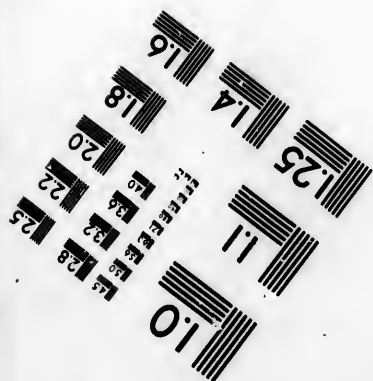
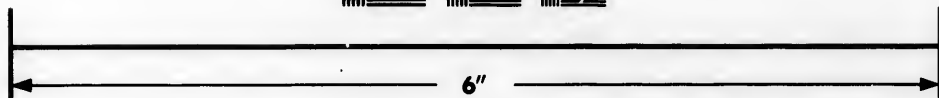


A resolution test chart featuring various patterns of horizontal and vertical lines of increasing frequency. Each pattern is accompanied by a numerical value indicating its resolution. The values include 1.0, 1.1, 1.25, 1.4, 1.6, 1.8, 2.0, 2.2, 2.5, 2.8, 3.2, 3.6, 4.0, 4.5, 5.0, 5.6, 6.3, 7.1, 8.0, 9.0, 10, and 11. The chart is used to measure the resolving power of imaging systems.



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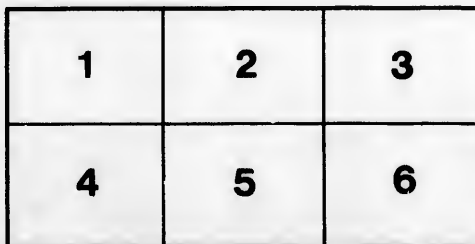
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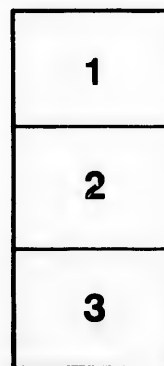
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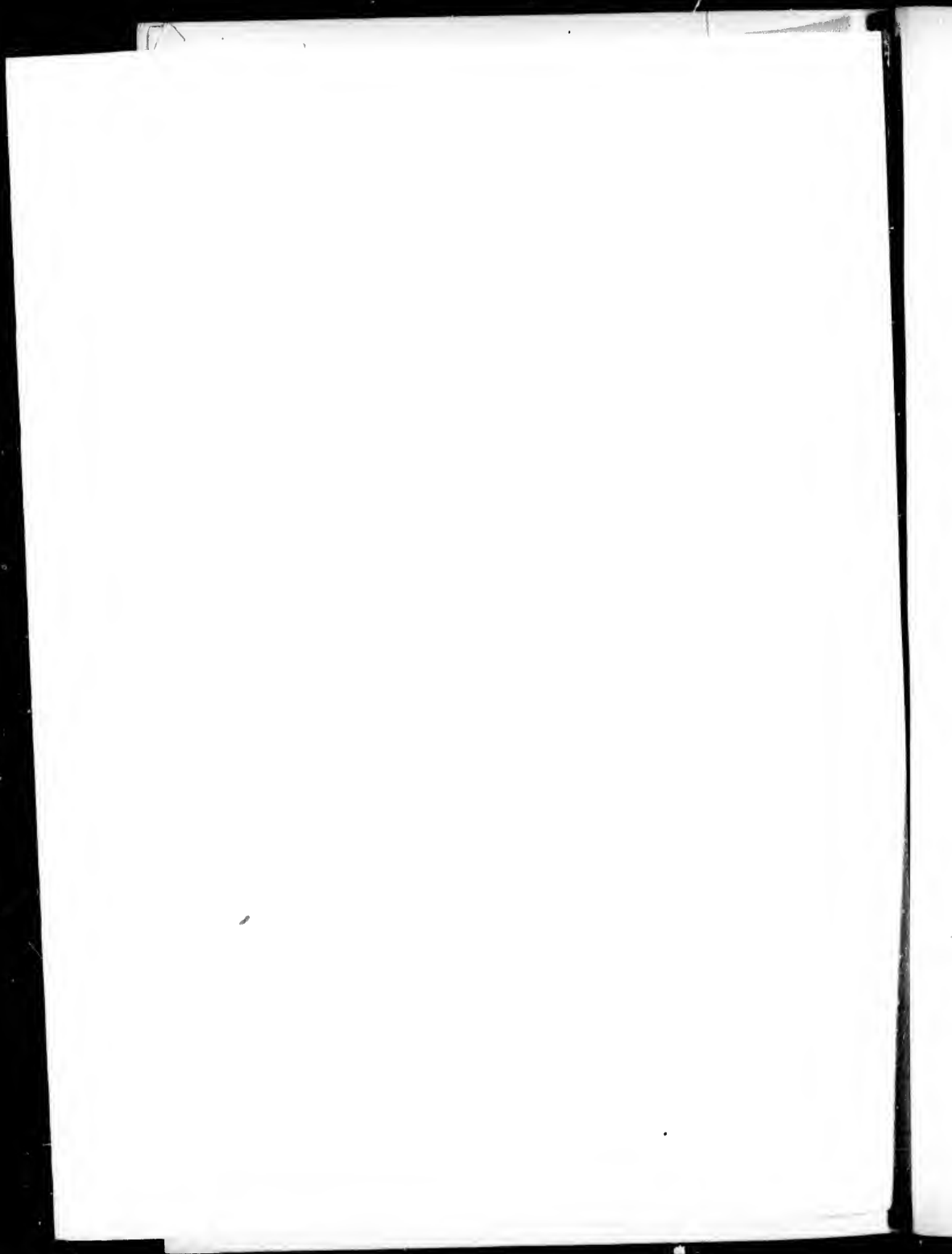


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TO

OFFICERS OF THE HUDSON'S BAY COMPANY.

THE Smithsonian Institution has been engaged for several years in the prosecution of researches relative to the climatology and natural history of the continent of North America. For this purpose the voluntary services of a large body of intelligent correspondents, distributed throughout the entire territory of the United States, have been secured, from whom records of changes of the weather, and other phenomena, with facts and specimens in natural history of much interest, have been obtained.

The observations thus accumulated have been reduced, and the results will shortly be published, both in tabular form and on maps, illustrating the lines of equal temperature: of rain at different points: the mean direction and intensity of the wind: the character of the land, whether forest or prairie, fertile or barren: the distribution of various animals and vegetables, etc. Reports have been issued, or are in preparation, embodying detailed monographic descriptions of the Algæ, the forest trees, the Vertebrata, insects, Mollusca, Crustacea, &c., of the continent; and efforts made generally to furnish a full and perfect account of its natural and physical history.

In the prosecution of these researches, a serious obstacle has been experienced in the lack of sufficient data from the region north of the boundary line of the United States, especially from its more northern portion. The isolated observations and collections, which have from time to time been received, have proved of great interest and importance; but the Institution now desires

to receive communications, if possible, from all inhabited portions of North America, especially from the stations of the Hon. Hudson's Bay Company. And with this view it has obtained the sanction of the proper authorities for an application to the officers of the Company for assistance, as shown by the accompanying letter of Sir George Simpson, Governor of the H. B. Territory.

The attention of the friends of science is therefore respectfully invited to certain points, which will be referred to more fully hereafter. In an accompanying package will be found detailed instructions in regard to making and recording observations, and it is only necessary here to indicate a few subjects which are of more particular interest.

1st. The beginning and ending of storms of wind and rain, and the time when the sky is overcast. Records of this kind enable us to map the face of the heavens over a large surface of country, and to determine the extent of a cloud, or of falling rain, snow, &c.

Beside the regular variations of the meteorological instruments, special information is desired as to the occurrence of thunder storms; the time of day at which they take place; the direction from which they come; their duration and intensity; notice of trees or other objects which may be struck by lightning.

2d. Tornadoes, land and water-spouts, and whirlwinds. The width of the path along which the mechanical effects are produced; the direction of the path; the appearance of the tornado at a distance; the motion of the clouds over the head of the observer as the tornado approaches and as it recedes from him. Note whether any electrical phenomena are exhibited, such as thunder, lightning, and luminous appearances; the mechanical effects, prostration of trees, and translation of heavy bodies.

3d. The aurora borealis: time of its beginning and ending; time of the formation of arch, beams, and corona; and whether there is a dark cloud below the arch; and other points mentioned in the pamphlet of instructions.

4th. Time of early and late frosts, particularly first and last. Depth of ground frozen, in feet and inches; disappearance of frost from the ground.

5th. Time of closing and opening of rivers, lakes, streams, &c., and any other phenomena relating to temperature.

A single register of any one of these phenomena carefully made,

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may prove of great service in tracing the changes of weather over large districts of country; for example, a knowledge of the exact time at which a violent wind commences at a particular place may enable us, with similar observations at other localities, to trace the progress of the disturbance through its whole course from its beginning to its ending.

For more detailed instructions reference should be made to the accompanying blanks and pamphlets.

Of the blank registers two different classes are sent. Those marked No. 1 are intended to record observations with all the instruments, with spaces to include the reductions for "Force of Vapor" and "Relative Humidity," which need not be filled up unless the observer himself prefers to make the calculations, which will otherwise be made at the Institution.

Blanks No. 2 are intended for observers who have no instruments, excepting a thermometer; and if this instrument be broken, or the observer have none, valuable materials may still be furnished by filling up the other columns, and simply noting the beginning and ending of warm and cold spells.

In the accompanying package will also be found blanks for recording periodical phenomena of animal and vegetable life. Such records will be of especial interest, as showing the progress and development of the seasons, and the geographical distribution of species.

In the package will also be found detailed instructions in regard to the collecting and preparing objects of natural history. Specimens of the different animals will be particularly interesting, especially of the small mammals, as mice, moles, shrews, gophers, weasels, rabbits, ground squirrels, marmots, etc. Good skins and skulls of the barren ground bear, the musk ox, and the reindeer, are much wanted.

Attention is especially invited to the collecting of eggs of any and all kinds of the birds which may be met with. The species of most interest are the different eagles, hawks, and owls, snipes, sandpipers, plover, gulls, ducks, loons, grebes, etc. Care should be taken, as far as possible, to secure a parent bird of each set of eggs, for the purpose of identifying the species; either the entire skin being preserved, or at least the head, wing, and tail. If a parent cannot be obtained, the eggs should nevertheless be

collected, and any information communicated which may serve to determine the species.

Skins of any divers or grebes in full spring plumage, of the large black grouse, of the ptarmigan, or willow grouse (especially in summer dress), of the different kinds of Canada or black-necked geese, and of any waders in full breeding plumage, and in fact of Arctic birds generally, will be very acceptable.

The different species of Salmonidæ, as salmon, trout, whitefish, and grayling, are particularly desired by the Institution. In the absence of alcohol, these may be skinned and dried. Fishes of all kinds, however, will be much valued.

Insects of all kinds will be highly prized, and, in fact, no object of natural history, however abundant and familiar, will be without its interest to the Institution.

If suitable opportunities occur for the transmission of any returns to these circulars, either of specimens or of observations, they should be sent directly to the Smithsonian Institution, Washington, D. C.; if not, they should be forwarded to the care of the Governor of the Hon. Hudson's Bay Company.

JOSEPH HENRY,
Secretary S. I.

SMITHSONIAN INSTITUTION, WASHINGTON, *April 20, 1860.*

APPENDIX.

HUDSON'S BAY HOUSE, LACHINE, 31st March, 1860.

To the Officers of the Hudson's Bay Company's Service.

GENTLEMEN: Having been applied to by the Secretary of the Smithsonian Institution of Washington, for permission to invite the assistance of the Company's officers in conducting observations, having for their object the development of the physical and natural history of the northern part of this continent, I have very cheerfully acceded to the request, and take the present means of commending the object in view to your favorable consideration.

You are well aware of the desire of the Company to promote the interests of science by all the legitimate means in its power. In the present case, where so much may be done by systematic and conjoined action, over a widely extended territory, it will be gratifying to learn that information and materials of a valuable character have been supplied from the stations of the Company, and by the industry of its officers.

The accompanying circular and instructions, from Professor Henry, will explain more fully the objects of the Institution, and will be found to embrace all necessary information for your guidance.

I am, gentlemen,

Your obedient servant,

G. SIMPSON.

