The connection of the two carbons to the prime mover of the clock is made by means of a steel ribbon, F, attached to the lower ends of the two rods *g* and *l*. This ribbon is led over several pulleys, and is wound on a wheel on the axis of the prime mover for a great part of its circumference. The turning of this

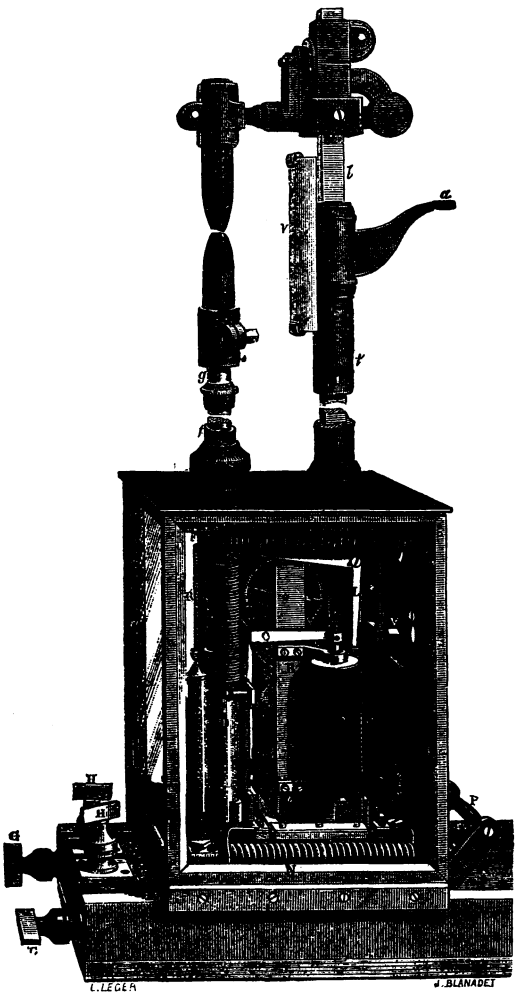


Fig. 15.

wheel is thus produced in a very certain manner. The rod *g* slides in the tube D fastened to the movable frame, and this tube is slit vertically to allow the attachment of the ribbon to pass. This manner of connecting the two carbons, which replaces the chain used by Serrin, and does away with the use of ratchet-wheels, allows the carbons to be placed at any desired height by a slight sliding of the ribbon.

Another peculiarity of this lamp is the mode of connecting the different interior parts of the apparatus. The current of the large cable arrives at the upper carbons by the rails and uninsulated portions of the regulator. From the lower carbon, it returns to the two insulated terminals H and H′, passing to one by the movable frame, and to the other through the electro-magnet S. The connections between the contacts are made with four thick spirals of nickel-plated copper. Two are shown at M and N.

The tube D, which carries the rod *g*, is not insulated from the frame; but the latter is insulated from the upright which supports it. This is on account of ease of construction, it being less difficult to insulate a straight piece than a round tube like D. An air-pump, T, serves to check the motions of the frame, and to prevent too rapid oscillations. The porous plate V is placed opposite the ends of the carbons, to protect the rods *t* and *l* from the excessive heat of the *foyer*. It is composed of the same material as the porous vases used in batteries. When the upper carbon rod arrives at the end of its course, it acts on a bevelled piece, which frees a contact spring, and suppresses the communication with the fine wire magnet, so that it may not be injured by the passage of too strong a current.

THE WEATHER IN JANUARY, 1883.

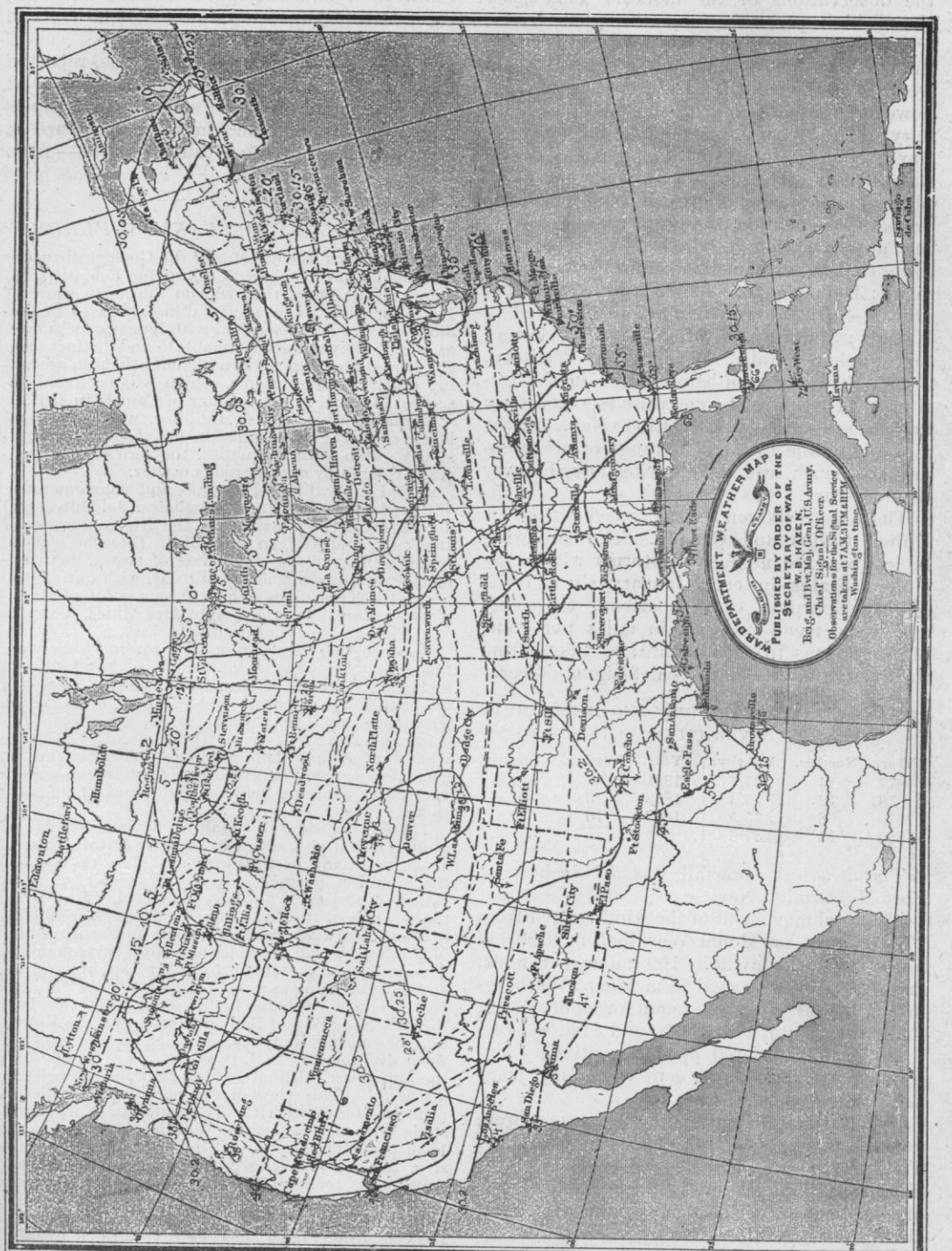
The monthly weather-review of the U. S. signal service contains copious statistics of the meteorological conditions, as observed at 171 regular stations in the United States and Canada, 224 stations occupied by voluntary observers, and 56 army-posts, besides various other sources of information. The following are given as the special features for the month: —

The very low mean temperatures. The departures from the normal are most marked for the upper lake-region, the upper Mississippi and Missouri valleys. The average temperature for all the districts east of the Rocky Mountain range was 3.3° below the normal.

The excessive rainfall over the south Atlantic and east Gulf states, with a marked deficiency in California.

The heavy snow-storms in the west, blockading or impeding all railroad traffic.

The chart on the opposite page has been reproduced by permission of the chief signal-officer from the regular chart No. III. of the signal-service series. It contains lines of equal air-pressure reduced to sea-level, lines of equal temperature unreduced, and mean



MONTHLY MEAN ISOBARS, ISOTHERMS, AND WIND-DIRECTIONS, JANUARY, 1883. REPRINTED IN REDUCED FORM BY PERMISSION OF THE CHIEF SIGNAL OFFICER.

monthly wind-directions as estimated from the observations of the month. This chart shows high pressures over the whole country, with northerly and north-westerly winds, the two combined producing the generally cold weather of the month. The extremes of cold, however, were not so great as is usual in January. The mean lowest minimum temperatures, from 47 stations of the signal-service in the different states, is −6.8°, while the same places indicate a mean greatest cold for all the years of observation of −13.3°. The following are exceptions: Pike's Peak, −37°, 4° lower than in the same month for the last eight years; Dubuque, Io., −26°, 2° lower; Pioche, Nev., −17°, 3° lower than before observed in Nevada; Santa Fé, N. Mex., −13°, 4° lower; and Spokane Falls, Washington Territory, −28°, 20° lower than before noted in the territory. The lowest temperature reported from any station was −54°, at Elko, Nev., on the morning of the 19th. The range of air-pressure was much less than during any January for five years.

There were sixteen storms traced within the United States and Canada. The following table gives the number of storms within the United States in each January since 1877. For the purpose of comparison, there are added the mean velocity, in miles per hour, of the storms in each month, as taken from the annual reports of the chief signal-officer.

TABLE OF JANUARY STORMS AND THEIR MEAN VELOCITY.

Year.	Number.	Velocity.	Year.	Number.	Velocity.
1877	14	37.7	1881	9	32.3
1878	12	26.3	1882	13	42.8
1879	8	35.5	1883	16	39.8
1880	14	37.6			

The heaviest snowfall was 52 inches, at Fort McDermitt, Nev.

The total movement of the wind ranged from 27,561 miles, on Mount Washington, to 1,853 miles, at Jacksonville. 100 miles per hour, and over, were reported from Mount Washington on the 3d (152, maximum for month), 4th, 12th, 18th, 20th, 21st, 24th, and 31st.

There were ordered up 149 cautionary signals, of which 79.9 per cent were fully justified.

No marked displays of the aurora were noted. Sun-spots were reported by Mr. D. P. Todd of Amherst, Mass., as seen on 11 days. They were least numerous at the first and last of the month, with a maximum frequency about the 16th.

An earthquake-shock was felt early on the morning of the 11th in Nashville, Jackson, Clarksville, and Memphis, Tenn.; Paducah, Ky.; Cairo, Anna, and Collinsville, Ill.; and at St. Louis and Protem, Mo.

A drought of great severity was reported from parts of Maine and Vermont.

Among numerous other statistics, are tables of monthly rainfall and mean temperature at Sacramento, Cal., for thirty years, — from 1853 to 1882 inclusive.

THE GEOLOGY OF LAKE SUPERIOR.

MR. SELWYN, the director of the Geological survey of Canada, has given in SCIENCE for Feb. 9 (p. 11) a note on the age of the rocks on the north shore of Lake Superior. The uncrystalline strata of the region, more or less associated with igneous rocks, are, as is well known, unconformable to and distinct from the Huronian. Mr. Selwyn includes them in ascending order in three groups, which will be found described in detail in the Geology of Canada in 1863.

1. Blackish and bluish argillites, with chert, and black or dark-gray magnesian limestones and sandstones, often with magnetite, the series being generally colored by carbonaceous matter.

2. Red and white sandstones and conglomerates, with red, white, and mottled shales, dolomites, and dolomitic marls, constituting the Nipigon group of Black bay and Nipigon bay. With these he classes, following Logan, the great mass of strata, including melaphyres, amygdaloids, and tufas, with native copper, — the Keweenian or cupriferous series of Michipicoten, Mamainse, and Pointe Aux Mines.

3. The sandstones of Sault St. Mary.

Between these three groups, according to Selwyn, 'there may be slight unconformities;' but he would include the whole of them in "those divisions of the great lower paleozoic system which underlie the Trenton group," and would call them lower Cambrian; asserting that there "is at present no evidence whatever of their holding any other place in the geological series," and "no sufficient reason for inventing or adopting new and unknown names for them."

These conclusions, it should be noticed, are arrived at after a first visit of a few weeks to certain parts of a vast, new, and peculiar region, which has engaged the attention, during the past forty years, of many skilled observers, who have collected, with regard to the whole of the Lake Superior basin, a great body of facts, and have reached conclusions with which Mr. Selwyn would seem to be wholly unacquainted. The problems presented by the rocks in question are far from being as simple as he supposes.

Mr. Selwyn includes in his second division both the Nipigon group of Bell and Hunt, and the Keweenian or cupriferous series, of which he conceives the third division, or St. Mary sandstone, "may be only the upper part, without any intermingling of volcanic material." This view of the continuity of the cupriferous series with the Potsdam (St. Mary) sandstone was maintained by Whitney; but Logan, in 1863, put forth strong, and to most minds conclusive, reasons for believing that the highly inclined cupriferous rocks at the east end of the lake pass unconformably below this sandstone (*Geol. Canada*, p. 85; also *Geol. report Canada for 1866–69*, p. 474). His conclusions have since been confirmed by other observers, notably by Strong and Irving in Wisconsin,