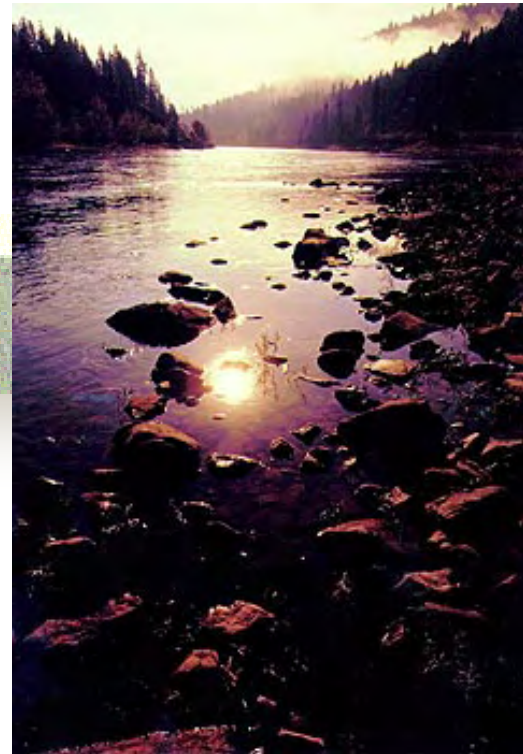
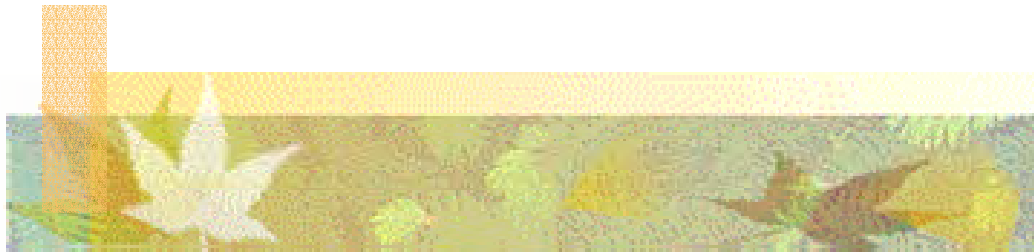




# LEWIS AND CLARK PLANTS IN IDAHO

"Beautiful discoveries"



*Boise National Forest  
Botany Program  
July 2003*

# President Thomas Jefferson

- *“dates at which particular plants put forth or lose their flowers”*



# “The Corps of Discovery”

■ Meriwether Lewis

■ William Clark



# *Their mission:*

- Chart the rivers that flowed to the Pacific
- Learn about the tribes that lived along the route
- Make natural history observations of plants and animals
- Return (alive) – with specimens



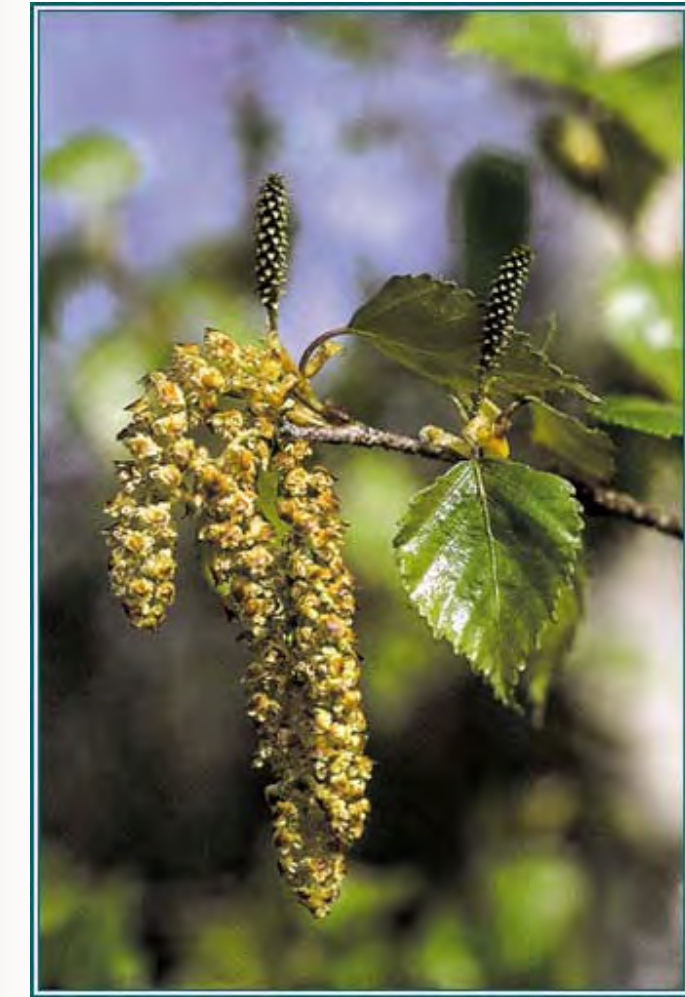
# Building materials, medicine, food



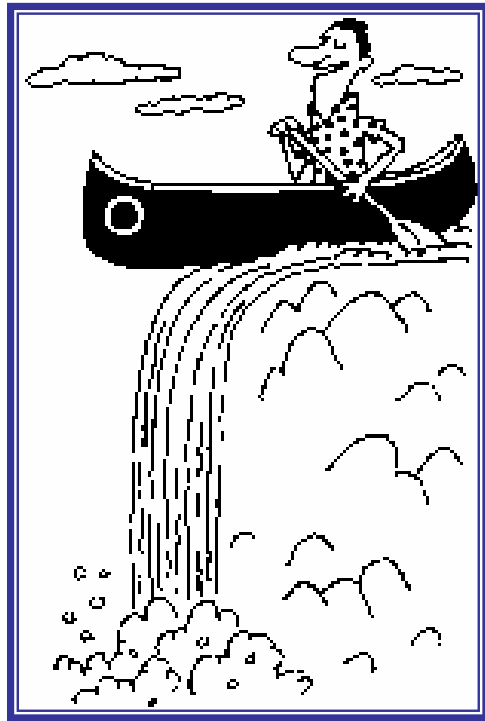
# The Canoe --“the greatest gift from Aboriginal cultures to all those who came after”

(“Voyageurs” painting by Frances Anne Hopkins 1838-1919)





*But Captain, how do we  
get there from here?*





# A Fair Trade

- “For this canoe he gave my uniform laced coat and nearly half carrot of tobacco. It seems that nothing except this coat would induce them to dispose of a canoe which in their mode of traffic is an article of the greatest val[u]e except a wife, with whom it is equal...” (Lewis – describing the purchase of a canoe from the Cathlamet Indians by Sgt. Ordway)



# *Cottonwood to the rescue!*

- *“Of all the western trees, the cottonwood contributed more to the success of the expedition than any other.”*

*- Historian Paul Russell Cutright*





**Medicine** — purchased from Mr. Gillaspie and Mr. Strong of Philadelphia, 5/26/1803:

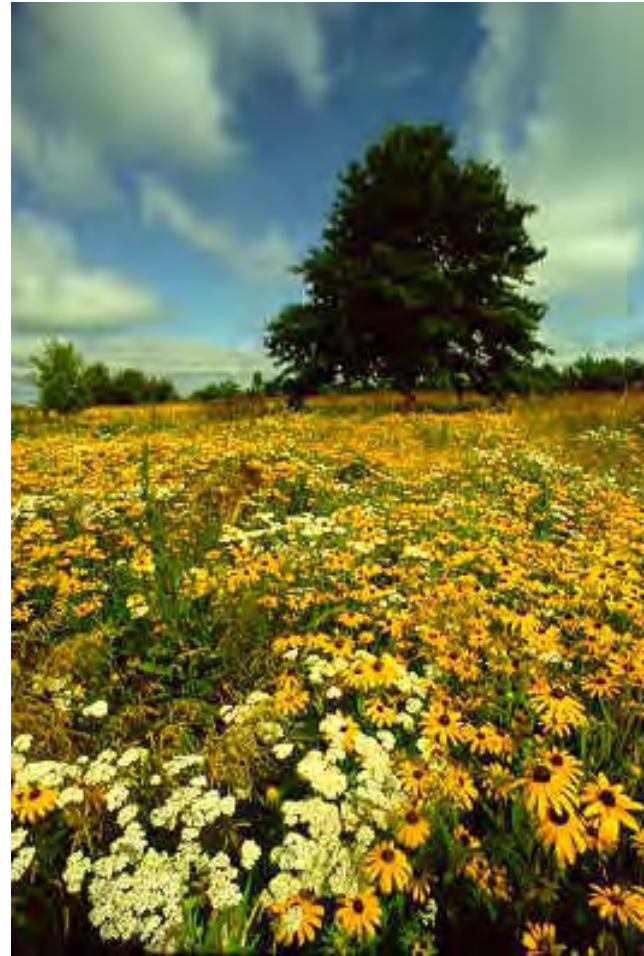
- 1 Set Teeth Instruments small (\$2.25)
- 1 Set Pocket Instruments small (\$9.50)
- 3 Best Lancets (\$0.80 ea.) - used for bleeding or blood-letting
- 1 Tourniquet (\$3.50) - for amputations
- Patent Lint (\$0.25) - linen or fleece-like material for poultices and dressing wounds

# Food – enough for 3 years?

- 45 kegs of pork, 50 of flour, 18 of whisky, 1 of Hogs Lard, and 7 of corn
- 12 casks of salt, 100 gallons of whiskey, 1 bag of coffee 50 weight, 2 lbs of tea, 30 gallons of strong wine
- 2 ditto of sugar, 1 ditto of beans



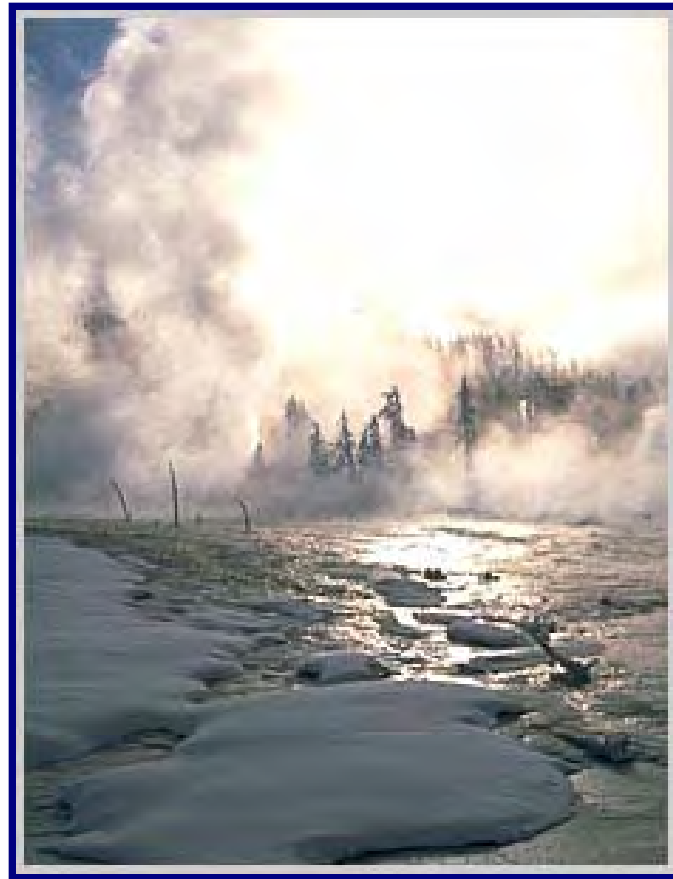
*From gentle plains and prairies...*



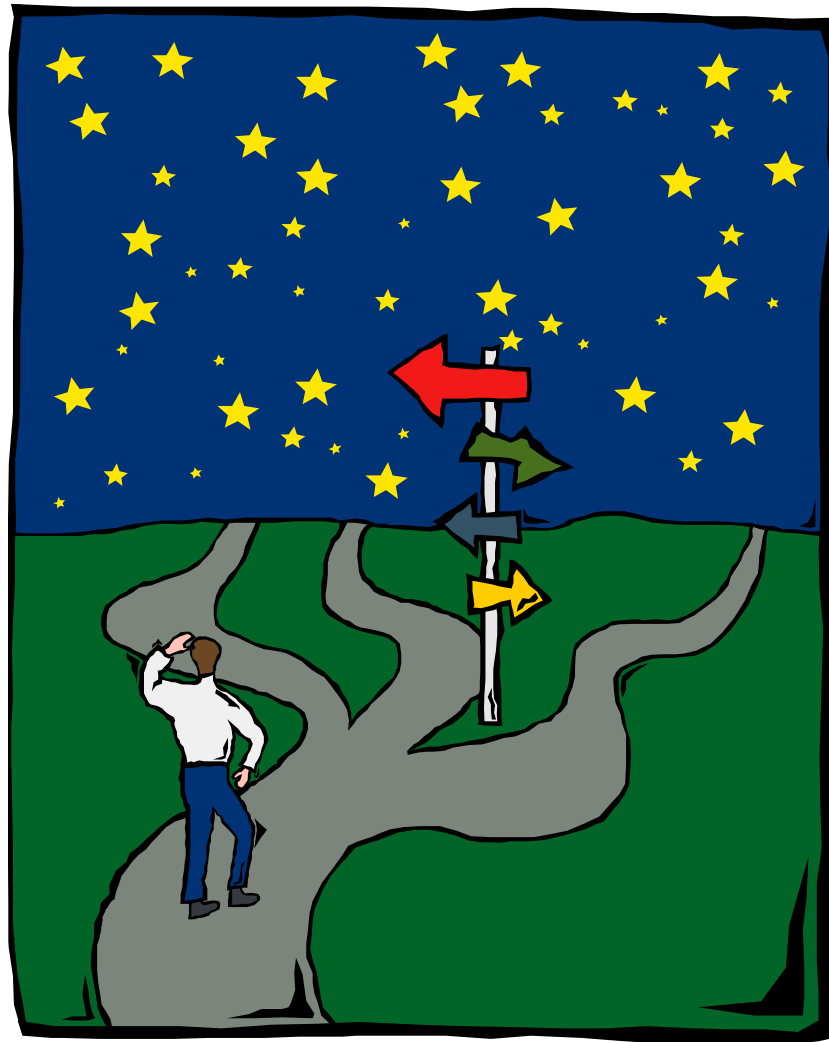
*To “The most terrible mountains...”*



These were places unlike anything they had ever seen before.



Decisions, decisions...







## Sacagawea

My name is Sacagawea. I am a Shoshone, a person from beyond the Rocky Mountains. I am from the headwaters of the Missouri River, and was born about 1789 by the white man's calendar. I was captured by a raiding party of Hidatsa warriors five years ago, and was brought from my homeland to their Knife River village. Here I met a French trader named Toussaint Charbonneau, who later became my husband. This year I am 16 years old. I had my first baby, a boy we named Jean Baptiste, on February 11, 1805.



*Of 290 plants collected, 176  
species were new to science!*



*Prunus virginiana* (western chokecherry)

- Lewis's chokecherry "cure"



*Prunus emarginata* – bitter  
cherry



# Lilies



- Edible --  
asparagus,  
onions, garlic,  
leeks, and chives
- Ornamental --  
tulips, lilies, and  
hyacinths
- **Poisonous** --  
death camas,  
false hellebore

*Erythronium grandiflorum* – glacier lily,  
avalanche lily, fawn lily



*Camassia quamash* -- small camas







# Camas bulb



*Fritillaria pudica* – yellow bells



*Trillium ovatum* – western wake-  
robin



*Veratrum californicum* - false  
hellebore



*Zigadenus elegans* – mountain  
death camas



*Philadelphus lewisii* (Lewis' mock-  
orange, syringa)



# Syringa





*Berberis (Mahonia) repens* -  
Oregon grape



# Oregon grape



*Lewisia rediviva* -- bitterroot



*Clarkia pulchella* – beautiful  
clarkia, pink fairy, ragged robin



*Mimulus lewisii* – Lewis'  
monkeyflower



© 2000 James L. Reveal

Lewis's flax, prairie flax (*Linum lewisii*)



*Purshia tridentata* (bitterbrush) –  
Frederick Pursh

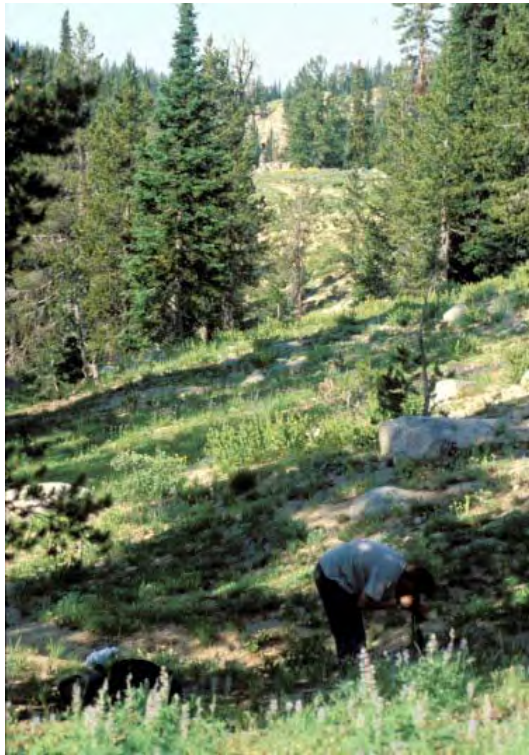


# An Idaho original – Sacajawea's bitterroot!



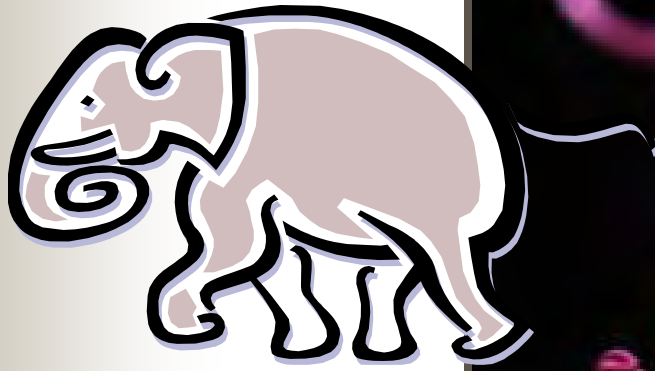


# Sacajawea's bitterroot (*Lewisia sacajaweanana*)



*Pedicularis groenlandica* –  
elephant's-head



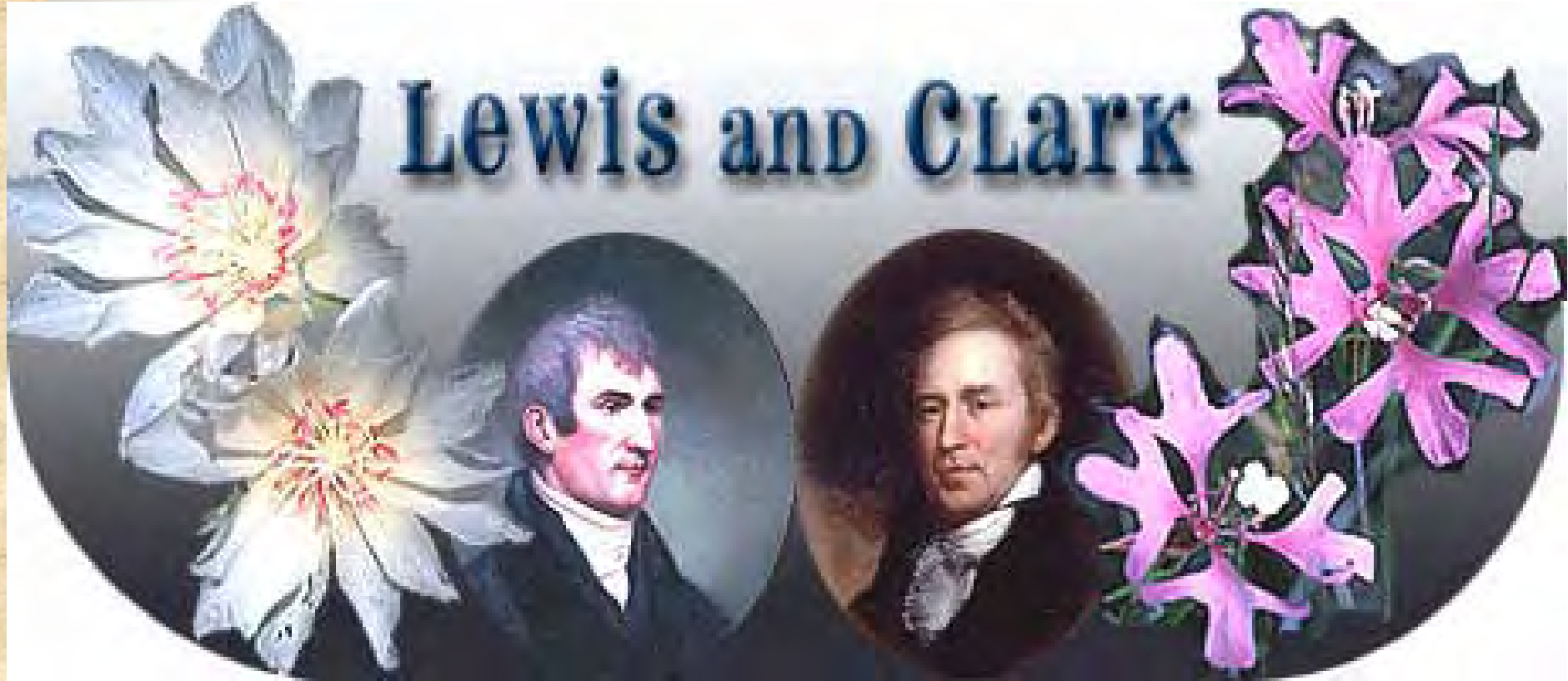


# What they didn't collect...





# Lewis and Clark











# For more information

- [http://www.inform.umd.edu/EdRes/Colleges/LFS/C/life\\_sciences/.plant\\_biology/L&C/L&Cpublic1.html](http://www.inform.umd.edu/EdRes/Colleges/LFS/C/life_sciences/.plant_biology/L&C/L&Cpublic1.html) (Lewis and Clark herbarium)
- [www.lewis-clark.org](http://www.lewis-clark.org) (Discovering Lewis and Clark)
- [www.pbs.org/lewisandclark/index.html](http://www.pbs.org/lewisandclark/index.html) (the Journey of the Corps of Discovery)
- [xroads.virginia.edu/~hyper/journals/toc.html](http://xroads.virginia.edu/~hyper/journals/toc.html) (Lewis & Clark journals online)
- [www.monticello.org](http://www.monticello.org) (seeds and other historical items)



More tension on the Lewis and Clark expedition.

## Lewis and Clark Plants in Idaho

Powerpoint presentation notes by Edna Rey-Vizgirdas, Forest Botanist, Boise NF  
(rev. 8/26/03)

1)

**Two hundred years ago**, on a rainy day in late May 1804, an expedition set off on an 8,000-mile (round trip) journey across the continent. It was Thomas Jefferson's grand idea, and Lewis & Clark's great adventure.

Although they collected and described many plants during the expedition, I will focus on **plants** that are native to Idaho and their role as food, medicine, and even transportation. In fact, if it weren't for plants, the expedition might never have happened!

2)

That most of this land was "unknown" territory (unknown to the Europeans, that is!) didn't seem to bother **Jefferson**. France had recently sold us the Louisiana Territory (for \$15 million), more than doubling the size of the country. Jefferson was also concerned that the British had a lucrative fur trade with Indian tribes along the northern border of the US.

Among other things, Jefferson wanted information on plants and their use by Native Americans. He knew that the goals of diplomacy and increased commerce could be sold to Congress; scientific discovery could not. Fortunately Congress decided to fund the expedition – at a cost of \$2,500.

3)

As is true for any corporation or government, the people in charge can make all the difference! L&C were well qualified to lead the Corps of Discovery. **Clark** was a geographer, expert map-maker, and skilled riverman. **Lewis** took crash courses in botany, zoology, and medicine.

4)

**Their mission** was to follow and map the rivers that flowed to the Pacific, make contact with tribes, document the region's plant and wildlife species, and to bring all of this information back home. Of course, they had to do this **on foot and by boat**. Travel by water was the most efficient transportation method at the time.

[This **birch bark canoe** is made from the bark of the white birch (*Betula papyrifera*) and lined with a wooden frame. It was the "Volkswagen" of the Algonquins and other northern tribes.]

5)

As they would soon discover, the West was home to thousands of strange new plant and animal species. Jefferson was particularly interested in the **value of plants** for timber, agriculture, medicine, and gardening (since he was an avid gardener and farmer).

6)

Native plants were essential for **transportation** – they were the foundation for the building of this country. Indians used **native trees** such as spruce, cedar, fir, or birch to make **canoes**.

7)

**White birch** (the state tree of New Hampshire) is also called **canoe birch or paper birch**. We have several birch species in Idaho including the western paper birch. The bark is very thin and peels off in papery layers.

Jefferson instructed L&C to make several copies of their journals – one copy was to be transcribed on **paper birch bark** since it was more durable than ordinary paper. (Unfortunately they never did make extra copies, and portions of their journals are still considered missing.)

8)

L&C found out the hard way that their iron boats were too heavy to portage around waterfalls. In some areas, they were able to purchase **canoes** from the Indians (they also made their own dugout canoes). Clark admired the Indians' canoes so much that he wrote over 1,000 words to describe them. He noted that some canoes made by the Indians of the lower Columbia were over 50 ft long and carried 20-30 people. He even observed them riding in high waves seemingly without effort.

9)

The Indians prized their **canoes** very highly. This exchange was made as the Corps prepared for their departure from Fort Clatsop on the Oregon coast. After several unsuccessful attempts to purchase a canoe, the captains realized that the price had to be right. A coat – or no deal (according to Lewis, it was a very fine coat that had hardly been worn!) (Photo is from the Canadian canoe museum.)

10)

Can a tree be a life-saver?? Near Livingston, Montana in July 1805, one of the men fell onto a snag that gouged a deep hole in his thigh. Since he couldn't walk, canoes were imperative. Clark found 2 **cottonwoods** that the men turned into 28-foot canoes.

How far do you think they could travel in 1 day?? With canoes and favorable river conditions, they floated up to 90 miles in one day! [Compare that with some parts of the trip where they were only able to travel 1 mile in a day! – i.e., portaging by foot in rugged terrain.]

To my knowledge, the largest dugout canoe they made was 33 feet long! It came from a huge cottonwood tree at “Canoe Camp” near Great Falls, Montana.

In addition to canoes, they used cottonwoods for wheels and wagons. (Remember there were no service stations or convenience stores!)

11)

When you’re going on a trip, you always bring a first aid kit (right?) Here’s a partial list of their **medical supplies**. Would you trust a doctor who used these? Fortunately, some of the practices they used (like blood-letting) are no longer accepted by modern medicine.

There was no physician on the expedition, since Jefferson trusted Lewis’ skills and didn’t trust most physicians! Lewis’ mother (Lucy Marks) was a herbalist/healer in Virginia, so he was well acquainted with the healing properties of plants. During the journey, Lewis would record several plants that were used medicinally by Native Americans. Surprisingly, only one person died during the expedition - from peritonitis.

12)

Having enough **food** was obviously a primary concern. Food could be broken into 3 categories: 1) food they brought with them, 2) food they garnered from hunting and fishing, and 3) food they obtained through trade or as gifts from the Indians.

This is a partial list of food purchased from vendors before the trip. The actual amount of food they brought with them was very restricted due to limited space. This made finding food even more important as the expedition progressed.

I probably would have brought several pounds of chocolate! They had no cheese or dairy products until the end of the trip.

13)

Fortunately for L&C, the first stages of the journey were relatively easy – gentle terrain and plenty of game. (Right photo: **native prairie** near Ames, Iowa.) The tallgrass prairie once covered millions of acres in the Midwest. The grasses could be 12 feet tall! Prairies are indicators of fertile soil that’s valuable for agriculture.

Tobacco was the main cash crop of the US at the time, and it was very land wasteful. After a few years of growing tobacco, the soil was depleted and they would have to find new land. So, the areas with fertile soil that were noted by the expedition would be very important for future settlement.

We have some remnant prairies in Idaho (although they're not tall grass prairies) – e.g., the Palouse prairie near Lewiston.

14)

As they moved farther west, the going got tougher. The **Rocky Mountains** in Idaho and Montana were very different than the Appalachians in the East. Crossing the Rockies was one of the greatest challenges of the Expedition.

In fact, they nearly starved to death as they **crossed the Bitterroots** from Montana to Idaho (in September 1805). They were forced to subsist for days on berries alone. Lewis called the route “intolerable” – steep, tortuous, and seemingly endless. This area would later become the Clearwater National Forest – one of the most beautiful (and most rugged) segments of the journey.

15)

It was a real life **obstacle course** -- They were faced with waterfalls, dense forests, steep cliffs, grizzly bears, and snow that could block their passage and strand them for months – if they were caught in the high elevations in winter.

16)

**Route-finding** was serious business! Today, we're spoiled by things like GPS (global positioning systems), although I know some people who can't even find their car in the parking lot! L&C made celestial observations and often relied on the local tribes for help.

17)

Their “supermarket” was the great outdoors. But of the many plants they would see, which ones were good to eat? Which would make them sick? Or even kill them? That's where the Indians (especially **Sacajawea**) played a vital role.

18)

**Sacajawea** knew many of the plants along the way, and she helped make contact with the tribes they met. Having a Native American woman (with a baby even!) on the expedition was a key ingredient to the success of the expedition. It was a signal to tribes they met that they were a peaceful party.

19)

Over one-third of the species collected by L&C (about 100 species) grow right here in our own backyard (on the Boise NF)!

Here's a few of the **Idaho native plants** they found.

20)

Lewis's **chokecherry** "cure" –

On June 11, 1805, Lewis set off from the main party with 4 men to follow what they thought was the Missouri River (near Great Falls, Montana). Later that day, he developed a severe pain in his intestines and a high fever. Since he had no medical supplies with him, he wanted to "try an experiment". Lewis looked around for a suitable plant, and found a chokecherry (probably a variety of *Prunus virginiana*). He and the men gathered several twigs from the tree, stripped off the leaves, and cut the twigs into small pieces. The twigs were boiled in water "until a strong black decoction of an astringent bitter taste was produced".

Lewis drank 2 pints of this beverage before he went to sleep. By 10 pm, his fever and pain were gone. He slept soundly that night, had another swig of the remedy the next morning and resumed his march.

That evening, *after walking 37 miles*, Lewis admitted that he was a little tired. He attributed this to his recent illness and not at all to his long walk!

[Note – **Chokecherry leaves are poisonous** – they contain cyanide! The use of native plants in home remedies is not recommended. Many species that have been used medicinally are actually poisonous.]

21)

We also have another native cherry in our area that was collected by L&C – **bitter cherry**. It's similar to chokecherry, although the flowers of bitter cherry look more like a rounded clump than a long cluster.

22)

L&C collected several species of **lilies**. There are 4,000 species of lilies worldwide. They must have felt some comfort when they found plants that were familiar (like meeting an old friend!). Lewis often compared species they encountered to eastern species that he was familiar with. As a group, lilies are easy to recognize, and many (though not all!) are edible. (Top photo – trillium, bottom – pink-flowered onion.)

23)

**Glacier lilies** bloom right after the snow melts in the mountains. They're also called "bears teeth" since the bulbs look like bear's teeth when peeled. Grizzly bears have been

known to dig up the bulbs and come back to eat them a day or two later – this increases the sugar content of bulbs.

24)

**Camas** was a staple food for many tribes in Idaho and Montana. The Corps first ate camas in bread and soup served by the Nez Perce in the fall of 1805. They were nearly starving from their difficult crossing of the Bitterroot Mountains, and the food supplied by the Nez Perce was a life-saver.

25)

The **camas fields** at Weippe Prairie and Musselshell Meadows were some of the largest camas gathering fields in the NW. Indians from as far away as the Pacific coast would travel to gather camas here.

Lewis said: “**from the color of its bloom....it resembles lakes of fine clear water. So complete is its deception that on first sight, I could have sworn it was water.**” –June 12, 1806

(Top left photo: Packer Meadow, Clearwater NF, Idaho.)

26)

**Camas bulb** -- Like onions, cooking helps make camas more digestible. The Nez Perce ate camas both raw and cooked. They would cook the bulbs underground for 2-3 days (which converts inulin – an indigestible starch – into fructose). Then they could pound and shape the camas into cakes that could last through the winter (some cakes weighed 10 pounds!).

27)

Another edible lily, **yellow bells** are often found growing together with glacier lilies. L&C collected both glacier lilies and yellow bells along the Clearwater River.

28)

**Western wake-robin** or trillium typically blooms around Easter at low elevations (you could say it's an Easter lily!). Because they prefer moist woods, wake-robins are more common in the northern part of the Boise NF. The flowers are very distinctive with 3 large white petals that fade to pink or purple. You can find this species in forests from British Columbia to California.

29)



Another member of the lily family, **false hellebore** is beautiful but poisonous! It's often found in mountain meadows and near seeps or springs. False hellebore was collected by L&C along the Lolo trail in northern Idaho.

Since its leaves resemble corn, another common name is "corn lily". A related species has been used to treat hypertension.

30)

As the name implies, **death camas** is also poisonous. L&C collected the mountain death camas by the Blackfoot River on the same day they crossed the Continental Divide (at Lewis and Clark Pass, Montana, on July 7, 1806). A close relative – the foothills death camas – grows right here in the Boise foothills. Apparently bees that drink too much of the plant's nectar can die from poisoning. Death camas often grows together with edible species (like wild onions). Two bulbs can be fatal!

31)

Some of the plants they collected would later become **state flowers** – like our very own **syringa**. Syringa is also called mock-orange because the flowers are incredibly fragrant. The species name honors Meriwether Lewis.

32)

**Native Americans** appreciated **syringa** long before Idaho became a state. Bows and arrows were made out of the shrub's stems. They used grubs to eat the tender pith, leaving a hollow stem that could be used as a pipe. Cradles were woven out of syringa wood, and soap was made from the leaves.

33)

Although **Oregon grape** is Oregon's state flower, it can be the dominant shrub in the understory of our central Idaho Douglas-fir forests.

34)

Like syringa, **Oregon grape** is a popular ornamental. Bright yellow flowers appear in April or May, then in summer, it has lots of dark blue fruits that look like miniature blueberries. The fall foliage is also quite attractive.

35)

**Bitterroot** is Montana's state flower -- the genus name *Lewisia* honors Lewis. "Rediviva" means "rebirth" or "to revive" - referring to the plant's hardiness. Plants that have been dried and pressed for many years can grow when replanted (aka "Lewis' plant that came back to life")!

Bitterroot must be peeled and cooked to be palatable. Here's what Lewis said about bitterroot – “**This the Indians with me informed me were always boiled for use. I made the experiment, and found that they became perfectly soft by boiling, but had a very bitter taste, which was naucious to my pallate, and I transfered them to the Indians who had ate them heartily.**” So perhaps it's an acquired taste!

36)

Lewis was so impressed when he first spotted this wonderful wildflower at Kamiah, he wrote more than 500 words to describe it! He regretted that there were no ripe seeds to take with him to grow. It was later named *Clarkia pulchella* – beautiful clarkia – after Captain Clark.

37)

Another one of Lewis' namesakes – **Lewis' monkeyflower** is a brilliant pink monkeyflower that grows along many of our mountain streams and seeps. The small red dots in the center of the flower are called “nectar-guides” since they serve as a signal (like highway signs) for pollinators. There are many species of monkeyflowers, but I think this is the most striking.

38)

**Lewis's flax** is the wild relative of the cultivated flax (*Linum usitatissimum*). Flax is cultivated for fiber (linen) and oil (linseed oil). Lewis's flax is an excellent garden plant - especially if you're a birdwatcher since birds love the nutritious seeds.

39)

When they returned, Lewis handed over his plant collection to **Frederick Pursh**, a German born botanist. Pursh described and illustrated many of the plants, and included them in his book on the Flora of North America (published in 1813). Pursh took numerous specimens with him to New York and then to London, but fortunately most of these were recovered. Today, Lewis's plant specimens (226) are housed at the Lewis and Clark Herbarium in the Academy of Natural Sciences in Philadelphia.

**Bitterbrush** (or *Purshia tridentata*) is named after Pursh. Bitterbrush is very important forage for wildlife (esp. deer and elk winter range). Indians used the bark for diapers and moccasins, and made a purple dye from the seeds

40)

*Lewisia kelloggii* → *Lewisia sacajawean*!

Many species of plants and animals were named after Lewis and Clark, but none were named after Sacajawea. We hope to change that! The Boise NF is home to a new species of bitterroot (formerly Kellogg's bitterroot) that we plan to name after Sacajawea – **Sacajawea's bitterroot!**

41)

**Sacajawea's bitterroot** also grows on the Payette, Sawtooth, and Salmon-Challis NF's in beautiful subalpine habitats. (Photos of type locality at Pilot Peak, Idaho City RD, and root)

42)

Some of plants collected by L&C are quite unusual, but you might not be able to tell unless you looked very closely. L&C collected this species (**elephant's-heads**) in May 1806 near Kamiah.

Strangely enough, some plants actually resemble animals (mimicry). For certain orchids, this helps them get pollinated. The orchid flower looks like a female wasp, so the unsuspecting male wasp attempts to mate with the flower and pollinates it.

43)

But -- I'm not sure how this plant benefits from the **elephant** resemblance? Only its pollinator knows for sure!

44)

**What they didn't collect** – poison ivy!

45)

We've come to the end of our journey with Lewis and Clark. Even though many things have changed along the L&C trail, some things haven't changed. **Idaho** is one of the few states where major portions of the L&C trail are still intact - and has been relatively unchanged for the past 200 years.

(photo – Lake creek lake, nr Salmon River)

46)

After the expedition was completed, Thomas Jefferson said: "**Lewis' journey across our continent has added a number of new plants to our former stock. Some of them are curious, some ornamental, some useful, and some may by culture be made acceptable to our tables.**"

47)

[4 photos – Indian gathering, Sacajawea, etc.]

Perhaps the most important thing about L&C is that the expedition highlighted the wonderful **diversity of plants, animals, and special places in the West**. And, I hope that these natural wonders will be around for another 200 years!

**Native plants** are as valuable today as they were during L&C's journey of discovery! Today, 3 out of 4 drugs are derived from plants. Yet relatively few species have been tested for their potential use in medicine.

Plants and forests also provide us with clean water, wildlife habitat, and lots of recreational opportunities.

48)

I encourage you to go forth and make **discoveries** of your own -- whether it's along the L&C trail or elsewhere on our **National Forests**.

49)

To **find out more about Lewis and Clark**, there are numerous helpful websites with maps, photos, and even teacher's guides. The L&C herbarium website lists all the plants collected by L&C and has excellent photos. You can even order L&C seeds from Monticello -- the home of Thomas Jefferson -- as well as other nurseries, so you can grow your own historic garden!

50) Gary Larson – “more tension on the Lewis and Clark expedition”

**Questions?**

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\*\*\*OPTIONAL Additional Materials for Presentation:\*\*\*

Pine needle baskets, willow snowshoes (or other Native American cultural items to share)

“Beautiful Discoveries – Plants of the Lewis and Clark Expedition” (Wayne Owen, author; produced by the Forest Service and Wild Outdoor World magazine)

Native plants and/or seeds (if available)