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☞CONTAINS THE SUMMER PREDICTION.☜

VENNOR'S WEATHER BULLETIN

FOR CANADA AND THE UNITED STATES.

A PAPER DEVOTED EXCLUSIVELY TO THE WEATHER AND ALLIED TOPICS.
"Study the Past if You would Divine the Future."

VOL. I.—No. 4. MONTREAL, MAY 1882. SINGLE COPIES, 5 CENTS.

The Rainy Day.

The day is cold, and dark, and dreary;
It rains, and the wind is never weary;
The vine still clings to the mouldering wall,
But at every gust the dead leaves fall,
And the day is dark and dreary.

My life is cold, and dark, and dreary;
It rains, and the wind is never weary;
My thoughts still cling to the mouldering Past,
But the hopes of youth fall thick in the blast,
And the days are dark and dreary.

Be still, sad heart! and cease repining;
Behind the clouds is the sun still shining;
Thy fate is the common fate of all,
Into each life some rain must fall,
Some days must be dark and dreary

—*Longfellow*

Whether or No.

A robin looked from a narrow chink
Of an old barn's rude facade;
Old Zero perched on the weather's brink
And the snow flakes did parade.
The robin thought of the vernal way
He'd sung of the cold gone by,
And said: "I fear instead of a lay,
That song was a sort of a lie."

VENNOR'S WEATHER BULLETIN.

MAY, 1882.

Enters MAY.
Moving DAY.
Nearly always COLD AND WET.
Which, by the way, most people forget.
MONDAY is the day this time.
The first day of the week ought to be fine.
But *ought* to be, and *will* be, are quite different things.
And the whole matter depends upon which way the WIND *slings*.

THE DAY of the week the MONTHS enter upon is of greater significance than most people are aware of. For there are always one or two days in every *seven* that, for a considerable period of time, are the days of disturbance. MAY entered on a MONDAY, last, in the year 1876—and the month came in cold and stormy, with snow flurries in many sections. The first real summer weather did not re-arrive until after the 20th. But April had been a fine month—just as it is likely to be this year, and as predicted in last BULLETIN.

THUNDER STORMS will probably occur in many sections, between the 20th and 25th.

HEAVY RAINS again during last week. *Snow flurries.*

5th Month. ALMANAC. 31 Days.

Mon. 1....Likely to enter bleak and white with *frosts in Northern*, and possibly in *Hudson River Valley* sections. Fine but cool weather. Fair weather with cool to cold nights generally up to the 6th, when a change is likely to be experienced.
Tues. 2. ..
Wed. 3....
Thur. 4.....
Frid. 5
Sat. 6.
SUN. 7....*4th Sunday after Easter.* Miserable weather.
Mon. 8....Followed by generally warmer conditions during the week; with storms in some Western sections. There may be brief intervals of hot weather. Rains again towards close of week, and stormy weather.
Tues. 9....
Wed. 10.....
Thur. 11.....
Frid. 12....
Sat. 13 ...
SUN. 14. *Rogation Sunday.* Generally wet and stormy.
Mon. 15....Bleak and fall-like, with wet weather in the majority of sections up to the 18th of the month. Altogether very variable weather.
Tues. 16....
Wed. 17....
Thur. 18....*Ascension.* Probably more settled and warmer, with decidedly hot weather in portions of the United States.
Frid. 19...
Sat. 20....
SUN. 21....*Sunday after Ascension.* Cold rains again. Changeable week with alternations of sultry, windy and cooler weather.
Mon. 22..
Tues. 23....
Wed. 24....*Queen's Birth-Day*; strong winds.
Thur. 25....Severe hail, thunder, and wind storms in Western sections.
Frid. 26....Weather getting rather more unsettled and unsummerlike than otherwise.
Sat. 27....
SUN. 28....Cool, bleak and backward weather generally, with heavy rains, wind and hail storms over both Canada and United States.
Mon. 29....
Tues. 30. .
Wed. 31....Considerable injury done to vegetation and crops. *Snow flurries.*

"THE HARBINGER OF SPRING."

The American Robin,

Wrongly so called, for it is a THRUSH—is regarded by most of the people of Canada as the "harbinger of spring." This is not, strictly speaking, true, as the birds frequently remain with us all through the winter. But this matters little. Its joyful song is always welcome, and smacks of summer breezes.

BIRDS AND THE WEATHER are closely connected, and it is our intention to take up a little bit of the BULLETIN each month, with brief notices of some of the most frequent species.

The above cut is from a drawing of a bird shot at Montreal in the spring of the year. We flatter ourselves as regards the excellence and truthfulness of the picture. It has life in it—

(Continued on page 3.)

May Weather.

April and May are the keys of the year.

A windy March and a rainy April make a good May.

Shear your sheep in May, and shear them all away.

A swarm of bees in May is worth a load of hay, but a swarm in July is not worth a fly.

A May flood never did good.

A cold and windy May makes a barn full and findy.

Look at your corn in May and you will come weeping away; look at the same in June and you'll come home in another tune.

A cold May enriches no one.

A hot May makes a fat churchyard.

A windy May makes fair year.

Water in May is bread all the year.

Betwixt April and May, if there be rain, it is worth more than oxen or grain.

A dusty March, a snowy February, a moist April and a dry May presage a good year.

May formerly was sacred to Apollo; the ancients little thought of what would follow—that May, descending as time onward rolls, should o'er by Fate be made the fête of 'Poles.'

PROBABILITIES FOR MAY, 1882.

—MAY is to usher in the cool and very wet summer of 1882, already twice predicted.

—RAIN, RAIN, RAIN in nearly all sections of North America, with late snow flurries in portions of the United States and Canada; *cool, wet and stormy weather in* GREAT BRITAIN, is our prediction, and "don't you forget."

—1882 is the first of a COUPLET OF WET YEARS, by our system of forecasting. Further, the year ends in a **2**, which by another theory invariably gives a wet season.

—May is likely to enter and end cold and wet.

—Saturdays and Sundays are likely to be the bad days of the week.

—Severe frosts during first week, in Canada and the United States, extending to some very southerly points.

—A warm period in most sections about the 10th and 11th of the month.

FROSTS may be expected in Northern United States and Canada about the 15th and 16th of MAY; and again upon or close to same dates in August.

—A relapse of cool and windy weather between the 15th and 20th of month, with frosts.

—24th. Threatening storms, windy, on verge of a change. Severe wind storms in western sections.

—Hail and wind storms likely to be experienced in Texas between 25th and end of month.

—A wet and stormy month, on the whole, in the Maritime Provinces and Newfoundland, with generally cool and backward weather—the beginning of a wet summer.

—Very late snow-falls in Northern and North-Western sections.

—Brief periods of heat; more cool and wet weather.

—There will be brief intervals of *muggy* heat and oppressive atmosphere during month.

—In the North-West and California coast the month may be altogether a more favorable one.

—Horrid weather along Maine coast and in Maritime Provinces.

—Incessant rains, and cold foggy weather in Newfoundland most of this month.

—There will be snow-flurries in May, in New Brunswick and Maine.

—Winter again on Anticosti Island.

—Wet and gloomy weather on Lower St. Lawrence.

—Poor hay prospects generally in Province of Quebec.

DRIFT.

—Winnipeg was *blizzarded* both at the entry and exit of March, this year. That's a good word.

—Weather prediction must ever be based upon a comparison of averages in a period of years, for each section of country.

—"Let us talk about the weather," is a saying which implies that, as a matter of course, everyone can talk about that. Well, perhaps they can talk of it, as people talk,—but how few understand what they are talking about. No! *the weather* is far beyond the mental grasp of all such as make the subject one of idle comment.

—May is a busy month in Central Asia, Persia, Asia Minor, Algeria, Syria, Morocco, Texas, Florida, China and Japan.

—April will end cold and wet; perhaps frosty at Chicago and westward.

Table for Foretelling the Weather.

This table has been compiled by Dr. Herschel and corrected by the late Dr Adam Clarke

It is the result of many years' actual observations, the whole being constructed on a due consideration of the attraction of the Sun and Moon, in their several positions, respecting the Earth. By simple inspection, it will show the observer what kind of weather will most probably follow the entrance of the Moon into any of its quarters, and that so near the truth as to be seldom or never found to fail.

If the New, First Quarter, Full Moon, or Last Quarter happens	In Summer.	In Winter.
Between midnight and 2 in the morning	Fair	Hard Frost unless Wind be S. or W.
Between 2 and 4 A. M.	Cold with frequent showers.	Snowy and Stormy.
" 4 " 6 "	Rain	Rain.
" 6 " 8 "	Wind and Rain	Stormy.
" 8 " 10 "	Changeable	Cold Rain if Wind be W.
" 10 " 12 "	Frequent Showers	Snow, if E.
At Noon and 2 P. M.	Very Rainy	Cold and High Wind.
Between 2 and 4 P. M.	Changeable	Snow or Rain.
" 4 " 6 "	Fair	Fair and Mild
" 6 " 8 "	Fair, if Wind N. W.	Fair.
	Rainy, if S. or S. W.	Fair and Frosty if Wind be N. or N. E.
" 8 " 10 "	Ditto	Rain or Snow if S. or S. W.
" 10 " 12 "	Fair and Frosty	Ditto.
		Fair and Frosty.

These remarks also apply to the following observations.

No. 1—The nearer the Moon's changes—first quarter, full and last quarter—are at MIDNIGHT the fairer will it be during the next seven days.

2nd—The space for this calculation occupies from ten at night till two next morning.

3rd—The nearer to MID DAY or NOON, the phases of the Moon happen, the more foul or wet weather may be expected during the next seven days.

4th—The space for this calculation occupies from ten in the forenoon to two in the afternoon.

The observations refer principally to the summer months, though they affect spring and autumn nearly in the same ratio.

Our Experience.

As regards the foregoing Weather Table goes in favor of its usefulness and truthfulness for the general requirements of the Farmer, Horticulturist, and ordinary pleasure-seeking individuals—its study involves observation, persevered in, leads to a general acquaintance with the laws regulating the weather. In other words, this table is an aid to the study of the weather—not always a sure key to its solution. Altogether, perhaps, it is right three times out of five. But the ordinary or average individual had better content himself with the Government probabilities, issued daily for the twenty four hours, and accessible to nearly everyone through the newspapers of the day. Or, better still, find in the pages of this little monthly paper the probable period of change and disturbance for the month to come. Our predictions are now *proved* to be more than two-thirds correct, for the main disturbances of the respective months; and we profess to be able to forewarn the people generally, over the North American Continent, of approaching "storm periods," from six to seven days prior to their arrival—and this we have done, and are doing repeatedly. Watch the BULLETIN and see for yourselves.—ED.

SPRING.

Sunshine streaming gaily;
Skies of deeper blue—
Crimson-budded woodlands;
Fields of greener hue—
Tell the winter wears
Spring returns anew.

SIGNS OF SPRING.

When bull-frogs pipe nocturnal lays
  Where erst the boys were skating;
When genial sunshine warms the days,
  And chattering birds are mating;
When lovers no more parlor stoves
  Hug, as in wint'ry weather,
But wander through the budding groves,
  And hug, instead, each other;
When goats no more on old shoes feed,
  Tin cans and kindred diet,
But gleeful crop the verdant mead
  And forage on the quiet;
When buttercups are all in bloom
  Among the growing grasses,
When flies are found in every room,
  Likewise in the molasses;
When housewives make their homes a—well,
  You can't mistake my meaning—
Make misery more than tongue can tell,
  And call the thing "Spring cleaning";
When early crocuses appear,
  And honey-bees are humming,
Then you can bet spring is here,
  And warmer summer's coming.

[Continued from first page.]

we fancy we hear its song—the "Song of Spring." And what is it's song? Comstock says, "The song of the Robin, although not complicated and brilliant, is pleasant and agreeable, from its simplicity and the well-known good character of the performer. But the red breast may be educated so as to excel nearly all other performers. When within hearing of the mocking bird, he not only catches many of the notes of that songster, but even improves upon them; so that we have heard robins sing in a style and with an effect, which we have never heard surpassed, or perhaps equalled by any other bird."

Minot, in his "Land and Game Birds of New England," says, "The Robins have, beside their song, a very faint whistle, like the Cedar-bird's lisp; but one note, which is constantly varied, usually being in the winter, early spring and fall, more dreary than in the summer, when it is sometimes merely a *chirp*, though at other times it is uttered in a tone of excitement or vehemence, and rapidly repeated. The cry of the young is somewhat harsher than that of the mature bird, who are very pleasant singers, and often warble a cheerful and energetic song, consisting of a few monotonous notes, which are repeated with some little varieties, chiefly in the morning and at dusk, in spring or summer." We think the song of the Robin a mixture of pleasant "jingle jangle," inclined to be monotonous when listened to for a length of time. Its song is particularly vehement or energetic during the spring months in Canada; but for a long period during the summer months the bird is comparatively silent. The Robin does a great deal of good and some harm. It is very fond of insects of all sorts, and grubs, but like many of ourselves, has a great liking for a desert of fruits, just when they are ripe and luscious. The latter characteristic or trait in the Robin's habits has brought down upon him a good deal of censure and ill feeling, but this is mainly amongst niggardly and uneducated people, who see no good in any object in Nature, unless this subserves their own interests.

The range of the Robin is wide-spread. It is found in all parts of North America, Greenland, on islands on Behring's sea, on several of the West India Islands (as Bermuda, Cuba, and Tobago) and through Mexico to Guatemala; also occasionally observed in Europe. The extremes of its range (reached only by a few individuals) are Greenland, the West Indies or Central America.

We could say or write a great deal more about this Spring bird, but space does not permit, and we would merely remark in conclusion, that its flight southward in the fall is entirely influenced by the sort of weather we are having—not going to have, for the birds know less about than ourselves; and there are but few winters in which one may not meet with it, in but a comparatively short journey to the south or west of Montreal. We have many paragraphs in our scrap-book relative to "Robins wintering at Toronto, Belleville, Hamilton and other points west," but as regards Ottawa, Montreal and Quebec, the wintering of the birds is an exceptional feature.

We have seen *Albino* (White) Robins, but they have not pink eyes as many conjecture. These and "White Swallows" are occasionally met with in every section of country, but they may be looked upon as very exceptional and forms of disease, rather than anything else.

April Items.

260,000 EASTER EGGS.

Torontonians consumed on Easter-day, according to the computations of the *Globe* and *Mail*, about 260,000 eggs—good, bad and indifferent. What a fearful egg-sample to other cities. It reminds us of a piece of poetry we have in our BULLETIN SCRAP BOOK, and here it is:—

AN EASTER EGG.

BY H. C. DODGE.

A man, like eggs, is "soft," they say,
And when he is, he writes a "lay."
His "yolk" is always "hard" to beat.
And he is sometimes "crushed" with care.
When he is "fresh" his "yolks" are "stale;"
He's "addled" when egg-nogs prevail.
A broken egg will stand alone;
A man that's "broke," 'tis too, stands a loan.
You "beat" a man when he is "bad,"
But not an egg—if you'd be glad.
An egg is on nest; man is not—
And both quite often "go to pot."
Both eggs and men in "shells" may float,
And both, too, have an ova-coat.
Eggs will hatch fowls; men foul things hatch,
And both make "cheek-'uns" hard to catch.
An egg will "poach;" so will a man;
And then he "scrambles" all he can.
In bowls of eggs some men take pride,
And yet their bowl-eggs they will hide.
Both eggs and men have "boils," and they
Are 'set upon' and "laid" away.
Some men sell eggs, and some eggs sell,
And some, when "egged," egg-hen will smell.
And some who are egg-salted high
As bad egg-amples often die.
But man is like an egg in fact,
When he is "hen-pecked" and is "cracked."

Spring "Poetry in Prose."

April, sunshine, birds in tune; backyard rubbish in full bloom; frequent showers, colds and gloom; dogs and cats and brilliant moon; lovers strolling out at eve—spoony fantasies to weave; torn up homes to regulate; urchins swinging on the gate; marbles on the sidewalks—boys, quite hilarious with their noise; —the same old season reproduced, when nature's winter bonds are loosed.

—April entered at Cincinnati and vicinity very warm and summer-like, the thermometer ranging on the 3rd from 61 to 79—a higher record than for a number of years.

NEW YORK, April 7.—Nominally the spring has come. The spring trade has opened vigorously, the merchants say twenty per cent. better than last year, but the weather is still wintry, and March very coolly continues herself along into April. Forgetfulness, no doubt. According to all precedents there ought to be a backward spring in order to make up for the exceeding mildness of the winter, and it looks as if that was to be the programme.

Something that answers for grass is bursting through the ground, and the long leafless shrubs and trees are preparing spring styles of buds in a very small way indeed.

—The thermometer recorded within 5° of zero at St. John, N.B., at the entry of the month, with a snow-storm.

A VIOLENT WIND STORM.

OCEAN BEACH, April 3.—A wind storm, yesterday, badly damaged a large number of cottages here. George Kisner's house was moved from its foundations and almost wrecked. Several barns were twisted out of shape. Four cottages in course of erection at Ocean Grove and five new cottages at Point Pleasant were blown down. The Baptist church at Tom's river, which was being enlarged, was blown over. The storm only lasted a few minutes.

DISASTROUS WIND STORMS.

A Reservoir blown down—Three persons killed and three injured—Considerable damage done.

READING, Pa., April 2.—This place was visited by a furious wind and rain storm this afternoon. George Sheltborne and two children, Rose and Charles, aged nine and twelve respectively, were decapitated by the shock.

PHILADELPHIA, April 2.—At Girard college this afternoon, the wind blew the roof off a shed on a number of boys. Three were knocked insensible and one was dangerously hurt.

—A wind storm played considerable havoc in British Columbia on the 8th.

—The State of Michigan suffered severely from a cyclone which swept over the country on the night of the 5th April. Great destruction of both life and property.

—On the 8th a similar disturbance struck Kansas and Iowa.

Singular for April.

EARTHQUAKES.

AMSTERDAM, N. Y., April 3.—Two shocks of earthquake were felt here yesterday morning. Houses were considerably shaken and many persons badly frightened. The shock was more severe at other points than here. The earthquake seemed to cover an area of ten and a half square miles. It was felt at Fonda.

STRUCK BY LIGHTNING.

Last Saturday night the barn of a farmer named Stoskopf, about seven miles from here, was struck by lightning and consumed by fire. A number of sheep and some other live stock were consumed.

MILLVILLE, N. J., April 3.—Newton Allen, aged twenty-one, was killed by lightning, yesterday. Two children in the same house were badly shocked.

BUFFALO, April 2.—The Main street station of the New York, Lake Erie & Western railway was struck by lightning, to-day, and burned. Loss $500.

SPIRE STRUCK BY LIGHTNING.

BELLEVILLE, April 3.—The spire of St. Michael's Church was struck by lightning during a storm yesterday. The only damage done was to the cross, which was split in several places.

—A sharp thunder storm along the Hudson, N. Y., on Good Friday morning.

—Cattle Killed by Lightning.—Lynden, Ont, April 7th.—Last night Mr. John Lee, Jr., who lives three miles north from here, had six head of cattle and four horses killed by lightning while standing in the stable. The buildings were not much damaged, being some distance from the house.

Thunder storm, Montreal and light snow fall 2nd April—Heavy snow, Quebec—April 5th, temperature below the freezing point over the greater portion of Canada—Gale on the Lakes.

Heavy thunder-storm, Ottawa, night of the 6th April.

Snow and Cold.

—The snow-fall at Winnipeg this Spring was greater than for a great number of years.

—Very stormy weather in the Bay of Fundy 1st week of April.

—Snow-falls in Nova Scotia April 7th; also in New Brunswick the entry of the month was very stormy.

The heaviest snow storm of the season set in last evening from the east and continued raging until noon to-day, when it moderated. The drifts in some places are eight feet high, making locomotion very difficult.—*Quebec 2nd.*

—Winnipeg, April 7th.—A train with 800 emigrants is frozen in three miles from the nearest source of supplies. Provisions are being carried by a relief train. It will be three or four days before the train can be got out. A man is dying in the train. There is no danger of starvation; but fuel and light may give out. *An April Snow-storm, Hudson, N.Y.*

Last night there was quite a sharp snow-storm in the eastern part of the country. At Hillsdale at least two inches covered the ground, and this morning the Berkshire Hills were as white as in mid-winter.—*April 9th.*

Dresden, Ohio, April 10.—Three inches of snow fell here to-day.

Indianapolis, April 11.—Reports in various parts of the State indicate that a hard freeze has killed the fruit.

New York, April 11.—Dispatches from various parts of the country show that the cold snaps have done some injury to fruits and grain. The damage, however, is as yet not serious.

The Newfoundland coast is completely blocked with ice. The steamers plying between Halifax and St. Johns have experienced very severe weather this season.

Snow-storm again, New Brunswick, April 11th.

Fine April, Winnipeg.

Canals opened for navigation, Albany, N.Y., by 11th April.

First steamboat, Montreal, 11th April.

We had snow-flurries again on the 11th of the month, with minimum temperature of 17°.6.

The Farmer's Friend and Planter's Guide is being most favorably noticed by the press everywhere. It is thought that one million and a half copies will be sold. We give this work to every subscriber to the Weather Bulletin *free*, commencing with the May number.

St. Johns, Que., April 12th.—About three inches of snow has fallen and it is still snowing hard.

Birds and Weather.

THE BLUEBIRD.

HARRIET E. PAYNE.

A dreamy haze of sunlight floats
Across the shining fields of snow,
And, rippling through the glory, flow
A few delicious, liquid notes.

It is the first warm day of spring,
When tender breezes wander by;
And bluer than the soft blue sky
I see the bluebird's radiant wing.

Thy message, gentle bird, I know,
Immortal hope thou bringest me
Of love and beauty yet to be;
Of summers sure beyond the snow.

When bluebirds sing, and try their tenor,
Then is it spring? not always says Vennor.

The Blue Robin, as the bird is frequently termed, is among the first arrivals along the St. Lawrence Valley. It closely follows up the northward progress of the spring weather, and is generally some time ahead of either the swallow or song sparrow. Its advent is hailed with delight every where. On the return of the birds in the autumn, on their southward migration, the color of their plumage is dull and they present a different appearance than when on their spring migration.

The little Indigo bird—also blue—is an entirely distinct species, and arrives much later on in the season.

The *Pewee*, or Pewit, a fly-catcher, is also among the very first arrivals, and may be always seen and heard near streams, bridges, old mills and other watering sites.

The Raven—Some New Facts.

We have both Crows and Ravens in Canada. The former, as everyone knows, are abundant, while the latter are very rare. The Raven, amongst other places, nests and rears its young in solitude of the Great Manitoulin Island on Lake Huron. Here its solemn *croak* may be heard on most of the inland lakes. It nests both in the dead trees and on the cliffs of limestone, which are so marked a feature of this particular section of Canada. We have examined its nest and taken many specimens of its eggs, which compare very closely with those of the crow. The bird is hard to get at, and has extremely keen vision; but when guarding its newly-fledged young, it shows both courage and fierceness. The Raven is also met with towards the sources of the Ottawa, Gatineau, Lièvres and Rouge rivers, and what is singular—and to us a new fact or trait in its habit—is that we have been informed by Indians and lumbermen, that the bird *remains in these resorts all through the winter*, visiting them at their meals in camp in company with the "Whiskey Jacks," or Canada Jays, (of which we intend to treat in a future issue) and stealing provisions whenever the opportunity occurs.

The following clipping in this connection, which has recently appeared in several newspapers, may be found of interest:—

"Professor Linden said a good word the other day at Buffalo for that much persecuted bird, the common crow. The crow of America belongs to a scattered family of about two hundred species, including among them the buzzard, jay, raven and magpie. Of the genus proper to which the crow belongs, seven examples are found in the United States, the great black raven being at the head. In the wilderness about one hundred miles from Buffalo, on the shores of Lake Ontario, ravens were found. Their nests were so secluded as rarely to be discovered. So wary were the birds that Mr. Linden had found it impossible to obtain a specimen. They were reported more abundant on the Canada shore of Lake Ontario, but it was impossible to procure a specimen even there, though a liberal reward had been offered. The crow was only preserved from annihilation by its great cunning. Even in captivity the bird displays a degree of sagacity which almost resembled human intelligence. Mr. Linden admitted that the crow could hardly be called a sweet singer; still when tamed, he made a very interesting pet. On the whole, he might safely be set down as a useful bird and a real friend of the farmer. He eats large quantities of noxious insects, and though he has a bad habit of pulling up your tender shoots of grain, it was a question whether the damage was not more than compensated by the number of larvæ of beetles thus brought to light and devoured."

Our Wood-peckers.

As requested, we give our experience relative to the species of wood-peckers inhabiting the Canadian woods and forests, in as brief a form as possible.

During the past fifteen years, collections have been made by us from Fort William, Lake Superior eastward to the Rouge River in Argenteuil Co., Que., and the following is our list of wood-peckers, slain and preserved:—

1—The Little Downy Wood pecker, our smallest species, and perhaps best known, almost always met with in every orchard or grove of any size.

2—The Hairy Wood pecker: Very similar to the first, and quite abundant everywhere.

3—The Northern Three toed Wood pecker. Very abundant in the forest along Lake Huron and Lake Superior, and to the north of the Ottawa valley, where they nest in numbers.

4—The Banded Three toed Wood pecker. Perhaps our rarest species, only three birds having been met with by us in the whole of our explorations, and these at very inland and remote northerly points.

5—The Yellow-bellied Wood-pecker. Abundant in all sections.

6—The Red headed Wood-pecker: Abundant in the woods and country parts, but apparently scarce in some sections of the Ottawa valley.

7—The Golden-winged Wood-pecker or Flicker: Abundant everywhere and known to the country people as the "High-holder."

8—The Pileated Woodpecker: Our largest species. Rather abundant on Lakes Huron and Superior, Great Manitoulin island; on the Madawaska and Bonnechere rivers, Ottawa valley, and country to the nortward. Specimens have been shot on the island of Montreal but here the birds are very rare. We have been fortunate enough to take the eggs of this

species from their hollow excavated in a dead pine. They rested upon rotten wood and bark.

The Northern Three-toed Woodpecker (3) is a fine bird and differs from most others of the family in having a lemon-yellow crest or patch on the crown. The upper part of the bird is jet-black; under parts, white.

The Downy and Hairy Woodpeckers are speckled black and white, and the males have vermillion or scarlet crown patches. In both cases the males alone show the colors mentioned. These birds are of great service in preserving our forests and orchards from the ravages of insects, and although the little Downy species has been called "the sap-sucker," and was at one time accused of "girdling" and killing fruit trees, he is now generally acknowledged to be amongst our most active and useful insectivorous birds.

The Shrike and the Sparrow.

The following remarks by Dr. Coues, relative to our Shrike and the English Sparrow, we endorse most heartily, and we do not know of another Ornithologist who is able to express an opinion so thoroughly backed up by actual field experience. He writes:—

"Nay, more, the Shrike is entitled to our special thanks and most favorable consideration for his interference in our behalf against the bird-pest of the country—the European Sparrow. In taking counsel with herself that she might right the balance of her forces, Nature—which we so fatuously interfered with when the Sparrow madness seized us, she bethought herself of the Shrikes, and in her own mysterious way she summoned these trusty allies to her aid. The Shrikes, nothing loth, went right to work, and were abating the nuisance very perceptibly when 'Bostonese' idiocy confronted them and cut short their righteous warfare. Men shot them down in the very acts of destroying Sparrow after Sparrow; at each murderous discharge of the gun a noble Shrike was martyred in doing his best for the good of the community. I do not know who was responsible for this outrage. I hope that it was merely the blunder of some ignorant underling, not instigated by any one professing to be an Ornithologist." Hear! Hear! And Dr. Coues is right. Canada could hardly do a wiser thing, as far as the Sparrow plague—for plague it is—is concerned, than support a colony of Shrikes.—*Ed.*

Hanged by the Neck—Curious Death of a Little Sparrow.

In the overhanging cornice of a brick house on the corner of Eighty-fifth street and Lexington Avenue a number of sparrows have built their nests and have made very comfortable little homes. This evening while sitting at our window, directly opposite, we discovered quite a commotion among the little colony of sparrows under the coping, and taking a careful view in order to find out the cause of the trouble, and with the aid of an opera glass, we discovered one of the little sparrows hanging by the neck by means of a small thread which was attached to something above, leaving a few inches of the string in plain sight. The other little birds were in a terrible state of excitement over the accident, and were trying all the means within their power to extricate their companion, but they evidently did not understand the force of attraction and gravitation, as in their efforts to free their companion they would sometimes two at once light on his body, and would pick at the string above, but in doing so they gave the additional weight which all the time was drawing on the neck of the little sufferer. But we finally had to give up looking at them, as the shades of evening were closing around us, and to him also, poor little fellow, as he seemed by this time to be quite dead. We suppose that in carrying up material for nest-making they took up this string, with the above result. We would gladly have released him, but it was not in our power to do so. We are speculating in regard to the case whether or no it may not have been a case of suicide caused by jealousy, or crossed in love by a stern parent, or some family troubles. But our final verdict was that it was a case of accidental death as above described.

French Field Mice.

Darwin's now familiar paradox, that the fertilization of certain flowers may depend upon the number of cats in their neighborhood, has an illustration now in France, where it may even be carried a step further. Any observer who knows the French rural districts well must be struck by the immense number of mouse holes which may be seen in some places. The surface of the ground at times has quite the appearance of a network of little burrows where it would be impossible for one of the field-bees required for the fertilization of Mr. Darwin's flowers to find a secure spot for its nest. In the department of the Aisne alone it has just been calculated by a special commission that these field mice have cost the farmers no less than thirteen million francs. The climate seems to be especially favorable to these creatures; and the population being sparse, the number of cats is few, and the mice increase and multiply beyond belief. Arsenic has been tried in the open; but the hares and rabbits get killed first, and now the plan adopted is to construct heaps or small stacks of straw, to which the mice resort in myriads. These heaps are placed partly below the level of the ground and securely packed and covered in, being first stored with poisoned beet-root, turnips and carrots. This plan is said to be succeeding well, and without harm to the hares and rabbits.—*Pall Mall Gazette.*

—April has given us thunder and lightning, wind storms, and snow storms in Canada; and in the United States—not far from us—*Earthquakes.* In our first issue of the BULLETIN, we predicted "volcanic disturbances" for the present year on the North American Continent.

India in Hot Weather.

I will briefly indicate the thermometric features, say at a central position like Allahabad. In January the indoor temperature will reach its minimum, perhaps standing at fifty-four degrees. The rise is very gradual, and gets into the "eighties" toward the middle of March; when steady at eighty-five degrees punkahs become necessary. Above ninety degrees the heat is oppressive, and at ninety-five degrees horribly so. This is generally the temperature during the lull between the moonsoons. In exceptional years I have known pillows and sheets to be uncomfortably hot, requiring sprinkling with water; and I similarly retired to rest in drenched night clothes. But the hot weather is mercifully interrupted by two remarkable meteorological phenomena. First, at its commencement we have almost always violent hailstorms, which beneficially cool the air, and then at its acme we have those very remarkable electrical dust-storms, which impress fresh life and vigor all around. Let me describe one. Nature seems subdued under the great heat, and is in absolute repose. Not the faintest breath is there to coax the faintest movement in the leaves: silence prevails, for even the gurrulous crows can't caw because their beaks are wide open to assist respiration. Suddenly the welcome cry is heard, "Tufan ata!" (A storm is coming! and the house servants rush in to) close all doors. Anxious to witness the magnificence of the approaching storm, you remain out to brave it, and soon feel its approaching breath on your cheek. Looking to windward you see a black cloud approaching, and before it leaves and sticks, kites and crows circling around in wild confusion. You now hear its roar while rapt in admiration, you are enveloped in its grimy mantle, and have to look to your footing in resisting fury; and this is no joke, for eyes, nostrils, and ears are clouded with dust. As the blast approaches you may see a flash of lightning and hear its clap of thunder, and then feel the heavy cold rain drops which sparsely fall around. Darkness black as Erebus surrounds you, darkness which literally may be felt, for clouds of dust occasion it; and if you are within doors night prevails, requiring the lighting of lamps. The storm passes, light returns, and you find everything begrimmed with dust. Every door is now thrown open to admit the cool, ozone-charged air, which you eagerly inhale with dilated nostrils, and feel that you have secured a fresh lease of existence.

COLUMBUS, O., April 10.—The Governor has designated April 27th for the planting of forest trees in Ohio, by the roadsides and in groves about homes. He recommends the formation of forestry societies.

—A cool and wet summer is almost invariably followed by a cold and stormy winter; and a muggy and moist summer by an open autumn and late setting-in of winter—but of course there are a number of other points that require to be considered in connection with these conditions in each instance.

Prediction or Prophecy.

So it is all around us. *Prediction* (in the sense we look at it) renders its invaluable aid more ways than can easily be enumerated. If we call it "prophecy" the meaning will be pretty much the same; but it is better to say *prediction*, as less likely to raise objection.—*Chambers.*

Our attempts at the weather, then, let it be clearly understood, comes under this last mentioned heading. People who continually talk about "prophecy" are not able to define the meaning of the word; it is to them a good word to use on all occasions when they attempt to criticize a subject they are not familiar with.

Let it be clearly understood, then, we do not and never have attempted "prophecy" but "prediction" or prognostication.

It is deserving of note that ministers of religion generally manifest much distrust of this word *prediction*, conscientiously regarding it as a bold interference with the mysterious will and decrees of Providence; and their scruples are worthy of respectful attention. Yet the distrust generally vanishes when these excellent persons take up their wonted position of affairs of every day life. If a clergyman wishes to shield his dear ones, he insures his life; and this involves as direct a prediction as anything connected with weather phenomena.—*Chambers*

Keep your Weather Eye Open.

There are no direct or suddenly appearing signs whereby approaching weather may be foretold for any length of time in advance. There is, however, a method by which this *may* be accomplished without the aid of any unusual or particularly striking indications. "A perverse and evil generation seeketh after a sign, but there shall no sign be given them," &c.

Earthquakes, comets, eclipses, the singular formation of clouds, coloured rain or snow-falls, coloured mists and fogs, have each and all been considered by "the people" as the forerunners of some terrible calamity, such as an epidemic, a famine or war. The superstitions of the past ages still linger in the minds of the mixed populations of the present day—with this difference, that the superstition is clothed in the garments of science or an attempt at science. Superstition reigns supreme where ignorance and darkness abound. Where there is education and general enlightenment, superstition vanishes. Again, there are classes of the community wherein both enlightenment and superstition are combined; enlightenment as regards the ordinary business affairs, and of the daily routine of duties, and superstition strong as touching their religious and spiritual relationships. The less the knowledge on any particular subject or department, the more room is there for ignorant surmise and superstition in regard to it; and in just such a relationship stands "the weather" with "the people."

Passing by then, as ridiculous in the extreme all such signs in the heavens and on the earth (as "the people" have attempted to interpret them) in connection with the weather of an approaching period or season, we would merely state, that, to every intelligent and thinking mind but one method can be regarded as likely to lead to any tangible results, and this combines, and is almost sufficiently explained by the two words—OBSERVATION and COMPARISON.

The former of these important headings applies to the past and present; the latter to the past mainly. OBSERVATION enables us to fix upon the averages of past years as touching snow and rain fall, warmth and cold, drought and precipitation. COMPARISON brings about an arrangement of these *averages* into couplets, triads or larger groups of like character, and points to the probabilities of the recurrence of one or more of these at some future time.

Experentia docet. But the mind of the observer has first to be fitted for such teaching. Hundreds of observers from conclusion form the results of their observations—but how few prove correct in weather prognostication.

Prognostications of the Weather.

(Continued from last number.)

III—PROGNOSTICATIONS BY THE HYGROMETER.

The principle according to which the mass of Hygrometers have been constructed is, that a certain degree of affinity between moisture and air, and moisture and many other substances exists. And that one substance attracts another for which it has an affinity, with proportionally less force according as it is more nearly saturated with it. Thus, a hair or a piece of cat-gut, or pack thread, may be used for hygrometric purposes. Each of these substances, as well as most others, exert a certain degree of attraction for moisture.

Accordingly, as the air gets more nearly saturated and exerts a proportionally less attractive force for humidity, these substances absorb a greater amount of moisture, and in doing so expand in thickness, but diminish in length. On the other hand, when the air becomes drier than usual, and exerts a proportionally stronger attraction for moisture, a portion of humidity is abstracted from these bodies; and this, while it diminishes their thickness, increasing their length. Hence the length of such or smaller substances filled up and adjusted to a scale of equal parts, according to various mechanical contrivances, has been employed as a measure of the dryness and dampness of the atmosphere.

The different degrees of rapidity with which moisture evaporates, and reduces the temperature of the evaporating surface, according to the state of the atmosphere with regard to humidity, is another principle upon which hygrometers have been constructed. But as we do not mean to describe meteorological instruments generally, we need not further enlarge upon this point.

Our object in making remarks upon hygrometric instruments is, that of the principle of their construction be understood, a great mass of weather indications held in esteem by the more ignorant part of the population, and which depend upon the same principles, become intelligible.

Hygrometrics, by indicating the existing dryness or dampness of the atmosphere, give information (though not always acurately) whether the wind be in a direction favorable to the formation, or the dissolution of clouds; consequently, afford a means by which wet or dry weather may, to a limited extent be prognosticated. And supposing the hygrometer to indicate great atmospheric dryness, even though the wind should shift to a warm and rainy direction, it may take one, two, or perhaps three days, before the reduction of the temperature of the air consequent upon its transportation to a colder climate, causes it to become sufficiently damp, and before enough of moisture be precipitated into the form of clouds, to occasion rain.

The great mass of what are called signs of fair, or of wet weather, depend upon hygrometric principles. Thus, a difficulty of opening windows, window-shutters, and doors, and of drawing out wooden pegs, have been considered signs of wet weather. The reason is, wood, like all other hygrometric substances, absorbs moisture, and expands in bulk as the air becomes damper.

The peculiar cries and instructive movements of birds, beasts, insects and reptiles, which have been considered indications of wet or dry weather, all result from agreeable or disagreeable sensations by which such animals are affected, when the state of the atmosphere is hygrometrically dry or damp. In reality, the animals themselves know nothing of the cause of the agreeable or disagreeable sensations by which they are affected. And though they manifest those sensations by peculiar cries and instinctive movements, they possess no foreknowledge of the weather.

In like manner, persons subject to rheumatism and other complaints, become affected probably upon hygrometric principles with their constitutional diseases, when the atmosphere becomes damp; and feel relieved upon the return of dry weather. Such persons may be considered living hygrometers.

Indeed, when it is considered that perspiration is more or less obstructed by increased dampness, and that the feathers of birds, and the hair covering the skins of beasts, as well as the muscular fibres of animals in general, are all better or worse hygrometers; it is no wonder that variations in the dryness or dampness of the atmosphere should give rise to agreeable or disagreeable sensations. Nevertheless, as properly constructed hygrometric instruments afford comparatively, much more accurate means of ascertaining the different degrees of atmospheric dryness and dampness; and all the subsequently mentioned indications of wet or dry weather, are merely less perfect and less precise methods of giving us similar information, they need be no longer regarded as weather prognosticators.

It may be remarked, however, that as hygrometers only give information regarding the dryness and dampness of the lower atmospheric strata by which they are immediately surrounded, and which are affected by all the vicissitudes of temperature which occur dur-

ng the alternations of day and night, they must be regarded, even when constructed upon the most improved principles, as very imperfect instruments for prognosticating the weather, which chiefly depends upon changes going on in the elevated regions of the atmosphere. They are also subject to another defect. Like all other solid bodies, they absorb radiating caloric, and accordingly, grow warm more rapidly than the atmosphere, when temperature is on the increase; and on the other hand, radiate caloric, and grow cold more rapidly than the atmosphere, when temperature is on the decrease. In the former case, they over-indicate the dryness of the atmosphere; in the latter, they over indicate its dampness. On these accounts it has been frequently observed, that hygrometers have indicated a considerable degree of dryness, particularly during day and summer, when a rain of long continuance was about to commence. And on the other hand, they have frequently indicated a great degree of dampness, and accordingly, have erroneously prognosticated wet weather, particularly upon the approach, and during the continuance of night, when atmospheric stillness, a cloudless sky, and a high settled state of the barometer, gave us every assurance of the continuance of dry weather.

In one of our former Almanacs we also alluded to the Hygrometer. It is, however, to our way of thinking, more of a toy than a serviceable meteorological instrument. One such,—and a very nice little house and table instrument—is manufactured at Albany, N. Y by Mr. Ullman, but on a different principle than any we have elsewhere met with.

Our next article on "Weather Prognostications" will treat of signs in the "Appearances of the Clouds;" "Color of the Sky" and "Appearances of the Heavenly Bodies."

Weather Chips.

—There are already indications of a severe ending of the year 1882; but we are not going to touch upon this yet—although our system would permit of our doing so with considerable chance of success.

—We have seldom seen it fail,—and we are backed by the records of a half century—that *thunder in April* is indicative of *a wet midsummer*, in those sections of country in which it has been experienced.

—The Editor of the WEATHER BULLETIN has the largest collection of BIRDS in the Dominion of Canada, not excepting even the public collections. These were collected during fifteen years' rambles in the wilds of Canada. It is our intention to give a number of articles on Canada and United States birds in a future number of this paper, and we commence some of them in the present issue.

—A cold summer is always a cloudy and wet one; and a generally cloudy season is invariably a cool one. Our prediction relative to the summer of 1882, therefore, being a cloudy picture we expect a generally cool and wet season.

Press on Predictions.

Vennor's predictions for April will be found in this issue. The famous prophet has made himself popular with the ladies by predicting a fine Easter Sunday, which is favorable for the crop of Spring bonnets.—*Milwaukee, Wis., April 3rd.*

Vennor's predictions for the month of March were quite accurately filled, enough so to reflect a continuance of the honor he has this year received for his close figuring.— *Evening Wis. April 1st.*

Vennor's storm, foretold in a letter to a Shediac gentleman, came in on time. All day yesterday it snowed and blowed in a manner that would do credit to a day in February or early March. We take back half the hard things we have said about Mr. Vennor.—*The Times, Moncton, N. B.*

Vennor hit it wonderfully in saying this spring "will set in with, if not quite, almost summer heat."—*Commercial Cincinnati.*

—The FARMER'S FRIEND can only be had by subscribing to VENNOR'S WEATHER BULLETIN for the year ($1). We have 1,000 books ready for mailing at once to all subscribers.

—Besides one hundred other articles the FARMER'S FRIEND contains—*A New Exposition of Weather Philosophy; Winter Weather Wisdom; The Practical Use of Weather Reports and Maps, and how they are made; The Law of Winds; Storm Disturbances; The Blazing and Reading of Instruments; Atmospheric Fertility, etc.* There are also papers on *Live Stock, Crops, Fruits and Vegetables, Household Affairs, etc.*, which cannot fail to be of interest to everyone The matter is all new and original and is not clipped from other journals. Most of the Farming Papers and Reviews now circulated contain the same matter over and over again; but in the preparation of our FARMER'S FRIEND, the matter was collected from original sources and at considerable expense. We have no hesitation in saying that no Farmer, Planter, or Householder as ever yet had so useful a book in their hands.

—A daily journal says that a few of the English writers on scientific topics have from time to time flung ridicule upon those who accept the theory that there is a connection between the activity of the sun's surface, as shown in sun-spots, and the weather of the earth. The theory appears, however, to be gaining converts. Dr. W. W. Hunter, director general of statistics in India, has recently contributed new arguments for its support. His researches embrace the records of sixty-four years at Madras. The cycle of increase and decrease of sun-spots is taken at eleven years. Within each of these eleven-year periods the minimum of rain-fall, forty inches, occurs in the last, first, and second years; the maximum, fifty-four inches, in the fifth and sixth years. Within the whole period, the five years of minimum sun-spots have had an average of only thirty-seven inches rain fall—less by eleven and a half inches than the average of the locality. Six severe famines have taken place during the sixty-four years, caused by the droughts of the minimum years and directly following them; the six droughts each occuring during the last, first, or second year of an eleven-year period. These researches must prove of great value, since they will enable the recurrence of East Indian famines to be foreseen and provided for.

Brief Paragraphs.

When the earth was very young, says Dr. Ball, Astronomer Royal for Ireland, it went round so fast that the day was only three hours long. The earth was liquid then, and as it spun round and round at that fearful speed, and as the sun caused ever increasing tides on its surface, it at last burst in two. The smaller part was the moon, which has been going round the earth ever since at an increasing distance. The moon now raises tides on the earth, and while there was any liquid to operate on in the moon the earth returned the compliment.

The famous Gold of Ophir rose tree, on the Maddox farm in El Dorado county, California, was recently destroyed by a violent windstorm. Its stem was twenty-six inches in circumference, and the shrub itself had grown around and over the oak fifty feet high, stopping in its upward progress only because it had nothing upon which to climb higher. When in full bloom, a splendid mass of golden flowers concealed the oak entirely from view with a blaze of glory which many persons have traveled far to see.

—"Do Railways and Telegraph wires influence in any manner our rain and snow-falls or general weather?" is a question that has been asked us by several writers recently. It is an important and curious question, and one well worthy of investigation. We can imagine such mediums affecting electric currents and thereby influencing the course and scattering of thunder-storms; but cannot, in any way, see what effect they could have upon either the rain or snow-falls of the country. However, we are glad to put the question and idea on record in our paper—hoping to hear further respecting it.

—The "Goose Bone" of Kentucky must not be laughed at. It has predicted well for many sections this year. The good people down there have faith in it—as their fore-fathers have had—and we cannot believe that any mere "old saw" has been held on to so long, without there being something in it. We like the Kentucky folk'; and so does every one who goes down there and spends a time with them. They are the very essence of friendship and whole-souled hospitality. Good luck to the "goose bone."

—April is said to be "the key of the year," but how few there are that can fit the key in the lock.

The attempt to read the weather by the odd or even endings of the years ('80, '81 or '82 for example) is ridiculous in the extreme; as well try a toss up of the dice. Remember, that the weather existed before numerals.

March, which according to the proverb, ought to go out like a lamb, is not doing so to any extent worth mentioning, and his latter days like those of a depraved old man, are, if anything, worse than those of his youth or prime. There is plenty of sunlight, but it is a malicious sun with a sickly smile for human suffering under hot blasts.

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*We would direct especial attention to our Premium,—"*THE FARMER'S FRIEND AND PLANTER'S GUIDE,*" noticed in another part of this paper. The book will be mailed at once to all subscribers commencing with the* MAY *number of the Bulletin—back subscribers may also receive it by sending us in another name. The book is not for sale in Canada.*

*We do not wish for any advertisements unless we ask for them. Our paper is to be kept free from all unseemly wood cuts. We can, at any time, when we have space, get all the "*ADS*" we require—and this by simply asking for them. This hint is required, and we trust it will be accepted by—*WHOM IT MAY CONCERN.

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The WEATHER BULLETIN *is destined to have a range (and possibly yet, a circulation) unequaled by any other paper or journal in North America—embracing as it does both the United States and Canada.*

Leading Prediction.

GENERAL FORECAST OF THE SEASON 1882.

Out of the thirteen long-range and general predictions which I have given forth and caused to be published in the leading newspapers of the day and in my yearly almanacs, between the years 1875 and 1882, only two have been seriously "out" or astray with respect to the summer season. This statement is not an empty assertion, but, on the contrary, one that is capable of proof. For, the verification of these predictions does not lie in my own translation of them, but in each case has been gathered from the telegraph reports of the day, and just as these have appeared in the daily journals in which the predictions were first published. Having said this much on by gone forecasts, I desire now, briefly, to give a brief but comprehensive outline of what, in my humble opinion, are likely to be the most remarkable features of the summer and autumn of the year 1882:

First: A season that will well merit the designation of cool to cold and wet, generally. Not that there will not be terms of summer warmth, and even intense heat for periods, but rather that these last will appear in the retrospectas of but comparative insignificance, or as the exceptions to the general rule.

Second—The season will be marked by not only great precipitation, but by a mugginess of atmosphere, generally, caused by the reeking condition of the earth and the long continuance of clouded sky. This will result in periods of extreme sultriness and heavy weather, during which the thunder and hail storms will occur. In other words the summer will be the reverse of clear and dry.

Third—There is a likelihood of June and August frosts in northern, western and southern sections and a general cold wave may occur toward mid summer.

Fourth—The autumn months will continue moist. September will probably give rains and floods in Western Canada and in Western and Southern sections of the United States. October will be much the same, with early cold and snow falls. November will begin the winter of 1882–83—a winter likely to be memorable on account of its exceptionably heavy snow falls and very cold weather over the whole Northern Hemisphere. That "a cold and wet summer is invariably followed by a cold and stormy winter," is a truth now so well proven and borne out by the testimony of past records that we cannot lightly put it aside; and if we have good and sufficient grounds for predicting the former—as we most assuredly have at this time—it is but right that we should warn the people of the latter in good season.

Fifth and last—The approaching season will probably be the first of a couplet of wet summers, and, as 1882 is, so is 1883 likely to be. But here we must stop for the present.

HENRY G. VENNOR.

Montreal, April 3, 1882.

We maintain that the weather repeats itself so uniformly, month by month, that anyone may judge for himself, three times out of five what is to be the leading characteristics of the month approaching, by simply studying and closly comparing the weather records for his section of country for a past period—say of ten years or so. We could mention the names of a number of individuals who have informed us that with the help of our almanacs, alone, for the past six years they have been enabled to form correct conclusions relative to the weather changes of the respective months of the year.

Alcohol has the advantage of being applicable to a range of temperature below the freezing point of mercury; no degree of cold yet observed in Nature or attained by artificial processes having frozen it.

The Advent of Spring.

When Blue birds sing,
Then is it spring?

Not always.

When is spring really commenced is a question not easily answered some years in our climate. Were our winters of a more decided character, say Manitoban or even Ottawan in their severity, the transition from frost and snow to genial spring would generally be well marked. But what can you do when spring tries to commence in November, and seems to gain a doubtful advantage during half the winter? The stentorian bull frog has been known to add his swampy chorus to the rejoicings of the New Year's season; lizzards in South-Western Ontario have began their whistling in February, pansies have opened in mid-winter, and shrubs in some of our counties have put on their leaves before January was over. In 1880 the American kingfisher, which retreats to the West Indies in autumn, was shot in the Don marshes, and wild ducks swarmed there in January, while caterpillars were crawling about in the city on the 25th February. Yet here the cold waters of the lake retard the burst of spring heat, and vegetation is sometimes two weeks earlier in the island counties to the west, where the struggle between winter and spring is more prolonged than here. In fact half of our springs seem to commence early in March, but rarely really commence then, as winter from time to time re-asserts its reign till April is well advanced. This "lingering of winter in the lap of spring" is a tedious affair, and it is rarely that the latter cares to deck herself till the blustering fellow with his snowy garments has been gone so long that his foot prints have all faded away. Hence, however, genial may have been much of the weather of February and March, the real opening of spring varied not a great deal in the great majority of years, in fact less than most people imagine.

MR. BAIN'S NOTES ON FLOWERING.

Mr. Jas. Bain, of this city, has kept a record intermittently since 1853 of the blossoming of trees and shrubs. The following shows the average date and the variations recorded:—The gooseberry bloosomed May 14 on an average of 8 years, the earliest date being May 8, and the latest May 24 Red and white currants for 8 years averaged May 27, with a range the same as the geoseberry. For 14 years the plum averaged May 19, ranging from May 2 to May 31; and the apple for 13 years averaged May 29, with extremes ranging from May 18 to June 8. Generally the dates of all these differed only a few days from the mean date.

OBSERVATORY NOTES.

The date depends very much, of course, on soil and situation and on the variety of the tree. Toronto Observatory records show an earlier blossoming period than Mr. Bain's notes. In the period 1872–81 the average of the maple for 8 years was May 2, the latest May 9, and the earliest April 7, 1878. The plum for 9 years averaged May 15, and ranged from April 25 to May 24, and the apple for six years averaged May 20, with a range from

May 6 to May 30. Only one note is taken regarding the peach, which blossomed last year on May 12.

APPEARANCE OF INSECTS AND BIRDS.

The first appearance of insects and migratory birds is very unreliable indication of the relative earliness of a season. Some years they come straggling so much that the first arrivals are not noted. One year the blue birds did not seem to come at all. The time of arrival seems to be regulated by other considerations than mere temperature for the earliest arrival of robins or thrushes during these ten years being February 10 in the excessive winter of 1880-81. That date ended the sleighing period in Toronto, but not the winter. Thrice in the ten years the robin arrived in February. The blue bird is a late arrival. This year he came with the robin in February. In 1880 he came on March 3rd, and one year not till April 19. The oriole and humming-bird are more regular, invariably coming in the second or third week in May. The exceptional record for 1878 is however missing. Butterflies are noted as early as March 7 and as late as April 26. Fireflies vary from early in May till late in June.

LATEST FROSTS AND SNOWS.

Of other spring incidents two of the most carefully noted are the latest hoar frosts and the latest snows. Under the latter term a fall of even a few flakes is included. On June 4, 1859, snow fell. In twelve other years out of the last forty the latest was in May, and in three the latest was in the end of March. The latest hoar frost occurred June 20, 1862, and in twelve other years June frosts were recorded, generally in the first week. In one period of 13 successive years the latest hoar frost was in May. May 2nd is the date of the earliest latest frost on record.

Trees, and the maple above all, are one of the most practical tests of the earliness of a season, as warm bursts of weather rarely tempt them into untimely blossoms. A comparison of the blossoming of these trees in different parts of the province would reveal interesting variations in our own spring climate and on our various soils.—*Globe.*

Winnipeg Mud.

Since my arrival here a week ago we have had all sorts of weather, including a cold snap since April set in, when the mercury went down to some fifteen below zero. Just now, however, the temperature is moderate, and the snow and ice are melting in the streets at such a rate that the roadways and crossings are literally afloat with a black, shining fluid that looks not unlike stove-pipe varnish, but which while liquid is vastly more slippery, and when dry sticks much more tenaciously than the above-mentioned preparation. I need hardly add that I refer to Winnipeg mud. The city officials are taking vigorous measures to abate this nuisance, but the rapid rate at which the great masses of snow and ice are melting, and the facility with which this rich prairie soil mixes with the water combine to render almost impossible the task of keeping the streets in anything like passable condition.

CORRESPONDENCE.

Editor Bulletin.

COLUMBIA, Mo., April, 1882.

SIR:—Your predictions have had a remarkable fulfilment in this section of country, and people are begining to realize the fact that there is some "method in your madness."

Respectfully,
COLUMBIA MILLING CO.

Editor Bulletin.

MILWAUKEE, WIS., April, 1882.

SIR:—Your last predictions have helped your reputation very much in the mind of the general public.

Yours truly,
Mang. Editor "THE EVENING WISCONSIN."

COLUMBIA, Mo, April 10, 1882.

Prof. H. G. Vennor.

DEAR SIR:—Not having received the April number of your valuable paper, we have become demoralized—what is the matter? After perspiring under 88° in the shade, last week, we are around borrowing overcoats this morning and "cussing" the man that took the stove down. Please send us the April number so that we may prepare for these changes.

Yours Respectfully.
COLUMBIA MILLING CO.
F. Pannell, Sec.

SYCAMORE, April 6, 1882.

Henry G. Vennor.

DEAR SIR:—I herewith hand you our programme for the celebration to be held in this city on April 26th, 1882. By furnishing us with a nice fair day you will greatly oblige, and should you ever happen this way we will allow you a weeks benefit.

A. J. THOMPSON, C. P.
SYCAMORE, DeKalb Co., Ill.

The Weather and Railways.

OGDEN COLLEGE.

BOWLING GREEN, Ky, April 8, 1882.

Dear Sir:

There can be no doubt, I think, that the total amount of rainfall over the surface of the earth is invariable,—that a temporary excess in one region is accompanied by a compensating deficiency elsewhere. If it were true therefore, that railways and telegraph wires changed in regard to rainfall the climate of desert places, it could be done only at the expense of other localities.

In my humble opinion, there is more plausibility in the theory that railways and telegraph wires, if not increasing the rainfall in certain regions, tend to make the rainfall more uniform throughout the year.

My attention was first called to the question during a residence in the northern prairie regions of Texas from 1873 to 1878. I went to Dallas after the completion to that town of two railways. Previously to that time there were two seasons in that portion of Texas, a wet season and a dry season. The winters and springs were always very wet, and the summers were, as a rule, rainless. This fact was claimed by old Texans and land agents as one of the greatest advantages of that country for wheat raising. I was told that farmers took their time in tieing and threshing their harvested wheat, often letting it lie loose on the ground for weeks. But few vegetables were cultivated then except by irrigation, and as water was generally scarce in the summer, gardens so cultivated were few and far between. As a matter of fact, the old Texan believed it impossible to grow vegetables in that country on account of the dry summer, and so he troubled himself no more about the matter. I dare say, however, the case was not as bad as was supposed, in regard to gardens, and that the wish was father to the thought. Outdoor work in that country in the spring and summer was generally much avoided.

Now, excellent vegetables, and of great variety, are raised in that country—raised there in great profusion. How much this "change of climate" may be due to the influx of new energy, I will not pretend to say, but certain it is, I observed that the summer there was as hot as in many of the older states. The two seasons, during my residence there, the whole crop, although properly shocked, was greatly injured by excess of rain. Old farmers frequently spoke of a "great change in the climate," as regards rainfall.

Cultivation of the soil, it is claimed, exercises some influence on the precipitation of moisture, as well as do forests. The portion of Texas to which I refer is rolling prairie of "black waxy soil," and very fertile. Timber is scarce and is found generally only in the bottoms along the streams. There was, if anything, a decrease in the amount of timber by the increase of population; and the greater average in cultivation was hardly sufficient to account for so great a change as was claimed in the distribution of the rainfall.

Last summer, it is true, Texas suffered severely from one of her old-fashioned dry summers, but it is also true that at the same time a disastrous drought extended for months over a large portion of the United States.

Owing to the large number of railways now under construction within her domain, and the great variety of her soil and physical paturn Texas offers a fair field for thoroughly testing this question.

WM. A. OBENCHAIN.

An Old Letter concerning Philadelphia.

Philadelphia, 10th December, 1831.

The winter has set in here so suddenly that fire-wood has risen in a few days from six to twelve dollars a cord. To-day and yesterday are milder than it has been; the ice in the Deleware is still moving during part of every tide. There never were so many bad colds before in this place as now. It is supposed by some that 50,000 people are confined to the house with them. The banks and public offices find the utmost difficulty to get along from so many of their hands being confined at home. Out of a class of medical students, which consists of 100, only sixteen are attending the lectures; and it is said that the Legislature of New Jersey have adjourned on the same account.

This singular condition of things was attributed to "an unusually sudden and great change of temperature."

Graham Hutchison.

Graham Hutchison was the youngest son of the Rev. John Hutchison, a Presbyterian Minister of Glasgow, Scotland. Like not a few Scotch ministers of real ability, the latter, a merchant meteorologist, he gave himself up almost entirely to minute Biblical criticism of some particular book of the Old Testament. The only part of his studies he gave to the public was "Essays on the Book of Job," too scholarly to be popular and consequently little known now. He had four sons, James, Robert, William and Graham. In a busy mercantile city like Glasgow it is little wonder they all desired to become merchants; shrewd men and after their business education in different counting houses in the city they united and founded the firm of James Hutchison & Co., manufacturers of plain muslins of every grade, doing a very large business with the leading London houses and with them only. The Rogers, Leaf, Moroleys, Pawsons, Bradburys, &c, of 50 years ago, were their constant customers. The leading men of these houses visited Glasgow several times a year and their orders having been firstreceived by G. Hutchison, they liked nothing better than to have a little talk with him on physiology, physiognomy, politics, meteorology, theology, &c. On any of these he was ready and always original and interesting. His London friends often said they did not understand how he could be both the thorough business man and the philosopher too. Mr. H. always took a deep interest in the Commercial and Literary Society of Glasgow, of which with other merchants along with the professors and clergymen of the city he was one of the founders. He was a regular attendant at its meetings and contributed many papers to it. Some of these were published and were full of information and thought. With his brothers and other leaders on political matters in the heart of Scotland he took a quiet yet deep interest in the phase of politics resulting from the accession to the throne of William the Fourth, which finally led to the introduction of the Reform Bill and all that resulted therefrom. His acquaintance with Sir Daniel Keyte Sandford, the accomplished Professor of Greek in Glasgow University, perhaps was the means of inducing the latter to offer himself as one of the candidates for the city of Glasgow, soon after the passing of the Reform Bill. Sir Daniel found, however, that though the electors admired his beautifully classical orations, he had not the skill at the beginning of their popular power to lead them in their aspirations after political liberty. Mr. Hutchison was somewhat disappointed at first but subsequently felt that prudent business men were required just then. All the brothers were highly conservative in their feelings, but all of them and Graham in particular, liked to listen to the often stern and theoretical, but as often unpractical ideas of their own workmen, of whom they had some thousands, who were scattered in the suburbs and country districts around Glasgow. Leaders of the weavers frequently met the firm on the questions of wages and politics, and Mr. Hutchison more than once remarked how closely in theory and impractibility the ideas of the classical Greek Professor and the workmen who knew only the three R's of education, approached to each other.

It was very much at the solicitation of some Glasgow merchants, amongst whom the Hutchison Brothers took a leading part, that Professor Nicoll delivered the course of lectures on astromony, which he afterwards published under the title of the "Architecture of the Heavens," and to this day these lectures are justly popular amongst young and old. The nebular hypothesis was then new and all wished to know about it. About the same time, at one of the meetings of the British Association for the Advancement of Science, before which Mr Hutchison read some papers, he had some correspondence, and interviews with the late Sir David Brewster on the subject of the construction of a monster telescope. Sir David felt satisfied that he could construct one which would bring the moon within a distance which would let us know a great deal more about it than any instrument then in existence. The funds required were large and the results too problematical to induce those who might have been able, to go on with the matter. In 1833 Mr. Hutchison found that his eyesight, from excessive reading and writing by candlelight, was getting impaired. He then employed a young friend as an amanuensis, who often afterwards spoke of the real pleasure he had in his society for four or five evenings every week for some years. During this time he produced a treatise on meteorology, full of information and original and well digested thought on the subject. This was followed by Essays on Unexplained Phenomena, presenting some new and striking views on the laws of caloric, and also on the question of the secondary laws in planetary motion. Mr. Hutchison's theological views were by some counted not sound. He declined being dictated to by some who thought they had a right to dictate to him. About 1834 the Rev. Robert Montgomery visited Glasgow and was invited to preach in St. Mary's Episcopal Church. In the past it was a success, as regarded audiences. The rector and he however, did not get along together very well. A number of gentlemen, however, including Mr. Hutchison, were so much interested in the eloquent young minister that they, with the permission of the Bishop, secured his services, and a neat little chapel was obtained close by the Royal Exchange, in the very centre of business. There for some time were delivered warm-hearted addresses on the most important of all subjects. Mr. Montgomery's audiences were largely made up of young merchants. On entering his new chapel, with reference to a report that some of them were called free thinkers, he told them that they "were men of business and so was he, and whatever the past was, his own business would be that they should should not be either Godless, Christless, careless or prayerless when he was done with them." By the exertions of Mr. Hutchison and others St. Judes Church on Blythwood Hill was afterwards erected, and there he continued to worship for some years, until Mr. Montgomery removed to London.

Mr. Hutchison was really a fine character. His temperament was highly nervous and sensitive, but never hasty to take offense. During many years of intimate intercourse the writer never heard him say a word which anyone would wish unsaid. This tribute, imperfect as it is he offers to his memory. B.

Earthquakes.

Great earthquakes seem to have occurred for some centuries past at intervals of about a hundred years, and groups of several important convulsions at intervals of fifty years. Thus, within the last four hundred years we find that the middle and latter part of the sixteenth century was marked by great and numerous earthquakes in China, Europe and the Atlantic, many of them very severe. In the middle of the seventeenth century there were great an disastrous shocks in the Mediterranean basin; and towards the latter end of it occurred the great Jamaica earthquake, besides many others of importance. Towards the middle of the eighteenth century was the great Lisbon earthquake, and subsequently the great one in Calabria. Hitherto, during the present century, there have been none of very extreme intensity; but they may perhaps be *looked for before long*. There thus appears to have been an interval of about a century between each of the very greatest paroxysms; and a like period may be traced between those of next importance in each century, following the former at an interval of from thirty to forty years. It also appears that, near the time of the great paroxysms, a number of smaller, but still important ones, have been crowded into four or five years; while, near those of second importance, a number also large is thickly spread over ten or twelve years. As the record of the great disturbances is of course more likely to be found in history than that of smaller ones, it seems further worthy of remark that the first, fifth, ninth, twelfth, and eighteenth centuries of the Christian era seem to have been those when the destructive force of earthquakes has exercised the largest influence over the human race in civilized countries; while the first and second A. D., and the third, seventh, tenth, and fourteenth B. C. of our era, were times of comparative repose.

DATES OF ELEVEN OF THE MOST RECENT EARTHQUAKES FELT AT MONTREAL.

1855, Feb. 8th and 19th.
1856, June 1st.
1857, Oct. 16th.
1858, Jan. 15th, May 10th, and June 27th.
1860, Oct. 17th.
1864, April 20th.
1870, March 4th, Oct. 20th.

Eighty-seven earthquakes have been recorded as having been felt in Eastern America. Of these twenty nine, at least, were felt in Canada; that of February 5th, 1663, being by far the most violent. The next in importance was that of April 20, 1864.

Connection of Moon's Phases with Earthquakes.

With regard to the phases of the moon's motions, M. Perrey found that in four years, 1844 to 1847 inclusive, the number of earthquakes near new and full moon, exceeded the number at the quarters very nearly in the proportion of six to five. In a number of exceedingly elaborate calculations, M. Perrey endeavored to show that, however the figures were handled, they always presented the same general conclusion; but there are not as yet sufficient facts to justify more than an allusion to this curious speculation. It does, however appear to be an inevitable deduction from the evidence, not only that earthquakes occur more frequently at the periods of new and full moon, but that their frequency increases at the time when the moon is nearest the earth, and diminishes when it is most distant; and, moreover, that earthquake shocks are more frequent when the moon is near the meridian, than when she is 90° away from it.

Tabulating, next, the various shocks in the months in which they respectively occurred, (regarding each group or succession of small shocks connected together as one earthquake) and afterwards collecting the months with seasons, we find the following to represent the state of the case when all the observations made in the northern hemisphere are arranged so as to show the numbers during the cold and warm seasons respectively. It will be understood that this table includes the whole number of earthquakes recorded, whenever the record gives sufficiently accurate data:—

April	489	
May	438	
June	428	Warm months 2,721
July	415	
August	488	
September	463	
October	516	
November	473	
December	500	Cold months..3,158
January	727	
February	539	
March	503	

Such a calculation might be the result of grouping together a number of cases which, if taken fairly, each in its relation to its own district, might show a different result. We will next, therefore, take M. Perrey's table of the European earthquakes, in his list recorded between A. D. 306 and 1843. Without particularizing the months—which, however, follow nearly, though not quite, in the same order—and taking separately into account the earthquakes of the present century as being the most trustworthy, we have the following result for Europe:—

	To end of 18th Century.	During 19th Century.	Total
Warm months,	394	463	857
Cold months..	525	638	1,153
	919	1,101	2,010

Showing that in the European list, the excess of shocks in the cold months is even larger in proportion, amounting to more than one-seventh of the whole number. In other words, for every three earthquakes that are felt in Europe in warm weather, four are felt in cold. This very remarkable result is fully borne out, though not always precisely in the same proportion, by all the separate lists tabulated for the various districts in which earthquakes have occurred. Thus, out of 217 in the British islands, 94 were in warm and 123 in cold months In the Iberian peninsula, out of 201. the numbers are 87 and 144 respectively; in the Italian, out of 993, there are 455 and 538; and in the French district, out of 667, we have 272 warm and 395 cold. In Levant, indeed, the total number recorded being 436, there, appear 222 in the warm months against only 214 in the cool; but if we take the earthquakes of the present century, which amount to 196 (nearly half the whole number recorded), we find the same excess as in the other districts—the cold months going 103 and the warm only 93. In the doubt that exists as to the real value of the tables before the year 1800, the latter must be regarded as the nearest approach to an average.

In the southern hemisphere, where the climates are, of course, reversed, we find a general indication to the same effect, although the number of observations as yet is too small to have much value.—(Prof. D. T. Ansted.)

What becomes of Wasted Solar Energy.

Dr. Siemens is naturally dissatisfied with the ordinary theory which attributes to the sun a wanton prodigality not to be met with anywhere else in nature within human experience It is commonly stated that the merest fration of the sun's radiant heat is utilized by his attendant planets, all the rest being wasted in space. According to the new theory of Dr. Siemens this is not so. From the sun's equator, he imagines, which revolves at a tremendous rate, radiant heat it is projected far into interplanetary space, where it meets with rarified interstella atmosphere of various gasses, which are decomposed by the heat and sent back in the shape of a counter current to the poles of the sun. On this hypothesis there is no waste of solar energy, and no danger of the diminution and final extinction of the sun's light and heat. Moreover Dr. Siemens maintains his hypothesis explains that mysterious appearance, the zodiacal light, as well as those puzzling bodies the comets. This is a very meagre sketch of the new and startling solar theory by one who has had all his life to deal with enormous degrees of heat, and whose eminent position as a practical man of science will command attention. Should Dr. Siemen's hypothesis be itself erroneous, it will at all events set investigation working in a new direction, and may thus lead to substantial gains to science.

he Winds and their Law.

Whether considered as the indices or as the causes of coming changes of weather, no phenomenon is more important than that of the winds. Upon the direction and force of the winds some meteorologist lay very great stress in every attempt ot storm fore-casting.

The resulting movement of the air, modified by the forces of inertia and friction, and by the rotation of the earth and local obstructions, is converted into the *local* winds whose directions are indicated by the arrows upon the maps, and whose velocities are given in miles per hour. These winds may be called local winds, as distinguished from the general winds in any section, and from the great currents of air to be hereafter spoken of; the general winds appear to be primarily dependent upon the existence and position of the areas of low and high pressure; the great currents, spreading, as they do, over whole continents and encircling the earth, are largely influenced by, if not entirely dependent upon, the earth's axial rotation.

If the earth were not in rotation on its axis, the winds would uniformly blow in straight lines outward from the centre of every area of high barometer toward the surrounding localities of lower barometer. Observation, however, has long since clearly shown that in this hemisphere, within any area of high pressure, the winds will be found to be not only blowing away from the centre (outward), but also to be deflected toward the right hand as they move forward. Observation has also shown, with equal clearness, that in this hemisphere, within any area of low pressure, the winds will blow toward the centre (inward), and will also be deflected toward the right hand as they move forward. This deflection to the right has been demonstrated by Mr. Wm. Ferrel, of Cambridge, Mass., to be a mathematical necessity from the influence of the earth's diurnal rotation, which causes everything moving on its surface to deflect slightly to the right in the northern hemisphere. This force, by which, to a popular illustration, a railroad train is made to bear more heavily on the right-hand rail of the track along which it advances, is the key to the explanation of many phenomena in connection with atmospheric and ocean currents. By considering the influence of this deflection it becomes possible to construct the following table, which shows which winds will generally prevail on each side of areas of high and low pressure:—

The observer being	THE PREVAILING WINDS WILL BE	
	Low Pressure.	High Pressure.
On the N. side...	N. and E.....	S. and W.
On the N. W. side	N.W. and N. E	S. E. and S. W.
On the W. side...	W. and N	E. and S.
On the S. W. side	S. W. and N. W.	N. E. and S. E.
On the S. side ...	S. and W.....	N. and E.
On the S. E. side.	S. E. and S. W..	N. W. and N. E.
On the E. side ...	E. and S.	W. and N.
On the N. E. side	N. E. and S. E..	S. W. and N. W.

Vertical as well as horizontal systems of winds, depending upon the disturbances of equilibrium continually taking place in the region of the clouds, always exist in conection with the ordinary horizontal gales; these are, in fact, a most prominent feature of tornadoes and water spouts.

The force of a local wind at any point, and at any moment, certainly depends primarily upon the relative barometic pressure at points in the vicinity, and upon the rapidity with which the pressure has been or at that moment is changing, but the force and direction of the wind at any station are also very materially influenced by the character of the ground in the immediate and distant neighborhood. The wind which on the ocean would blow with a certain velocity, will have but one-half or one-third of that velocity when blowing over hilly country. This is due to the lesser friction on the ocean, and this frictional resistance in two different ways disturbs the direction of the wind:

1. If, for example, there is a north wind blowing very generally over a lake of elliptical shape, such as Lake Michigan, and over the neighboring country, then on the central line of the lake a strong north wind will be experienced, and a feebler one at the points on land far removed from the shore; but at points on the north-west and south-east shores of the lake a north west wind will be experienced, while a north-east wind will be observed on the north-east and south-west shores. Similarly, if a south wind blows steadily over the Southern States and coast, it will, to observers on the coast, appear as a south-west wind, and a north wind will be changed into a north-east wind; and this, too, independently of the additional influence exerted by the

earth's rotation, which should in this present example increase the extent of those changes in accordance with the law above given, at first deduced in all its generality by Ferril.

2. The friction of the earth's surface has a greater influence upon strong than upon feeble winds, and thus does more to retard the tangential than the centripetal motion of the air in the neighborhood of an area of low pressure. Consequently, in severe storms on land the wind is found to be directed more nearly toward the central area of the disturbance than in oceanic storms. Thus in tornadoes the inward and upward motions predominate over the tangential.

Precisely as the velocity over water is greater than over land, so is the velocity far above the earth's surface greater than lower down. Balloon voyages show occasional velocities of one hundred miles per hour. The severest gales on the earth's surface rarely exceed eighty-five miles, though doubtless this has been exceeded in certain tornados and momentary gusts, etc. The currents only a few hundred feet above the earth have frequently twice the velocity of those observed on the surface, as shown by observations of the velocity of passing cloud shadows.

The destructive power of a wind, or its power to overthrow or move any body, is the difference in the pressure on opposite sides of the body. In steady winds this difference depends not only upon the velocity of the wind, but equally on the shape of the resisting body. Those bodies offer least resistance in which (as in fishes, the hulls of ships, bridge piers, etc.) the hinder portion receives the backward pressure of the fluid that presses up against it, thus permitting as little approach to a vacuum as possible. In the case of sudden gusts the resisting body receives the whole force of the impulse precisely as a blow. The atmosphere, though so light, is not devoid of mass and inertia. Air in motion at the rate of one hundred miles per hour strikes obstacles with a force equal to that which the same volume of water would exert if moving at the rate of three and one half miles hourly.

The Temperature.

The thermometric changes over all parts of the earth's surface are mainly dependent upon the apparent annual and daily motions of the sun and the grand atmospheric currents.

As fluids and gasses are both bad conductors of heat, the distribution of heat in the atmosphere is effected most largely by the winds or by convection, just as in the ocean it is effected by means of the grand aqueous currents.

Aqueous vapor visibly suspended in the air, as haze or cloud, serves as an effectual and double shield against the radiation of heat from the earth, and also against the sun's rays themselves. Even the invisible particles of vapor floating in the atmosphere, however rare, present an obstruction to the free passage of heat of low intensity, or obscure heat much in the same way as haze and smoke obstruct the light, or as stones in the bed of a water-course retard the flow of that fluid. On the most Alpine situations, where, on account of their loftiness, much less aqueous vapor is interposed between them and the cold stellar regions, radiation is less impeded, and, consequently, when exposed to the direct rays of a serene midday sun the heat is intolerable, while at night the unimpeded radiation produces a corresponding extreme of cold. The temperature observed is the difference between the heat given out and that received in a definite interval of time.

The temperature of the lower air depends primarily, indeed, upon the amount of heat poured down upon the earth by the sun, and the amount absorbed by the air, as the earth radiates its heat back into space; but, in addition to this, the heat held latent in the vapor diffused through the air is at times liberated by the condensation of the vapor into fog, rain or snow, and then it becomes sensible to the thermometer. During the day a moist atmosphere will become warmer than one that is dry, and during the night the radiation of heat through a moist atmosphere will be less than that through a dry one. During cloudy or hazy weather the radiation is almost wholly cut off, so that a very uniform temperature prevails between the earth and the bottom of the lowest layer of clouds. On the other hand, sufficient heat is absorbed (*i.e.* becomes latent) in the process of evaporation to materially reduce the temperature of the air; thus it is that drying winds are also "cooling." An increase of barometric pressure, by increasing the capacity of the air for moisture, serves to stimulate evaporation and temporarily reduce the temperature. A diminution of pressure and consequent expansion of confined air produces a lower temperature and diminished capacity or moisture, until the condensing vapor gives forth its latent heat.

Examination of the weather-charts will show that the temperature varies much less over cloudy than over clear districts; that it varies less in low than in elevated regions; that it is warmer on one side of an area of low or high pressure than the other, and generally *warmer in advance of any storm-centre and colder in the rear.*

The Moisture (RELATIVE HUMIDITY).

In all localities of the globe, and at all times, moisture, in greater or smaller quantities, exists in the atmosphere, which is, consequently, never absolutely dry. Intervals or interstices occur between the particles of the dry air, which are partially filled with this ever-present aqueous vapor. The more numerous such intervals are, the greater is the *capacity* of the air for moisture; and when these intervals are so full of vapor that the air is incapable of containing or holding any more it is said to be *saturated.*

An increase of heat increases the capacity of the air for moisture; while, on the contrary, a fall of temperature is the occasion of a corresponding diminution of the capacity for vaporous matter.

The important element of moisture is given in the Signal Service Bulletins, not in the absolute quantity in which it is found at any given place, but as a percentage of full saturation, or what, in the language of meteorologists, is expressed by the term *Relative Humidity.* This must not be confounded with absolute humidity, which is a very different thing. For, supposing the temperature of the air at a given place to be 40° and fully saturated with aqueous vapor, and then to be suddenly raised to 50° without any addition being made to its store of vapor, its absolute humidity would in each case be exactly the same, but in the former case the weather would, in popular language, be very damp, and in the latter case, very dry. In the former case the relative humidity (or *humidity*, as it is so often simply called) would be very high—*i. e.*, 100 per cent.; in the latter very low—*i. e.*, 50 per cent.

Watery vapor dissolves in air very much as salt dissolves in water, and as the salt is deposited in cystals whenever the water becomes fully saturated with vapor, the latter is deposited on the earth in the form of mist, dew, and rain if the temperature be high, or as frost, hail, or snow-crystals if the temperature be low.

One cubic foot of air, having a temperature of 50°, and under a uniform barometric pressure of 30.00 inches, and *fully saturated,* will hold 4.28 grains of water according to Glashier's tables. If, under these conditions, the temperature or pressure of the air is lowered, there will result a deposition of a portion of the water, and that either in the form of a fog, dew, rain, frost, or snow and hail. On the other hand, if there be an increase in the temperature or the pressure, the air becomes capable of holding a larger quantity of vapor, and ceases to be fully saturated. Relative humidity expresses the proportion of vapor actually contained in the air compared with what the air could contain.

Certain winds will be found to be moister than others. The west and north-west are generally the driest in the Mississippi Valley. Dry air almost always predominates on the leeward side of mountain-chains, and is the characteristic of the plains and plateaus west of the Mississippi Valley. Dampness or a large increase of relative humidity accompanies threatening weather as an almost invariable premonition. Ascending currents of air also increase in dampness; descending currents grow drier.

The smoky haze which spreads to a great distance when extensive forest fires prevail is composed of minute atoms of charcoal, which possess the singular property of attracting moisture to themselves, and thus perpetuating dry weather.

The Clouds and their Indications.

By entering graphically on the map the general features of the weather and sky, we complete the detailed representation of the atmospheric condition. The clouds by their kinds and changes are indices to the relative temperature, moisture, and pressure existing at high altitudes; by their motions they indicate the nature of the prevailing current of air, showing whether it is from the tropics, and

hence likely to be warm, or from the polar regions, and cool.

The ascent of expanding warm air gives rise to the *cumulus* clouds, whose flat bases are all on a pretty uniform level. These subside and dissolve when they cease to be fed by rising currents of moist air; the thickness of the cumuli from base to peak is less in cold dry weather than on moist days. The *cirrus* clouds are probably formed independently by the radiation of heat outward into the highest regions of the atmosphere, in which case they are composed of snow-flakes or of spiculæ of ice; and they are also formed of the remnants of the storm-clouds, in which case they are generally composed of warmer vapor. The strong winds that attend areas of low barometer give rise, through the influence of friction, etc., as before stated, to ascend strata of moist air, in which, by expansion or cooling, as the case may be, are produced the *scud* and rain-cloud, of which there is a fine example in the easterly rains of the Atlantic coast. This scud-cloud, which is at first like a cumulus of irregular shape, subsequently spreads into broad sheets of *stratus* and *nimbus*.

Two or more layers of clouds almost invariably coexist wherever extended rain storms prevail, the upper layer stretching far in advance of the lower, but descending and merging into the lower over the area on which rain is falling most abundant. In the rear of this area cumus clouds are abundant. A general survey of the map will show that cumuli or the cirri first mentioned in the preceding sentence are not inconsistent with fair and clear weather, as these terms are popularly used. An increased accumulation of large cumus clouds may become cloudy weather, but does not generally presage the extended storms of winter. The cirrus of the second class, sometimes called cirro-stratus, almost always precedes at some distance any extensive rain storm, whether of winter or summer. The stratus will generally be found to be reported in connection with threatening weather at the different stations.

Storms and Cyclones.

Whether of snow, rain, or wind, whether of greater or less violence, storms and cyclones have much similarity in their general features and behavior. Strong contrasts of temperature and of pressure, in contiguous currents of warm and cold air, mark the progress and also the origin of a storm. The Gulf Stream and the adjacent areas of colder water, the land bordering on oceans or lakes, whether frozen or open, mountains and plains and river valleys, are examples of regions over which moist and dry or warm and cold strata come in contact. But even more important, though imperfectly understood, are the sudden changes that take place overhead, which are apparently due to the elevation of moisture into the higher regions of the atmosphere. The storms that visit the United States may be described as of four types, as follows:

1st. The West India cyclones, originating in the southern regions of the zone of easterly trade winds, and generally east of the Windward Islands, possibly even in the Meteorological Torrid Zone, or equatorial belt of calms and rains. A very low pressure and large humidity mark their central region. Toward this the winds blow from all points, and, deflecting to the right, pursue their spiral course inward and upward; at least, this is the only satisfactory explanation that has yet been offered for the various phenomena. The moisture brought by this wind condenses as the pressure is reduced, and clouds are formed, with heavy rain.

Around the centre of a cyclone an upward current is supposed to exist, and high above are found the cirrus clouds, which stream far away in advance on the upper currents of air. These storms are carried to the north and west until they pass into the Meteorological Temperate Zone, where the prevailing south and west winds control their motions. This generally happens on or opposite the South Atlantic coast, and as the storms then pursue a course nearly parallel with the Gulf Stream, with its attendant band of warm, moist air, they produce heavy easterly gales along our Atlantic coast, and finally are lost in the Northern Atlantic, but occasionally, doubtless, reach Iceland and the coast of Great Britain.

2nd. The autumn, winter, and spring rains, which generally first announce themselves on the south west or western plains of this country, may be regarded as disturbances originating on the northern confines of the Tropical Zone and on the Pacific slope (as distinct from those of the preceding class that originate in the West Indies).

From the area of high pressure on the Pacific coast of Central and North America a volume of moist air is forced up over the Sierra Nevadas and Rocky Mountains; its moisture is deposited, and a wave of rarified but probably dry air is started on its north east or eastern course. No sooner does this arrive, as a wave of low barometer, over the comparatively moist air of the Mississippi Valley, than, by relieving the surface stratum of its pressure, there at once begins the condensation of its moisture, which process, if the air is not too dry, goes on rapidly increasing.

Local currents arising in this surface stratum of air feed the central area of condensasion, which soon becomes hazy and then cloudy, till rain begins. While the general progress of the storm-centre will be North-eastward, yet it is evident that wherever the moistest air exists, there the condensation will take place the most rapidly, there the barometer will also fall the most rapidly, and thither the storm will be strongest drawn. Such storms, naturally, therefore, move very rapidly up toward the lakes, and hang tenaciously over them, and move slowly away from them. In winter their course is eastward, in early autumn north-eastward.

The temperature of the upper regions must decide whether rain or snow will attend these storms. Their advance is almost invariably heralded by an increase of temperature, due apparently to latent heat evolved by the condensation going on in the circumjacent and superior air and radiated downward to the earth, and to the increased facility with which the saturated air on the surface absorbs the heat radiated by the earth.

3rd. Well-defined, though generally weak disturbances, have been observed to pass from the north to the south, or the north-west to the south-east, but these are probably rare in the United States, and probably occur only in midwinter, when the north east winds and high pressure in British America are exceptionally strong. Continuous snow, succeeded by cold, dry weather, characterize these storms; and such a one, on one occasion, after striking the coast of Alabama and turning eastward, ascended the Gulf Stream to the north-eastward, thus coursing around the area of high pressure that had then been pushed southward over the lake region.

4th. The storms which are generally confined within the United States are the northers, tornadoes and thunder-storms. The latter are generally spread over a very narrow space, so that they may at times pass between the stations from which our reports are received. These storms evidently originate in the lower cloud stratum in local, but intense differences of temperature, moisture, and pressure, and are believed in general to prevail only on the western side or in the rear of areas of high pressure. The gyratory movements of these small storms depend upon local currents and resistances, rather than on the earth's rotation; they *may*, therefore, gyrate either toward the right or the left. In these storms the cumulus clouds are particularly remarkable for their height, and the cirrus clouds for their small extent. The presence of a surface area of dry air is sometimes sufficient to dissipate these storms, or to cause them to retire into the cloud regions. Similar storms form over mountain-tops, and are experienced by balloon voyagers when the air is quite undisturbed below. Several such smaller storms frequently simultaneously coexist, pursuing parallel paths circulating with the general winds about the continental areas of low barometer, and the area of local storms thus corresponds very nearly to what would be an area of general rain were the temperature lower over the region. The lightning which accompanies these storms is the effect of the concentration upon large drops of water of the electricity previously distributed throughout the invisible vapor; it is considered as a *result*, not a cause, of storms.

5th. It has been noticed that there is a tendency in the spring and summer toward an accumulation of barometric pressure over the middle and eastern Atlantic States. When this area of high barometer moves eastward, the easterly winds on its south side, driving on to the coast from Maryland to Massachusetts, produce clouds, and occasionally severe storms of small extent, which are driven north and westward until broken up among the Appalachian Mountains.

In general, areas of high barometer prepare the way for the succeeding low pressure and high winds, and have been not inaptly termed *storm-breeders*.

"The Cyclone" and "The Tornado."

The difference between a cyclone and a tornado is defined by Mr. William Ferris, of the United States Coast Survey, to be this: A cyclone is usually a broad, flat, gyrating disc of atmosphere, very much greater in width than in altitude; a tornado is a column of gyrating air, the altitude of which is several times greater than its diameter. Cyclones are born of conditions extending over large areas; tornadoes depend rather upon the vertical relations of the atmosphere, and occur when, owing to local changes of temperature, the under strata of air burst up through the overlying strata. The enormous velocities of the ascending current of tornadoes are supposed to be caused by the difference between the gyrating velocities above and those on the surface. It is these ascending currents which carry up the vast bodies of water afterward precipitated in the form of a deluge of rain. The water is sometimes kept from falling by the ascending currents, and is often projected outside the area of the tornado, when it falls in a gentle shower over a large area. When the weight of the water overbears the force of the ascending currents, there occurs the tremendous fall of rain known as a cloud-burst. When the area of a tornado is very small, a land-spout or a water-spout may be formed, according as it is over land or water. The width of these spouts ranges between two feet and and two hundred, and their height from thirty to fifteen hundred feet. A white squall is an invisible spout, formed when the dew-point is low. The accompanying cloud is invisible because of its height, but below there is a raging and boiling sea, with the gyrating current of air above it. Land spouts and water spouts are hollow.

A CYCLONE—In examining cyclones phenomena occasionally present themselves which strongly suggest the idea that they include within their circuit, as an independent meteor, the whirlwind or the tornado, the phenomena in question being most frequently met with in those cyclones which present, in close contuity, masses of air differing very widely from each other in temperature or humidity. Of such cyclones the great storm of October 14 last appears to be one. On that occasion the changes of temperature and humidity were sharp and sudden, particularly from the Grampians to the Chevoits, the great fall occuring when the wind changed to northward. Off the Berkwickshire coast the darkness accompanying the changes of wind, temperature, and humidity was denser and more threatening than elsewhere, and almost simultaneously with the approach of these changes, a hurricane, or rather tornado, broke out with a devouring energy which bore everything before it. The tornado character of the storm off Evemouth is shown by the accounts of some of the survivors, who describe the wind as blowing straight down from the sky with an impetuosity so vehement and overmastering that the sea for some extent was beaten down flat into a stretch of seething foam, in which many boats sank as if driven down beneath the foam by the wind, while outside this tract the waves seemed to be driven up to a height absolutely appalling, which in their turn engulfed many of the boats yet remaining. Similar seas, with level wastes of seething foam, bounded immediately by waves of a height and threatening aspect never before witnessed, were encountered by several well-appointed steamers out in the middle of the North Sea during this storm, thus confirming the observations of the Eyemouth fishermen. These facts seem to point to one or perhaps more tornadoes of no inconsiderable dimensions, with slanting columns, the terrific force of the gyrations of whose lower extremities played no inconspicuous part in the devastation wrought during the continuance of this memorable storm.—*Nature*

In the Far North.

The ice region of the North is full of marvellous grandeur and mystery. It is not only mysterious in itself, but likewise in much of its history. Known to us only as associated with everything barren, frigid and forbidding, it yet possesses charms and even beauties that are especially its own. For nearly the whole year its frozen waters and frozen land present phenomena startling almost beyond imagination. Turn your eyes whither you will, in a space of 1,500 miles diameter around the geographical Pole, immense masses and fields of ice only are seen in every conceivable form, whether in the partly hidden land, or the all but completely covered sea. On the one hand may be towering mountains of rock, soaring high in majestic grandeur and encircled or divided from each other by mighty glaciers and fields of ice; on the other, there may be presented a seemingly limitless level of solid, varying from eight to fourteen feet in thickness, and in parts thrown up into enormous ridges, sometimes forty feet high, and of irregular lengths, with huge ice islands called bergs, scattered about upon its surface.

If it be the open season of summer, these bergs may be seen floating about in stately splendor, or occasionally when caught in currents or eddies, tearing along with ominous violence. If there has been a storm and the ocean has burst through and broken up the ice, the scene presented is a very wild one, and the utmost dexterity is required on the part of the mariner to avert danger from the masses dashing against the vessel's side. If it be calm or moderate weather, the picture Nature puts before the eye are marvellous. If the sky is clear, thousands of fairy-like castles or crystal cities thrown into ruins, appear to view. Reflected images of all imaginable shapes dance before you. In the air may be seen, inverted, some distant objects which in reality is far below the line of ordinary vision. Sometimes the sun does not look round, but oval; or perhaps there may appear to be four suns, or at night four moons, lighting up the ice-bergs. In winter also, the whole of one part of the heavens is often illuminated by the splendid *coruscations* of the AURORA BOREALIS In summer, according to the latitude, there is no sun-sets for weeks; and during winter there is total darkness for a like period. The cold is intense, except occasionally. Even in autumn thick ice will sometimes form in one night; and in winter or spring the register is generally from 30° to 60° below zero. Still if proper precautions be taken, even this extreme temperature is bearable.

Now, it is through such a region as this that explorers have to make their way. How they do it is a story often told, yet always interesting. In the first place these ships are more ordinarily strengthened to encounter ice; yet very often no common skill or human power is of any avail, and constant watchfulness of ice movements is needed. In summer the ice breaks away from the coast of Greenland, and not unfrequently leaves a narrow, tortuous passage round what is called Melville Bay. It is, however, exceedingly dangerous. and ships are often detained here a long while.

If the explorer has succeeded in passing Melville Bay, then Lancaster Sound or Smith Sound is entered. Seldom is this done till near the close of summer; consequently it is necessary to find some safe harbour in which to winter. Some ships have had no such shelter, and have drifted about—as did the two American vessels in 1850-51—all through the dark and bitter season. But supposing a winter harbour is found, then the ships are housed or covered in, and the crews properly attended to. What is next done in the way of wisely maintaining health by proper amusements, education and exercise, would take too long to tell. Enough to say that, except on the occasion of the last official Polar expedition, very little mortality has occurred. Indeed, health in the Arctic regions is more to be depended on than in tropical climes. During winter all hands are employed in making preparations for spring travelling. Then, when March arrives, sledges are packed, officers and men appointed, and away these explorers go, over ice and snow, along barren shores into unknown wastes, hundreds and hundreds of miles without the slightest hesitation. Strange, too, how accurately they mark their way, and even prearrange when separate parties shall again meet in certain localities at first only fixed by geographical science and assumed configuration of land.—CHAMBERS.

Judge Ilatchford and his Almanacs.

The judge is known to all second-hand book stall keepers and junk dealers in New York, not as the richest and most industrious judge on any bench, but as the man who collects old almanacs. This whimsical pursuit is almost a mania with Judge Blatchford. From the stateliest nautical almanac down to the humblest patent medicine annual, nothing with the signs of the zodiac and the phazes of the moon is foreign to his tastes. When he was practicing at the bar he was largely concerned with admiralty cases, and a series of almanacs is part of the library equipment of every admiralty lawyer. This was the origin of his specialty. He has now on hand the largest and most varied lot of old almanacs in the country, if not in the world. I should not call it a very

interesting collection; to him it is amazingly interesting. He has ransacked Nassau and Ann streets for years with such industry that it is a rare thing now for him to find an almanac or calendar not already in his collection. Several summers ago Judge Blatchford went to Europe, for a few weeks' vacation. On his return, when he landed at the North river pier, he staggered under the weight of a mysterious looking cubical package or bale, carefully strapped. He would allow nobody to touch it. It might have contained $100,000 worth of lace or jewelry. The custom house inspector looked over the rest of his baggage and then approached the big bundle. "What have you got there, sir?" he said. Judge Blatchford faintly blushed, as is his habit when embarrassed, and stammered, "Oh, nothing but a lot of—er—publications." "But publications are dutiable," suggested the officer. "Not when published more than twenty years" returned the judge promptly, "and these are all older than that." But he gave no sign of any intention to open the package for examination. "All right, judge," said the inspector, who knew perfectly well with whom he was speaking;" I guess we wont look into the bundle." And he put his chalk mark on the bale, at the same time winking at a brother officer, as much as to say, "There are some passengers into whose little transgressions it is best not to look too zealously." The judge trotted off with his precious burden, greatly relieved in mind. The bundle was innocent enough, containing as it did nothing but almanacs of the eighteenth century, the spoils of Oxford street, the Quais Malaquais and Voltaire, and the dusty shops of Leipsics, Stuttgart and Geneva.

Star Gazing from a Volcano.

The astronomical observatory on Mount Ætna has been finished. It stands at an elevation of nearly 100,000 feet above the sea This is the highest spot in the world occupied by an observatory. Astronomers will watch with great interest the result of the experiment. To plant an observatory near the crest of an enormous volcano would seem at first blush to be a foolish undertaking. Perfect steadiness and freedom from any tremulous motion whatever are among the prime requisites of an astrominal observatory. But Ætna is frequently shaken by the mighty forces pent up within, or under the mountain. Besides, there is great danger, in case of an eruption of the volcano, that any structure erected upon it may be overwhelmed. The builders of the observatory were mindful of this in selecting the site. They chose a little eminence on the side of the central crater, which they think, in case of an eruption, would divide any stream of lava flowing in that direction into two branches, leaving the observatory standing unharmed between rivers of fire. All the inconveniences and disadvantages, not to say perils, of the site are regarded as offset by the advantage to be derived from its great height, which will place the astronomers above the densest and most troublesome portion of the atmosphere. Everybody who has used a telescope knows how great such an advantage must be. Owing to haze and air currents there are surprisingly few nights in the course of a year during which sharp and steady vision is possible with high telescopic power. At the height of the Ætna observatory the use of such powers must be much easier.

The observatory has been erected at the expense of the city of Cantania, whose citizens evidently take a broad view of its usefulness, and show no desire to make it a purely local enterprise, or to restrict its use by foreigners. In fact, foreign men of science are especially invited to visit the observatory and make use of it as much as they like. Three bedrooms, a dining-room and a kitchen have been provided for their use, and the telescope of the observatory is furnished with a tube, the length and aperture of which can be changed to suit the instruments that foreign observers may bring with them. This spirit on the part of the builders, and the great advantages that the spot presents as an observing station, give promise of excellent results, and it may reasonably be hoped that from their high perch upon this ancient volcano scientific men will succeed in widening our knowledge of the worlds and sun around us.

The observatory is also furnished with instruments for the observation of atmospherical and terrestrial phenomena.

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We wish to hear from Weather Observers in every section of the country, relative to weather phenomena which may occur during the summer months, particularly respecting frosts in southern and western sections, hailstones, cyclones, &c. Such information helps us much in the formation of our predictions, and thus eventually benefits all who write to us. The "Bulletin" is rapidly running over the whole northern Hemisphere and is already probably read by more people than any other paper printed on the Continent.

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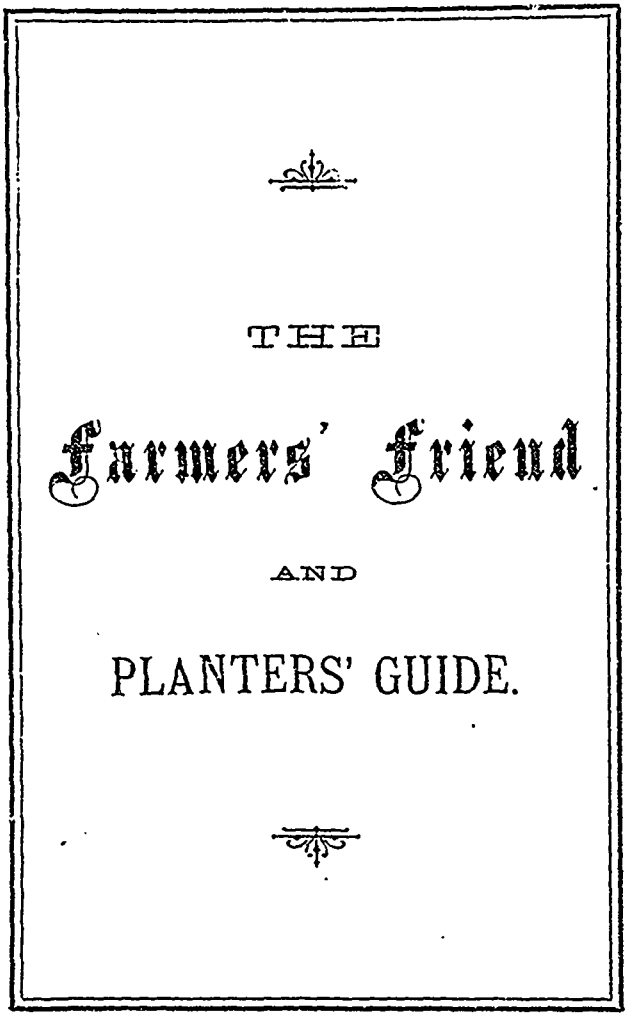

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