almost all the rivers; I have had occasion to see about three hundred and thirty pearls belonging to the Count Wedel-Jarlsberg. The colour and lustre are in most of them whitish or bluish white, some have a reddish lustre, others are dark olive-green, liver-coloured, and grayish-brown. Their forms are varying, most are spherical, but also oblong, and monstrosities. The greatest white pearl is oblong, the diam. is 8·6 mill. and

8 mill. In Thelemarken the pearls have a beautiful reddish lustre. From Lofoten our museum has received mussels, but they contained only small monstrosities of pearls.

As the investigations of our land and freshwater mollusks altogether are but very few, it is a matter of course that our literature contains but very little information as to them, even if we take into consideration all the books containing some information on the subject.

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As but few districts have yet been examined I have, on purpose to make it easier to see the different places where the mollusks have been found, thought I had better use the ecclesiastical division in 'Stifter' (Dioceses) for the southern part, whilst the northern Tromsó Stift must be divided into several sub-divisions—the Amt of Nordland, the Amt of Tromsó, and the Amt of Finmarken. On the map you will find a reddish colour laid on the chief localities.

It is a great pleasure for me to have the opportunity of giving my best and most hearty thanks to all who have assisted me in many ways, also in lending me both specimens and collections. Among these I shall mention the Professors Messrs. R. Collett, Lilljeborg, and G. Sars; J. S. Schneider, Manager of the Museum at Tromsó; H. Friele, in Bergen; and the late Dr. C. M. Poulsen, in Copenhagen.

Class MOLLUSCA GASTEROPODA.

Ord. GASTEROPODA INOPERCULATA.

I. GEOPHILA Fér.

Family LIMACIDÆ.

Genus LIMAX L.

Subgenus HEYNEMANNIA West.

Limax maximus L. Rather rare. About Christiania; Lillesand in Christiansand Stift; and Bergen.

L. maximus var. **niger.** Very common in Christiania, Christiansand, and Hamar Stifts; Aafjorden, Vigten, Lekó, and Ródó in Throndhjem Stift; and Grónó in the Amt of Nordland.

L. maximus var. **albus.** Bamble in Christiansand Stift.

L. maximus var. **fasciatus.** Laurvik, Modum, Christiania; and Skien in Christiansand Stift.

L. maximus var. **cinereo-nebulosus.** Malmóns, Laurvik, Skien.

L. maximus var. **leucogaster.** Laurvik, with more or less variety in colours; and from other places in Christiania Stift.

L. cinereus Lister. Rare in the beech wood by Laurvik; the Island of Tromsó, and Arendal in Christiansand Stift; also at Bergen.

L. cinereus var. **unicolor** Heynem.

1. The whole animal dark blackish-brown: Bergen and Arendal.
2. Bluish-grey: Bergen.
3. With small black and white spots.

L. cinereus var. **punctatus** Mh. *The whole animal yellowish-white, with a broad black band on the neck, the middle part of the shield with small spots, the back not much but irregularly speckled.*

The animal was not quite full grown and a little contracted; length 48 mill. Tromó by Arendal.

Subgenus MALACOLIMAX Malm.

Limax tenellus Nilss. Is probably not so uncommon as previously believed. In the park and oakwood at Jarlsberg, Christiania, Modum, by the lake 'Spirilen,' and other places in Christiania Stift. Some few localities in Christiansand Stift.

Subgenus AGRIOLIMAX Mörch.

Limax agrestis L. Very common throughout the country to 70° N. latitude. Renó, Tromsóen, and Trondenæs, About Christiania I have found it in November, when there has been snow lying for several days, and the temperature was below 0° (Celsius).

L. agrestis var. **succineus** Müll. Christiania.

L. agrestis var. **norvegicus** West. Ringerige and Eker in Christiania Stift.

L. agrestis var. **albidus.** Brevik.

L. agrestis var. **varians.** Brevik.

Subgenus HYDROLIMAX Malm.

Limax lævis Müll. Only in the southern part of Norway. Bygdó, near Christiania, Laurvik; Brevik, Næs Jernværk, Lillesand, and Christiansand in Christiansand Stift.

Subgenus LEHMANNIA Heynm.

Lehmannia marginata Müll. Very common in Christiania Stift; Lillesand, Christiansand, Bergen; 860 m. high up in Œsterdalen in Hamar Stift; and about Kistrand, and Porsangerfjord, in Finmarken.

L. marginata var. **obscurus** Mh. *The animal hard and solid, not transparent, the keel yellowish, the back dark yellowish-brown or greyish-brown, the lower parts of the sides not so dark; some specimens speckled with lighter colour; the shield blackish-brown, often with a handsome yellow margin.*

One animal from Dovre, in Hamar Stift has a light band on each side of the shield. Ringerige, Laurvik, Krageró, and Lillesand in Christiansand Stift.

Genus ARION Fér.

Subgenus LOCHEA Moq-Tand.

Arion empiricorum Fér. var. **ater.** Very common in the Christiania and Christiansand Stifts; Bergen; Throndhjem Stift; and Grónó in the Amt of Nordland.

A. empiricorum var. **marginatus** Moq. Bergen.

A. empiricorum var. **medius** Jens. Bergen.

A. empiricorum var. **albus** L. Not so common as var. *ater*. Modum, Tónsberg, Laurvik, Asker, Skien, and Bergen.

Subgenus PROLEPSIS Moq-Tand.

Arion subfuscus Drap. Generally dark-coloured; common all over the country to 70° N. lat.

A. subfuscus var. **albus** B. Esm. *White, with a greyish tinge on the back.*

Tónset in Hamar Stift; Maalselven in the Amt of Tromsó; Tromsóen and Porsangerfjord in the Amt of Finmarken.

Arion hortensis Fér. Common in the Christiania, Christiansand, and Hamar Stifts; the most northern locality is Trondenæs on Hindó in the Amt of Tromsó.

A. citrinus West. Ringerige and Herfjeldet in Christiania Stift.

Family HELICIDÆ.
Subfamily VITRININÆ.
Genus VITRINA Drap.
Subgenus PHENACOLIMAX Stabile.

Vitrina pellucida Müll. Very common in the south; extends to the north of Amt of Nordland.

V. angelica Beck. From the north of Bergen Stift, and very common in Tromsó Amt; from Tromsóen, Maalselven, Renó, Karlsó; and from Vardó, Porsangerfjord, Lebesby, and Varangerfjord in the Amt of Finmarken.

Subfamily ZONITINÆ.
Genus HYALINIA Agass.
Subgenus HYALINIA Gray.

Hyalinia cellaria Müll. Not very common. In the vicinity of Christiania, Skien, Porsgrund, Brevik, Arendal, and Lillesand in Christiansand Stift; Manger in Bergen Stift.

H. cellaria var. **compacta** Jeff. Modum.

H. cellaria var. **plana** B. Esm. The shell on the upper side flat. Manger in Bergen Stift.

H. alliaria Müll. Uncommon. Modum, Ringerige, Laurvik, Lillesand, Tromsó, near Arendal; Bergen.

H. nitidula Drap. Christiania, Bygdó, Langesund, Bergen.

H. pura Ald. Rare. Modum, Eker, and Langesund.

H. pura var. **viridula** Menke. Modum, Langesund, Skien; Manger in Bergen Stift; and Romsdalen in Throndhjem Stift.

H. hammonis Ström. Very common all over the country.

H. hammonis var. **virescens.** Fagerheim near Tónsberg, Christiania Stift.

H. petronella Charp. As common as *H. hammonis*, and very often in company with it.

Subgenus VITREA Fitz.

Hyalinia crystallina Müll. In the neighbourhood of Christiania, Modum in Christiania Stift; Romerige in Hamar Stift; Vestfjorddalen in Telemarken, and Stordóen in Bergen Stift.

H. contracta West. Rare. Forneboskoven, Bygdó, Ringerige, Modum, and Asker in Christiania Stift; Brevik and Lillesand, in Christiansand Stift.

Subgenus CONULUS Fitz.

Hyalinia fulva Müll. Very common everywhere to Nordcap.

Subgenus ZONITOIDES Lehm.

Hyalinia nitida Müll. Common in the southern parts.

H. nitida var. **albida.** Ringerige.

H. norvegica B. Esm. Very rare. Langesund in Christiansand Stift.

Subfamily HELICIDÆ.

Genus HELIX L.

Subgenus PATULA Held.

Patula pygmæa Drap. Probably very common, but researches are wanting. Christiania, Krödsherred, Drammen, Modum, Asker, Hvalóerne, in Christiania Stift; Tónset in Hamar Stift; Maalselven in the Amt of Tromsó; Porsangerfjord, Vardó, and Varangerfjord in the Amt of Finmarken.

P. rotundata Müll. Not very common. In the neighbourhood of Christiania, Eker, Laurvik, Hof, in the county of Jarlsberg, Sandefjord, in Christiania Stift; Brevik, Langesund, Skien, "Gaustafjeld" (about 2460 metres high) in Telemarken, Arendal, Lillesand, Bergen.

P. rotundata var. **albina.** Malmóen, near Christiania.

P. ruderata Stud. One of our most common species; goes as well to the far north as on our highest mountains, wherever it is possible for any mollusks to live.

P. ruderata var. **albina.** Tin in Telemarken, Rœvenæs in Porsangerfjord, and Elvenæs in South-Varanger.

Subgenus ACANTHINULA Beck.

Acanthinula aculeata var. **sublævis** West. Brevik in Christiansand Stift.

A. harpa Say. This species is widely distributed, but in most localities few specimens are found. Asker and Eker in Christiania Stift; Tónset and Valders in Hamar Stift; South-Varanger and several places in Porsangerfjord in the Amt of Finmarken.

Subgenus VALLONIA Risso.

Vallonia costata Müll.—Common in the southern parts. In the vicinity of Christiania, Jarlsberg, Drammen, Sandefjord, Telemarken, Brevik, Skien; Gudbransdalen in Hamar Stift; Trondenæs and Tromsó on Tromsóen in the Amt of Tromsó.

V. pulchella Müll. Not so common as *V. costata*, but always found together with it. Christiania, Ramnæs in the county of Jarlsberg, Hvalóerne, Skien, Lillesand, Tromsóen in the Amt of Tromsó.

Subgenus TRICHIA Hartm.

Trichia hispida L. Very common in some places in Christiania, Christiansand, and Bergen Stifts; in Hamar Stift it is rather rare; I have not found it in Œsterdalen; and as it neither in Sweden nor in Finland goes higher than 61°, I doubt whether it is circumpolar as Clessin says in his 'Excursions Fauna.'

T. hispida var. **depilata** Pfr. In the vicinity of Christiania and Sandefjord, Brevik and Skien.

T. hispida var. **conica** Jeff. Bygdó near Christiania, Eker, Sandefjord; Manger in Bergen Stift.

T. hispida var. **septentrionalis** Cles. Eker in Christiania Stift; Langesund.

T. hispida var. **concinna** Jeff. Bygdó and several other localities round Christiania; Skien.

T. hispida var. **nana** Jeff. Langó, near Christiania, Ramnæs in the county of Jarlsberg.

T. hispida var. **albina.** Krokkleven in Ringerige.

Subgenus XEROPHILA Held.

Xerophila candicans Ziegl. A few specimens found near Fredriksværn, Christiania Stift, 1871, by the late Dr. Poulsen, Copenhagen.

X. ericetorum Müll. In the Zoological Museum there is a specimen of this species without bands, found many years ago at Bygdó, near Christiania. It has, since then, never been found, although the locality has often been searched. On that account it seems very difficult to explain the presence of one shell. Perhaps it might have been among sand brought with vessels from England or France. I think this the most probable explanation, as, a few years ago, I found a well conserved shell of *Helix aspersa* in some imported sand near Langesund.

Subgenus EULOTA Hartm.

Eulota strigella Drap. In the neighbourhood of Christiania, Lier, Modum, and Ringerige in Christiania Stift; Langesund, Brevik, Skien, Vestfjorddalen, in Telemarken; also in Christiansand Stift.

E. strigella var. **subglobosa** West. Rare; (Westerlund.)

E. fruticum Müll. Not very common, but plentiful where it occurs. Bygdó, Ringerige, Jarlsberg Park, and Lier, in Christiania Stift.

E. fruticum 1. **rufa** (*a*) **unicolor.** Lofoten, in the Amt of Nordland.

(*b*) **unifasciata.** Christiania, Lier, Ringerige.

2. **pallida-cornea** (*a*) **unicolor.** Langesund.

(*b*) **unifasciata.** Lillesand.

3. **alba** (*a*) **unicolor.** Jarlsberg, Lier, Laurvik, Skien.

(*b*) **unifasciata.** Christiania, Jarlsberg, Lillesand.

Subgenus CHILOTREMA Leach.

Chilotrema lapicida L. Probably very common both in Christiania and Christiansand Stifts, but nowhere abundant. In the vicinity of Christiania, Asker, Lier, Modum, Ringerige, and Sandefjord in Christiania Stift; Langesund, Skien, Telemarken, and Lillesand in Christiansand Stift; Sognefjorden in Bergen Stift.

C. lapicida var. **minor.** Bamble near Langesund, diam. 13·5 mill., alt. 6 mill. Asker near Christiania, diam. 13·5 mill., alt. 4·5 mill.

Subgenus ARIONTA Leach.

Arionta arbustorum L. Very common; is found in all parts of the country, as well on the highest mountains as up in the far north. The shells are very thin everywhere in the north, as also in the south, where the soil is very poor in lime; in the park at Jarlsberg, where they live in great quantities, they are very thin and mostly semi-transparent. Grótó in the Amt of Nordland; Maalselven, Tromsóen, Renó, and Fugleó in the Amt of Tromsó; Porsangerfjord in the Amt of Finmarken.

A. arbustorum var. **rudis** Mühlf. Found at Fredriksværn and Dovre (1000 metres). Clessin, in a letter to me, said that he very much doubted that this variety was to be found here, as it has previously only been found in the south of Tyrol. Dr. Poulsen, of Copenhagen, was kind enough to lend me the two specimens he found at Fredriksværn, and they are quite identical with some examples I have from Prof. E. von Martens, at Berlin, which he found in Tyrol. Therefore there can be no doubt that the specimens found at Dovre are the var. *rudis*.

A. arbustorum var. **alpestris.** With both high spire and depressed. 'Skeikampen' in Gansdal, Gudbransdalen, and Lofoten in the Amt of Nordland.

A. arbustorum var. **flavescens** Cles. Ringebu, Gudbransdalen, in Hamar Stift; the vicinity of Christiania, Jarlsberg, and Lier, in Christiania Stift; Gaasó, Grótó, Tranó, in the Amt of Nordland; Fugleó in the Amt of Tromsó.

A. arbustorum var. **trochoidalis** Rof. Grótó, in the Amt of Nordland.

A. arbustorum var. **picea** Ziegl. Christiania.

A. arbustorum var. **septentrionalis.** Skien.

Subgenus TACHEA Leach.

Tachea nemoralis Müll. Only found on the west coast; at Sandvigen, and in the cemetery of the cathedral at Bergen, Ullensvang in Hardangerfjorden, Bergen Stift; Stavanger, Christianiasand Stift.

T. nemoralis var. **lutea.** 12345, (12)345, (123)45, (123)(45), 00345, 00300, 00000. Bergen.

T. nemoralis var. **carnea.** 00345, 003(45), 00(345), 00300. Bergen, and Stavanger.

T. hortensis Müll. Widely distributed in Christiania Stift, but not often numerous. The only locality where it is found in great quantities, is in the garden and park at Jarlsberg. The Countess of Wedel-Jarlsberg has collected many thousands for me. They live on the fruit trees, the stems of oak, beech, asp, on *Stachys sylvatica* and *Angelicæ sylvestris*. The shells are thin and small, and never reach the size gained in other countries.

1. **lutea.** 12345. Christiania, Lier, Modum, Fredrikshald, Jarlsberg, Christiania Stift; Lillesand, Bergen, Throndhjem; (12)345, Christiania, Jarlsberg, Langesund; (123)45, Christiania, Róken, Jarlsberg; 123(45), Jarlsberg; (123)45, Christiania, Jarlsberg, Laurvik; 1(234)5, Jarlsberg; (12345), Jarlsberg; (12)3(45) Jarlsberg, Arendal; (12)(345), Jarlsberg; 10345, Jarlsberg, Langesund, Bergen; 12045, Jarlsberg; 10305, Bergen; 00000, Jarlsberg, Christiania, Modum, Lillesand, Arendal, Jædderen.

2. **lutea** (semi-transparent). Jarlsberg, Lillesand.

3. **grisea.** 12345. Jarlsberg.

4. **grisea-brunnea.** 00000. Jarlsberg, Christiania, Fredriksværn.

grisea-brunnea (semi-transparent). Laurvik.

5. **hepatica.** 12345, Lillesand, Hof in the county of Jarlsberg; (12)345, Jarlsberg; 12045, Jarlsberg; 00000, Lysaker, near Christiania.

6. **rosea-hepatica.** 00000. Jarlsberg.

7. **isabellina.** 00000. Jarlsberg.

8. **pallida-castanea.** 00000. Christiania.

9. **lilacina.** 00000. Christiania, Jarlsberg.

10. **albida** (transparent-fasciæ). 12345. Christiania, Ringerige, Jarlsberg, Laurvik, Brevik, Lillesand; (12)345, Christiania; (123)45, Hof in the county of Jarlsberg; 00345, Laurvik; 00000, Christiania, Ringerige, Jarlsberg; with *brown bands*, 12345, Jarlsberg.

T. hortensis var. **hybrida** Poir.

(*a.*) **rosea-labiata.**

1. **carnea.** 00000, Jarlsberg; on the apple trees.
2. **pallida-castanea.** 12345, Jarlsberg, Langesund.
3. **hepatica.** 00000, Jarlsberg.

pallida-hepatica. (12)345, Jarlsberg, Langesund; 123(45), (12)3(45), (123)45, and 12045, Jarlsberg

4. **lutea.** 12345 and 00000, Jarlsberg.
5. **grisea-lutea.** 12345, Jarlsberg.
6. **grisea-brunnea.** 12345, Jarlsberg, Langesund.
7. **rosea-hepatica.** 00000, Jarlsberg.

(*b.*) **fusco-labiata.**

1. **hepatica.** 12345, 12(345), (12)345, (12)3(45), and (123)45, Lillesand; (12345), Bergen; 00000, Frediksværn.

T. hortensis var. **minor** Jeff.

1. **lutea.** 12345 and 00000, Jarlsberg.
2. **hepatica.** 12345, Lillesand.

Subgenus HELICOGENA Risso.

Helicogena pomatia L. This species must be excluded from the list of our mollusca. Mr. J. Friele has named the botanic garden in Christiania as its locality. I have spoken to the head-gardener, who has been there for thirty years or more, but he assured me that he has never seen anything like this shell in the garden. About twelve years ago, Prof. R. Collett brought some from Denmark, but they have all vanished, so also some I took with me from Sweden; they have probably been eaten by foxes or *Erinaceus*, which live everywhere in the neighbourhood of Christiania. Last year I again got some from Sweden, and had them put in the park at Jarlsberg. But I cannot at all consider it to belong to our fauna.

Subfamily PUPINÆ.

Genus BULIMINUS Ehrenb.

Subgenus NAPÆUS Alb.

Napæus obscurus Drap. Rare. Asker near Christiania, Modum, Langesund, and Brevik.

Genus COCHLICOPA Risso.

Cochlicopa lubrica Müll. Very common all over the country.

C. lubrica var. **minima** Siem. Not very common. Christiania, Modum, Jarlsberg, Brevik, Porsgrund, Grótó.

C. lubrica var. **albina** B. E. Milk-white, glossy. Ringerige.

Genus PUPA Drap.

Subgenus CHARADROBIA Alb.

Charadrobia cylindracea Da Costa. Rare. On the walls of 'Sverreborg' at Bergen and Lillesand.

Subgenus PUPILLA Leach.

Pupilla muscorum L. Common everywhere; in the southern parts both with tooth and without it; in the north, *unidentata* is rare inland.

P. muscorum var. **elongata** Cles. Trondenæs on Hindó, in the Amt of Tromsó.

P. muscorum var. **minor.** Christiania.

P. muscorum var. **lundstromi** West. Lofoten.

Subgenus ISTHMIA Gray.

Isthmia minutissima Hartm. Christiania, Malmóen near Christiania.

I. minutissima var. **odontostoma** West. Akershus, Fæstning, and Christiania.

Subgenus COLUMELLA West.

Columella edentula Drap. Eker in Christiania Stift, and Bergen.

C. edentula var. **Gredleri** Cles. Tónset in Hamar Stift; Tromsóen, Vardó, Porsangerfjord, and South Varanger.

Subgenus VERTIGO Müll.

Vertigo gravida West. Bórsesó near Skien.

V. pygmæa Drap. Not very common. In the vicinity of Christiania, Hof in Jarlsberg, Eker, Modum, and Ringerige; Bergen.

V. substriata Jeffr. Eker, Langesund, Brevik; Molde in Throndhjem Stift.

V. antivertigo Drap. Not common. Christiania, Hvalóerne, and Skien.

V. lilljeborgi West. Rare. Skien.

V. alpestris Ald. Common. Round Christiania, Modum, Ringerige, Jarlsberg, and Hvalóerne in Christiania Stift; Tónset, Lilleelvedalen, in Hamar Stift; Porsangerfjord in the Amt of Finmarken.

V. arctica Wallenb. (P. Hoppei). 'Gaustafjeld' in Telemarken; Vardó, The Nordkap, Porsangerfjord; several localities in South Varanger; 660 m. high on Svendborgtind in Maalselvedalen.

V. pusilla Müll. More common than any of the preceding species. In the neighbourhood of Christiania, Eker, Modum, Ringerige, and Vestfjorddalen in Telemarken.

V. angustior Jeffr. Lindóen, Malmóen, and Asker in Christiania Stift.

Genus BALEA Prid.

Balea perversa L. Not very common. Christiania, Skien, Langesund, Brevik, Lillesand, Bergen, Dovre 600 m. high, Throndhjem, Tranó, and Grótó in the Amt of Nordland.

B. perversa var. **lucifuga** Leach. Fredriseshald in Christiania Stift.

Genus CLAUSILIA Drap.
Subgenus CLAUSILIASTRA Möll.

Clausilia laminata Mont. Very common in Christiania and Christiansand Stifts.

C. laminata var. **virescens** Ad. Schm. Jarlsberg.

C. laminata var. **nana.** Laurvik and Christiania.

Subgenus ALINDA Böttg.

C. biplicata Mtg. Manger, near Bergen.

Subgenus PYROSTOMA Vest.

C. ventricosa Drap. Very rare. Brevik.

C. rolphi Leach. Very rare. Christiania and Asker.

C. plicatula Drap. Common round Christiania, Modum, Jarlsberg, Langesund, and Skien.

C. plicatula var. **leucostoma** West. Modum and Drammen.

C. plicatula var. **curta** Ad. Schm. Asker near Christiania.

Subgenus IPHIGENIA Gray.

C. sejuncta West. Rare. Ekeberg near Christiania, and Langesund.

C. dubia Drap. var. **obsoleta** A. Schm. Rare. Asker, Bergen, and between Skien and Porsgrund.

C. cruciata Stud. Gausdal in Hamar Stift.

C. bidentata Ström. The most common of all our Clausiliæ. Found everywhere in the southern parts; much less frequent in the north, where it is found as high as Renó in the Amt of Tromsó. It has seldom folds on the interlamellare.

C. bidentata var. **septentrionalis** A. Schm. Often with the type.

C. bidentata var. **exigua** West. Modum.

C. bidentata var. **erronea** West. Brevik.

C. bidentata var. **subrugosa** West. Modum.

C. bidentata var. **minor.** Alt. 7·5—8 mill. Christiania and Fredikshald.

C. bidentata var. **elongata** Cles. Brevik and Modum.

Family SUCCINIDÆ.
Genus SUCCINEA Drap.
Subgenus NERITOSTOMA Klein.

Succinea putris L. Very common in Christiania and Christiansand Stifts, Bergen (H. Friele); but it is not yet found higher up than 61°. Slender forms are most common, measuring alt. 20 mill., diam. 11·5 mill., mouth alt. 14·5 mill., diam. 7·7 mill. The colour is variable—grey and greyish-yellow at Christiania, smoke-colour at Modum and Fredrikshald, yellow to brown from Jarlsberg, whitish-yellow to reddish-brown from Eker.

S. putris var. **olivula** Baudon. Jarlsberg, Hole, and Mjóndalen in Christiania Stift.

S. putris var. **trianfacta** Da Costa. Laurvik and Skien.

S. putris var. **limnoidea** Pic. Fragnerdammen near Christiania; one shell collected 1834.

Subgenus AMPHIBINA Mörch.

S. stagnalis Gassies. Colour: greyish-yellow. Some specimens found in 1870, near Arendal, by O. Jensen.

S. pfeifferi Rossm. Much more common than *S. putris*. In the vicinity of Christiania, Skiensfjord, Lillesand, Arendal, Bergen, Nordland, Tromsóen, Maalselven, in the Amt of Tromsó; Alten, Pasvikelven, in South-Varanger. The colour is in the south pale greyish-yellow or smoke-coloured, but in the north amber-coloured.

S. pfeifferi var. **contorta** West. Tromsóen.

S. pfeifferi var. **propinqua** Baudon. Arendal. From Tónset I have one shell which very much resembles this variety; it is smaller, very glossy, brownish-smoke colour, with red spire.

S. pfeifferi var. **ventricosa** Pic. Gaasó, in the Amt of Nordland.

S. pfeifferi var. **contortula** Baudon. Renó, in the Amt of Tromsó.

Subgenus LUCENA Aken.

Succinea oblonga Drap. Malmóen, Lindóen, and Brandskjær, near Christiania, Krokkleven at Ringerige.

S. oblonga var. **agonostoma** Kustr. Sundvolden at Ringerige, Malmóen.

S. oblonga var. **arenaria** Bouch. Langesund.

II. HYDROPHILA Fér.
Family AURICULIDÆ.
Genus CARYCHIUM Müll.

Carychium minimum Müll. Common in Christiania and Christiansand Stifts,

Family LIMNÆIDÆ.
Subfamily LIMNÆINA.
Genus LIMNÆA L.
Subgenus LYMNUS Mont.

Limnæa stagnalis L. Is not very common. It is very variable, not only from different localities but also from the same lake. The head-type as in Rossmassler's Iconographie, vol. v., pl. 128, fig. 1230, is rare; much more frequently we meet with slender forms, more or less resembling *vulgaris* and *appressa* Say. Lakes by Christiania; Formo in Gudbransdalen, with the columella bent very much backwards; the Pasvikelv in South Varanger; and Hennæssjóen in the Amt of Nordland. The largest specimen belongs to Prof. Sars, it is from Œstensó, near Christiania, alt. 55·5 mill., diam. 27 mill., mouth alt. 29 mill., diam. 16 mill.

L. stagnalis var. **vulgaris** Leach. Not uncommon; colour brown to greyish-brown, and very variable. Specimens from Padderudvand in Asker were of the following dimensions:—

alt. 38 mill., diam. 18·5 mill., mouth alt. 20·5 mill., diam. 13 mill.
„ 36 „ „ 15 „ „ 17 „ „ 9·5 „

From Lóvtjern at Eker:—

alt. 37·5 mill., diam. 16 mill., mouth alt. 20 mill., diam. 10·5 mill.
„ 37·5 „ „ 15 „ „ 17·5 „ „ 7·5 „
„ 32 „ „ 15 „ „ 17·3 „ „ 9·5 „
„ 32 „ „ 13 „ „ 16 „ „ 9 „
„ 30·5 „ „ 12·5 „ „ 15·3 „ „ 9 „

The two last have very slender spires, and the outer-lip of the mouth reflected; the whorls are convex, except one shell, which is a little concave, as Clessin mentions in his 'Excursions Fauna' for var. *subulata* West. In 'Aborretjérn' in Gudbransdalen, a great quantity of them are living. The lake is very small, and they seem to live under very homogenous conditions, but in spite of this they are developed into more than ten different forms, from one very near var. *colpodia*, but with slender spire, and other shells gradually more slender, some with very long and slender spires, the last whorl more convex, and the outer-lip of the mouth reflected; they remind me of var. *ampliata* and No. 1234 in Rossmassler's Iconographie, which Kobelt considers to be the real var. *fragilis*; some have the last whorl less convex and somewhat angled at the upper part. Var. *minor*, with narrow whorls, is also represented. The dimensions are given for the greatest and smallest shell.

alt. 46 mill., diam. 21 mill., mouth alt. 25 mill., diam. 14·5 mill.
„ 34 „ „ 14·5 „ „ 17·5 „ „ 9·5 „
„ 31 „ „ 13·5 „ „ 16 „ „ 8·5 „

From Norderhoug, in the Ringerige I have some handsome and very slender shells, alt. 37·3 mill., diam. 14·5 mill., mouth alt. 17·5 mill., diam. 8.5 mill.

L. stagnalis var. **turgida** Menke. Tónset in Hamar Stift.

L. stagnalis var. **minor** Kob. Tónset, Abborretjern, Gudbransdalen.

Subgenus GULNARIA Leach.

Gulnaria auricularia L. Rare. Tyrifjorden and Asker in Œstensó near Christiania. Prof. Sars found them in great quantities; lately they have quite disappeared. Lier, Skien.

G. lagotis Schr. More common than the preceding species. Asker, with the whorls very convex, and open *umbilicus;* Ringerige, Skien, Christiania, Dovre (1000 m. high); Fiskumvand at Eker; Lillehammer, very thin and brittle; Manger, near Bergen; and Tónset.

G. lagotis var. **baltica** Nilss. Arendal.

G. ovata Drap. Probably all over the country, as it is very common in Christiania, Christiansand, Hamar, and Tromsó Stifts. From most localities, very thin and so changeable in form, that I hardly have the same form from two localities. All these variations and transitions make it very difficult and doubtful how to deal with varieties, which very often seem to be '*Bedingte varietäten.*' On that account I have found it better to wait, in hopes that when we have got many more collections from different parts of the country, and from the same locality more than one year, we shall be able to give a fuller account of this species. In a rivulet in Asker, where there is a rapid current, I collected many shells, both full-grown and young ones, the latter with the spire very slender, whorls very convex, mouth broad (egg-formed), reminding me of *lagotis*. The full-grown specimens had the spire shorter, mouth larger, and resembling var. *patula* D. C. In Tónset *Gulnaria* lives in every lake and pond, but nowhere in its typical form. In a swamp overgrown with rushes, there lived a very interesting form, which reminds one equally of *lagotis* and *peregra* as *ovata*. I had the opportunity to collect them in two succeeding summers, they are not only different the two years but also each collection. *All* have the first whorls very convex as *lagotis*, but the spire is more plump and the suture not so deep, more like *ovata*. The last whorl is depressed under the suture, which makes it angled, not rounded, in bending down. The first year's collection was for the greater part full-grown specimens. Some had the last whorl compressed under the suture, this makes it less

bulged, and the mouth egg-shaped above at an acute angle; others have it oval or angled-oval, reminding us of forms of *L. peregra* var. *curta*.

The second year I found mostly biennial animals, and I am inclined to think they have had much more food, as the last whorl suddenly was more expanded with the suture ascending as in *lagotis*, the striæ coarser, mouth egg-shaped, spire variable in height. At present I must put it down as *ovata*, without deciding it as any variety before I have got more collections from the same place, hoping later to find a constant form. At Lomtjem in Kvikne, 40 kilometers farther north and 700 metres altitude, I found a Limnæa, which also must be ranged under *ovata*. In some the spire is higher than in the typical form, and gradually gets shorter, and at last it resembles var. *patula*; whorls very convex, the most of them horizontal under the suture, in which it is like the preceeding, but is separated from this by the last whorl, being much more bulging, mouth much larger, and the outer lip reflected.

G. ovata var. **colletti** Hoyer. Laxelv in Porsangerfjord in the Amt of Finmarken.

G. ovata var. **patula** Da Costa. Toten near Mjósen, Vaale in Jarlsberg, and Oxfjord, in the Amt of Finmarken.

L. mucronata Held. Vardó, in the Amt of Finmarken.

Subgenus LIMNOPHYSA Fitz.

L. palustris Müll. Not common. Bórsesó near Skien, Maalselven, in the Amt of Tromsó; Pasvikelven, in the Amt of Finmarken.

L. palustris var. **septentrionalis** Cles. Østensó, near Christiania.

L. palustris var. **fusca.** Bergen.

L. peregra Müll. Very common in Christiania, Christiansand, and Hamar Stifts, and is found up to Varangerfjord, in the Amt of Finmarken, and belongs to the circumpolar species. At the Zoological Museum they have some shells

found on the 'Frognerdam,' in Christiania, 1834. I have compared them with those I have collected fifty years later, they are just as thick and strong, but the form is not quite the same; the last whorl has been less convex, somewhat truncate, with very distinct sculpture, as in *L. stagnalis*, even in very young specimens. Alt. 16 to 17 mill. Shells from Asker and Jarlsberg have the same form. From Gaasó, in Nordland, I have a very interesting form with the whorls very convex and suture very deep. Malakozool Blätter, N. F., Band viii., with two plates.

L. peregra var. **margaritana.** Asker.

L. peregra var. **ambigua** West. Is an intermediate link between *peregra* and *lagotis*. Prof. Sars has found some in 'Lusvand,' at Jædderen, which must be like this. It is exceedingly pretty, glossy, very finely striated, yellowish-brown, with dark reddish-brown spire. Alt. 17 mill., diam. 9 mill., mouth alt. 11·5 mill., diam. 6·5 mill.

L. peregra var **minor** Mh. Alt. 9·11 mill., diam. 6·5 mill., mouth alt. 7 mill., diam. 4·2 mill. Modum, in Christiania Stift.

L. peregra var. **elongata** Cles. Baadntjern, near Christiania.

L. peregra var. **peregra-ovata** Kob. Salangen, in the Amt of Tromsó; Kistrand in Porsangerfjord, in the Amt of Finmarken.

L. glabra Müll. Not very common. In the vicinity of Christiania, Romerike, Laurvik, Jarlsberg, and Sandefjord, in Christiania Stift; Skudesnæs and Lillesand, in Christiansand Stift.

L. glabra var. **elongata** Jeff. Bamble, near Langesund.

L. glabra var. **subulata** Kob. In a pond at Arendal.

L. truncatula Müll. Very common, both in the northern and the southern parts. Porsangerfjord and South-Varanger, in the Amt of Finmarken.

L. truncatula var. **microstoma** Drouet. Helgó in Mjósen, Ullensaker, Gudbrandsdalen, Gaasó, Tromsó, and South-Varanger.

L. truncatula var. **oblonga** Puton. Asker and Bryn, near Christiania; Tromsó.

L. truncatula var. **maximella.** Asker, Justó, near Lillesand.

L. truncatula var. **compressa** B. Esm. Bergen, Statelle, Brevik, and Tromsó.

L. truncatula var. **schneideri** B. Esm. In several ponds on 'Flóifjeld,' near Tromsóen, in the Amt of Finmarken.

L. truncatula var. **minor.** Asker.

Subfamily PHYSINA.
Genus PHYSA Drap.
Subgenus PHYSA Drap.

Physa fontinalis L. Rare. Vaale, Ramnæs, and Jarlsberg, in the county of Jarlsberg.

Subgenus APLEXA Flem.

Aplexa hypnorum L. In the neighbourhood of Christiania; the Justuó, near Lillesand, 14·5 mill. alt.

Subfamily PLANORBINA.
Genus PLANORBIS Guett.
Subgenus TROPODISCUS Stein.

Planorbis marginatus Drap. Rare. Bergen, Jædderen; many years ago found on Bygdó, near Christiania.

Subgenus GYRORBIS Ag.

P. vortex L. Very rare. Christiania and Bergen.

P. rotundatus Poir. Rare. Several places near Christiania and Hvalóerne.

P. spirorbis L. Rare. Asker.

Subgenus BATHYOMPHALUS Ag.

P. contortus L. Very common in Christiania, Christiansand and Hamar Stifts, Nordland, and Finmarken.

Subgenus GYRAULUS Ag.

P. borealis Lovén. Very common in Christiania, Christiansand, and Hamar Stifts, Nordland, and Finmarken.

P. borealis var. angigyrus West. Tónset, Kvikne, and Ringerige.

P. borealis var. flexus West. Christiania.

P. borealis var. gredleri Cles. Christiania, Siljordvand in Telemarken, Drammen, Gudbrandsdalen.

P. borealis var. arcticus Beck. Finmarken.

P. polaris B. Esm. and Hóyer. Maalselven, in the Amt of Tromsó.

P. limophilus West. Rare. Jædderen and Valders.

P. concinnus West. Rare. Œier in Gudbransdalen.

P. glaber Jeff. Not common. Jædderen, Valders, Christiania, Bergen, Gaasó in Nordland.

P. stromi West. Rare. Christiania and Eker.

P. albus Müll. Common in Christiania, and Christiansand Stifts, Bergen, and Œsterdalen in Hamar Stift.

P. albus var. hispidus Drap. Dróbak, Sandvigen in Asker; Bergen.

P. albus var. cinctutus West. Very common. Christiania, Christiansand, and Hamar Stifts, Nordland and Finmarken.

P. albus var. depressus West. Ringebu in Gudbransdalen.

P. albus var. lemniscatus Hartm. Gausdal and Ringebu in Gudbransdalen, Christiania, Arendal, Jædderen, and Bergen.

P. albus var. draparnaldi Jeff. Jædderen, Stavanger, and Fredriksstad.

Subgenus ARMIGER Hartm.

P. crista L.

P. crista var. nautileus L. Helgó in Mjósen, and Snaróén near Christiania.

P. crista var. cristatus Drap. Christiania, Fredriksstad, and Stavanger.

P. crista var. spinulosus Cles. Fredriksstad.

Subgenus HIPPEUTIS Ag.

P. complanatus L. Rare. Moss, Akersvand in Jarlsberg, Skien, and Arendal.

Subgenus SEGMENTINA Flem.

P. nitidus Müll. Rare. Bergen.

Subfam ANCYLINA.

Genus ANCYLUS Geoff.

Subgenus ANCYLUS Geoff.

Ancylus fluviatilis Müll. Not common. In the vicinity of Christiania, Sandefjord, and Jædderen.

A. fluviatilis var. gibbosum Bourgt. More common than the preceding species. Christiania, Asker, Sognselven, Fiskum, and Skien.

Subgenus ACROLOXUS. Beck.

A. lacustris L. Christiania, Brevik, Skien, Arendal, and Jædderen.

Genus PISIDIUM C. Pfr.

Subgenus RIVULINA Cless.

Pisidium globulare Cless. Rather common. Many places near Christiania, Ringsaker at Hedemarken, Romerige, Ringebu, Tónset, in Hamar Stift; Langevand, near Bergen; also in Christiansand Stift; Maalselven, in the Amt of Tromsó; Porsangerfjord and South-Varanger in Amt of Finmarken.

Subgenus FOSSARINA Cless.

P. henslowianum Sheppard. Bergen.

P. fossarinium Cless. Very common. Many places round Christiania, Dróbók, Laurvik, Porsgrund, Romerige, Hvalóerne, 'Siljordvand' in Telemarken, Tónset in almost all lakes, and as far north as Maalselven, Tromsóen, Porsangerfjord, and South-Varanger.

P. fossarinum var. flavescens Cless. Kródsherred, Christiania Stift; Trondenæs, in the Amt of Tromsó; Alten, in the Amt of Finmarken.

Abnormity.—'Colour white, glossy; lower margin is not straight, but impressed from the side; from the underside it looks like fig. 1, from the side it is long and narrow, as in fig. 2. Something like this form has also been seen in Unio. It is sure to be caused by external circumstances.' (Clessin in letter.)

P. pallidum Pfr. Rare. Asker by Christiaia, Tónset, Fjeldfróskelv in Maalselven.

P. obtusale Pfr. Very common in Christiania, and Christiansand Stifts, and in the Amt of Tromsó. Often in great quantity. Many localities round Christiania, Eker, Ringerige, Romerige, Krödsherred, and Jarlsberg, in Christiania Stift; Brevik, Arendal, Skien, Lillesand, 'Langvand,' in Bergen; several lakes in Tónset, where I also found a small form, very ventricose, colour bluish-grey, and epidermis rough; Trondenæs, 'Skotstinderne,' near Grótó; Tromsóen.

P. obtusale var. **personatum** Malm. Romerige.

P. obtusale var. **esmarkiana** Cles. Sandtjern at Eastern Modum.

P. obtusale var. **colletti** Cles. *Shell small, ventricose, tolerably solid, distinctly striate, beaks broad, ventricose and very prominent; anterior margin short and rounded, posterior margin narrow and rounded.* Ringebu in Gudbransdalen.

P. lilljeborgi* Cles. Very common in the north. It is new for the fauna. In Tónset, in many lakes; Gausdal, in Gudbransdalen; Gaasó and Grótó, in the Amt of Nordland; Trondenæs, 'Prœstvand,' in Tromsóen, in great quantities; Oxfjord and Kvænvik, in Alten, in the Amt of Finmarken.

P. lilljeborgi var. **transversale** Cles. Trondenæs.

P. lilljeborgi var. **minor.** 'Vetlevand,' near Gausdal Sanatorium.

P. pusillum Gmel. Rare. Asker, Eker, and Christiansand.

P. pulchellum Jen. Not so rare as the preceding species. Statelle, some small lakes at Tónset, Gausdal, and Trondenæs.

P. hoyeri Cles. Tromsóen and Renó, in the Amt of Tromsó.

P. nitidum Jen. Rather common. Tyrifjorden, Eker, Ringerige, Laurvik, Skien, several lakes round Arendal,

* The description of this and following new species and varieties is in the last part of 'Malacozoologishe Blatter,' N. Folge Band viii.

Christiansand, many lakes in Tónset; Andóen, in the Amt of Tromsó; Oxfjord and Hammerfest, in the Amt of Finmarken.

P. subtruncatum Malm. Rare. Christiania, Eker, Arendal, and Christiansand.

P. milium Held. Common in Christiania, Christiansand Stift, the Amt of Nordland, the Amt of Tromsó, and the Amt of Finmarken. Akersvand, in Jarlsberg; Krödsherred, lakes round Gausdal Sanatorium and in Tónset, Maalselvedalen, Trondenæs and Tromsóen.

P. scholtzii Cles. Not common. Gausdal and Ringebu, in Gudbransdalen, Tónset, Trondenæs, Maalselvedalen, and South-Varanger.

2nd Ord. GASTEROPODA OPERCULATA.

I. PULMONATA TERRESTRIA.

Family VALVATIDÆ.

Genus VALVATA Müll.

Subgenus CINCINNA Hübner.

Valvata piscinalis L. Common. In the vicinity of Christiania, Gudbransdalen, Tónset, Jædderen, Porsangerfjord, South-Varanger; belongs to the circumpolar species.

V. piscinalis var. **costulata** West. Ringebu in Gudbransdalen. Alt. 4·7 mill., diam 4·8 mill.

Subgenus TROPIDINA Adams.

V. depressa C. Pfr. Stavanger, 'Vetlevand,' near Gausdal Sanatorium. Alt. 5 mill., diam. 6 mill.

Subgenus GYRORBIS Fitz.

V. cristata Müll. Rare. Christiania.

V. sibirica Middl. Bottnelv, in South-Varanger; and Salonijavre in Pasvikelven, in the Amt of Finmarken.

Family RISSOIDÆ.

Genus BYTHINIA Gray.

Bythinia tentaculata L. Frognerdammen near Christiania.

CLASS II.—MOLLUSCA CONCHIFERA.

Family CYCLADIDÆ.

Genus SPHÆRIUM Scop.

Subgenus CORNEOLA Clessin.

Sphærium corneum L. Many places around Christiania; but is not common elsewhere. Moss, Formo in Gudbransdalen; Jarlsberg, and Tyrifjorden.

S. draparnaldi Cless. Bergen, several localities? (Westerlund).

S. mamillanum West. Much more common than the preceding species, and goes much farther north 'Sognsvand' near Christiania, Skien, Norderhoug at Ringerige, 'Vetlevand' near Gausdal Sanatorium, several lakes at Tónset and Malangen, in the Amt of Tromsó.

S. mamillanum var. **clessini** mihi. *Shell small, in transverse section, heart-shaped, with prominent lines of growth, greyish-horn colour, either with three narrow greyish-yellow bands, or the two lowest confluent; lower margin more rounded than the type, and the curve to the anterior and posterior side less prominent. Cardinal teeth in the left shell as in the type, cardinal tooth in the right one less curved, and not thickened in the posterior part.* L. 6·5 mill., br. 5·8 mill., th. 4·6 mill. From 'Vetlevand,' near Gausdal Sanatorium in Gudbransdalen.

Genus CALYCULINA Cles.

Calyculina lacustris Müll.

C. lacustris var. **steini** A Schm. Rather common, but only in Christiania and Christiansand Stifts. Several localities near Christiania, Asker, Snaróen, Jarlsberg, Sem, Skien, Dróbak, and Eidsvold.

C. parulum Cles.

C. parulum var. **martensi** Cles. Bergen.

Family UNIONIDÆ.

Genus MARGARITANA Schm.

Margaritana margaritifera L. Very common all over the country.

Genus ANODONTA Cuv.

Anodonta cygnea L. Probably common, but very little known.

A. cygnea var. **cellensis** Gmel. Asker, Trógstad, Vandsó, near Moss; and Hvalóerne, in Christiania Stift.

A. cygnea var. **ponderosa** Pfr. Bórsesó, near Skien.

A. cygnea var. **anatina** L. Trógstad.

TABLE OF DISTRIBUTION.*

Number.	NAME.	South Norway.	North Norway.	Sweden.	Finland.	Siberia.
	I.—Family LIMACIDÆ.					
	1. Genus LIMAX.					
1	Heynemannia maximus	1	1	1	1	0
	var. niger	1	1	1	0	0
	var. albus	1	0	1	0	0
	var. fasciatus	1	0	1	0	0
	var. cinereus-nebulosus ...	1	0	1	0	0
	var. leucogaster	1	0	1	0	0
2	H. cinereus	1	0	0	0	0
	var. unicolor	1	0	0	0	0
	var. punctatus	1	0	0	0	0
3	Malacolimax tenellus	1	0	1	0	0
4	Agriolimax agrestis	1	1	1	1	1
	var. succineus	1	0	1	0	0
	var. norvegicus	1	0	0	0	0
	var. albidus	1	0	1	0	0
	var. varians	1	0	1	0	0
5	Hydrolimax lævis	1	0	1	0	0
6	Lehmannia marginata	1	1	1	0	0
	var. obscurus	1	0	0	0	0
	2. Genus ARION.					
7	Lochea empiricorum	1	1	1	1	0
	var. ater	1	1	1	0	0
	var. marginatus	1	0	0	0	0
	var. medius	1	0	0	0	0
	var. albus	1	0	1	0	0
8	Prolepsis subfuscus	1	1	1	1	0
	var. albus	1	1	0	0	0
9	P. hortensis	1	1	1	0	1
10	P. citrinus	1	0	1	0	0
	II.—Family HELICIDÆ.					
	1. Subfamily VITRININÆ.					
	3. Genus VITRINA.					
11	Phenocolimax pellucida	1	1	1	1	1
12	P. angelicæ	1	1	0	0	0

* I have divided Norway in two parts—south and north of the polar-circle.

Number.	NAME.	South Norway.	North Norway.	Sweden.	Finland.	Siberia.
	2. Subfamily HYALININÆ.					
	4. Genus HYALINIA.					
13	Euhyalina cellaria	1	0	1	1	0
	var. compacta	1	0	0	0	0
	var. plana	1	0	0	0	0
14	E. alliaria	1	0	0	0	0
15	E. nitidula	1	0	1	0	0
16	E. pura	1	0	1	0	0
17	E. hammonis	1	0	1	0	0
18	E. petronella	1	1	1	1	1
19	Vitrea crystallina	1	1	1	1	1
20	V. contracta	1	0	1	0	0
21	Conulus fulvus	1	0	1	0	0
22	Zonitoides nitida	1	1	1	1	1
23	Z. norvegica	1	0	0	0	0
	3. Subfamily HELICIDÆ.					
	5. Genus HELIX.					
24	Patula pygmæa	1	1	1	0	1
25	P. rotundata	1	0	1	0	0
26	P. ruderata	1	0	1	0	0
27	Acanthinula aculeata	1	0	1	0	0
	var. sublævis	1	0	1	0	0
28	A. harpa	1	0	1	0	0
29	Vallonia costata	1	1	1	0	0
30	V. pulchella	1	1	1	1	1
31	Trichia hispida	1	1	1	1	1
	var. depilata	1	0	1	1	0
	var. conica	1	0	1	0	0
	var. septentrionalis ...	1	0	1	0	0
	var. concinna	1	0	1	0	0
	var. nana	1	0	0	0	0
	var. albina	1	0	0	0	0
32	Xerophila candicans	1	0	0	0	0
33	Eulota strigella	1	0	1	0	1
34	E. fruticum	1	0	1	0	0
35	Chilotrema lapicida	1	1	1	1	1
36	Arionta arbustorum	1	0	1	1	0
	var. rudis	1	1	1	1	0
	var. alpestris	1	0	1	0	0
	var. flavescens	1	0	1	0	0
	var. trochoidalis	1	0	1	0	0
	var. picea	0	1	0	0	0
	var. septentrionalis ...	1	0	0	0	0
37	Tachea nemoralis	1	0	0	0	0
38	T. hortensis	1	0	1	0	0
	4. Subfamily PUPINA.					
	6. Genus BULIMINUS.					
39	Napæus obscurus	1	0	1	0	0

Number.	NAME.	South Norway.	North Norway.	Sweden.	Finland.	Siberia.
	7. Genus COCHLICOPA.					
40	Cochlicopa lubrica	1	1	1	1	1
	var. minima	1	1	1	0	0
	var. albina	1	0	0	0	0
	8. Genus PUPA.					
41	Charadrobia cylindracea	1	0	1	0	0
42	Pupilla muscorum	1	1	1	0	0
	var. lundströmi	0	1	0	0	1
	var. elongata	0	1	0	0	0
	var. minor	1	0	1	0	0
43	Isthmia minutissima	1	0	1	0	0
	var. odontostoma	1	0	0	0	0
44	Columella edentula	1	0	1	1	1
	var. gredleri	1	1	1	0	0
45	Vertigo gravida	1	0	0	0	0
46	V. pygmæa	1	0	1	1	0
47	V. substriata	1	1	1	1	0
48	V. antivertigo	1	0	1	0	0
49	V. lilljeborgi	1	0	1	1	0
50	V. alpestris	1	1	1	1	0
51	V. arctica	1	1	1	0	1
52	V. pusilla	1	1	1	0	1
53	V. angustior	1	0	1	0	0
	9. Genus BALEA.					
54	Balea perversa	1	1	1	1	0
	var. lucifuga	1	0	1	0	0
	10. Genus CLAUSILIA.					
55	Clausiliastra laminata...	1	0	1	1	0
	var. virescens	1	0	0	0	0
	var. nana	1	0	0	0	0
56	Alinda biplicata	1	0	1	0	0
57	Pyrostoma ventricosa...	1	0	1	0	0
58	P. rolphi	1	0	0	0	0
59	P. plicatula	1	0	1	1	0
	var. leucostoma	1	0	1	0	0
	var. curta	1	0	1	0	0
60	Iphigenia sejuncta	1	0	1	0	0
61	I. dubia	1	0	1	0	0
	var. obsoleta	1	0	1	0	0
62	I. cruciata	1	0	0	1	0
63	I. bidentata	1	1	1	1	0
	var. septentrionalis ...	1	1	1	0	0
	var. exigua	1	0	1	0	0
	var. erronea	1	0	1	0	0
	var. subrugosa	1	0	1	0	0
	var. minor	1	0	0	0	0
	var. elongata	1	0	0	0	0

Number.	NAME.	South Norway.	North Norway.	Sweden.	Finland.	Siberia.
	5. Subfamily SUCCINIDÆ.					
	II. Genus SUCCINEA.					
64	Neritostoma putris	1	0	1	1	1
	var. olivula	1	0	0	0	0
	var. trianfacta	1	0	1	0	0
	var. limnoidea	1	0	0	0	0
65	Amphibina stagnalis	1	0	1	1	1
66	A. pfeifferi	0	1	0	0	0
	var. contorta	1	0	1	0	0
	var. propinqua	1	0	0	0	0
	var. ventricosa	0	1	0	0	0
	var. contortula	0	1	0	0	0
	var. sarsi	0	1	0	0	1
67	Lucena oblonga	1	0	1	0	1
	var. agonostoma	1	0	1	0	0
	var. arenaria					
	III.—Family AURICULIDÆ.					
	12. Genus CARYCHIUM.					
68	Carychium minimum	1	0	1	1	0
	IV.—Family LIMNÆIDÆ.					
	6. Subfamily LIMNÆIDÆ.					
	13. Genus LIMNÆA.					
69	Lymnus stagnalis	1	1	1	1	1
	var. vulgaris	1	0	1	0	0
	var. turgida	1	0	1	0	1
	var. minor	1	0	1	0	1
70	Gulnaria auricularia	1	0	1	1	1
71	G. lagotis	1	0	1	1	1
	var. baltica...	1	0	1	0	0
72	G. ovata	1	0	1	0	1
	var. colletti...	1	0	1	0	0
	var. patula	0	1	1	0	1
73	G. mucronata	1	0	1	0	1
74	Limnophysa palustris...	1	0	1	0	1
	var. septentrionalis ...	1	0	1	0	0
	var. fusca	1	0	1	0	1
75	L. peregra	1	0	1	0	1
	var. margaritana	1	0	1	0	0
	var. ambigua	1	0	1	0	0
	var. minor	1	0	1	0	0
	var. elongata	0	1	1	0	0
	var. peregra-ovata... ...	1	0	1	0	0
76	L. glabra	1	0	1	1	1
	var. elongata	1	0	1	1	0
	var. subulata	1	0	1	1	0
77	L. truncatula	1	0	1	1	1
	var. microstoma	1	0	1	1	0
	var. oblonga	1	1	1	0	0

J.C., v., Oct.,