

EXTRA!

FROM THE OLD FARMER'S ALMANAC

GOOD EATS, GOOD COOKS

WHEN THE PRESIDENT DISAPPEARED FOR 6 DAYS

FRESH BLUEBERRY RECIPES

HOW TO GET AHEAD OF YOUR CABBAGE



JULY 2019

FEATURES

GARDENING

How to Get Ahead of Your Cabbage

FOOD

Fresh Blueberry Recipes

LIVING NATURALLY

Good Eats, Good Cooks

HISTORY

When the President Disappeared for 6 Days



WEATHER FORECASTS

How We Make Our Predictions

July U.S. and Canadian Weather Forecasts

Weather Update

DEPARTMENTS

CALENDAR

July Holidays, Fun Facts, and More

ASTROLOGY

Best Days to Do Things

Gardening by the Moon's Sign

ASTRONOMY

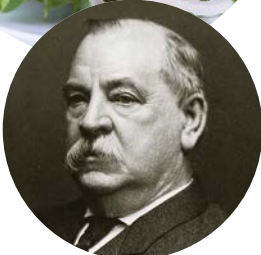
Sky Map for July

WIT

Humor Me
Grins and groans from the Almanac

WHAT'S NEXT

See what we have in store for our August issue!



FOLLOW US:



JULY

Holidays, Fun Facts, and More

HOLIDAY HAPPENINGS

July 1: Canada Day

July 4:

Independence Day

July 27: National Day of the Cowboy

WACKY TIMES

July: National Watermelon Month

July 3–Aug. 11: Dog Days

July 7–13: National Farriers Week

July 20–28: National Moth Week

July 8: International Town Criers Day

July 17: World Emoji Day

July 22: Spooner's Day

July 27: Take Your Houseplants for a Walk Day

ABOUT THIS MONTH

This month was named to honor Roman dictator Julius Caesar (100 B.C.–44 B.C.). In 46 B.C., with the help of Sosigenes, he developed the Julian calendar.

Birthstone: Ruby



Birth Month Flowers: Larkspur and Water Lily





EYE ON THE SKY

MOON PHASES

New Moon: July 2,
at 3:16 P.M. EDT

First Quarter: July 9,
at 6:55 A.M. EDT

Full Buck Moon: July 16,
at 5:38 P.M. EDT

Last Quarter: July 24,
at 9:18 P.M. EDT

New Moon: July 31,
at 11:12 P.M. EDT

SPECIAL EVENT

July 4:

Earth is at aphelion (point in a planet's orbit that is farthest from the Sun), when it will be 94,513,221 miles from the Sun.



TAP FOR MORE ABOUT **MOON PHASES**



TAP FOR MORE ABOUT **JULY'S FULL MOON**

RHYME TIME

*A rustle of
corn-leaves;
a tinkle*

*Of bells on the
hills; a twinkle*

*Of sheep in
the lowlands;
a bevy*

*Of bees where
the clover is
heavy;*

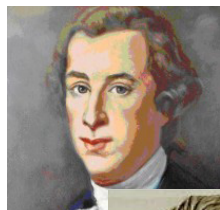
*A butterfly
blundering
by—*

*And that is
July!*

—James Newton
Matthews,
American poet
(1852–1910)



Answer: D, born Nov. 23, 1749. (A, born July 28, 1746; B, born Aug. 5, 1749; C, born Dec. 24, 1745.)



A.

B.



C.



D.



JULY'S QUIZ

In honor of U.S. Independence Day (July 4), who was the youngest delegate to sign the Declaration of Independence?

- A. Thomas Heyward, Jr.
- B. Thomas Lynch, Jr.
- C. Benjamin Rush
- D. Edward Rutledge



BEST DAYS TO DO THINGS

These July dates, deemed to be propitious in astrology, are based on the astrological passage of the Moon. However, consider all indicators before making any major decisions. —*Celeste Longacre*

OUTDOORS

- Begin logging: 15, 16
- Go camping: 12–14
- Go fishing: 2–16, 31
- Set posts or pour concrete: 15, 16

PERSONAL

- Advertise to sell: 10, 11
- Ask for a loan: 23–25
- Begin diet to lose weight: 21, 26
- Begin diet to gain weight: 7, 11
- Buy a home: 10, 11
- Color hair: 25, 26



Cut hair to discourage growth: 20, 21
Cut hair to encourage growth: 8, 9
Get married: 8, 9
Have dental care: 6, 7
Move (house/household): 1, 27, 28
Perm hair: 17–19
Quit smoking: 21, 26
Straighten hair: 12–14
Travel for pleasure: 4, 5
Wean children: 21, 26

AROUND THE HOUSE

Bake: 2, 3, 29, 30
Brew: 10, 11
Can, pickle, or make sauerkraut: 20, 21
Demolish: 10, 11
Dry fruit/vegetables/meat: 22–24
End projects: 1
Lay shingles: 4, 5
Make jams/jellies: 20, 21
Paint: 25, 26
Start projects: 3
Wash floors: 20, 21
Wash windows: 22–24

IN THE GARDEN

Destroy pests and weeds: 22–24
Graft or pollinate: 2, 3, 29, 30
Harvest aboveground crops: 6, 7
Harvest belowground crops: 25, 26
Mow to decrease growth: 22, 23
Mow to increase growth: 10, 11
Pick fruit: 6, 7
Plant aboveground crops: 10, 11
Plant belowground crops: 20, 21
Prune to discourage growth: 22–24
Prune to encourage growth: 4, 5

ON THE FARM

Breed animals: 10, 11
Castrate animals: 17–19
Cut hay: 22–24
Purchase animals: 2, 3, 29, 30
Set eggs: 16–18
Slaughter livestock: 10, 11
Wean animals: 21, 26



GARDENING BY THE MOON'S SIGN

Use the July dates shown in the Moon's Astrological Place calendar below to find the best days for the following garden tasks:

PLANT, TRANSPLANT, AND GRAFT: Cancer, Scorpio, Pisces, or Taurus

HARVEST: Aries, Leo, Sagittarius, Gemini, or Aquarius

BUILD/FIX FENCES OR GARDEN BEDS: Capricorn

CONTROL INSECT PESTS, PLOW, AND WEED: Aries, Gemini, Leo, Sagittarius, or Aquarius

PRUNE: Aries, Leo, or Sagittarius. During a waxing Moon, pruning encourages growth; during a waning Moon, it discourages growth.

THE MOON'S ASTROLOGICAL PLACE IN JULY

1 Gemini	9 Libra	17 Aquarius	25 Taurus
2 Cancer	10 Scorpio	18 Aquarius	26 Taurus
3 Cancer	11 Scorpio	19 Aquarius	27 Gemini
4 Leo	12 Sagittarius	20 Pisces	28 Gemini
5 Leo	13 Sagittarius	21 Pisces	29 Cancer
6 Virgo	14 Sagittarius	22 Aries	30 Cancer
7 Virgo	15 Capricorn	23 Aries	31 Leo
8 Libra	16 Capricorn	24 Aries	



TAP FOR
MERCURY IN
RETROGRADE
DATES



APP EXTRA!
TAP FOR
JULY MOON
PHASES

MERCURY IN RETROGRADE

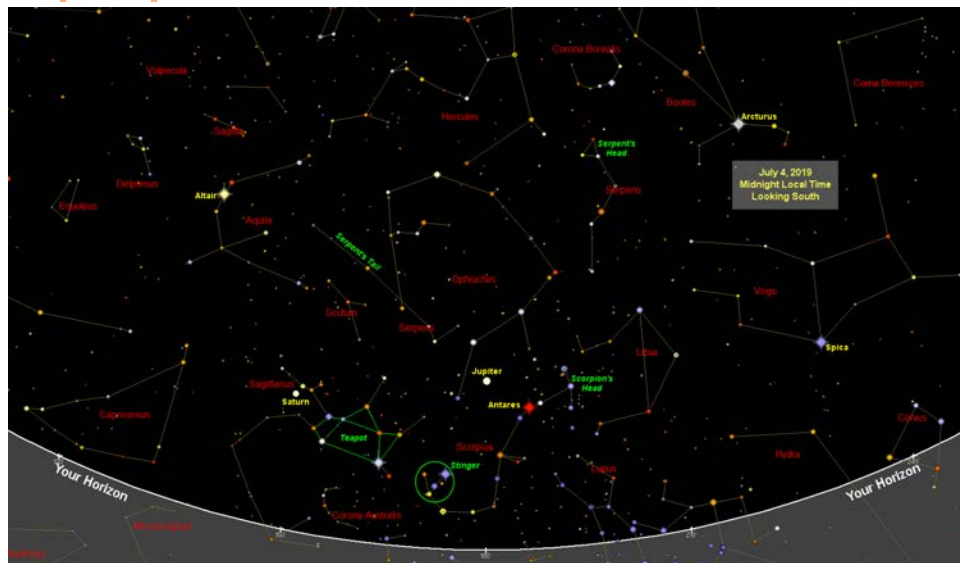
Sometimes the other planets appear to be traveling backward through the zodiac; this is an illusion. We call this illusion *retrograde motion*.

Mercury's retrograde periods can cause our plans to go awry. However, this is an excellent time to reflect on the past. Intuition is high during these periods, and coincidences can be extraordinary.

When Mercury is retrograde, remain flexible, allow extra time for travel, and avoid signing contracts. Review projects and plans at these times, but wait until Mercury is direct again to make any final decisions.

In 2019 to come, Mercury will be retrograde during **July 7–August 2**, and **October 31–November 20**.

—Celeste Longacre



THE SOUTHERN SKY ON THE FOURTH OF JULY

All across the United States, the Fourth of July is known for its bright and sparkling fireworks displays. It's also the best time of year to observe two distinctive constellations of the far southern sky.

The constellations Scorpius, the Scorpion, and Sagittarius, the Archer, never venture very far above the southern horizon. Even now, when they are at their highest, you'll want an unobstructed view to the south, free of trees, hills, and tall buildings. As always, your best view also requires a dark location, free of man-made light pollution.

Looking due south at midnight on July 4, there are two bright planets to help you get your bearings. Dead ahead is Jupiter, King of Planets, by far the largest planet in the solar system and also by far the brightest object on this month's sky map.



TAP TO GET
A PRINTABLE
JULY SKY MAP



TAP TO
FOLLOW
OHIOAN JEFF
DETRAY'S SKY
ADVENTURES



Just to the lower right of Jupiter lies Antares, the 15th brightest star in the sky. Antares is a slightly reddish star that represents the heart of the Scorpion. Compare its color to that of Jupiter to better perceive the pale red of Antares.

Three stars in a near-vertical line to the right of Antares comprise the Scorpion's head. Move your gaze downward from Antares to follow the Scorpion's twisting torso, which leads to a group of five stars forming the Stinger, the poisonous barb at the tip of the creature's tail. Be glad that this creepy-crawly lives in the sky and is not scuttling around you in the darkness.

To the left of Scorpius and Jupiter, in the constellation Sagittarius, the Archer, lies the planet Saturn. The Ringed Planet is currently as bright as it will get this year, although it pales in comparison to mighty Jupiter. Saturn sits just to the left of the famous Teapot asterism (unofficial star pattern), which is made up of the eight brightest stars in Sagittarius.

From a very dark location, the sky around Sagittarius appears misty or hazy, an effect caused by the combined light of the countless stars constituting the Milky Way galaxy, our home in the cosmos.

There is another constellation of note in the southern sky. Consider the curious constellation Serpens, the Serpent. Unique among the 88 constellations, Serpens is the only one divided into two separate parts. In Latin, the parts are *Serpens Caput* (Serpent's Head) and *Serpens Cauda* (Serpent's Tail). The two parts slither on opposite sides of Ophiuchus, the Serpent-Bearer, who is depicted as holding one half of Serpens in each hand.

Finally, we would be remiss in not acknowledging an anniversary that will be celebrated for as long as we gaze at the night sky. This July marks the 50th commemoration of mankind's first Moon landing, which took place on July 20, 1969, when *Apollo 11* astronauts Neil Armstrong and Edwin "Buzz" Aldrin landed the lunar module *Eagle* at Tranquility Base while crewmate Mike Collins orbited overhead in the command module *Columbia*.

This year on July 20, take a moment to step outside, look toward the southeast, watch the moonrise, and give thought to the momentous events of a half-century ago. Use the Almanac's easy calculator to find the time of moonrise for your location: <https://www.almanac.com/astronomy/moon-rise-and-set>.

—Jeff DeTray



GARDENING

How to Get Ahead of Your Cabbage

Be ready when fall rolls around.

PHOTO: DLA4/GETTY IMAGES



Old-timers knew how to get the most out of a crop. Fortunately, some of them kept records of their best efforts. Consider Martha Ballard. On May 9, 1809, she set “Turnips & Cabbage stumps” in her garden in Hallowell, Maine. Another year, she set her cabbage stumps on April 18—165 of them in all. In 1806, she planted on May 4 and had a harvest 2 weeks later, mixing the fresh shoots with wild greens harvested from the fields and forest.

This we know from Martha’s diary, *A Midwife’s Tale: The Life of Martha Ballard, Based on Her Diary, 1785–1812* (by

Laurel Thatcher Ulrich; published by Knopf in 1990 and winner of a Pulitzer Prize in 1991). The diary reminds us of an almost-forgotten garden trick, as simple as it is thrifty.

When 19th-century gardeners like Martha Ballard harvested their cabbages and turnips in the fall, they uprooted them entirely—stems, heads, and roots—and kept the whole plants in the root cellar for the winter. As soon as the ground could be worked in the spring, these gardeners planted the roots (heads had long since been eaten, of course) in the cool soil. Soon they harvested bushy, fresh green

sprouts—a tasty addition to soups, salads, or fricasees at a time when the rest of the garden was just beginning to be planted.

The wintered-over mother plants didn’t develop into mature vegetables but went to seed by the end of the summer, providing ample seeds for the next spring’s planting.

You can bring the idea into the 21st century: In December or January, try sprouting winter-stored beets, celeriac, rutabagas, parsley, or cabbages. Do it near a window, keeping the roots damp. The reward could be flavorful garnishes to set off many a midwinter dish.

—*Almanac editors*



Fresh Blueberry Recipes

July is National Blueberry Month! To celebrate, we've gathered some recipes that are easy to prepare and mouthwatering to eat. So pick your own or search the farmers' market—it's blueberry time!

FOOD



TAP FOR
RECIPE

Cran- Banana- Blueberry Pops

PHOTO: JULIA SUDNITSKAYA/SHUTTERSTOCK



SHARE
THIS
RECIPE

CRAN-BANANA-BLUEBERRY POPS

2 cups fresh blueberries

2 ripe bananas

1-3/4 cups cranberry juice cocktail, divided

2 tablespoons honey (optional)

Combine blueberries, bananas, and 3/4 cup of cranberry juice in a blender; blend for 20 seconds. Pour mixture through a fine-mesh strainer, pressing with spatula, to remove blueberry skins, if desired.

Rinse blender, then pour back in strained liquid with remaining cranberry juice and honey (if using). Blend for another 20 seconds. Pour into molds and freeze for at least 4 hours. Halfway through freezing, insert sticks.

Makes about 10 pops.

FOOD

 TAP FOR
RECIPE



Blueberry Sour Cream Pancakes

PHOTO: SAM JONES/QUINN BREIN

BLUEBERRY SOUR CREAM PANCAKES

- 1-1/3 cups all-purpose flour
- 1 tablespoon brown sugar
- 1 tablespoon ground cinnamon
- 1-1/2 teaspoons baking soda
- 1-1/2 teaspoons ground nutmeg
- 1 teaspoon salt
- 1 egg, beaten
- 1 cup sour cream
- 1 cup whole milk or buttermilk
- 1 cup fresh blueberries

In a bowl, stir together flour, brown sugar, cinnamon, baking soda, nutmeg, and salt.

In a separate bowl, stir together egg, sour cream, and milk. Add to the dry ingredients, stirring just enough to combine. Add blueberries carefully, blending just enough to mix them in.

Using a 1/4 cup measure, drop batter onto a hot, greased griddle. Cook until pancake surface is covered with bubbles. Flip and cook until the other side is well browned.

Makes 4 servings.



SHARE
THIS
RECIPE

FOOD

 TAP FOR
RECIPE

Blueberry Jam



SHARE
THIS
RECIPE

BLUEBERRY JAM

4 cups fresh blueberries
3-1/2 cups sugar
zest and juice of 1 lemon

In a saucepan over medium heat, combine blueberries, sugar, lemon zest, and juice, stirring well and mashing about 1/4 of the berries. Continue to cook for about 30 minutes, or until thick. Pour into hot, sterilized jars, leaving a 1/4-inch headspace. Seal and process for 20 minutes in a boiling water bath.

Makes 2 pints.

LIVING NATURALLY



Good Eats, Good Cooks

... and their Anytime Salad with Fig-Infused Balsamic Dressing

PHOTO: PIXABAY

Whenever we eat at the other one's house, my sister Patty (we call her Pad) and I invariably exclaim that the meal was better than anything we could have eaten anywhere in the world that day. We aren't just being polite.

We both love to cook, and we often joke about writing a family cookbook. We aim for dishes that are nutritious, cheap, uncomplicated, easy, and fast. We also like to have fun and stay creative in the kitchen. And, of course, we love to eat. But our methods are probably not ready for the wider world.

TALK ABOUT CREATIVITY

Years ago, Pad won a weekend for two with all the amenities at a fancy spa for a recipe she thought up on the spot and had never made.

She heard about the contest on the radio

while driving home from work. An idea popped into her mind, so she pulled over, thought a few moments, scrawled a recipe on the back of a postcard she had in her glove compartment, and mailed it at the next post office she came to.

After Pad's recipe won, our mom made the dish for years every time we had a family gathering. It was rich (the contest was sponsored by a dairy products company, and she'd loaded the recipe with their best stuff) but delicious.

I consider myself the more extreme foodie. Unlike Pad, who enjoys scouting for new cooking ideas, I don't like to eat out. I organize meals around my vegetables, and I've never eaten a restaurant meal that did their vegetables proud (or served anywhere near enough of them).

We grow most of our own vegetables and a lot of fruit. We can, freeze, and dry much

of what we grow and stash winter squashes, garlic, onions, cabbages, potatoes, carrots, and beets in two separate cellar compartments. A giant pressure canner allows us to can low-acid foods such as black beans and vegetable soups safely. We grow winter salad greens in a solar greenhouse attached to the house and cook on the kitchen woodstove often during the winter.

SISTERS' COOKBOOK?

Pad's and my imagined cookbook probably wouldn't make it in the commercial world. We'd no doubt have to self-publish, because it wouldn't be the kind of cookbook that editors usually demand, with precisely measured ingredients and exact cooking times and temperatures.

Our cooking more closely resembles that of our great-great grandmothers on the

farm, whose recipes called for a lump of this, a pinch of that, and a few handfuls of whatever's available from the garden or the cupboard. We rarely make a dish the same way twice, write down what we've done, or measure ingredients, except in a general way.

How would a test kitchen handle a soup that started with a slow-simmered broth made (that particular day, anyway) from a bag of saved onion skins, celery leaves, potato peels, wilted lettuce leaves, and a cabbage core or two, a handful of whatever fresh or dried herbs were available, and maybe a few Thanksgiving turkey bones?

On the other hand, Pad's made-up-on-the-spot casserole did win that contest. So, here's a sample of something that appears on my lunch or dinner table often.

ANYTIME SALAD

Assemble whatever veggies and fruit that are on hand and go well

together, such as . . .

Any combination of raw or cooked greens, including edible garden weeds such as purslane, wild violets, or lamb's quarters

Tomatoes

Peppers

Steamed young potatoes

Lightly steamed or

leftover vegetables, such as broccoli, summer squash, corn-off-the-cob, green beans

Any combination of minced fresh or dried herbs

Fresh fruit of any kind

Make a meal by spreading the hot or cold vegetables and/or fruit on a large plate. Then plunk a wedge of cheese, a chopped hard-boiled egg, a little leftover chicken/fish/meat, and a mound of chickpeas (black beans, quinoa, lentils, etc.) in the center and drizzle with Fig-Infused Balsamic Dressing (recipe below).

Serve with fresh whole-wheat flatbread.

FIG-INFUSED BALSAMIC DRESSING

Dress with this elegant dressing, which carries the sweet, complex taste of marinated figs. To make, pour a small bottle of balsamic vinegar into a small saucepan. Chop a few unsulfured Turkish figs; add to vinegar. Heat to a simmer (don't boil), then remove from heat. When cooled, decant into a wide-mouth jar. The vinegar improves with time; don't strain out the figs.

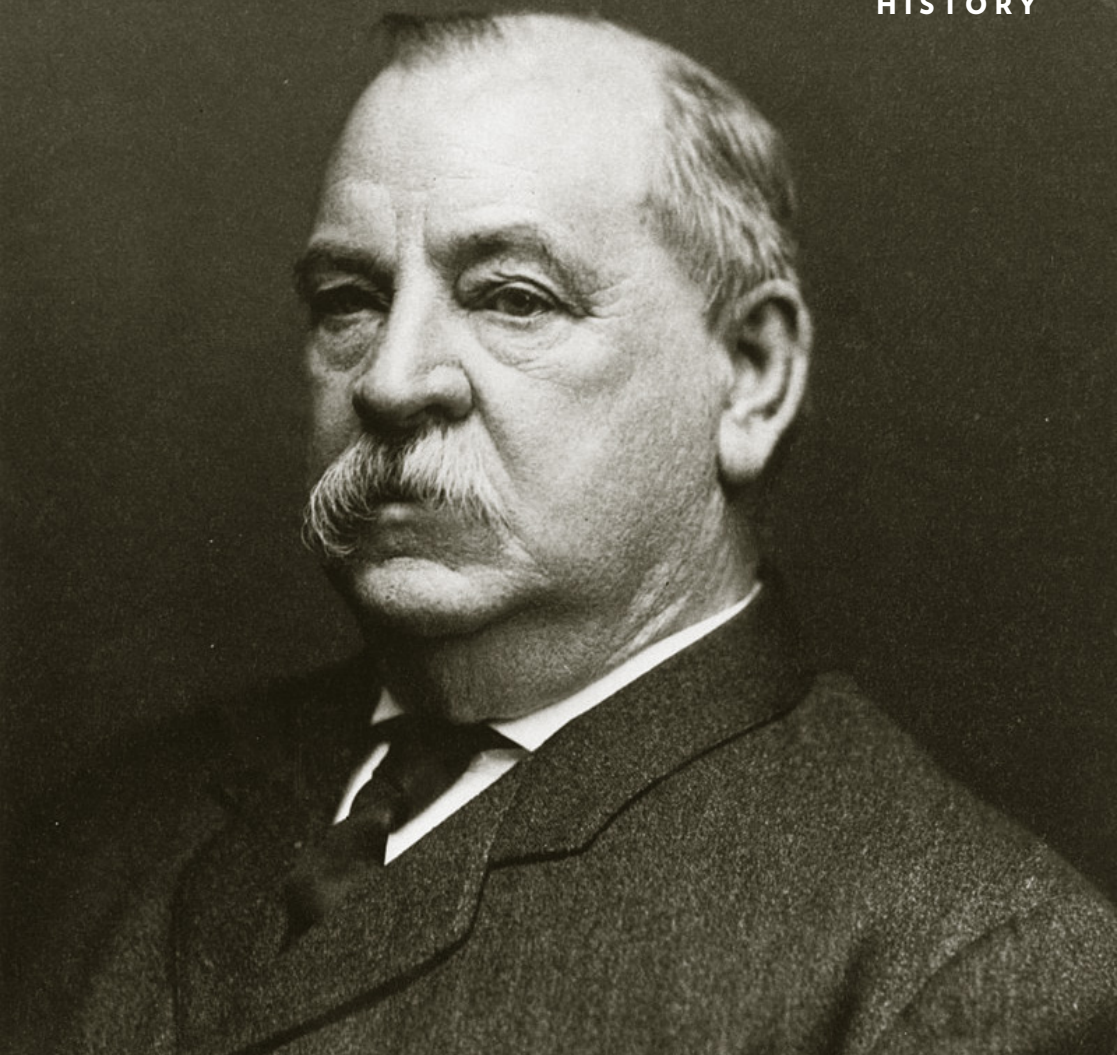
Use as is or mix half-and-half with good olive oil. (This is great on all vegetables, hot or cold.)

Add minced garlic, a little maple syrup, horseradish, honey mustard, or culinary herbs to vary flavor. (Not all at once!)

—Margaret Boyles



TAP TO READ MORE OF MARGARET BOYLES'S POSTS IN HER "LIVING NATURALLY" BLOG



When the President Disappeared for 6 Days

Why did Grover Cleveland drop out of sight?

Portly, cigar-chewing Grover Cleveland had been re-elected in 1892, the only president to leave the White House and return for a second term 4 years later. Immediately after taking office, he had to cope with a grave, national financial crisis. The troubles stemmed from a fight between those who believed, like Cleveland, in staying on the gold standard, and people like Vice President Adlai E. Stevenson, who were in favor of permitting an unlimited amount of silver to be coined.

In the midst of this, on June 18, 1893, Cleveland asked Dr. Robert M. O'Reilly, the White House physician, to have a look at a "rough place" in the roof of his mouth on his cigar-chewing side. O'Reilly saw an angrily inflamed area about the size of a quarter, with granulation similar to that of a cauliflower. A tissue sample was immediately

sent to the country's top pathologist, Dr. William H. Welch, at Johns Hopkins Hospital in Baltimore. The word that came back from Dr. Welch, not surprisingly, was "malignant."



Dr. Joseph D. Bryant

Cleveland's instant reaction was to maintain complete secrecy. The already shaken nation

must not know. On June 30, as Congress recessed, the president, hoping to save the nation from complete collapse yet needing to buy time, called for a special session of Congress on August 7 to continue discussion about the financial crisis.

Arrangements were made for the president to undergo surgery to remove the malignancy under conditions as cleverly contrived as they were critical.

In late June, with close friend Dr. Joseph D. Bryant, the president took a train to New York. Unnoticed in the dusk, the pair took a common carriage from the train station to Battery Park at the southern tip of Manhattan. Lying offshore was Commodore Elias G. Benedict's yacht *Oneida*, which the president boarded unseen and unsuspected.

Shortly before noon on July 1, Cleveland was prepped for surgery. One

HISTORY

account claims that after he was strapped into a straight-back chair that was lashed to the mast, a tense Dr. Bryant told the skipper of the yacht, “If you hit a rock, hit hard, and go straight to the bottom.” Other accounts reveal that the surgery took place in the yacht’s saloon, with six doctors in attendance.

One physician, Dr. Ferdinand Hasbrouck, a young dentist with knowledge of the new anesthetic “laughing gas,” had to extract two bicuspid teeth to make room for the surgeon’s work. Some resources say that five teeth were removed in total—the more likely outcome, as a large part of Cleveland’s upper jawbone was also removed.

Dr. Bryant used a white-hot electric knife (cocaine reportedly was used as a topical anesthetic) and worked with desperate speed, for fear that the president might die under anesthetic. He

completed the surgery in 31 minutes, then packed the wound and had the patient settled in bed. The entire procedure lasted 90 minutes.

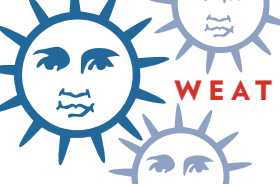
The president improved rapidly. On July 5, the *Oneida* tied up at the wharf of Cleveland’s summer home, Gray Gables, on Buzzards Bay in Massachusetts. Shaky but unaided, the president made a cautious descent down the gangplank and into the arms of his anxiously waiting wife, Mrs. Frances Folsom Cleveland.

The press, who had been waiting for 6 days with no word about the president’s strange disappearance, received a simple explanation: The president had merely been away for a few days receiving treatment for two ulcerated teeth. However, a second operation was performed on July 17, also aboard the *Oneida*, to remove any remaining diseased tissue.

Later, Cleveland was fitted with a partial denture that filled out his facial contours and provided no evidence of the disturbance. The large cavity in the roof of his mouth was closed with a rubber plug. Miraculously, his speech was not impaired.

On August 7, as planned, the president met with Congress for a showdown fight. His message could be summed up in these words: “The government had no right to injure the people by financial experiments opposed to the policy and practice of other civilized states.” The battle was finally won. On August 28, the house voted 239 to 108 in Cleveland’s favor.

Cleveland lived another 15 years after his ordeal, dying in 1908 not of cancer but of a gastrointestinal ailment complicated by heart and kidney disease. He never revealed the real reason for his 6-day disappearance.



WEATHER FORECASTS

IF ANT HILLS ARE HIGH IN JULY, WINTER WILL BE SNOWY.

HOW WE MAKE OUR PREDICTIONS

We derive our weather forecasts from a secret formula that was devised by the founder of this Almanac, Robert B. Thomas, in 1792. Thomas believed that weather on Earth was influenced by sunspots, which are magnetic storms on the surface of the Sun.

Over the years, we have refined and enhanced this formula with state-of-the-art technology and modern scientific calculations. We employ three scientific disciplines to make our long-range predictions: solar science, the study of sunspots and other solar activity; climatology, the study of prevailing weather patterns; and meteorology, the study of the atmosphere. We predict weather trends and events by comparing solar patterns and historical weather conditions with current solar activity.

Our forecasts emphasize temperature and precipitation deviations from averages, or normals. These are based on 30-year statistical averages prepared by government meteorological agencies and updated every 10 years. Most-recent tabulations span the period 1981 through 2010.

We believe that nothing in the universe happens haphazardly, that there is a cause-and-effect pattern to all phenomena. However, although neither we nor any other forecasters have as yet gained sufficient insight into the mysteries of the universe to predict the weather with total accuracy, our results are almost always very close to our traditional claim of 80 percent.

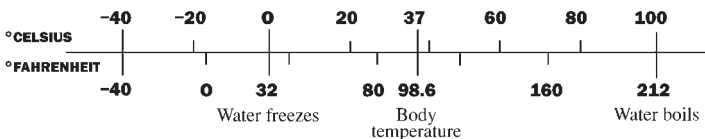


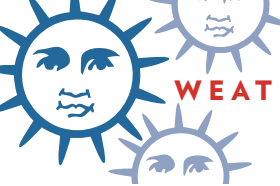
TAP TO FIND OUT THE WEATHER HISTORY OF THE DAY



LOVE ALL THINGS WEATHER? TAP FOR THE WEATHER FOLKLORE OF THE DAY

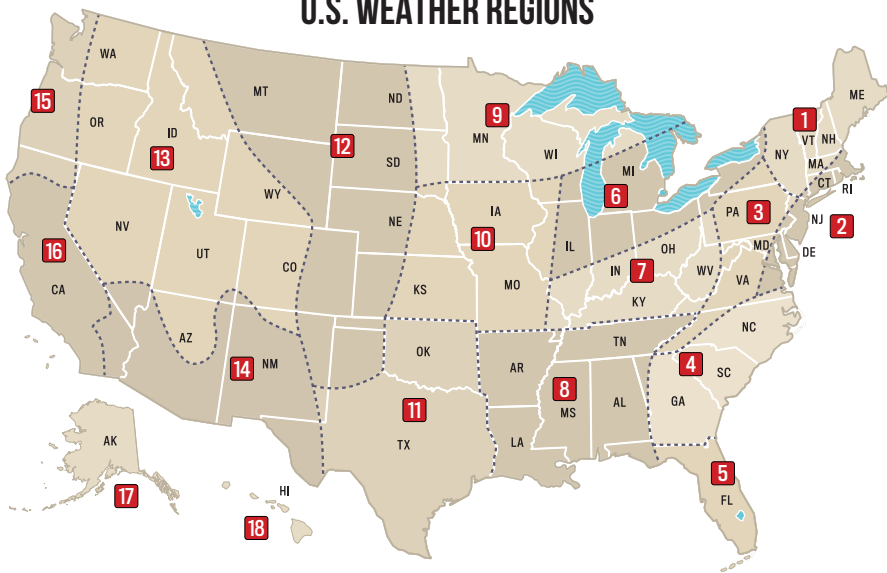
CELSIUS-FAHRENHEIT TABLE



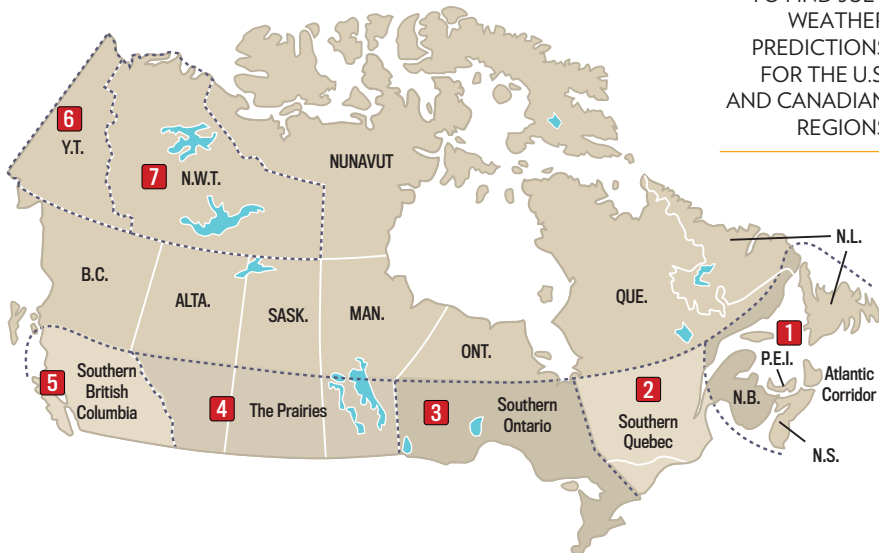


WEATHER FORECASTS

U.S. WEATHER REGIONS

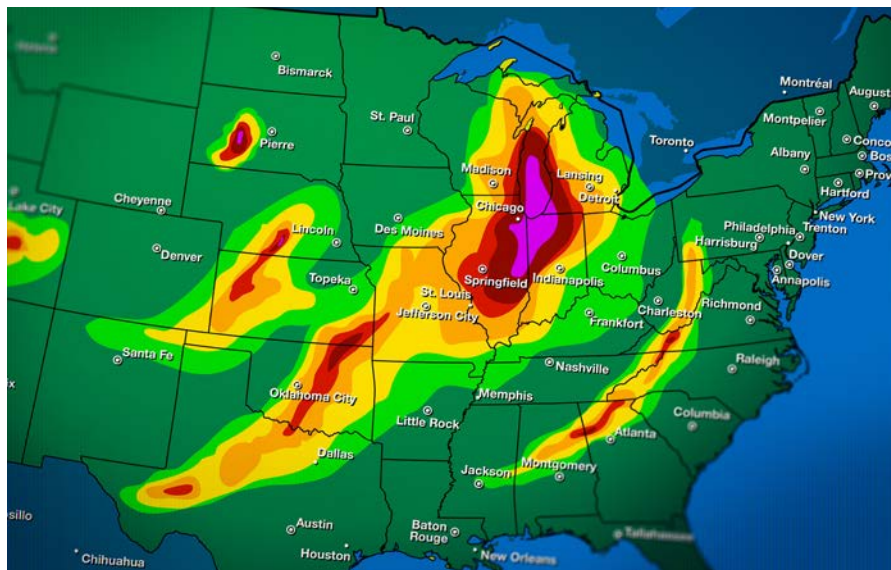


CANADIAN WEATHER REGIONS



CLICK HERE
TO FIND JULY
WEATHER
PREDICTIONS
FOR THE U.S.
AND CANADIAN
REGIONS





WEATHER FORECASTING 101

Although our forecasts at The Old Farmer's Almanac are created by weather professionals using the same scientific data available and used elsewhere, the Almanac's methodology is significantly different from conventional practices. In this two-part series, we examine how the two ways differ.

PART 1: HOW CONVENTIONAL PREDICTIONS ARE MADE

Most of the weather forecasts that we see on TV or the Internet or hear about on radio cover the period from the next few hours to the next few weeks.

The **shortest-range forecasts**, also known as nowcasts, typically cover the next hour or two, and are focused primarily on precipitation—espe-

cially the exact starting and ending times and intensity of any rain, snow, and ice that will occur.

As you might expect, the most important tool used for these forecasts is radar, which shows the current precipitation and how it has been moving and changing in intensity. To a large extent, these forecasts take what is happening now and how it has changed over the past hour or so



and extrapolate these events into the next couple of hours.

Lightning strike data and high-resolution satellite imagery provide additional insights into this extrapolation, while computer-generated forecast models suggest changes beyond pure extrapolation of trends.

Forecasts covering the next 1 to 10 days or so are based largely upon computer-generated, deterministic forecast models, which start with the current state of the atmosphere and use the physics of fluid dynamics (after all, the atmosphere is considered to be a fluid) to predict how the atmosphere and its weather will change.

Beyond about 10 days, the computer models rapidly lose their ability to make precise forecasts because their errors tend to grow and compound over time. Small errors in the initial state of the atmosphere (even those as small as half a degree in temperature or one mile per hour in wind speed) can sometimes grow over time within a computer forecast model, assuming an unwarranted significance that drives the forecast to a substantial error.

While as weather professionals we do indeed have detailed weather information from physical observations, sensors, radar, and satellite

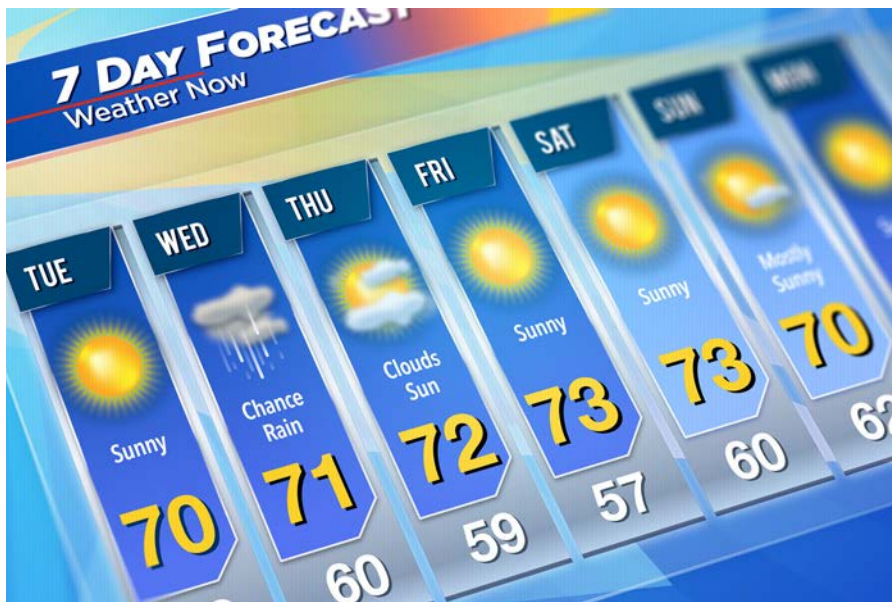
imagery, we do not have this information on a microscale, our initial data does not include the variations caused by a stream running through a farm or wind that is funneled between large buildings.

Plus, we do not fully understand all of the driving forces within the atmosphere, such as the microscale physics that form individual clouds and tornadoes.

For these reasons, conventional forecasters parameterize the microscale effects, meaning that they use simplified equations that capture these developments well enough in the short term but may introduce errors that compound and grow over time.

Even though computers continue to get faster and more powerful, their capabilities are not infinite, and weather forecasting is one of their most complex and intensive uses. If it took a computer 48 hours to produce a forecast starting 2 hours hence, that forecast would be of no value, so some additional simplifications need to be made in the forecast models to enable them to generate timely forecasts.

The small errors in initial conditions and simplifications in the physics that are necessary because we have neither infinitely accurate initial data nor infinitely powerful com-



puters were the inspiration for the concept of a so-called “butterfly effect”—that, for example, something as simple as a butterfly flapping its wings in central America can create a tiny change in the local wind flow that can grow and amplify over time to result in a hurricane hitting the Gulf Coast a week later.

One way in which scientists account for this is by running the computer models multiple times with small changes in the initial weather conditions—for example, we would change the temperature from 78.2° to 78.4° and see how the forecast differs. Known as ensemble model fore-

casts, these run-throughs can show weather professionals the full range of possibilities and give an idea of their probabilities that deterministic models cannot.

Once we get **beyond about 20 days**, the errors in computer-generated forecasts compound to the point where they are no more accurate than climatology and lose their usefulness. So, for longer-range forecasts, conventional forecasters need to utilize different strategies.

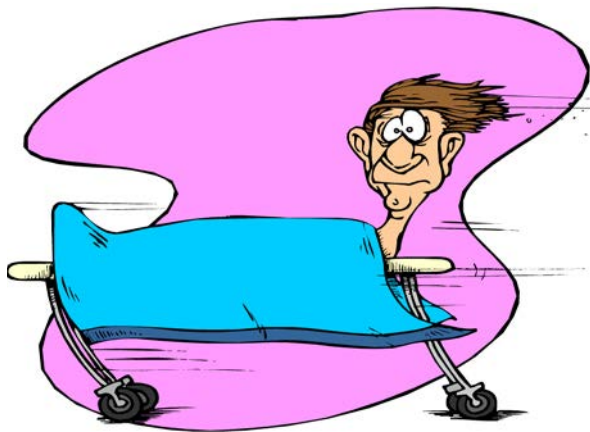
Next time, in part 2: How Almanac predictions are made.

—Michael Steinberg, Old Farmer’s Almanac meteorologist



HUMOR ME

GRINS AND GROANS FROM THE ALMANAC



DOWNHILL

As the old man lay on his deathbed, racked with pains, an old family servant entered the room and, with a look of compassion, asked him how he was feeling.

“Ah, very poorly indeed,” said the man. “I must certainly die and soon set out for the long, oh, so long, journey.”

Replied the servant: “You will have a good

going then, for it will all be downhill.”

A WISE CHOICE

After a buffoon had offended his sovereign, the monarch ordered him to be brought forth and, with a stern countenance, reproached him for his crime.

“Wretch!” said he. “Receive the punishment you merit—prepare for

death!”

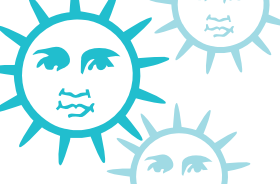
The culprit fell on his knees and cried for mercy.

“I will extend no other mercy to you,” replied the prince, “except to permit you to choose what kind of death you will die; decide immediately, for I will be obeyed.”

“I adore your clemency,” said the fellow. “I choose to die of old age.”

THE DIFFERENCE

A somewhat conceited fellow introduced his rather unprepossessing young friend as “not quite so great a fool as he looks to be,” whereupon the latter quickly added “... and therein lies the difference between the two of us.”



WHAT'S NEXT



ASTRONOMY

Explore with our Sky Map



CALENDAR

August name origin, birthstones and -flowers, regular and weird holidays, Eye on the Sky, August trivia quiz, Rhyme Time



LIVING NATURALLY

Two-Ingredient Natural Shampoo



HISTORY

“We’re Rowing to Europe!”



GARDENING

Tramps and Stowaways—stories of immigrant plants



FOOD

Tantalizing Tomato Recipes

Plus: Weather Update • U.S. and Canadian Weather Forecasts • Gardening by the Moon’s Sign • Best Days to Do Things • Humor • and much more in the August *EXTRA!*

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