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REVISION OF THE GREENLAND
ROCK PTARMIGANS

(MISCELLANEOUS NOTES ON GREENLAND ORNITHOLOGY III)

BY

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WITH ONE MAP

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“The ptarmigans form a group of birds that offers many difficulties to the systematist. The rapid and continuous changes of plumages undergone by any one bird during the summer months, together with a rather wide range of individual variation among specimens from any given locality, are puzzling features in themselves, still further complicated by other differences due to age and sex. Then, ptarmigan, and the rock ptarmigan in particular, are not well represented in collections, inhabiting, as they do, relatively remote and inaccessible regions. So, more often than not, when specimens are brought together from different sections they prove to be not comparable and deductions then can only be made by inference.” These words expressed by SWARTH¹⁾ describe so well the difficulties in working with the variations of the ptarmigans that I put them here in front of this investigation. The Rock-Ptarmigans of North America and their geographical variation has been studied for about one hundred years, but on account of the difficulties attached to the subject many errors have been made. The geographical variation of the Greenland ptarmigans has always been a puzzle; their systematical status has often been subject to studies, but still not all questions are settled. The Rock-ptarmigans inhabiting Greenland have since long been separated from the American and European forms. BREHM was the first to call attention to the distinction of the Greenland ptarmigan²⁾. He calls it *Lagopus mutus reinhardi*³⁾ and says that it has a weaker bill than the Iceland form and that the female in summer plumage has paler almost whitish bars on the feathers. Later, extensive studies on Greenland ptarmigans were made by FINSCH⁴⁾, who studied East Greenland specimens in particular; also TURNER⁵⁾ has studied the Greenland ptarmigans, but his results are not very valuable, as he compares Greenland birds in autumn-plumage with Canadian birds in summer-plumage.

Most authors agreed in the fact that the Greenland ptarmigan differed from the other forms described⁶⁾, but the descriptions usually

¹⁾ H. S. SWARTH, Report on a Collection of Birds and Mammals from the Atlin Region, Northern British Columbia, University of California Publications in Zoology, Vol. 30, No. 4, 1926, p. 94.

²⁾ C. L. BREHM, Lehrbuch der Naturges. europ. Vögel, Vol. II, 1824, p. 986.

³⁾ *Tetrao Reinhardi*, l. c., p. 986; *rect. Reinhardti* as it is named after the Danish Professor Reinhardt.

⁴⁾ O. FINSCH, “Birds” in Die zweite deutsche Nordpolarfahrt in den Jahren 1869 und 1870, unter Führung des Kapitän Koldewey, Bd. 2, 1874, p. 199.

⁵⁾ L. M. TURNER, On *Lagopus mutus*, Leach, and its Allies, Proceedings of the United States National Museum, Vol. V, 1882, p. 225.

⁶⁾ H. WINGE, (Grønlands Fugle, Meddelelser om Grønland, Vol. XXI, 1898, p. 125) however not, and he even doubts that the American form (*rupestris*) can be upheld.

were rather obscure owing to lack of material. As a matter of fact, the form *reinhardti* was maintained, and so also by HARTERT in his great work¹). In this work the Greenland ptarmigan is said to differ from the North American form *L. m. rupestris* in having narrower and not so regular bars on the upper-parts in the summer-plumage of the male, and in having less black in the summer-plumage of the female. The differences against the Iceland form are those already mentioned by BREHM.

The first to show that the form *reinhardti* not was a single race, but could be split up into more forms was SCHIÖLER²). He supposed, that Greenland was inhabited by no less than three different ptarmigans of which two were endemic, viz:

1. *L. m. rupestris* (Gm.): Inhabiting the northern part of the west-coast to about Holstensborg district (also extralimital).
2. *L. m. reinhardti* (Br.)³): Inhabiting the southern part of the westcoast, northwards to Sukkertoppen district.
3. *L. m. groenlandicus* subsp. nov.: East Greenland⁴).

Unfortunately SCHIÖLER did not possess any nearctic material and on account of this his results did not show the real affinity of the Greenland ptarmigans; his paper nevertheless constitutes a considerable step forward. Only short time later a new paper was published still more elucidating the matter. It was H. S. SWARTH⁵), who by examing a vast number of North American ptarmigans (unfortunately no Greenland specimens), found, that the ptarmigans of the North American mainland ranged themselves naturally into three forms: *L. m. rupestris* (Gm.), *L. m. dixonii* Grinnell and *L. m. kelloggae* Grinnell. A few years later, P. A. TAVERNER studied the North American ptarmigans⁶), and as he also examined some Greenland ptarmigans (all from the central part of the Westcoast, viz. Umanak, Disko, Sukkertoppen) he extended his studies to the Greenland forms too. As he did not read Danish he was not sure about SCHIÖLERS results, but found — as SCHIÖLER — two forms on the Westcoast:

1. *L. rupestris kelloggae* Grinnell: "West Greenland north of Disko island" (also extralimital).

¹) E. HARTERT, Die Vögel der paläarktischen Fauna, Vol. III, 1921—22, p. 1870.

²) E. LEHN SCHIÖLER, Om de i Grønland forekommende Racer af Fjældrypen, *Lagopus mutus mutus* (Montin), Dansk Ornithologisk Forenings Tidsskrift, Vol. 19, 1925, p. 108.

³) SCHIÖLER fixed the *terra typica* of *reinhardti* to Southwest Greenland (Julianehaab and Godthaab).

⁴) *L. groenlandicus* is preoccupied by *Lagopus Grönlandicus* BREHM 1855; PETERS (Birds of the World, Vol. II, 1934, p. 35) substitutes *captus* nom. nov.

⁵) *l. c.*, 1926, p. 98.

⁶) P. A. TAVERNER, A study of the Canadian Races of Rock Ptarmigan, Annual Report 1928, Nat. Mus. of Canada, p. 28 (Ottawa 1929).

2. *L. rupestris reinhardi* (Brehm): "Southwestern Greenland north to near Disko island".

Finally it should be mentioned that recently ALWIN PEDERSEN¹⁾ has studied a small material of East Greenland ptarmigans, stating a geographical variation in the ptarmigans of this coast too, however without going nearer into the subject.

Summarizing I may say, that the ptarmigans of West Greenland have only been studied sufficiently *inter se*, not in comparison with populations from other countries, and that the status of the East Greenland ptarmigans only has been subject to a rather cursory treatment. The purpose of this paper is to give the subspecific status of the Greenland ptarmigans, and it will be seen that the result of my examination of an extensive material on many points differs from that of the previous authors. To clear up the geographical variation of the ptarmigans, a group that varies individually to so great an extent, a very large material is necessary. For the study of the Greenland ptarmigans more than 500 specimens have been examined. Most of the material belonged to the Zoological Museum in Copenhagen, but large series have also been borrowed from the following Museums: The Zoological Museum in Gothenburg, Stockholm, Oslo, Berlin and London (Brit. Mus.), U. S. Nat. Mus., National Mus. Canada and MEINERTZHAGEN's collection²⁾. In all I have examined the following material in this investigation:

135 specimens from Western Greenland (British Mus. 17, Berlin Mus. 6, Copenhagen Mus. 112); 60 East Greenland specimens (all Copenhagen Mus.); 83 Canadian specimens (Oslo Mus. 3, British Mus. 15, Berlin Mus. 16, U. S. Nat. Mus. 5, National Mus. Canada 15, Copenhagen Mus. 29); 217 Iceland specimens (British Mus. 14, Copenhagen Mus. 195, Berlin Mus. 6, MEINERTZHAGEN Coll. 2); 34 Spitzbergen specimens (Gothenburg Mus. 9, Stockholm Mus. 19, British Mus. 6). The Greenland ptarmigans all belong to the so-called "*rupestris*"-group, which roughly speaking differs from the "*mutus*"-group of Europe and Western Asia in having no uniform black feathers on breast in male summer-plumage and in being generally more brownish olive, not so greyish as "*mutus*", in autumn-plumage. Therefore it was not deemed necessary to compare the Greenland ptarmigans with any true "*mutus*" forms, only with the "*rupestris*" forms from the neighbouring countries, *i. e.* Iceland and Canada. The Greenland ptarmigans differ *inter se* and from the American and Icelandic ptarmigans in 1. Size, 2. Colour.

¹⁾ ALWIN PEDERSEN, Fortgesetzte Beiträge zur Kenntnis der Säugetier- und Vogel-fauna der Ostküste Grönlands, Meddelelser om Grønland, Vol. LXXVII, 1930, p. 448.

²⁾ For lending me their material of the Rock-Ptarmigan I am greatly indebted to DR. HERBERT FRIEDMANN, Count NILS GYLDENSTOLPE, Mag. R. HØRRING, Prof. L. A. JÄGERSKIÖLD, Dr. PERCY R. LOWE, Colonel R. MEINERTZHAGEN, Prof. ERWIN STRESEMANN, Dr. P. A. TAVERNER, & Bestyrer A. WOLLEBÆK.

1. Specimens from Northwest Greenland;
from Upernivik to Holstensborg District (incl.)

Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
♂♂	Holstensborg	8. 8.1925	202	10	10
	Upernivik	25. 6.1886	195	9.5	9.5
	Disko	1. 9.1925	198	9.5	9
	Disko	1. 9.1925	189	9.5	8.5
	Søndre Strømfjord . . .	x. 8.1918	—	11	9
	Serfanguak	28. 9.1912	200	11	9
	Disko	1. 9.1925	188	10	9
	Kangamiut	12. 7.1917	201	10	9
	Søndre Strømfjord . . .	25. 7.1925	199	10	9
	West Greenland	x. x.1846	191	9	—
	Kekertalik	24. 7.1912	200	10	9
	Disko	1. 9.1925	193	9.5	8.5
	Serfanguak	23. 6.1912	198	10	9
	Kangamiut	19.11.1916	200	10	8.5
	West Greenland	x. x.1904	196	10	9
	Serfanguak	15. 5.1912	195	10.5	9
	West Greenland	x. x.1846	205	10	9
	Serfanguak	12. 1.1912	198	10.5	9.5
	Ikerasak ¹⁾	x. x.1895	199	10	—
♀♀	Disko	1. 9.1925	181	10	8.5
	Disko	1. 9.1925	187	9	9
	Holstensborg	1. 7.1901	186	9	9
	Umanak	27. 5.1920	189	10	9.5
	Søndre Strømfjord . . .	24. 7.1925	189	9.5	9
	West Greenland	x. x.1801	197	10	9
	Kangamiut	11.11.1916	193	9	8.5
	Kangamiut	27.10.1916	189	10	9
	Serfanguak	9. 1.1913	185	9	8
	West Greenland	12.11.1822	184	10	9
	Kangamiut	22.11.1916	186	9.5	9
	Serfanguak	15.12.1912	192	9	9
	West Greenland	x. x.1845	193	10	8
	West Greenland	x. x.1845	190	10	9
	West Greenland	x. x.1841	184	10	9
	West Greenland	x. x.1824	182	9	8
	Kangamiut	11.11.1916	192	11	9
	Kangamiut	21.11.1916	198	10	9
	Ikerasak	x. x.1895	196	10	—
	Ikerasak	x. x.1895	188	9	—
	Ikerasak	x. x.1895	195	10	—
	Ikerasak	x. x.1895	196	9.5	—
	Holstensborg	8. 8.1925	195	9.5	8.5
	Holstensborg	8. 8.1925	192	9	8

¹⁾ The specimens from Ikerasak 1895 (1 ♂, 4 ♀♀), measured here, belong to the Berlin Museum (coll. VANHÖFFEN).

2. Specimens from Southwest Greenland;
from Sukkertoppen to Julianehaab District (incl.)

Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
♂♂	Arpagfikfjord	10. 7.1893	194	10.5	9
	Arsuk	15. 9.1893	—	10	9.5
	Julianehaab	16. 9.1925	199 ¹⁾	10	9
	Julianehaab	16. 9.1925	204	10	10
	Julianehaab	16. 9.1925	210	10	9.5
	Julianehaab	16. 9.1925	203	10.5	9.5
	Julianehaab	16. 9.1925	210	10.5	9.5
	Ameralikfjord	6. 7.1925	194	10	9
	Fiskenæsset	x. x.1846	198	10	8.5
	Godthaab	29. 6.1925	199	10.5	9
	Godthaabsfjord	29. 6.1925	195	9	9
	Ameralikfjord	6. 7.1925	194	10.5	9
	Godthaab	9. 8.1923	192	9	9
	Godthaab	15. 8.1923	208	10	9.5
	Godthaab	x. x.1843	—	10	8.5
	Godthaabsfjord	29. 6.1925	198	10	10
	Godthaabsfjord	28. 6.1925	202	10	8.5
	Godthaabsfjord	29. 6.1925	197	10	9.5
	Ameralikfjord	6. 7.1925	198	10	8.5
	Talerulik	14. 7.1925	210	9.5	9
	Godthaabsfjord	2. 7.1925	197	10	8
	Godthaab	15. 4.1924	203	10	10
	Godthaab	3. 3.1900	200	10	9
	Godthaab	x. x.1832	211	11	9
	Sukkertoppen	26.10.1906	190	9	8.5
	Sukkertoppen	11.10.1917	211	10	9
	Sukkertoppen	15.11.1918	202	9	9
	Sukkertoppen	12.11.1910	201	—	—
	Sukkertoppen	23.11.1919	203	10	9
	Sukkertoppen	15.10.1917	200	10	9
Ivigut	19. 2.1891	204	10	9	
Arsuk	x. x.1911	195	10	9	
Godthaabsfjord	2. 7.1925	197	9.5	8	
♀♀	Godthaab	15.11.1904	183	9.5	9
	Godthaab	14.11.1902	190	9	9
	Godthaab	2.12.1893	195	9	9
	Sukkertoppen	3. 3.1917	195	9.5	8.5
	Sukkertoppen	15.10.1917	186	9	9
	Sukkertoppen	20.10.1906	185	9	8.5
	Sukkertoppen	15.10.1917	199	9.5	9
	Ivigut	16. 2.1891	196	9.5	9.5

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¹⁾ Some specimens collected Julianehaab 16.9.1925 have still wings in moult.

Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
	Julianehaab	16. 9.1925	193	10	9
	Julianehaab	16. 9.1925	—	9.5	9
	Julianehaab	16. 9.1925	—	11	9.5
	Julianehaab	16. 9.1925	—	10	9.5
	Julianehaab	16. 9.1925	—	10	9.5
	Nanortalik	28. 5.1915	187	9	8
	Arpagfikfjord	10. 7.1893	186	10	8
	Godthaabsfjord	28. 6.1925	183	9	9
	Fiskenæsset	x. 8.1843	188	9.5	9
	Godthaab	21. 8.1926	189	10	8.5
	Talerulik	14. 7.1925	183	9	9
	Godthaab	7. 6.1920	196	9	9
	Godthaabsfjord	29. 6.1925	184	9	9
	Godthaabsfjord	28. 6.1925	184	9	9
	Godthaab	21. 5.1904	194	9	9
	Godthaab	18. 8.1923	193	10	8

3. Specimens from the Northern Part of East Greenland
(Germania Land).

Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
♂	Germania Land	15. 2.1907	216	11	8.5
	Germania Land	29. 8.1906	219	11	9
	Germania Land	11. 6.1907	221	11.5	10
	Germania Land	6. 5.1907	200	10	10
	Germania Land	14. 2.1907	218	10	9
	Germania Land	9. 5.1907	212	11	9
	Germania Land	1. 3.1907	217	10	9.5
	Germania Land	22. 3.1908	220	11	10
	Germania Land	29. 8.1906	—	11	10
	Germania Land	5. 3.1907	223	11	11
	Germania Land	6. 9.1906	211	10.5	9
	Germania Land	x. 4.1908	220	11	10
	Germania Land	10. 8.1907	—	11.5	10
	Germania Land	20. 6.1908	219	11	10
	Germania Land	21. 5.1907	216	12	10
	Koldewey Island	14. 2.1907	215	10.5	9
	Germania Land	12. 6.1907	217	12	11
♀	Germania Land	15. 8.1907	198	11	9
	Germania Land	25. 5.1907	202	11	9
	Germania Land	11. 3.1907	198	11	9

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Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
	Germania Land.....	26. 5.1907	193	11	9
	Germania Land.....	26. 5.1907	207	10.5	9
	Germania Land.....	15. 8.1907	198	10	9
	Germania Land.....	17. 3.1907	203	10	10
	Germania Land.....	10. 4.1908	199	10	10
	Germania Land.....	15. 3.1908	197	10	9.5
	Germania Land.....	10. 8.1907	—	10	9
	Germania Land.....	16. 8.1907	—	10.5	9.5
	Germania Land.....	28. 7.1919	202	10.5	9
	Germania Land.....	11. 6.1907	203	10	9
	Germania Land.....	15. 8.1907	200	10	9
	Germania Land.....	10. 8.1907	—	10	9

4. Specimens from the Central Part of East Greenland;
from Hudson Land to Scoresby Sound District (incl.)

Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
♂♂	Hudson Land	30. 4.1921	208	10	10.5
	Hudson Land	15.11.1920	215	10	10.5
	Hudson Land	14.10.1920	201	10.5	9
	Hudson Land	11.10.1920	211	11	9
	Scoresby Sound	12. 5.1892	215	11.5	10
	Scoresby Sound	12. 5.1892	213	11	10
♀♀	Hudson Land	14.10.1920	206	9	9
	Hudson Land	13. 8.1930	—	10	8.5
	Hudson Land	11. 9.1920	—	10	10
	Hudson Land	11.10.1920	202	10	10
	Hudson Land	10.10.1920	197	9	9
	Kap Dalton.....	11. 7.1932	202	10	9

5. Specimens from the Southern Part of East Greenland;
from Kangerdlugsuak to Angmagsalik (incl.)

Sex:	Locality:	Date:	Wing:	Bill	
				Length from Nostrils:	Breadth at Base:
♂♂	Kangerdlugsuak	about 1930	202	—	—
	Kangerdlugsuak	about 1930	206	—	—
♀♀	Kangerdlugsuak	about 1930	186	—	—
	Angmagsalik	about 1898	193	9	8
	Angmagsalik	24. 8.1929	187	10	8.5
	Angmagsalik	24. 8.1929	192	10	8

I. Size.

Of the large Greenland material most specimens in the Copenhagen Museum are measured with the exception of all juveniles and nestlings. Some few fully grown young birds are however included. Of birds moulting remiges only a few specimens are measured to obtain the proportions of bill, but wing measurements are of course not taken on such birds. To study the geographical variation Greenland is divided into 5 sections, and the ptarmigans thus divided into 5 groups. The measurements are given above p. 6—9 (all measurements in mm).

The ptarmigans inhabiting the different sections of Greenland, as scheduled above, then measure as follows:

1st Section:	♂♂	Length of wing:	188—205	(average 197.1)
		Length of bill:	9—11	(average 10.0)
		Breadth of bill:	8.5—10	(average 9.0)
	♀♀	Length of wing:	181—198	(average 190.1)
		Length of bill:	9—11	(average 9.6)
		Breadth of bill:	8—9.5	(average 8.8)
2nd Section:	♂♂	Length of wing:	190—211	(average 200.6)
		Length of bill:	9—11	(average 9.9)
		Breadth of bill:	8—10	(average 9.0)
	♀♀	Length of wing:	183—199	(average 189.5)
		Length of bill:	9—11	(average 9.5)
		Breadth of bill:	8—9.5	(average 8.9)
3rd Section:	♂♂	Length of wing:	211—223	(average 217.4)
		Length of bill:	10—12	(average 10.9)
		Breadth of bill:	8.5—11	(average 9.7)
	♀♀	Length of wing:	193—207	(average 200.0)
		Length of bill:	10—11	(average 10.4)
		Breadth of bill:	9—10	(average 9.2)
4th Section:	♂♂	Length of wing:	201—215	(average 210.5)
		Length of bill:	10—11.5	(average 10.7)
		Breadth of bill:	9—10.5	(average 9.8)
	♀♀	Length of wing:	197—206	(average 201.7)
		Length of bill:	9—10	(average 9.7)
		Breadth of bill:	8.5—10	(average 9.2)
5th Section:	♂♂	Length of wing:	202—206	(average 204.0)
	♀♀	Length of wing:	186—193	(average 189.5)
		Length of bill:	9—10	(average 9.7)
		Breadth of bill:	8—8.5	(average 8.2)

From the very large series of birds from Western Greenland we learn, that no difference exists in size between the populations inhabiting the northern and southern part of the coast. This does not agree with the results gathered by SCHIÖLER¹⁾ who says: "Regarding the size the ptarmigans of the northern part of the Westcoast appear to be smaller than the southern ones; and their bill seems to be still smaller and especially less arched than this of the other races." The differences however stated by him are certainly very slight and by measuring the large series above these differences have almost disappeared. He adds himself: "The series, available for comparison, is so small, that it is very likely, that the difference in size will appear to be smaller or quite to disappear, if a larger number of birds was collected." The birds from Northeast Greenland, on the contrary, are decidedly larger than the birds of the West, both in length of wing and in proportions of bill (but especially in length of wing). This holds good of both male and female. There is practically no overlapping in the males, and only a slight overlapping in the females and most specimens from Northeast Greenland are easily recognized on their larger dimensions. In Western Greenland males never exceed a wing-length of 211 mm, whereas this is to the contrary, the smallest measurement of the Northeast ptarmigan; only one single specimen measured 200 mm, but it is an exception and is not included in the schedule above when finding the average-length of wing. Of the females 50 per cent. are larger than the largest females in West Greenland. The average of the West Greenland females was 189—190; the Northeast birds are all larger than this size; one 193, all others 198 or larger; of the West Greenland birds only 1 of 44 specimens was larger than 198 mm.

The material from the central parts of the Westcoast (section 4) evidently shows that the ptarmigans in this country also belong to the big form, although the measurements are somewhat smaller on an average. Of 6 males 3 are larger than the largest West Greenland specimens and one is as small as the average of the West Greenland form (197—200); of 4 females 3 are larger than the largest West Greenland bird, the fourth is almost as large as the largest West Greenland specimen. The average of both ♂ and ♀ is more than 10 mm larger than the West Greenland averages. So the birds from the central parts of the East coast no doubt belong to the large form although they do not attain the extreme large measurements of the Germania Land birds. Probably the country around Kap Dalton constitutes the southernmost boundary of the breeding-range of the large form. South of this place the large glaciers at Blossville coast probably do not permit the occurrence of

¹⁾ *l. c.* p. 113.

ptarmigans, and south of it (at Kangerdlugsuak) already ptarmigans belonging to the small form are found.

The material from the Scoresby Sound district certainly is not large, but the few birds available no doubt belong to the large form. From the Scoresby Sound proper I have examined two males collected by DEICHMANN on RYDER'S Expedition 1891—92. They are labelled 12.5.1892, but in the description of the ornithological results of the expedition BAY gives no dates¹). These two specimens are collected on Danmarks Island or in the vicinity of this island, and as they measure wing 213 and 215, they belong to the northern, large form. The date proves that most probably they are breeding-birds. Unfortunately I could not examine the large series of birds from Scoresby Sound collected by ALWIN PEDERSEN during 1927—29, and his method of measuring does not quite agree with mine. I have measured some few of his specimens, and it seems that the measurements taken by him usually are 2—4 mm shorter than those taken by me. ALWIN PEDERSEN has captured three males in Liverpool Land; of these one (collected in Sept.) obviously has remiges in moult; the two others have the wing-length 203 and 211 mm²). This however corresponds to 206 and 214 measured by me. A long series of females, all from Liverpool Land, measure: 190, 194, 196, 196, 198, 200, 200, 201, 203 mm. This corresponds to 193—206 if measured by me. But even the measurements as given by ALWIN PEDERSEN are rather large, when keeping in mind that the West Greenland birds (♀♀) never reach a wing-length of 200 mm. The larger size of ALWIN PEDERSEN'S Scoresby Sound birds is also obviously seen when comparing with his measurements of three Angmagsalik birds, viz: ♂ 187 mm, ♀♀ 184, 189 mm. He has himself noticed the difference in size, saying: "auch scheinen diese (Angmagsalik) Schneehühner etwas kleiner als die nordostgrönländischen zu sein. Am Scoresbysund sollen mitunter sehr grosse Exemplare vorkommen."

Of the numerous authors dealing with the birds of East Greenland (for instance FINSCH, MANNICHE, DEICHMANN, BAY, KOLTHOFF, LÖPPENTHIN among others) only FINSCH has given measurements which are of some use as regards the difference in size between the East and West Greenland ptarmigans. FINSCH has measured 7 ♂♂ and 3 ♀♀ from Sabine and Clavering Island (north of Hudson Land) and has compared them with specimens from Southwest Greenland. His measurements are:

Northeast Greenland: 7 ♂♂: 7''3'''—7''10''' (average 7'' 7½''')
 Southwest Greenland: 4 ♂♂: 7'' —7''4'''

¹) E. BAY, "Pattedyr og Fugle" in "Den østgrønlandske Expedition udført i Aarene 1891—92 under Ledelse af C. RYDER", part 3, Meddelelser om Grønland, Vol. 19, 1896, p. 25.

²) *l. c.*, 1930, p. 448.

Northeast Greenland: 3♀♀: 7'' —7''5''' (average 7''2''')
 Southwest Greenland: 5♀♀: 6''5'''—6''11'''

FINSCH's series thus shows a constant difference in size between the Western and the Northeastern birds, a difference which he, however, does not mention with a word in the text.

SCHJØLER has been aware of the difference in size, as he says¹): "The Ptarmigans of East Greenland are bigger and stouter than the typical form and the Iceland form, with which latter, however, they have their strong bill in common."

From the Southern parts of the East coast I have examined only a small series. From Kangerdlugsuak two young birds (collected by U. MØHL-HANSEN) were available, but with still growing remiges and therefore useless for measuring of wing-length. Fortunately, I was able to measure three adult specimens secured by CHAPMAN on the British Arctic Air Route Expedition and kept in the British Museum. They measured: 2 ♂♂ 202, 206 mm, ♀ 186 mm, thus obviously belonging to a smaller form than the more northern birds. The same holds good of the scanty Angmagsalik material. 3 ♀♀ measure: 193, 192 and 187 mm²). Also the bill of these birds are smaller than those of more northern countries. The female measuring 193 mm was in winter-plumage; it is the specimen about which HELMS says: "The skin of a female in winter dress was sent home in 1898³)." Thus no doubt, the ptarmigans of Southeast Greenland are of the same size as those inhabiting West Greenland, being somewhat smaller than the Northeastern birds. Still it is left to compare the populations of the Greenland ptarmigans with those of other races, inhabiting the surrounding countries, viz. Canada and Iceland. A rather large series of Canadian birds are measured, in all 29 ♂♂ 24 ♀♀. They had the following measurements:

♂♂: wing 192, 192, 194, 194, 196, 196, 196, 196, 197, 197, 197, 198, 198, 198, 200, 200, 200, 201, 202, 202, 203, 204, 204, 205, 206, 206, 207, 208, 210, (average 200.0).

Bill (from nostrils) 9, 10, 10, 10, 10, 10.5, 11, 11.5 (average 10.3).

Breadth of bill 8, 8.5, 8.5, 9, 9 (average 8.6).

♀♀: wing 175, 179, 180, 180, 181, 183, 183, 184, 184, 185, 185, 185, 186, 186, 186, 186, 188, 189, 190, 190, 191, 192, 193, 193, 196, 197, 199 (average 187.0).

Bill (from nostrils) 9, 9, 9, 9, 9, 9, 9, 9, 9.5, 9.5, 10, 10, 10 (average 9.3).

Breadth of bill 8, 8, 8, 8, 8, 8, 8, 8.5, 9, 9 (average 8.2).

¹) *l. c.* p. 111.

²) The females measuring 187 and 192 mm were by ALWIN PEDERSEN stated to measure respectively 184 and 189 mm.

³) O. HELMS, The Birds of Angmagsalik, Meddelelser om Grønland, Bd. LVIII, Nr. IV, 1926, p. 239.

The American birds are of the same size as the birds from West and Southeast Greenland, *i. e.* smaller than those from Northeast Greenland. A small series has been measured from the northern part of Grinnell Land¹⁾, collected by Captain FEILDEN on the voyage of H. M. S. "Alert". The birds are now in the British Museum, where I have examined them. These birds measure: ♂♂: wing 206, 212 (average 209 mm), ♀♀: 200, 200 (average 200 mm). A single specimen from Beechey Island (off North Devon), obtained 26.12.1852, a male in winter-plumage, measures: wing 209 mm. These specimens are certainly on an average larger than the other Canadian birds, and it appears that they approach the large form inhabiting Northeast Greenland, but the material of course is too insufficient to make any further comments. A series of Iceland ptarmigans (*islandorum* (FABER)) measure:

♂♂: wing 192, 194, 194, 194, 195, 195, 199, 200, 203, 203, 203, 207,
(average: 198.3).

Bill (from nostrils) 10, 10.5, 10.5, 11, 11 (average: 10.6).

Breadth of bill 9.5, 9.5, 10, 10.5, 10.5 (average: 10.0).

♀♀: wing 184, 184, 184, 185, 186, 187, 188, 190, 190, 191, 192, 198, 198
(average: 189.0).

Bill (from nostrils) 9.5, 10, 10, 10, 10 (average: 9.9).

Breadth of bill 9, 9.5, 10, 10, 10.5 (average: 9.8).

The wing of the Iceland form does not at all differ from the West Greenland form, but the bill is on an average a little stronger; this is, as a matter of fact, a rather inconsiderable difference, which will, however, manifest itself when a series is measured.

We may then summarize, that the ptarmigans of entire Western Greenland and Southeast Greenland are of equal size, and that the birds of Northeast Greenland are larger, especially regarding length of wing. The Canadian and Iceland ptarmigans are of the same size as the West Greenland birds. Ptarmigans from Grinnell Land are intermediate in size between the Northeast and the West Greenland form. The fact that the Northeast Greenland birds are distinguishable by larger proportions is interesting, as the different forms of *Lagopus mutus* as a rule are nearly of the same size, and never exceed 210 mm in wing-length. The only exception to this rule besides the Northeast Greenland birds is the Spitzbergen form *Lagopus mutus hyperboreus* Sundevall, which is still larger than the Northeast Greenland ptarmigans. I have taken the following measurements (on 20 ♂♂, 10 ♀♀):

♂♂: wing 220, 224, 225, 227, 228, 229, 230, 230, 231, 232, 232, 234, 235,
235, 236, 236, 236, 238, 243, 244 (average 232.25).

¹⁾ The birds are collected on 82°31-32' and one even on 82°46'. On the label of this latter specimen FEILDEN has written: "Northernmost bird captured by man."

Bill (from nostrils) 11, 11, 11, 11.5, 12, 12, 12, 12.5, 13, 13, 13
(average 12.0).

Breadth of bill 9, 9.5, 9.5, 10, 10, 10, 10, 10, 10, 10.5 (average 9.9).

♀♀: wing 217, 218, 219, 220, 221, 224, 224, 227, 227, 228 (average 222.5).

Bill (from nostrils) 11.5, 11.5, 12, 12 (average 11.8).

Breadth of bill 9, 9.5, 9.5, 9.5 (average 9.4).

On the table I p. 16 is shown the difference in size between the Spitzbergen specimens, the Northeast Greenland specimens and the birds from the rest of Greenland and arctic Canada giving all specimens in one scheme.

2°. Colour.

As mentioned above SCHIÖLER has described a difference between the population of ptarmigans inhabiting the Northwestern and Southwestern Greenland. He says: "The ptarmigan from the southern part of the Westcoast, i. e. from about 66° n. lat. and southwards, is in the autumn-plumage greyish-brown approaching the typical form (from Scandinavia) but the colour is tinged with olive-brown¹⁾" "More to the North, at the Strømfjord, Holstensborg, Disko and Umanak the ptarmigans in autumn-plumage are more brownish than the above-mentioned; they may approach the Iceland ptarmigan but do not reach it in the warmth of the colour" (p. 112). In western Greenland, with the comparatively narrow coastland running almost strictly North-South, the chances for development of geographical races in the ptarmigans assumably should be greater than for instance in the great landmasses of North America. It should not be difficult to substantiate if any geographical variation took place in the ptarmigans of Western Greenland when examing specimens collected in various places during the summer and autumn-time (in winter migration might obscure the facts, and in the white winter-plumage supposedly no differences of any taxonomical value are to be found). SCHIÖLER studied a rather large material of birds from West Greenland and, as emphasized above, he came to the result that a racial development had taken place, dividing the West Greenland population of the ptarmigans into two groupes, a Northern and Southern, which in a certain area merged into each other. It cannot be denied that the ptarmigans from the southernmost part of Western Greenland are somewhat paler than the birds inhabiting the districts further to the North, but the differences do not appear to be so essential that the two populations may be said to belong to different races; especially when considering the very large individual variation of the ptarmigans the material does not permit such a division. The individual and geographical differences are most pronounced in the autumn-plumage. Below are

¹⁾ *l. c.* p. 111.

Table I. Variation in Wing-Length of the Greenland Ptarmigans, compared with some other populations.

1. Males.

	<i>L. m. rupestris.</i> (Greenland Sect. 1, 2, 5 and Arctic Canada)	<i>L. m. captus.</i> (Greenland Sect. 3, 4)	<i>L. m. hyperboreus.</i> (Spitzbergen)
188.....	○
189.....	○
190.....	○
191.....	○
192.....	○ ○ ○
193.....	○
194.....	○ ○ ○ ○ ○
195.....	○ ○ ○ ○ ○
196.....	○ ○ ○ ○ ○ ○
197.....	○ ○ ○ ○ ○ ○ ○
198.....	○ ○ ○ ○ ○ ○ ○ ○ ○ ○
199.....	○ ○ ○ ○ ○
200.....	○ ○ ○ ○ ○ ○ ○ ○ ○ . .	○
201.....	○ ○ ○ ○ ○	○
202.....	○ ○ ○ ○ ○ ○ ○
203.....	○ ○ ○ ○ ○
204.....	○ ○ ○ ○ ○
205.....	○ ○ ○ ○ ○
206.....	○ ○ ○ ○
207.....	○
208.....	○ ○	○
209.....
210.....	○ ○ ○ ○
211.....	○ ○	○ ○
212.....	○
213.....	○
214.....
215.....	○ ○ ○ ○ ○
216.....	○ ○ ○ ○ ○
217.....	○ ○ ○ ○ ○
218.....	○ ○ ○ ○ ○
219.....	○ ○ ○ ○ ○
220.....	○ ○ ○ ○ ○	○
221.....	○
222.....	○
223.....	○
224.....	○
225.....	○
226.....	○
227.....	○ ○ . . .
228.....	○ ○ ○ . .
229.....	○ ○ ○ ○ .
230.....	○ ○ ○ ○ ○
231.....	○ ○ ○ ○ ○
232.....	○ ○ ○ ○ ○
233.....	○ ○ ○ ○ ○
234.....	○ ○ ○ ○ ○
235.....	○ ○ ○ ○ ○
236.....	○ ○ ○ ○ ○
237.....	○ ○ ○ ○ ○
238.....	○
239.....
240.....
241.....
242.....
243.....	○
244.....	○

given short diagnoses of the coloration of the birds available in autumn-plumage (including the young birds in first autumn-plumage). When nothing else is remarked the birds belong to the Zoological Museum of Copenhagen.

Disko:	1 ♀ ad.: rather pale buffish or brownish-olive. 1 ♀ ad. ¹⁾ : warm rusty brown. 8 juv. (♂♂ & ♀♀): all more or less olive-greyish, olive-brown or buffish, one very warm buff.
Tasseralik:	1 ♂ ad. ²⁾ : dark olive-greenish. 1 ♀ ad.: buffish-brown.
Holstensborg:	1 ♂ ad.: dark olive-brownish. 1 ♂ ad.: pale greyish-olive with yellowish tinge and "frosty" markings.
Serfanguak:	1 ♂ ad.: rather pale brownish-grey. 1 juv.: olive-buffish.
Søndre Strømfjord:	1 ♂ ad.: rather dark and warm olive-buff. 1 ♂ ad.: olive-greenish (without brown). 2 juv.: olive-buffish, rather warm in colour.
Kangamiut:	1 ♂ ad.: rather dark olive-brown.
Sukkertoppen:	1 juv. ³⁾ : greyish-olive.
Talerulik:	1 ♂ ad.: olive-green.
Godthaab:	1 ♂ ad.: olive-greenish. 1 ♂ ad.: dark olive-buffish. 1 ♀ ad.: olive-greenish. 2 juv.: pale; greyish-yellow with olive tinge.
Fiskernæs:	2 ♂♂ ad.: pale buff (near to "sandy"), one with "frosty" markings.
Lichtenfels:	5 ♀♀ ⁴⁾ : rather pale; greenish-olive with greyish tinge.
Arsuk:	1 ♀ ad.: pale; greyish with yellowish tinge.
Arpagfikfjord:	1 ♂ ad.: olive-green.
Julianehaab:	1 ♂ ad.: pale; greyish with olive tinge. 3 ♂♂ ad., 3 ♀♀ ad.: pale; greyish (with much "frosty") and with yellowish tinge. 1 ♀ ad.: pale; pure grey. 1 ♂ ad.: pale buff (near to "sandy") with "frosty" markings.

The change in colour from North to South thus is very gradual, and the individual variation is very considerable. Many specimens from

¹⁾ This specimen belongs to the National Museum of Canada.

²⁾ A little place between Holstensborg and Agto.

³⁾ This specimen belongs to the Zoological Museum of Berlin.

⁴⁾ These specimens belong to the British Museum.

the two populations are indistinguishable, for instance specimens from Fiskernæs (South) and Holstensborg (North) are almost identical; the same is true of birds from Arpagfjokfjord (South) and Tasseralik (North). A specimen from Julianehaab (in extreme South) is so to say identical with a female from Disko (in the North). All in all the differences between northern and southern birds are too insignificant, and I do not recognize two races. Unfortunately, no specimens in autumn-plumage could be examined from the districts north of Disko, but from Disko southwards to Holstensborg settlement it must be admitted that the birds usually are brownish and not so grey as in the south. In the extreme south (Julianehaab) the birds are paler, the general aspect is greyish or greenish, mixed with more or less olive or yellowish, and the dark spots and dots on the feathers are finer, supplying the feathers with a fine, often minute powdering or a sort of frosty veiling. In Sukkertoppen and Godthaab districts the birds might also be reckoned among the pale ones, as they are olive-greenish or greyish, usually without any buffish-brown colour. Many birds, however, are indistinguishable and all in all I do not find it opportune to divide the West Greenland ptarmigans into two races. Perhaps the differences could be shown more satisfactorily by a larger material; until now it has not been possible to recognize more than one form in the West. In the summer-plumage of the male probably the same individual and geographical differences are to be found, but the fact that only a very scanty material from the northern part of the West coast could be examined prevents me from giving any definite statement. A large material from the south (especially from the Godthaabsfjord June—July 1925) has a greyish-olive or greenish-olive coloration, whereas a single male from the North (Upernivik) is more brownish-fulvous; the difference, however, is very slight.

In the summer-plumage of the females there is practically no difference between the populations of the north and the south. In both the plumage is heavily barred with broad bands of blackish and are indistinguishable from the corresponding plumage in the typical form *L. m. mutus*. The light bands, which alternate with the black, are rather pale, creamy or lemon, and thin (usually the black bands are broader than the light ones), so that the general aspect of the plumage is dark. The feathers of the upperparts have conspicuous white tips, which are, however, soon worn off. Totally 7 southern females (from Godthaab southwards) and 5 Northern (Søndre Strømfjord—Umanak) have been examined. Perhaps the Northern specimens are on an average a trifle more yellowish, but this difference is certainly very slight.

In the winter-plumage there is no difference. The coloration of the primaries, which differs in some races, is in the West Greenland birds exactly as in *L. m. mutus*, *i. e.* shafts of primaries brownish, but usually

tips white; only exceptionally speckled on webs (females sometimes with a little suffused brown along shafts of outermost 2—3 primaries); the first-year wing always rather distinct speckled on tip of two outermost primaries.—

Much interest is attached to the East Greenland ptarmigans. The Northern, large population, inhabiting the coast southwards to Scoresby Sound, differs in autumn-plumage from the West Greenland form. The ground colour is not olive-brown buffish, or olive-greenish, but usually much paler, sandy yellow-grey or pure yellow sand-colour, and the pattern much finer, the black spots and lines restricted to scattered minute dots. This applies to both sexes, but apparently is most conspicuous in the male. The summer-plumage of the female¹⁾ is not essentially differing from *L. m. mutus* (or from the West Greenland birds), the light bands are rather pale yellow, and the dark bands broad and predominating; some specimens, however, are somewhat more yellow. In winter-plumage there is no difference from the West Greenland birds²⁾ except in the coloration of the primaries, which have only a pale brownish streak on the middle part of the shafts of the first (outermost) primaries, and sometimes it is even quite lacking on the first primary; 1—3 cm of tips are always white, and feathers are never speckled on web.

In the central part of East Greenland the ptarmigans have the same pale appearance as the northern birds, but they are not always so typically developed, some being a little darker, buffish-olive as the birds of Northwest Greenland, but as a rule they are pale, sandy-yellowish or greyish-lemon. A few birds from Hudson Land and Clavering Island are all pale; of three females collected by LÖPPENTHIN³⁾ at Moskusoksefjord, Cape Stosch, Knudshoved respectively (all at about 74° n. lat.) the two former are pale, and the last rather dark buffish-olive. SCHAANNING recently has examined five adult birds from the central part of East Greenland (localities: Hudson Land, Cape Stosch, Cape Franklin, Myggebukta; all at about 74° n. lat.) all being in autumn-dress, collected in the last days of July and in early August; about these he says the following: "The few skins of full-grown birds which are available are indeed somewhat distinctive in their light greyish-

¹⁾ The summer-plumage of the male appears to be more or less suppressed, being developed only on head and neck. It does not seem to differ in colour from that of the Western form.

²⁾ It should be mentioned here that the females of the northeast ptarmigans often are supplied with a broad and pure black loreal streak quite as in the males. This is not the case in other races, nor does this in Northeast Greenland apply to all females. This is first described by MANNICHE, *Meddelelser om Grønland*, Vol. XLV, 1910, p. 115.

³⁾ BERNT LÖPPENTHIN, *Die Vögel Nordostgrönlands zwischen 73°00' und 75°30' N. Br.*, *Meddelelser om Grønland*, Vol. 91, Nr. 6, 1932, p. 44.

yellow, almost *sandy yellow* plumage, with some of the shaft stripes of the remiges quite white and others light horny brown¹.”

The birds inhabiting the southern part of the Eastcoast are entirely different from the Northeast Greenland population. It is already shown above that the Southeast Greenland ptarmigans agreed in size with the Western birds, in contrast to the large Northeast Greenland form. Also in colour, however, they are quite identical with the Western form. From Kangerdlugsuak I have examined two young birds (collected by MØHL-HANSEN), both being in the combined juvenile and first autumn-plumage. They were both quite identical with two young birds from Godthaab on the Westcoast; the colour was greyish-olive with a slight yellowish tinge. Compared with some young birds from Northeast Greenland, which are yellowish sand-coloured, the difference is rather conspicuous. Three adult birds, collected by CHAPMAN at Kangerdlugsuak (cf. above p. 9) were greenish-olive like the birds from the Godthaab-district of the Westcoast, one of them with a yellowish tinge (like some of the Julianehaab specimens). From Angmagssalik two females (collected August 1929) were examined, both being of about the colour of the Julianehaab specimens, greyish with yellowish tinge. So the ptarmigans of Southeast Greenland doubtless belong to the same race as the Southwest Greenland birds. The difference between the northern and southern population of the Eastcoast has already been pointed out by ALWIN PEDERSEN concerning the Scoresby Sound and Angmagssalik birds; he says: “Zwischen Schneehühnern aus der Gegend am Scoresbysund und von Angmagssalik scheint ein kleiner Unterschied in der gelben Bänderung des Sommerkleides zu bestehen, indem diese bei Angmagssalik-Schneehühnern mehr grauweiss als gelblich ist”, (*l. c.*, p. 448).

Regarding the coloration of the Greenland ptarmigans we may then say, that the birds of West and Southeast Greenland have brownish, greyish or greenish ground-colour with a more or less yellowish tinge and often (especially in the southernmost part of West Greenland) with a greyish or whitish “frosty” veiling which together with the scattered black spots produces a “pepper and salt” coloration; the birds of Northeast Greenland are pale yellowish sand-coloured. Great interest is attached to a comparison between the Greenland and North American races of the Rock-Ptarmigan. The Northeast Greenland birds constitute a special race which is endemic and not to be found elsewhere. Pale sandy birds may be found in North America (TAVERNER mentions a few from Yukon, Cape Kellet (Bangs Island) and elsewhere), but they are exceptions to the rule and do not form populations in any places outside East Greenland. Apart from the special Pacific races of the

²) H. THO. L. SCHAANNING, A Contribution to the Bird Fauna of East-Greenland, Skrifter om Svalbard og Ishavet, Nr. 49, 1933, p. 15.

ptarmigan, which are only of minor interest when discussing the Greenland forms, North America are inhabited by two forms which by recent authors are called *L. m. kelloggae* Grinnell and *L. m. rupestris* (Gm.)¹). According to SWARTH the distribution of *kelloggae* is Alaska and North-west Territory eastwards to Coronation Gulf and Bathurst Inlet, and the distribution of *rupestris* the Canadian islands and the mainland from British Columbia to Hudson Bay and Labrador. Later TAVERNER extended the range of *kelloggae* through the entire nearctic region from "the interior of Alaska and northern Yukon, the western Arctic coast to Coronation gulf, the Arctic islands, except southern Baffin island; and west Greenland north of Disko island." *L. m. rupestris* is inhabiting Arctic North America in its whole breadth south of the breeding-range of *L. m. kelloggae*. The main result thus is that Arctic North America is divided between two races of the Rock-Ptarmigan, a Northern brownish form (*kelloggae*) and a southern more greyish form (*rupestris*). Now the question is: Is the West Greenland form different from the two Canadian forms, or is it identical with either the one or the other? To answer this question it is necessary to examine the two American forms. *L. m. kelloggae* is characterized by the very vivid ruddy coloration of the summer- and autumn-plumages. The female in summer-plumage is bright tawny or vivid fulvous on the entire underparts and on the edges and patches of the upperparts. Terminal spots, and vermiculations of feathers of upper-parts are fulvous or ochre of the same colour as underparts. Vermiculations on feathers are rather rough, the apical feather-spots are larger, the black bands are narrower, and altogether the black colour is much reduced. This makes the whole bird look very pied and variegated, with the black and the warm fulvous sharply contrasting. The same tendency to restrict the black colour and to acquire a warm buff coloration is found in the summer-plumage of the male and in the autumn-plumages, but apparently it is not so characteristically developed in these plumages. SWARTH describes *kelloggae* as follows: "The notable feature of this bird is its bright ruddy tone of coloration, a character that is evident in both sexes and in all stages of the summer plumages. As compared with *rupestris*, the general tone of colour throughout is brighter and more reddish, and there is notable restriction of the dark areas on individual feathers²." Compared with *kelloggae*, *L. m. rupestris* has a paler ground-colour, and black spots and bands are more extended. The

¹) The New Foundland birds probably constitute a special form (*L. m. welchi* Brewster); TAVERNER holds it to be invalid, but it is maintained in the recent issue of the A. O. U. Check-list. I have personally examined some few birds which appear to be a trifle darker than *rupestris* with the black bars and spots of larger extension in the autumn-plumage; the difference however is very slight.

²) *l. c.* p. 98.

female in summer-plumage is identical with the Scandinavian form *mutus*; it has under-parts light cream-coloured or light yellow, narrow tips to feathers of upper-parts white, and greyish or pale lemon-coloured vermiculations on the upper-parts. The dark parts are more extended and the yellow colour of the upper-parts is restricted to rather small greyish or light yellow spots and is comparatively easy worn off in the summer, so that the upper-parts look still darker. The difference between *kelloggae* and *rupestris* in females' summer-plumage is considerable, the one is bright ochre or vivid fulvous, with little black, the other pale greyish or lemon with much black. "The distinction is obvious at a glance and does not need massed specimens, careful illumination, or critical judgment for demonstration¹)." In autumn-plumage grey is the predominating ground-colour with more or less "pepper and salt" colour superimposed in the typically developed specimens.

As the individual and geographical variation in the Greenland birds was most pronounced in the autumn-plumage a comparison with American birds is best made between birds in this plumage. The birds from the Southern part of the Westcoast especially from the Sukkertoppen—Godthaab district are exactly matched by specimens of *rupestris* in autumn-plumage. A male from Churchill (Manitoba) and a female from Foxe Land are identical with Godthaab specimens, *i. e.* are of an olive-greenish colour with a greyish tinge. On the other hand, certain specimens in autumn-plumage which by TAVERNER are called *kelloggae* and which I have examined, are identical with birds from the Northern part of the Westcoast. For instance a male from Bathurst Inlet with buffish-olive plumage is exactly coloured as a ♂ ad. from Søndre Strømfjord. A young bird from Foxe Land could perhaps be assigned to *kelloggae*, as it is pale brownish; it bears a close resemblance to the palest Disko birds, but is not quite as greyish-green as the Godthaab birds. The differences between *kelloggae* and *rupestris* in autumn-plumage described by TAVERNER are the following: "*L. m. kelloggae* has a distinct general yellowish rust appearance, whereas *rupestris* is clearly grey with considerable white frosty veiling on the back of the most perfect specimens." No doubt the West Greenland birds are nearest related to *rupestris*, the "grey group", but it must be noticed that the birds with real *frosty* colour in Greenland are found only in Julianehaab district, whereas in Godthaab they are all of a darker greyish-olive with only a slightly *frosty* tinge or without this at all. A subspecific division cannot be made, as many Julianehaab and Godthaab specimens are indistinguishable, but the tendency to be paler in the south is unmistakable. In Julianehaab a single specimen is even pure grey without any olive colour

¹) V. TAVERNER, *l. c.* p. 31.

at all¹). Probably the same difference is present in America, the southernmost birds being the palest and most greyish. The American *rupestris* and the ptarmigans inhabiting the southern part of both East and West Greenland are identical both in size and in the colour of all three plumages. Thus there cannot be any doubt that the South Greenland birds are true *rupestris*.

The birds from Northwest Greenland are by TAVERNER called "*kelloggae*" and thus stated to differ from the Southwest birds. Considerable difficulties, however, arise when calling the Northwest Greenland birds *kelloggae*. As already shown above the ptarmigans from Northwest Greenland in autumn-plumage often approach the colour of *kelloggae* and sometimes were quite identical with specimens assigned to *kelloggae* by TAVERNER, who however, had only 3 ♀♀ and 7 ♂♂ in autumn-plumage of non-Greenlandic *kelloggae* and none from Alaska; probably *kelloggae* from the type-locality in Western North America are decidedly more rusty (cf. below, p. 27). What in this regard is of the greatest importance is the colour of the females' summer-plumage, which is entirely different in *kelloggae* and Northwest Greenland birds. This appears at once by comparison at random of specimens from Alaska and Northwest Canada with birds from Northwest Greenland. A series of fresh-moulted birds from Collinson Point, Anderson River and Coronation Gulf (in all 6 birds from early June) were compared with fresh-moulted females from Umanak (27.5) and from Grinnell Land (2 specimens from 14.5 and 30.5). The difference between the dark and vivid fulvous of the Alaska birds and the pale lemon with whitish borders and greyish vermiculations of the Northwest Greenland (and Ellesmere Land) birds is very striking. The birds from Northwest Greenland in this plumage are practically identical with birds from the southern part of the Westcoast (*i. e.* with *rupestris*); two ♀♀ in fresh-moulted summer-plumage from Godthaab (21.5 and 7.6 respectively) are not to be distinguished from the Umanak birds, captured about 800 km farther to the North. A female in fresh summer-plumage from Nanortalik (28.5) which is situated in the Southernmost West Greenland (about 600 km South of Godthaab) however is slightly paler than the Godthaab birds and has a considerable amount of greyish on the back. When comparing worn birds from July quite the same result is achieved. Birds from July or last days of June are examined from Collinson Point (Alaska), Griffin Point (Alaska), Anderson River (North of Great Bear Lake), and Barren Grounds (Northwest

¹) If by collecting still further to the south (Nanortalik, Frederiksdal) it should appear that the ptarmigans here were all so pale that they could be separated from the birds in the Godthaab and Sukkertoppen districts, they should be called *reinhardtii*. SCHIÖLER (*l. c.*, p. 114) has restricted the type-locality to "Julianehaab and Godthaab"; I further restrict it here to Julianehaab.

Territory), all being practically alike. These *kelloggae* were compared with July-birds from Holstensborg and Strømfjorden, and the same difference was found between them and the above-mentioned *kelloggae* as stated under the fresh-moulted birds. Also here the Northwest Greenland birds looked like the southern specimens, of which birds from Taleuluk and Godthaabsfjord were used for the comparison.

So the Northwest Greenland birds cannot be *kelloggae*, the difference from the true "*kelloggae*" being too considerable. It seems, as already emphasized above, that the females in summer-plumage are on an average somewhat darker yellowish in the northern than in the southern part of West Greenland, but do not by far reach the warm fulvous, sometimes deep buff colour of the Alaska birds. Also by a compilation of the literature it appears that Northwest Greenland birds cannot be *kelloggae*. SCHIÖLER mentions the type of *reinhardti*¹⁾ which is a female in summer-plumage and says: "It cannot be said with certainty from where in (West) Greenland this type-specimen originates." This would certainly not have been the case if the Northern form had been identical with *kelloggae*, which in summer-plumage strikingly contrasts with *rupestris*. Still more convincing is SCHIÖLER's addition: "It must not be left out of consideration, that females in summer-plumage are the most difficult to distinguish in the various races." This may be compared with TAVERNER's words on the characteristics of *kelloggae*: "Spring females are strongly barred below and broadly featheredged above in decided pattern which cannot be easily obscured by the rapid wear that quickly confuses other plumages. This plumage presents the racial characters more plainly and convincingly than any other and is the main reliance for subspecific study of the species. Females in summer-plumage show the difference between yellow and grey races in unmistakable degree²⁾." These two quotations cannot be reconciled, and the birds of Northwest Greenland have nothing to do with *kelloggae*. This also appears very clearly from TAVERNER's paper (although he calls Northwest Greenland birds *kelloggae* himself). Of Greenland spring-females he has examined four; of these two specimens from Disko (16.7 and 28.7 respectively) and one from Svartenhuk (8.7) are stated to be "greyish", *i. e.* like *rupestris* and the fourth (Disko, 28.7) is said to be "yellowish" *i. e.* *kelloggae*, but TAVERNER adds: "this specimen is rather dark and less yellowish, it might almost equally well go in group II" (*rupestris*) (p. 31). Thus no true *kelloggae* was found from Greenland, the specimens to the contrary, all were "greyish". TAVERNER's statement that the Northwest Greenland birds are *kelloggae* thus carries no conviction, and in my opinion SWARTH is right in assuming that *kelloggae* extends its range easterly to Barren

¹⁾ *l. c.* p. 114.

²⁾ *l. c.* p. 31.

Grounds only¹). This also seems to be the case if the material mentioned by TAVERNER is looked over. Females in summer-plumage of *kelloggae*-aspect were found several places in Alaska (9 specimens), in British Columbia (2), Nettilling Lake, Baffin Land (2), Coronation Gulf (1) and Victoria Land (1) and one from Anticosti Island. The bird from Victoria Land (Taylor Island) is described as "a strangely pale bird with the yellow largely creamy." Here probably already pale birds begin to occur. Further east, in King William Land already true *rupestris* occur. I have examined three females in summer-plumage captured on the Norwegian "Gjøa" Expedition (and now kept in the Oslo Museum); they were all typical *rupestris*²). The birds from Nettilling Lake will be mentioned below.

Of grey "*rupestris*" TAVERNER has examined summer-females from the southern part of Baffin Land (7 specimens), Ungava (5), Mackenzie (1), Victoria Land (1) and British Columbia (1). The single bird from Victoria Land (Taylor Island) being of this type shows that already here the pale eastern form may turn up³). So no true "*kelloggae*" from the northeastern part of Canada (Keewatin, Melville Pen., North Devon, Northern Baffin Land and Ellesmere Land) were examined by TAVERNER. SWARTH, however, found true *rupestris* on Taylor Island and I have examined *rupestris* from King William Land as mentioned above. The ptarmigans collected by the Fifth Thule Expedition (kept in the Zoological Museum of Copenhagen) are of interest in this connection: Four females (from Danske Island (north of Vansittart Island), Martineau Island (Gore Bay) Cape Lolland (at Gulf of Boothia) and Baker Lake (west of Chesterfield Inlet) respectively) were all typical *rupestris* with white edges on back-feathers, pale lemon bands, and large extension of the black colour; only the Baker Lake specimen is somewhat darker, approaching the *kelloggae*-type. Two males in combined summer-autumn plumage (Baker Lake and Cape Lolland) are rather brownish, almost identical with birds from Kangamiut and Søndre Strømfjord in western Greenland. As mentioned above some few of the spring-females from Southern Baffin Land examined by TAVERNER belonged to his "Yellowish" group (2 specimens), the greater part to his "Greyish" group (7 specimens). I have examined a large material of summer-females from Nettilling Lake, in all 11 specimens, (7 collected by HANTSCH kept in

¹) *l. c.* p. 98.

²) Cf. also H. THO. L. SCHAANNING, Birds from Arctic North-America, Meddelelser fra det Zoologiske Museum Oslo, Nr. 33, 1933, p. 159. The specimens examined by me are the Nos. 126, 127, & 128. The bird mentioned by SCHAANNING as No. 129 under the name *L. m. rupestris* is however a *L. lagopus leucopterus* Taverner.

³) Cf. what is said above about the other specimen from Taylor Island. SWARTH, who has examined the same two birds from Taylor Island calls them *rupestris*, not *kelloggae* (*l. c.*, p. 96).

the Zoological Museum of Berlin, 4 kept in the National Museum of Canada); of these 11 birds 7 were indistinguishable from *rupestris*, 3 were intermediate between *kelloggae* and *rupestris*, with rather reduced black banding on under-parts but still with a rather pale yellowish colour, and on upper-parts still with some whitish borders and greyish spots. Only a single bird was as yellowish as a true *kelloggae* from Alaska. Thus the birds from the southern Baffin Land do not have anything to do with the real *kelloggae*, as in Greenland the summer-plumage of the females are rather greyish. Unfortunately TAVERNER had not examined true *kelloggae* from Alaska in autumn-plumage, his most westerly specimens being from Yukon, Bathurst Inlet and Coronation Gulf. I have examined 1 ♂ and 1 ♀ from Alaska in moult to autumn-plumage (13.7), the new feathers appeared to be still darker rusty than in birds from Northwest Greenland. The same appeared from an examination of some Siberian specimens of *kelloggae*. Besides the yellow and greyish group TAVERNER distinguishes a group of birds in autumn-plumage which he calls "sandy Group" consisting of birds with a very pale sandy colour being "absolutely unlike any other birds in the collection." There are two Greenland specimens (Disko, Sukkertoppen), one from Alaska, one from Yukon, one from Banks Land. The Greenland specimens of this sandy type he holds for being "*reinhardi*", but the occurrences of this subspecies so far west as Yukon and Alaska he calls "a disturbing puzzle and one that I cannot attempt to solve." In my opinion it is only an individual variety. A bird from Fiskernæs is of such a pale sandy colour, and it must be admitted that many specimens from the Julianehaab—Arsuk district have a considerable amount of yellowish on the upper-parts. Such specimens are, however, rare in Godthaab District and it is already mentioned above that the name "*reinhardi*" has to be bestowed on them if they should be considered subspecifically different from *rupestris*. The scattered occurrence of sandy-coloured specimens in Canada, however, makes it likely that they form an individual variation in the race "*rupestris*", but the sandy type is probably of somewhat more frequent occurrence in Greenland than elsewhere. A comparison between the Greenland and Iceland ptarmigans still remains. The autumn-plumage of the Iceland birds is of a brownish, buffish or rusty colour, generally it is of a somewhat warmer hue than even the brownest West Greenland specimens; sometimes it is rufous-brown, approaching chestnut. The male in summer-plumage is practically indistinguishable from Northwest Greenland birds, but is a trifle more brownish, not so pale greyish-olive. The female in summer-dress, however, is very much differing from the Greenland forms. It is much more yellow than these, feathers being golden-yellow on under-parts, and warm fulvous on upper-parts, and the borders to feathers on upper-parts are not white but creamy or

yellow; black bands on breast-feathers are narrower, and black altogether reduced. These birds approach the coloration of *kelloggæ* and are sometimes not to be distinguished from them, whereas they may at a glance be distinguished from the West Greenland subspecies. The vivid yellow-fulvous colour of the Iceland form in comparison with the Greenland form was already described by BREHM¹). Recently LÖPPENTHIN found the same difference in comparison with Northeast Greenland specimens: "Im Brutkleid sind isländische Schneehühner auch bedeutend dunkler und rotgelber als ostgrönländische Vögel, von denen einige ganz hell graugelb mit dunkleren Querlinien sind²)." We may then summarize the status of the Greenland ptarmigans in the following way: Northeast Greenland south to Cape Dalton is inhabited by an endemic, large and in autumn-plumage pale sandy form. The ptarmigans of Southeast and the entire Westcoast are identical with the form inhabiting Arctic Canada and is smaller than the Northeast Greenland form and generally darker than this, being of a greyish to greenish or more brownish coloration in the autumn-plumage. No doubt there is a slight geographical variation, but a discussion about the racial division of the Canadian—West Greenland ptarmigans gave the result, that the individual variation was too large to permit any splitting up of this population into smaller units.

In Western Greenland and Canada greyish, brownish and sometimes sand-coloured birds are captured on the same locality³), but in the South evidently only greyish birds are found. In the Barren Grounds country westwards to Victoria Land and Bathurst Inlet brownish birds are more common and merge into the western form (*kelloggæ*), which in the autumn-plumage is characterized by having deeper and warm brown-coloration (grey birds practically absent); the main characteristic, however, is the vivid fulvous colour in the females' summer-plumage.

Nomenclature.

The last part of this paper forms a synopsis of the four forms here discussed, *viz.* the Alaskan, the two Greenland and the Iceland form. At first it is necessary to clear up which are the proper names of these forms.

¹) *l. c.*, p. 986.

²) *l. c.*, p. 44.

³) Of three males secured at Cape Kellett (Bangs Island) Sept. 1914, one was greyish, one yellowish and one sandy (TAVERNER, *l. c.*, p. 33—34). — SSEREBROWSKY (Journal f. Ornithologie 1926, Vol. LXXIV, p. 691) mentions some pale, sandy birds from Northern Siberia, but adds: "Uebrigens muss ich darauf hinweisen, dass es in demselben Gebiete auch dunkle Exemplare, und, wie aus einigen Bälgen von der Nordwickbucht ersichtlich, auch im Herbstkleide dunkelgefärbte gibt" (p. 695). He further assumes, that the pale birds are old, the dark ones younger specimens, but this is not so; in the young birds we find the same scale of individual variations as in the adults. The pale bird is pictured by TH. PLESKE, Mem. Boston Soc. Nat. Hist., Vol. 6, No. 3, 1928.

The Iceland form should be called *L. m. islandorum* (Faber)¹), only one later name applies to this bird, viz. *Tetrao Islandicus* Brehm²). The East Greenland race was by SCHIÖLER named *L. m. groenlandicus*³). This unfortunately is preoccupied by *Lagopus Grönlandicus* Brehm⁴). As a substitute PETERS recently proposed *captus*⁵) which is the name that has to be used for this subspecies. No type or *terra typica* is chosen. I propose Germania Land as this was the place from where the specimens originated on which SCHIÖLER based his description of this form. As type is proposed the following specimen: ♂, Germania Land, 29th Aug. 1907, coll. MANNICHE; wing-length: 219 mm.

Many names are applicable to the widely distributed West Greenland — Canadian form. The oldest name is *Tetrao rupestris* Gmelin⁶), which has the *terra typica* Hudson Bay and was based on PENNANT'S Arctic Zoology. *Lagopus mutus rupestris* (Gm.) is therefore the right name to be used for the Canadian—West Greenlandian subspecies.

The next name given to this form is *Lagopus dispar* Ross⁷); this name was hitherto not recognized, at any rate I could not find it in any list of synonyms on the ptarmigans⁸). Ross collected some ptarmigans at "Waygat and Jacobs Bight" (i. e. Vaigat and Disko Bay) and says about them: "Dr. Leach is strongly disposed to consider it as a distinct species, from the white or common ptarmigan of Scotland. Should this conjecture be hereafter proved to be correct, he then proposes to name this species *Lagopus dispar*, from the difference existing between the two sexes, which is a physiological character of sufficient importance, if constant, to separate these birds as two species⁹)." As type-locality of this form I chose Disko as the specimens mentioned by Ross must have been captured here. The name *L. dispar* thus would replace the name of the Alaska form (*kelloggae*), if this subspecies really was to be found in the northern part of Western Greenland. Some years later BREHM described the West Greenland birds as *Tetrao Reinhardi*¹⁰). As mentioned

¹) *Tetrao Islandorum* Faber, Prodrömus d. Isländ. Ornith., p. 6 (1822 — Island).

²) *l. c.*, p. 440.

³) *l. c.*, p. 115.

⁴) Vogelfang, p. 264 (1855 — Greenland).

⁵) *l. c.*, p. 35.

⁶) Syst. Nat., Vol. I, 2, p. 751 (1789 — Hudson Bay).

⁷) JOHN ROSS, Voyage of Discovery, made under the Order of the Admiralty in His Majesty's Ships Isabelle and Alexander, for the Purpose of exploring Baffin's Bay, etc., II Ed., Vol. II, 1819, p. 168. (OBS.: The remarks on *Lagopus dispar* are published only in Edition II (in 2 Volumes, in 8°), and not in Edition I (in 1 Volume, in 4°)).

⁸) In H. E. DRESSER, Birds of Europe, 1871—81, p. 157, and in L. A. JAEGER-SKIÖLD & G. KOLTHOFF, Nordens Fåglar, Ed. II, 1926, p. 201 it is, however, mentioned.

⁹) Ross, *l. c.*, p. 168.

¹⁰) *l. c.*, 1824, p. 986.

above the type-locality is chosen here as Julianehaab. If the birds of the Northwest of Greenland should turn out to be different from *rupestris* they had to be called *dispar*, and if the birds inhabiting the extreme South (Julianehaab) constantly are paler the name *reinhardti* is available. However, I do not think it possible to split these birds up into further subspecies. Still another name is bestowed on this race, *Lagopus americanus* Audubon¹). AUDUBON under this name describes birds from the Churchill river. He described at first the pure white winter-plumage and then a male in autumn-plumage. *Lagopus americanus* of course is synonymous with *L. rupestris*. The name *L. americanus* was suppressed by most authors; only BAIRD mentions it with the following words: "A ptarmigan, supposed by some authors to be the *Lagopus mutus* or *alpinus* of Europe, is mentioned by authors as found on Baffin's Bay and Churchill river. Mr. AUDUBON, on an examination of specimens brought from those countries considers them distinct, but gives no appreciable characters to separate them²)." This last remark refers to the following passage by AUDUBON (on the autumn-plumage of *americanus*): "Some greyish-white undulations occasionally seen, tend to approximate the colouring to that of some specimens of *Lagopus mutus* of Scotland, but the prevailing tint is not grey, as in that species, but brownish-yellow." This description shows that more or less brownish specimens may be found in the South of the range of *L. m. rupestris*, thus again showing how great the individual variation is in this species.

SUNDEVALL's name *Lagopus rupestris* var. *occidentalis* is somewhat of a puzzle³). SUNDEVALL describes it as being only smaller than *rupestris* and gives no further particulars of any importance. The distribution of var. *occidentalis* is stated to be "in Groenlandia et America maxime boreali", which certainly is very vague. HARTERT⁴) enters SUNDEVALL's name in the synonymy of *reinhardti* (BREHM's Greenland-form), and this is correct as the type originated from Western Greenland (about Fisker-næs)⁵). It should, however, be mentioned here, that already in 1883 the name was used by NELSON⁶) for ptarmigans collected by TURNER on

¹) J. J. AUDUBON, Synopsis of the Birds of North America, 1839, p. 207. — I could not personally study this book, but Dr. HERBERT FRIEDMANN kindly extracted AUDUBON's description of this ptarmigan for me. For this, as well as for other help with this paper, I express my sincerest thanks to Dr. FRIEDMANN.

²) S. F. BAIRD, The Birds of North America, 1860, p. 637.

³) Öfversigt Kungl. Vetensk.-Akad. Förhandlingar, 1874, p. 20.

⁴) *l. c.*, p. 1870.

⁵) Cf. N. GYLDENSTOLPE, Types of Birds in the Royal Natural History Museum in Stockholm, Arkiv för Zoologi, Vol. 19 A, No. 1, p. 112, 1926.

⁶) E. W. NELSON, Birds of Bering Sea and the Arctic Ocean; in: Cruise of the Revenue Steamer "Corwin" in Alaska and the N.W. Arctic Ocean in 1881; Washington 1883, p. 83.

Atka Island, which is inhabited by a distinct subspecies now called *L. m. athkensis* Turner, but it can be said with certainty that SUNDEVALL did not include Atka specimens in his description. At last it should be mentioned, that BREHM'S *MS-names* for certain Greenland specimens of ptarmigans were published by SCHIÖLER¹), viz.: *Tetrao Reinhardi brachyuros* and *Lagopus Reinhardi macruros*.

As regards the name of the Alaskan race, all authors agree in using GRINNELL'S name *kelloggae*²). I agree to this, but shall make some remarks. PETERS says about the Alaskan-Pacific races of the Rock Ptarmigan: "*Nelsoni*, *kelloggae* and *dixoni* are all very similar, and could be united under the oldest name without distortion of the facts³)."

If this was done, *nelsoni*, which is the oldest name, was to be used. — *L. m. nelsoni* inhabiting Unimak, Unalaska and Amaknak Islands (in the Aleutians), however is a rather distinct subspecies, of which I have examined some specimens from the U. S. Nat. Mus. *Lagopus mutus dixoni* is the next name available. As a matter of fact I could not examine specimens of this form, but both the original description by GRINNELL⁴) and the recent investigations by SWARTH⁵) show that *L. m. dixoni* is a distinct race⁶). Another point which is to be taken into consideration is that no doubt *kelloggae* has a very extensive distribution in Eastern Siberia besides the American range. I have examined specimens (in the British Museum) from Kamtchatka and Eastern Siberia westwards to Yenesei, and they were all identical with Alaska birds. The same is mentioned by SWARTH, who says: "It is conceivable that the ptarmigan of northeastern Siberia is the same as the Alaskan subspecies here designated *Lagopus rupestris kelloggae*⁷)," and is further emphasized by SSEREBROWSKY, who comes to the result, that the birds westwards right to Ural and the Petshora valley are identical with Alaska birds (which he calls *rupestris*). His new form, *L. m. pleskei*, is — when judging from the description — probably not valid⁸). Also birds from Hondo (North Japan) appear to be *kelloggae*, but as a matter of fact I have only examined a few birds in summer-plumage. HARTERT says the following about Hondo-birds,

¹) *l. c.*, p. 114.

²) Described in Univ. California Publications Zoology, Vol. 5, 1910, p. 383 (Prince William Sound, Alaska).

³) *l. c.*, p. 34.

⁴) J. GRINNELL, Birds and Mammals of the 1907 Alexander Expedition to Southeastern Alaska, Univ. California Publications in Zoology, Vol. 5, 1909, p. 207.

⁵) *l. c.*, p. 98.

⁶) HERBERT FRIEDMANN is of the same opinion; in a letter to me he says: "Regarding *Lagopus mutus dixoni*, I should say that in my opinion it is a valid race. I can see no reason for throwing it out."

⁷) *l. c.*, p. 100.

⁸) *l. c.*, p. 696.

which are separated as *L. m. japonicus* Clark: "Nach den wenigen von mir untersuchten Stücken kann ich erhebliche Färbungsunterschiede von *L. m. reinhardi* und *rupestris* am ♂ nicht entdecken, doch sind die ♀ merklich lebhafter rotgelblich¹)." This is the characteristic of *kelloggae* and no doubt the two forms are very similar if not identical. If they are really identical, *japonicus* (described 1907) has to be used as the proper designation of the Alaska-Siberia form. A recently described form from the Kuriles (*L. m. kurilensis* KURODA)² is no doubt invalid. I could examine one single specimen only (in the Stockholm Museum).

The following is an account of the four forms which are dealt with above, giving synonyms, short diagnoses and distribution.

Lagopus mutus rupestris (Gmelin).

Tetrao rupestris GMELIN, Syst. Nat., Vol. I, 2, p. 751 (1789 — Hudson Bay.

EX PENNANT, Arctic Zoology, Vol. II, p. 312).

Lagopus dispar ROSS, Voy. Disc. etc., Ed. II, Vol. II, p. 168 (1819 — Disko).

Tetrao Reinhardi (*rectius Reinhardti*) BREHM, Lehrb. Nat. Eur. Vög., Vol. II, p. 986 (1824 — Julianehaab, Southwest Greenland).

Lagopus americanus AUDUBON, Synopsis Birds N. America, p. 207 (1839 — Churchill river).

Lagopus Grönlandicus BREHM, Vogelfang, p. 264 (1855 — Western Greenland).

Lagopus rupestris var. *occidentalis* SUNDEVALL, Öfversigt Kungl. Vetensk.-Akad. Förhandlingar, No. 3, p. 20 (1874 — "*in Groenlandia et America maxime boreali*"), restricted to Western Greenland).

Tetrao Reinhardi brachyuros (BREHM in MS) SCHIÖLER, Dansk Ornithologisk Forenings Tidsskrift, Vol. 19, p. 114 (1925 — Western Greenland).

Lagopus Reinhardi macruros (BREHM in MS) SCHIÖLER, Dansk Ornithologisk Forenings Tidsskrift, Vol. 19, p. 114 (1925 — Western Greenland).

Diagnosis: Female in summer-plumage: Aspect dark, with alternating pale creamy to yellowish and blackish bands; large extension of the black parts of feathers. White borders to feathers of upper-parts. — Male in summer-plumage: General aspect olive-greenish to olive-brownish; no uniform black feathers. — Autumn-plumage in both sexes: Varying from grey to brown, and sometimes (but rarely) paler, sand-coloured specimens are found. General aspect usually olive-greenish to olive-brownish with more or less "pepper and salt" colour superimposed. Specimens in the south generally with more "frosty", and northern birds often more brownish and buffish; thus a slight geographical variation takes place³).

Measurements: ♂♂: Length of wing 188—211 mm, Length of

¹) *l. c.*, p. 1870.

²) Bull. British Ornithol. Club, Vol. 45, 1924, p. 15. It is stated to be darker and larger than *japonicus*.

³) If the northern is separable (which I highly doubt) it should be called *L. m. dispar* Ross.

bill 9—11.5 mm, Breadth of bill 8—10 mm. ♀♀: Length of wing 179—199 (one 175) mm, Length of bill 9—11 mm, Breadth of bill 8—9.5 mm.

Distribution: Northern British Columbia, Southern Yukon, Central Mackenzie, northernmost Manitoba, Barren Grounds (Keewatin) westwards to Bathurst Inlet, Ungava Pen., Labrador, Baffin Land, and arctic islands westwards to McClintock Channell, Ellesmere Land (where slightly merging into *L. m. captus*, cf. p. 14), entire Western Greenland and southern part of East Greenland (northwards to Blosseville Coast at 68° n. lat.).

2. *Lagopus mutus captus* Peters.

Lagopus mutus groenlandicus SCHIÖLER (*nec* BREHM 1855), Dansk Ornithologisk Forenings Tidsskrift, Vol. 19, p. 155 (1925 — Northeast Greenland, restricted here to Germania Land).

Lagopus mutus captus PETERS, Birds of the World, Vol. II, p. 35 (1934 — Northeast Greenland).

Diagnosis: Summer-plumage: Both sexes practically indistinguishable from *rupestris*. — Autumn-plumage in both sexes: Ground-colour pale yellowish, sandy without or with more or less greyish; the general aspect is pale, and the black spots are reduced usually to scattered minute dots. The individual variation is considerable, especially in the south where darker yellowish-brown to buffish birds are found. Black on shafts of primaries as a rule very reduced in comparison with *rupestris*.

Measurements: A large form. ♂♂: Length of wing 211—223 (one 200) mm, Length of bill 10—12 mm, Breadth of bill 8.5—11 mm. ♀♀: Length of wing 193—207 mm, Length of bill 10—11 mm, Breadth of bill 9—10 mm.

Distribution: Restricted to Northeast Greenland, in the north probably going right to Peary Land (but no specimens examined from here), in the south to Blosseville Coast (southernmost record: Cape Dalton).

Note: *L. m. captus* is one of the most interesting forms of the Rock Ptarmigan, as it appears to bridge the considerable differences between the common *rupestris*-forms and the peculiar endemic Spitzbergen form *L. m. hyperboreus* Sundevall. In size it is quite intermediate, which is distinctly seen on table I, above p. 16. The pale yellowish or greyish colour of *hyperboreus* is about the same tone as in *captus*. The loreal streak in males' winter plumage appears to be particularly broad in *hyperboreus*¹⁾, and the same is the fact in *captus*. No doubt the Spitzbergen ptarmigan originates from Northeast Greenland just as probably also the Iceland form (*islandorum*) has emigrated from Southeast Greenland.

¹⁾ Cf. G. KOLTHOFF, Kungl. Svenska Vetensk.-Akad. Handlingar, Vol. 36, No. 9, 1903, p. 39.

The limit between *captus* and *rupestris* in East Greenland is a very important zoogeographical line, as the southern boundary here runs for several northern forms and also other forms meet here. Here goes for instance the limit between *Carduelis flammea rostrata* (Coues) and *C. f. hornemanni* (Holbøll)¹⁾, and here is the southern limit of *Branta leucopsis*, *Calidris canutus canutus*, *Phalaropus fulicarius jourdaini* and probably also of *Stercorarius longicaudus pallescens* and *Nyctea scandiaca*, and here also goes the southern limit of the following mammals: *Canis occidentalis albus*, *Dicrostonyx groenlandicus*, *Ovibos moschatus wardi*, *Mustela erminea*²⁾ and *Lepus arcticus groenlandicus*³⁾. The reason why these forms have not extended their distribution farther to the south is partly the barrier formed by the great almost continuous glaciers at Blossville coast, partly differences in the climate, which is considerably milder and, especially, moister south of Blossville Coast, than north of this coast.

3. *Lagopus mutus kelloggæ* Grinnell.

?*Lagopus japonicus* CLARK, Proc. U. S. National Museum, Vol. XXXII, p. 469 (1907 — Hondo); probably identical with *kelloggæ*, and if so *japonicus* is the right name for this form.

Lagopus rupestris kelloggæ GRINNELL, Univ. California Publications in Zoology, Vol. 5, p. 383 (1910 — Prince William Sound, Alaska).

?*Lagopus mutus pleskei* SSEREBROWSKY, Journ. f. Ornithologie, Vol. 74, p. 696 (1926 — Taimyr Pen.); probably not distinguishable from *kelloggæ*, as it seems that only an individual variation is named; I have not examined specimens from the type-locality.

?*Lagopus mutus kurilensis* KURODA, Bull. British Ornithol. Club, Vol. 45, p. 15 (1924 — Kuriles).

Diagnosis: Female in summer-plumage: Aspect bright fulvous, with comparatively narrow black bands and spots on upper-parts, which is warm fulvous or ochre, sometimes buffish. Black throughout reduced. Borders and apical spots on feathers of upper-parts yellowish or fulvous, *not* white. — Male in summer-plumage: Somewhat more fulvous or rusty than *rupestris*, not so olive, but only few birds examined. — Autumn-plumage in both sexes: Brownish, varying from olive-brown to dark rusty buff and chestnut. Sometimes paler, sand-coloured specimens are found.

Measurements: Not differing from *rupestris*.

¹⁾ Cf. M. DEGERBØL & U. MØHL-HANSEN, Meddelelser om Grønland, Vol. 104, Nr. 18, p. 26—27.

²⁾ AD. S. JENSEN, Grønlands Fauna, et Forsøg paa en Oversigt, Festskrift udgivet af Københavns Universitet i Anledning af Hans Majestæt Kongens Fødselsdag 26. September 1928, København MCMXXVIII, p. 22.

³⁾ Cf. M. DEGERBØL & F. WIMPFEN BRÆSTRUP, Vidensk. Meddel. Dansk Naturhist. Forening, Vol. 98, 1934, p. 205.

Distribution: Tundras of Siberia westwards to Ural and Petshora Valley, also Kamtchatka and probably Hondo (North Japan) and Kuriles, further Alaska (mainland except southern coastal range), Northern Yukon, Northern Mackenzie eastwards to Coronation Gulf and Bathurst Inlet; presumably also islands west of Mc Clintock Channell.

4. *Lagopus mutus islandorum* (Faber).

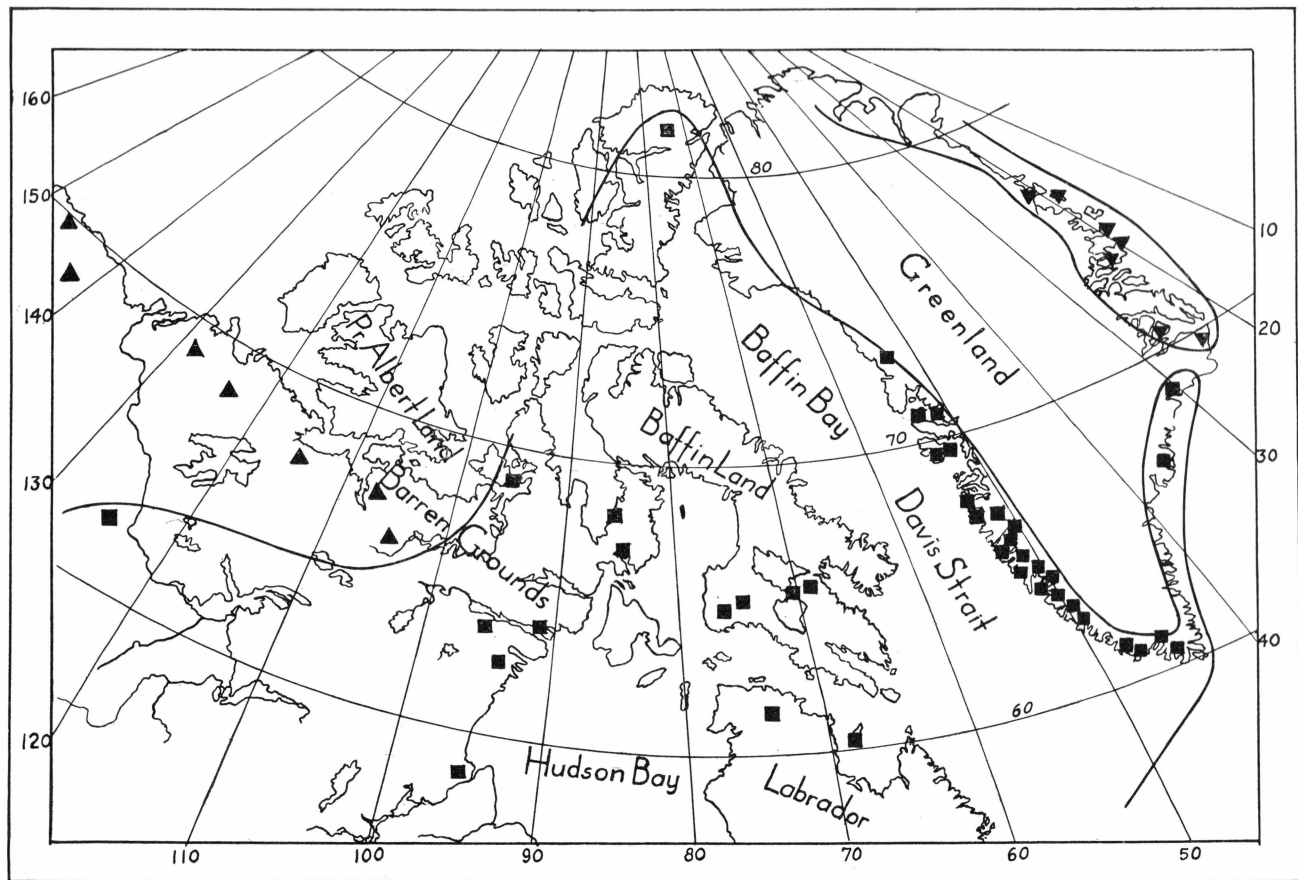
Tetrao Islandorum FABER, Prodröm d. Isländ. Ornith., p. 6 (1822 — Island).
Tetrao Islandicus BREHM, Lehrbuch d. Naturges. europ. Vögel, Vol. II, p. 440 (1824 — Island).

Diagnosis: Female in summer-plumage: Approaching *kelloggæ*, but not so dark and warm coloured, ground-colour being more golden-yellow and ochre, not fulvous or buffish. Black reduced, but not to such a degree as in *kelloggæ*. — Male in summer-plumage: As *rupestris*, on an average perhaps slightly more brownish. — Autumn-plumage in both sexes: Ground-colour olive-brown to buffish, usually without frosty, thus looking like the brownish specimens of *rupestris* approaching *kelloggæ*.

Measurements: As *rupestris* and *kelloggæ*, but bill somewhat stouter and larger. ♂♂: Length of wing 192—207 mm, Length of bill 10—11 mm, Breadth of bill 9.5—10.5 mm. ♀♀ Length of wing 184—198 mm, Length of bill 9.5—10 mm, Breadth of bill 9—10 mm.

Distribution: Restricted to Iceland.

The accompanying map gives the distribution of the different forms in Greenland and Canada.



Distribution of *Lagopus mutus* in Canada and Greenland.

Each dot marks a locality from where specimens are examined. The approximate breeding-ranges are circumscribed.

▲ *Lagopus mutus kelloggae* Grinnell. ■ *Lagopus mutus rupestris* (Gmelin). ▼ *Lagopus mutus captus* Peters.