CULTIVATION

BOTANY.— Wood grows here [Concord] with great rapidity; and it is supposed there is as much now as there was twenty years ago. Walden woods at the south, and other lots towards the southwest parts of the town, are the most extensive, covering several hundred acres of light-soil land. Much of the fuel, which is consumed, is, however brought from the neighbouring towns. The most common trees are the oak, pine, maple, elm, white birch, chestnut, walnut, &c., &c. Hemlock and spruce are very rare. The ornamental trees transplanted, in this as in most other towns, do not appear to have been placed with much regularity; but as they are, they contribute much to the comfort and beauty of the town. The elm, buttonwood, horse-chestnut, and fruit trees have very properly taken the place of sickly poplars, in ornamenting the dwellings. The large elm in front of the court-house, –the pride of the common,– is almost unrivalled in beauty. It is about "three score and ten," but is still growing with youthful vigor and uniform rapidity.

Dr. Jarvis, who is familiar with the botany of Concord, informs me, that "most of the plants found in the middle parts of the state grow here, excepting the alpine flowers. The extensive low lands produce abundantly the natural families of the aroideæ, typhæ, cyperoideæ, gramineæ, junci, corymbiferæ and unbelliferæ. These genera especially abound. There are also found, the juncus militaris (bayonet rush), on the borders of Fairhaven pond; cornus florida; lobelia carinalis (cardinal flower) abundant on the borders of the river; polygala cruciata, in the east parts of the town; nyssa villosa (swamp hornbeam) at the foot of Fairhaven hill." The cicuta Americana (hemlock) grows abundant on the intervals. Every person should know and shun it for its poisonous qualities.

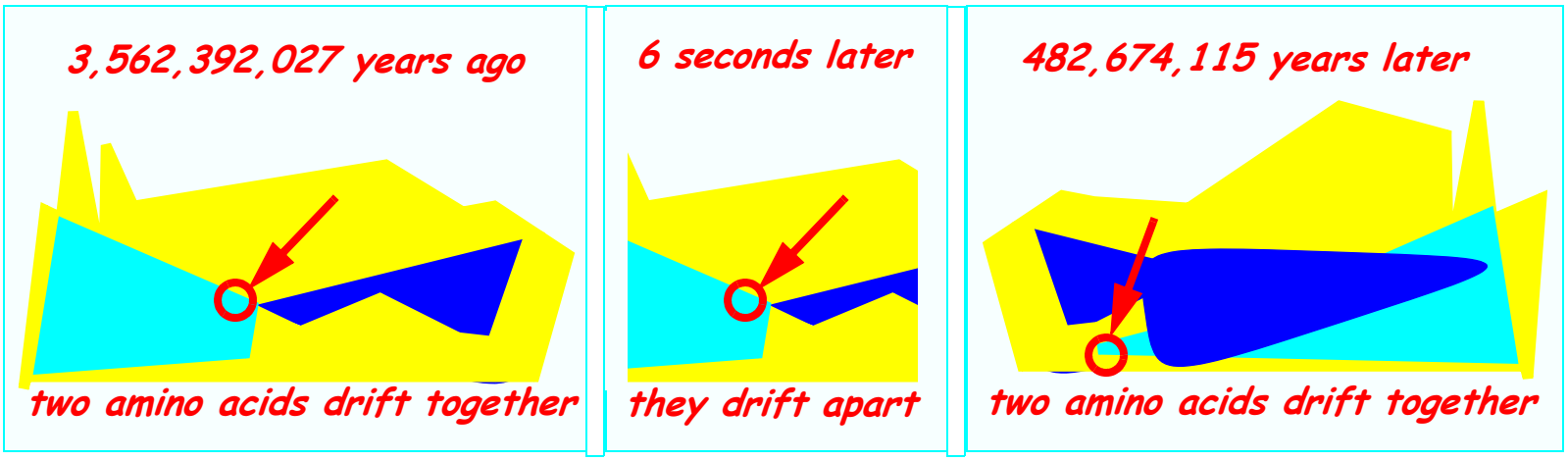
There are many excellent and well cultivated farms in the town, which produce winter rye, corn, potatoes and the usual productions of the vicinity. Garden seeds have been extensively raised. Teasels and the culture of silk have recently been introduced. Considerable attention has of late been paid to the cultivation of fruit trees, grape vines, and other horticultural productions, and, though a too long neglected branch of agriculture in this town, there is no doubt that nature has done enough for the soil to ensure great success.[1]

1. Lemuel Shattuck's 1835 A HISTORY OF THE TOWN OF CONCORD;... Boston: Russell, Odiorne, and Company; Concord MA: John Stacy
(On or about November 11, 1837 Henry Thoreau would indicate a familiarity with the contents of at least pages 2-3 and 6-9 of this historical study.)

3,750,000,000 BCE

Mixed deposits of ferrous and ferric oxide suggest the presence of free atmospheric oxygen. Since this is construed as evidence for photosynthetic activity, we infer that Adam the Protomacron had come into existence, perhaps attached to a fragment of clay, as a sac without internal structure, capable of some form of self-replication:

The Origin of Life



[Thanks for the above to Kauffman, Stuart A., "At Home in the Universe: The Search for Laws of Self-Organization and Complexity," (1995), Penguin: London, 1996, reprint, pp. 34-35.] With the benefit of hindsight, but only with the benefit of hindsight, we can now declare that this macromolecule had a characteristic probably not possessed by any previous macromolecule: it was "alive." Various forms of this protomacron would dominate the surface of the planet for the next billion years or so, before the next significant step in development would occur. (It must be emphasized that whatever this initial simple form of life amounted to, it eventually was absorbed and superseded so totally as to leave no trace of itself behind. The earliest precursors of which we now have any trace, such as fossils in the rocks left by mats of blue-green algae, are already vastly more complicated than it would have been possible for this first form of living being to have been. For more about this, consult Manfred Eigen's STEPS TOWARDS LIFE: A PERSPECTIVE ON EVOLUTION, Oxford UP, 1992.)

PLANTS

3,500,000,000 BCE

Origination of the oldest dated stromatolites. These layered geological formations are built by successive generations of blue-green algae (cyanobacteria). Lower Precambrian rocks in South Africa contain what is possibly the earliest known evidence of cellular organisms, resembling blue-green algae.

PLANTS

2,000,000,000 BCE

In 1972, at the Pierrelatte refining facility in France, a discovery was made in uranium ore that had been unearthed at the Oklo River mine of Eastern Gabon, Africa. This ore was found to be depleted in $Uranium_{235}$, the fissile isotope we now use in our nuclear power plants. What had been the cause of this anomalous depletion? –Some two billions of years ago, it seems, the natural concentration of radioactive elements in that strata of rocks had caused beneath the surface of the earth a local natural criticality — a self-sustaining fission reaction, a natural nuclear reactor. It had not gone off like an A-bomb (it had not formed itself into a supercritical mass of sufficient size and density, minimal 5% concentration in a minimal mass of some 11 kilograms, to result in a criticality), but –perhaps in combination with surface lightning strikes– the concentration had been sufficient to cause unusual local depletion of this isotope in the ore. We're actually not doing anything in our nuclear power reactors –such as the six that until recently were lined up along the coast at the Fukushima Daiichi electric-power facility in Japan– that the planet hadn't already done on its lonesome, long before the human species, long before animals, long before land plants, back in the era in which the only life that as yet existed on this planet was in the form of strands of blue-green algae!

Data suggest that by this time in the history of the Earth, despite the fact that life was still confined to cyanobacteria blooms in the waters — molecular oxygen had already begun to make a significant difference in the nature of the enveloping atmosphere.

PLANTS

1,600,000,000 BCE

Strong evidence indicates that filamentous and unicellular blue green algae existed by this period in the history of the Earth.

PLANTS

900,000,000 BCE

Late Precambrian deposits at Bitter Springs, Australia, hold numerous kinds of blue-green and green algae.

PLANTS

570,000,000 BCE

Dawning of the Paleozoic era.

PLANTS

395,000,000 BCE

The lower Devonian period. The Scottish Rhynie chert deposit from this period is famous for its excellent representation of *Rhynia*, one of the earliest vascular plants in the fossil record.

PLANTS

350,000,000 BCE

Land plants became significant. By the upper Devonian, *Calamites* (the giant horsetail) would become abundant (in strata of that age). We know now that seed bearing plants (*Archaeosperma* and *Spermolithus*) are represented in upper Devonian deposits.

PLANTS

345,000,000 BCE

Now termed the Mississippian, this period together with the Pennsylvanian (through to 225,000,000 BCE) once was taken to constitute the Carboniferous, the age of coal.

PLANTS

136,000,000 BCE

Deposits from the Cretaceous period contain our 1st present evidence of flowering plants.

PLANTS

50,000 BCE

By this point, archeologists suspect, humans had begun to notice that certain leaves impart delicious flavor to food.Wild date seed were left in the Shanidar Cave of Northern Iraq. Also found at that site was evidence that

SPICE

cave dwellers consumed chestnuts, walnuts, pine nuts, and acorns.

PLANTS

17,000 BCE

Excavations at Wadi Kubbaniya, Nile Valley (Egypt) reveal charred remains of 25 different plants, including wild nut sedge tubers, acacia seed, cattail rhizomes, and palm fruit.

PLANTS

8,500 BCE

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
8,500 BCE	wheat		Southwest Asia

8,000 BCE

Wheat and barley were Near Eastern food crops. In ancient cultures barley was the everyday food of the poor. Archeologists have learned that by this time people used flint sickles and grinding stones. The cultivation of grains had an essential role in the development of civilization.

PLANTS

Recent discovery of squash seeds in a granary on the western slope of the Andes, in what is now Peru, indicates that by this point agriculture had begun there. It would seem that human agriculture had five points of origin and although all were independent, they occurred in approximately the same timeframe.

A recent genetic study indicates that the wild cat that had domesticated itself by this point in time was the *Felis silvestris lybica* of Turkey and the Middle East.

CAT

Archeological remains indicate that cannabis (hemp) was one of our early cultivated plants. Hemp textile making apparently started more or less simultaneously in Europe and Asia.

PLANTS

7,500 BCE

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia

Jared Diamond's Domesticated Plant Species

8,500 BCE	wheat		Southwest Asia
by 7,500 BCE	millet		China
by 7,500 BCE	rice		China

7,000 BCE

Flax was known in Syria and Turkey, and is apparently the earliest plant source for fiber (linen) as well as an important source of oil (pressed from the seed). By 5000 BCE we know that various flax species were involved. Evidence shows that seed size increased over time, suggesting that humans were selecting for larger seed.

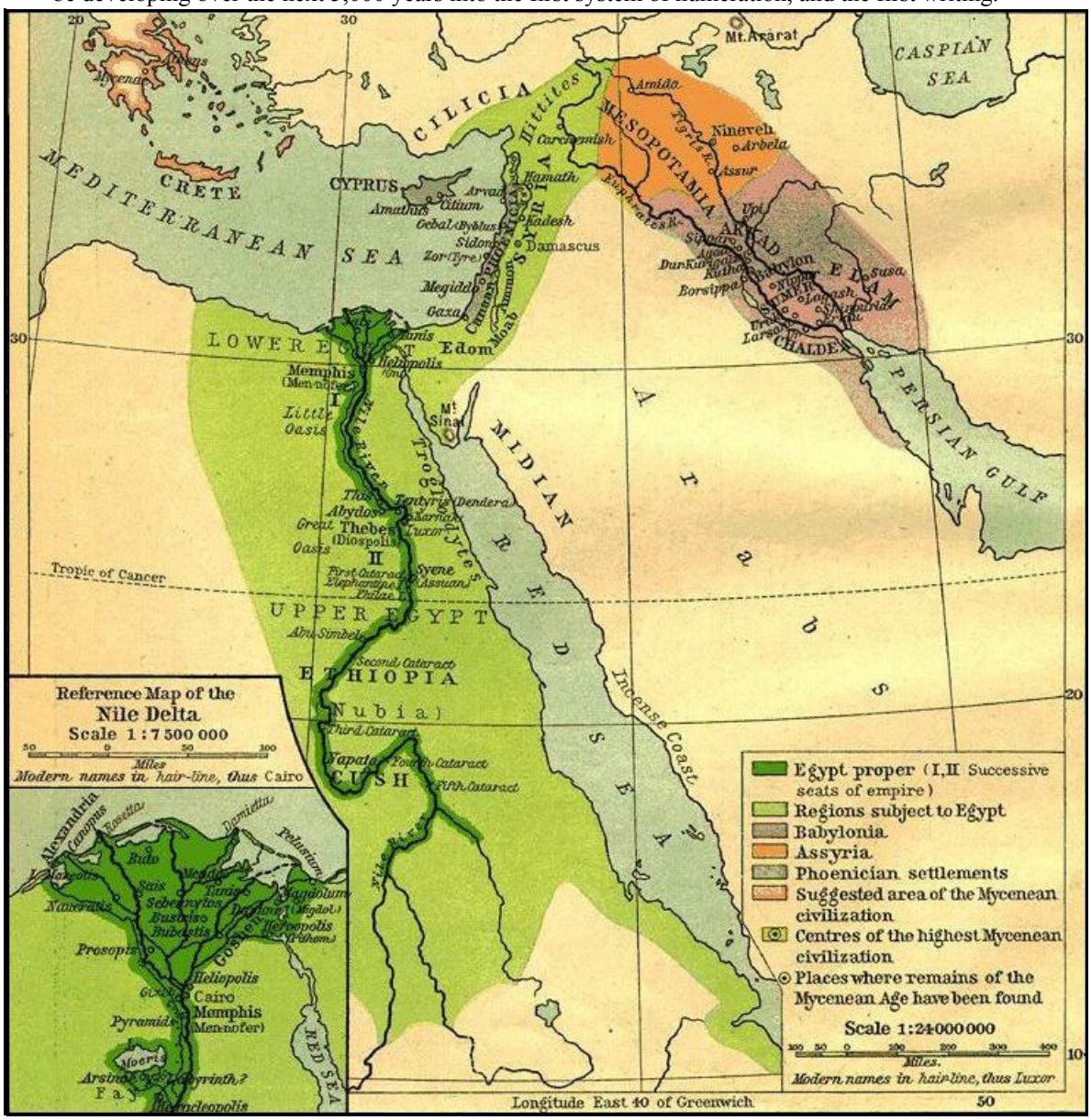
PLANTS

From this point until 6,200 BCE, climates would be warmer and often moister than today's.

A first walled settlement was built on the site of Jericho, sporting a tower and amounting to 74 acres.

Floodwater agriculture would be being used in the valley of the Nile River, and in southwestern Asia.

In the land of the two parallel rivers, Mesopotamia, there were the beginnings of settled agriculture. They were using clay tokens to record the numbers of animals and the measures of grain; this practice would gradually be developing over the next 5,000 years into the first system of numeration, and the first writing.



Potatoes and beans would be being domesticated in Peru.

PLANTS

Pumpkins would be being domesticated in middle America.

Rice would be being domesticated in Indochina.

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
8,500 BCE	wheat		Southwest Asia
by 7,500 BCE	millet		China
by 7,500 BCE	rice		China
7,000 BCE	eggplant		Indus Valley
7,000 BCE	sesame		Indus Valley
7,000 BCE?	sugar cane		New Guinea?
7,000 BCE?	banana	*Musa sapientum*	New Guinea?

6,800 BCE

A "large hoard of carbonized lentils" over 1,000,000 seed, was present in B Yiftah'el, north Israel. The size of such a hoard makes it clear that these lentils were under cultivation.

PLANTS

6,500 BCE

The lentil, the pea, the chickpea, and the fava bean constituted the principal pulses for ancient Old World agriculture. The fava bean was known in Israel.

PLANTS

6,000 BCE

Settled agriculture was beginning in the valley of the Nile River.

From this point until about 3,000 BCE, settled agriculture would be coming into existence as well on the Indian subcontinent.

PLANTS

Chufa and the sycamore fig were being domesticated in Egypt.

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
8,500 BCE	wheat		Southwest Asia
by 7,500 BCE	millet		China
by 7,500 BCE	rice		China
7,000 BCE	eggplant		Indus Valley
7,000 BCE	sesame		Indus Valley
7,000 BCE?	sugar cane		New Guinea?
7,000 BCE?	banana	*Musa sapientum*	New Guinea?
6,000 BCE	chufa		Egypt
6,000 BCE	sycamore fig		Egypt
6,000-3,500 BCE	oats		Western Europe
6,000-3,500 BCE	poppy		Western Europe

Modern type domesticated bread wheat and lentils were beginning to be cultivated in southwestern Asia.

Citrus fruit was beginning to be cultivated in Indochina.

Bullrush millet was beginning to be cultivated in southern Algeria.

Finger millet was beginning to be cultivated in Ethiopia.

Foxtail millet and peaches were beginning to be cultivated in central China.

In China, the beginning of the village of Ban Po.

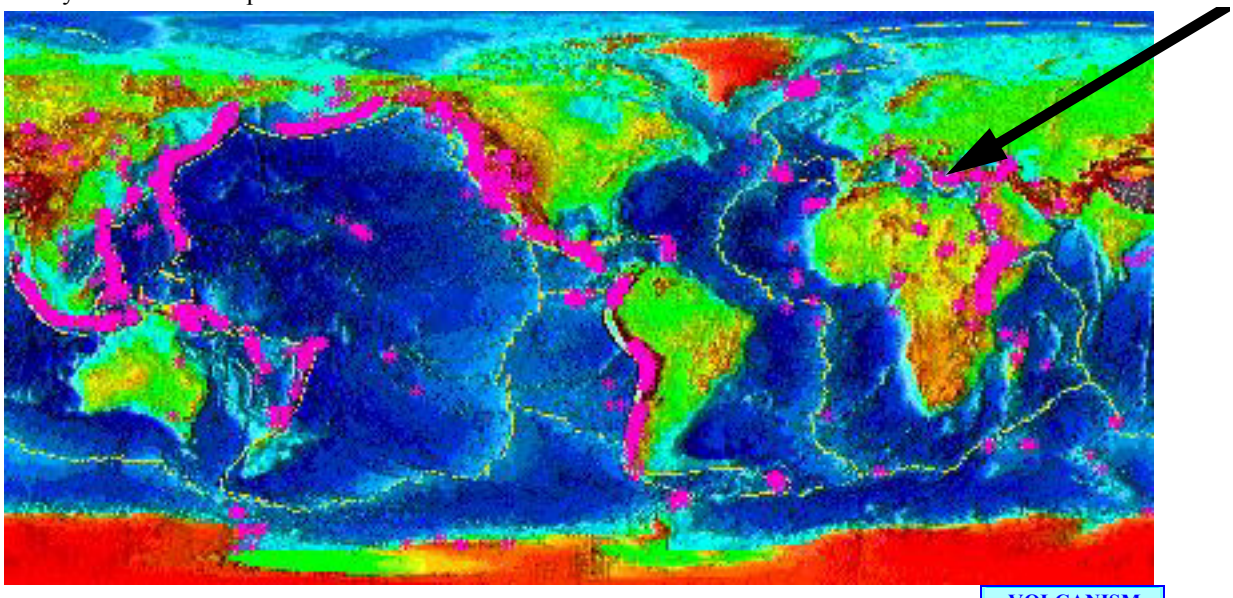
Squash was beginning to be cultivated in Mexico.

Irrigation was coming into use in Mesopotamia.

Chili peppers and beans dating to this period have been discovered in a Peruvian highland valley. Both regular beans (*Phaseolus vulgaris*) and lima beans (*Phaseolus lunatus*) are known archaeologically from Peru.

PLANTS

The earliest know documentation of "volcanism" is a wall painting in Anatolia (present-day Turkey) of a nearby cinder cone eruption.[2]



VOLCANISM

Durham (macaroni) wheat was cultivated in Anatolia and domesticated cattle were to be found in southeastern Anatolia.

PLANTS

5,500 BCE

In midden levels dating from 7,000 to 5,500 BCE in Tamaulipas, Mexico, researchers have discovered evidence of gourds, squashes, beans, and chili peppers.

PLANTS

2. Our term “volcano” derives from Vulcano, a small island at the southern boundary of the Aeolian Islands about 25 kilometers from northern Sicily. This last erupted in 1888-1890. Vulcanello, the youngest part of Vulcano Island, began to form only about 2,100 years ago as an isolated island that later became connected with the main island. The latest activity at Vulcanello occurred in the 16th Century — its lava flows now host large hotel complexes.

5,000 BCE

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
8,500 BCE	wheat		Southwest Asia
by 7,500 BCE	millet		China
by 7,500 BCE	rice		China
7,000 BCE	eggplant		Indus Valley
7,000 BCE	sesame		Indus Valley
7,000 BCE?	sugar cane		New Guinea?
7,000 BCE?	banana	*Musa sapientum*	New Guinea?
6,000 BCE	chufa		Egypt
6,000 BCE	sycamore fig		Egypt
6,000-3,500 BCE	oats		Western Europe
6,000-3,500 BCE	poppy		Western Europe
by 5,000 BCE	sorghum		Sahel?
by 5,000 BCE	African rice		Sahel?

We can roughly position the "Garden of Eden" mythology, for what it's worth, in Mesopotamia in the timeframe 6,000-4,000 BCE, because during that time period the temperature was warming, culminating in an era somewhat warmer than present, in which equatorial weather patterns may have reached farther north than they do now and westerly storms may have been confined to latitudes higher than at present. During the following period, until 2,700 BCE, the YangShao culture would be flourishing in farming villages in various valleys of the Yellow River[3] of China, from which sites we have collected pottery that had been painted.

PLANTS

Domesticated rice (*Oryza sativa*) is reported from the Ho-mu-tu site in what is now Chekiang province of China. Cabbage seed from this period has been uncovered, in earthen jars, in Shensi Province — cabbage today makes up fully 1/4 of all expenditures for vegetables among Chinese families!

4,000 BCE

3. The Yellow River could not have been as yet referred to as the Yellow River, because its waters were clear. It would be during the Qin and Han dynasties that the Chinese central government would promote farming along the upper reaches of the river's watershed, and the flow of sediments would begin. Now, of course, a very dangerous situation exists downstream, because the years of deposit of sedimentation have raised the riverbed until it is held in its channel only by enormous man-made dikes along each side of the flow. The bottom of the river can now be higher, rather than lower, than the surrounding fields.

Plant	Name	Place
Grape	*Vitus vinifera*	Eastern Mediterranean
Onion	*Allium Cepa*	Western Asia

Vitis vinifera is believed to have been cultivated from Afghanistan to the Black Sea.

PLANTS

Cotton seed dating from this period has been found in Pakistan.

At about this point, native North and South Americans, descended from Asians who'd crossed the land bridge across the Bering Strait long ago, hunted and cultivated corn. Archeological evidence of Mastodons driven to extinction, and arrowheads and spear points found in caves in Clovis and Folsom, New Mexico, establish that these natives lived in the New World for millennia — how many millennia is subject to debate.

Holocene delta development worldwide transgressive sequence of deltaic deposits.

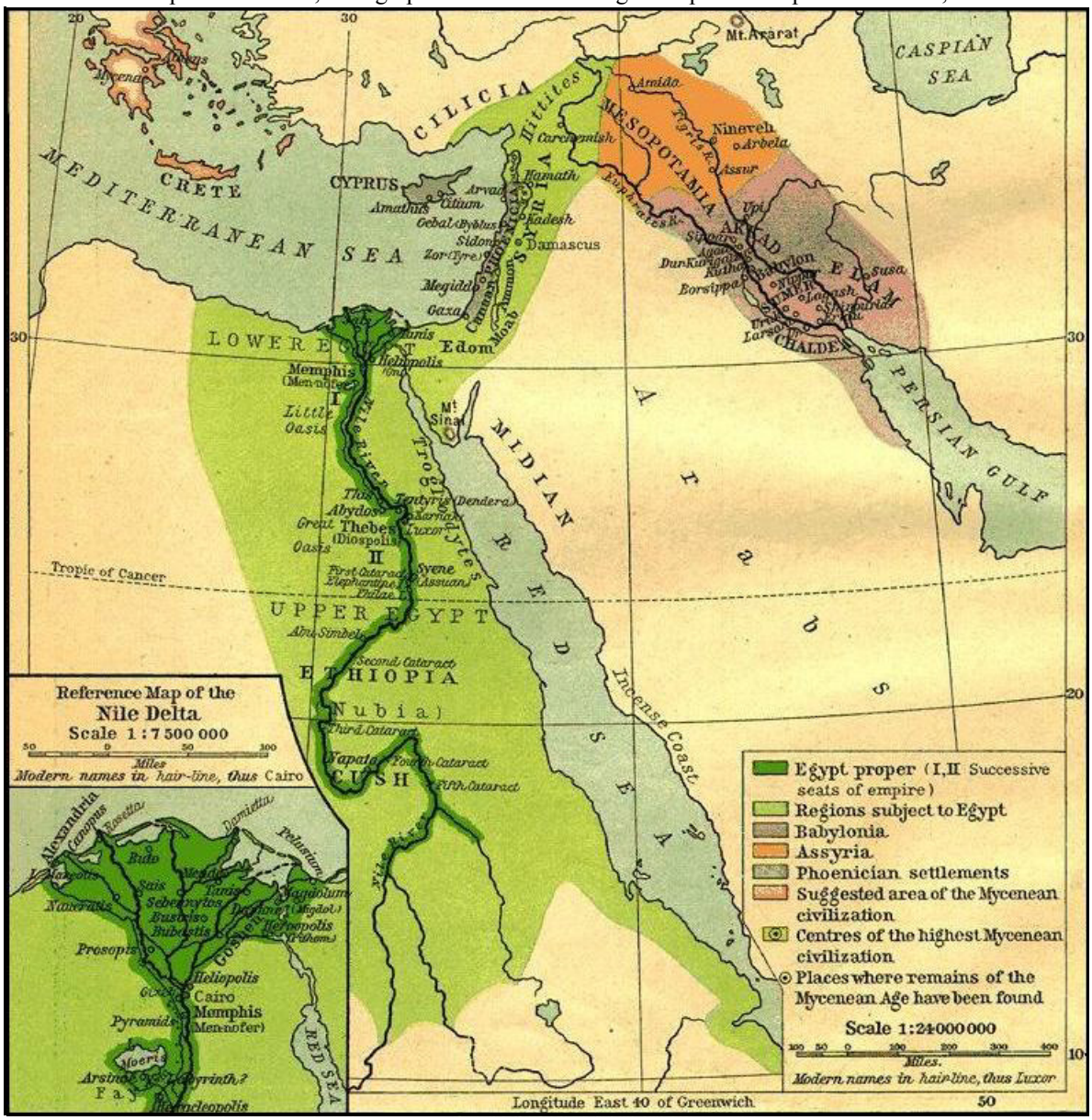
At about this point, it was "Eden"; wet warm conditions in Near East, time of plenty.

At about this point, there was rapid development of a rich, fertile delta in Mesopotamia

At about this point, the Irish elk decline, 4000 to 3250 BCE.

At about this point, in what is now the US; on Mississippi at 6000 BP, slowing sea level rise at 10-15 below present level, beginning of meander belts. Development of Pine Island Beach trend, a linear sand shoal developed when sea level slowed 10-15 ft. below present level at mouth of Mississippi (currently beneath Lake Pontchartrain).

At about this point, in Mesopotamia; Sea level, Persian Gulf Recent (1996) reviews of Persian Gulf paleosealevel indicates that levels were up to 2 meters higher than at present during the period 6000-4000 BP. In the Mesopotamian delta, stratigraphic relations showing the rapid development of a rich, fertile delta.



3,500 BCE

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
8,500 BCE	wheat		Southwest Asia
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by 7,500 BCE	rice		China
7,000 BCE	eggplant		Indus Valley
7,000 BCE	sesame		Indus Valley
7,000 BCE?	sugar cane		New Guinea?
7,000 BCE?	banana	*Musa sapientum*	New Guinea?
6,000 BCE	chufa		Egypt
6,000 BCE	sycamore fig		Egypt
6,000-3,500 BCE	oats		Western Europe
6,000-3,500 BCE	poppy		Western Europe
by 5,000 BCE	sorghum		Sahel?
by 5,000 BCE	African rice		Sahel?
by 3,500 BCE	Corn (maize)	*Zea mays*	Mesoamerica
by 3,500 BCE	beans		Mesoamerica
by 3,500 BCE	squash		Mesoamerica
by 3,500 BCE	manioc		Amazonia
by 3,500 BCE	potato	*Solanum tuberosum*	Andes of South America

3,000 BCE

Jared Diamond's Domesticated Plant Species

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8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
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by 7,500 BCE	millet		China
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Jared Diamond's Domesticated Plant Species

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by 3,500 BCE	squash		Mesoamerica
by 3,500 BCE	manioc		Amazonia
by 3,500 BCE	potato	*Solanum tuberosum*	Andes of South America
by 3,000 BCE	African yams	*Dioscorea*	Tropical West Africa?
by 3,000 BCE	oil palm		Tropical West Africa?

Plant	Name	Place
Garlic	*Allium sativum*	Western Asia
Rhubarb	*Rheum rhaponticum*	Asia Minor

OTHERS

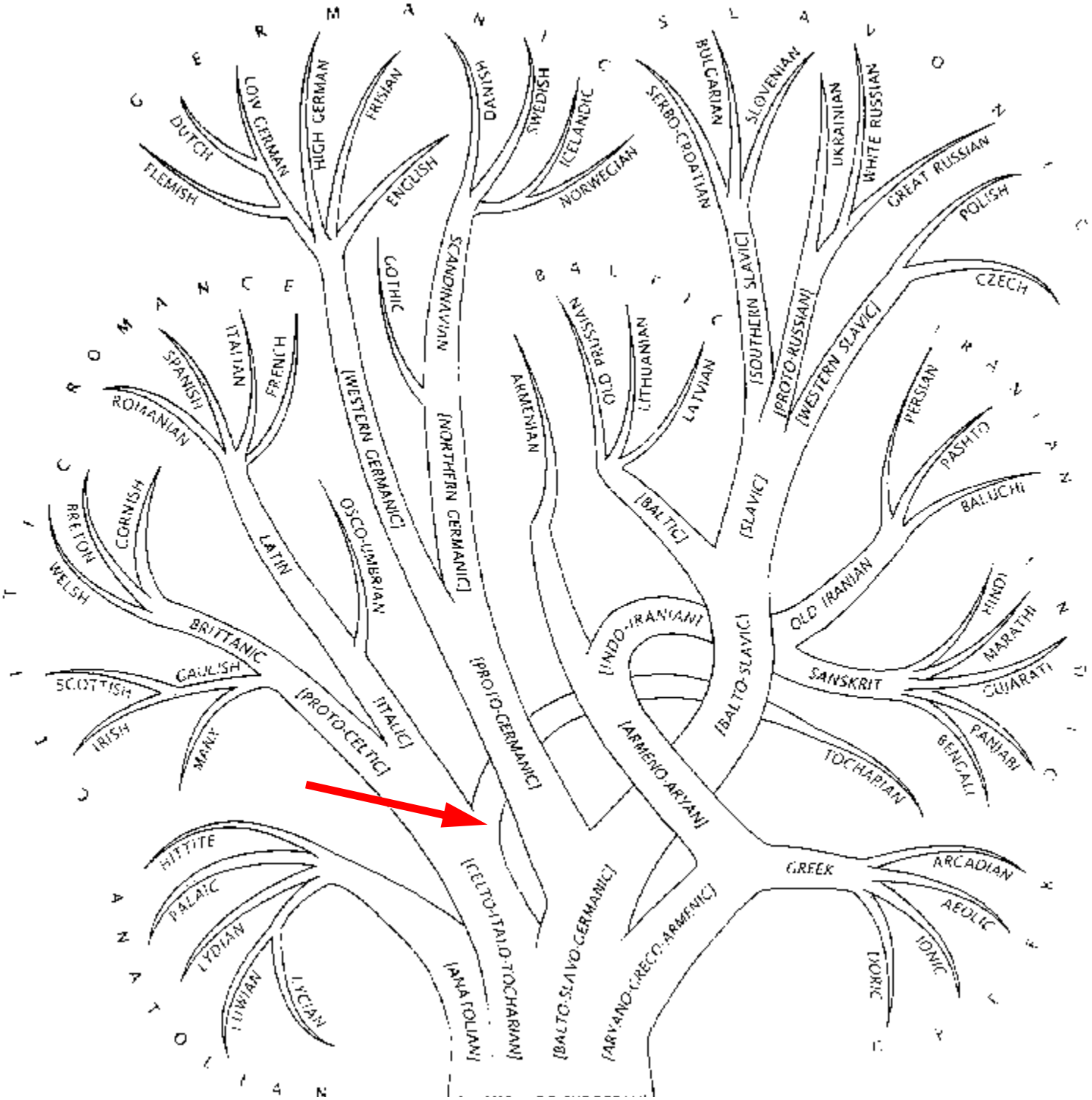
At about this point, Megalithic tombs were first being constructed in Ireland.
Sorghum was known in sub-Saharan Africa.

PLANTS

At about this point in the growth of the branches of the Indo/European language family, there occurred the Tocharians and the Gutians.

THE INDO/EUROPEAN LANGUAGES

CULTIVATION CULTIVATION



2,800 BCE

In what eventually would become California, at about this timeframe, there was a sudden summer warming — as can now be seen in the tree rings of the bristle-cone pines.

PLANTS

Four-wheeled carts appeared in Eastern Europe and Manchuria. This dispersion suggests that the steppe peoples transmitted the technology.

Egyptian papyri describe the use of Indian spices such as cinnamon. These spices were not used to flavor food as much as to make medicines, dyes, and perfumes. Indeed, a 14th-Century CE list of "spices" would include 288 different items, of which the less-palatable ones would include turpentine, frankincense, and gold leaf.

A great flood occurred in the Tigris-Euphrates valley (although featured in Babylonian writings and the Bible, there had been an enormously larger flood in the Pacific Northwest of the North American continent some 16,000 years earlier).

Cotton was domesticated in India.

Clothing decorated with metal or bone disks appeared among the steppe nomads living east of the Black Sea. Judging by burial sites, decorated clothing was originally worn by women. Later, similar disks were found stitched unto men's clothing, also — but in patterns that suggest arrow and knife resistance rather than style.

Earliest bone skates, found in Budapest, Hungary (earliest date; these might have been fashioned as recently as *circa* 2000 BCE).

The *FAH SHEN-CHIH SHU* detailed the five "sacred crops" of China, soybeans, rice, wheat, barley, and millet.

PLANTS

2,737 BCE

Allegedly, the brewing of tea was discovered by the emperor Shen Nung. [Tea was not the product of a bush, but of a tree that can grow up to 60 feet high. The reason that it is always now considered a bush is that by constant pruning we keep it in bush form, and the reason that we keep it in bush form is for convenience in constant pruning of the new crops of young and tender leaves. This plant is a kind of camellia, named the *Camellia sinensis*. The *Camellia* genus itself was so named in honor of a Moravian Jesuit missionary named Kame, one of the great early white plant collectors. All of the 240 species of this *Theacea* family of plants are native to western China and northern India, but, historically, only in western China was an infusion made of the leaves, as cited in the above legend about the year 2737 BCE. In the earliest times, we know from archaeology, the infusion of the leaves was sometimes salted, sometimes mixed with boiled shallots, and sometimes spiced with dried orangepeel, dates, etc. The *Camellia sinensis* tree also was growing, unnoticed and unutilized, all over northern India, so it is appropriate that the legend cite a Chinese emperor as its discoverer.]

PLANTS

2,500 BCE

Jared Diamond's Domesticated Plant Species

Era	Plant	Name	Place
8,500 BCE	pea		Southwest Asia
8,500 BCE	olive		Southwest Asia
8,500 BCE	wheat		Southwest Asia
by 7,500 BCE	millet		China
by 7,500 BCE	rice		China
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by 3,500 BCE	manioc		Amazonia

Jared Diamond's Domesticated Plant Species

by 3,500 BCE	potato	*Solanum tuberosum*	Andes of South America
by 3,000 BCE	African yams	*Dioscorea*	Tropical West Africa?
by 3,000 BCE	oil palm		Tropical West Africa?
2,500 BCE	goosefoot		Eastern North America
2,500 BCE	sunflower		Eastern North America
?	coffee		Ethiopia?
?	teff		Ethiopia?

2,737 BCE

Allegedly, the brewing of tea was discovered by the emperor Shen Nung. [Tea was not the product of a bush, but of a tree that can grow up to 60 feet high. The reason that it is always now considered a bush is that by constant pruning we keep it in bush form, and the reason that we keep it in bush form is for convenience in constant pruning of the new crops of young and tender leaves. This plant is a kind of camellia, named the *Camellia sinensis*. The *Camellia* genus itself was so named in honor of a Moravian Jesuit missionary named Kame, one of the great early white plant collectors. All of the 240 species of this *Theacea* family of plants are native to western China and northern India, but, historically, only in western China was an infusion made of the leaves, as cited in the above legend about the year 2737 BCE. In the earliest times, we know from archaeology, the infusion of the leaves was sometimes salted, sometimes mixed with boiled shallots, and sometimes spiced with dried orangepeel, dates, etc. The *Camellia sinensis* tree also was growing, unnoticed and unutilized, all over northern India, so it is appropriate that the legend cite a Chinese emperor as its discoverer.]

PLANTS

2,300 BCE

Assyrians recorded that before their gods created the earth, they had been drinking a wine made from sesame seeds.

PLANTS

A map depicting the Mesopotamian city of Lagash was carved into a stone tablet held in the lap of a Sumerian god.

Donkey-mounted couriers begin carrying written messages about Iraq and Iran. Originally, these imperial messengers, called *angaros* in Persian and *angelos*, or angels, in Greek, had no scheduled routes or relay stations. Instead they would count on getting replacement mounts from the areas through which they traveled. This procedure would sometimes led to conflict with locals. (The government paid local leaders to provide the post riders with grooms, shelter, watering facilities, and substantial numbers of mounts. Since nothing happens

perfectly, sometimes the post riders were reduced to taking what they needed.) A modified system in which the kings kept their own postal herds worked better, and by the 13th Century the Mongols would have relay stations linking every major town between the Yellow and Black Seas.

Eastern Mediterranean smiths began beating meteoric iron into sacred knives and medallions. Meteoric iron has continued to be made into aristocratic weapons into historic times, Indonesian krisses being the most famous examples. As about 2,000 meteorites fall on earth during the typical year, meteoric iron is found throughout the world. While the Ka'bah in Mecca is probably the world's most famous iron meteorite, the largest would be found near Grootfontein, Namibia, in 1920 — a 60-65 ton block of iron shale measuring about 9 feet long, 8 feet wide, and 3-1/4 feet thick.

Friezes on the walls of a tomb in Saqqara, Egypt show youths wrestling. Other friezes on the same tombs also show boys in light tunics boxing with bare fists and fencing with papyrus stalks (perhaps in the context of playing soldier).

2,000 BCE

Before this point in time, Peach (*Prunus persica*) and apricot (*Prunus armeniaca*) had been mentioned in Chinese literature. It is supposed that *Prunus armeniaca* was transported to Greece by Alexander the Great. We have evidence that the Greeks were eating *Prunus persica* by 332 BCE. Publius Vergilius Maro (Virgil) would note the *persica* fruit in Rome *circa* 50 BCE, and by 1571 the Spanish would have introduced three types of it to Mexico.

PLANTS

Plant	Name	Place
Plum	*Prunus domestica*	Western Asia
Corn (maize)	*Zea mays*	Central South America
Peach	*Prunus persica*	China/Western Asia
Orange	*Citrus sinensis*	Indochinese Peninsula
Cantaloupe	*Cucumis melo*	Western Asia/Africa
Radish	*Raphanus sativus*	China
Soybean	*Soja max* or *Glycine soja*	China
Watermelon	*Citrullus vulgaris*	Central Africa

OTHERS

Pearl millet was being cultivated in sub-Saharan Africa.

PLANTS

Since the Bronze Age, the olive has helped constitute the wealth of many Mediterranean populations.

PLANTS

Soon alfalfa would be domesticated in Iran.

PLANTS

Beginning of settled agriculture in the Niger River Valley.

Native North-Americans had settled in permanent villages, where they domesticated dogs, and cultivated manioc, squash, maize, and beans.

PLANTS

1,552 BCE

A 65-foot-long medical scroll from Egypt (discovered in 1884 by Georg Ebers and termed the "Ebers Papyrus") lists about 800 medicinal drugs, including many herbs and spices, among them anise, caraway, cassia, coriander, fennel, cardamom, onions, garlic, thyme, mustard, sesame, fenugreek, saffron, and poppy-seed. Numerous mixtures involved opium, including one the manuscript stipulates was useful in the calming of obstreperous children.

PLANTS

1921 The covenant of God made with Abram, when he leaves Haran to go into Canaan, which begins the 430 years of sojourning.
1897 The cities of Sodom and Gomorrah are destroyed for their wickedness by fire from Heaven.
1856 The kingdom of Argos, in Greece, begins under Inachus.
1822 Memnon, the Egyptian, invents the letters.
1715 Prometheus first struck fire from flints.
1635 Joseph dies in Egypt, which concludes the book of Genesis, containing a period of 2369 years.
1574 Aaron born in Egypt: 1490, appointed by God first high priest of the Israelites.
1571 Moses, brother to Aaron, born in Egypt, and adopted by Pharoah's daughter, who educates him in all the learning of the Egyptians.
1556 Cecrops brings a colony of Saites from Egypt into Attica, and begins the kingdom of Athens in Greece.
1546 Scamander comes from Crete into Phrygia, and begins the kingdom of Troy.
1493 Cadmus carried the Phœnician letters into Greece, and built the citadel at Thebes.
1491 Moses performs a number of miracles in Egypt, and departs from that kingdom, together with 600,000 Israelites, besides children: which completed the 430 years of sojourning. They miraculously pass through the Red Sea, and come to the desert of Sinai, where Moses receives from God, and delivers to the people, the Ten Commandments, and the other laws, and sets up the tabernacle, and in it the ark of the covenant.
1485 The first ship that appeared in Greece, was brought from Egypt by Danaus, who arrived at Rhodes, and brought with him his fifty daughters.
1453 The first Olympic games celebrated at Olympia, in Greece.
1452 The Pentateuch, or five first books of Moses, are written in the land of Moab, where he died the year following, aged 110.
1451 The Israelites, after sojourning in the wilderness forty years, are led under Joshua into the land of Canaan, where they fix themselves, after having subdued the natives: and the period of the sabbatical year commences.
1406 Iron is found in Greece from the accidental burning of the woods.
1198 The rape of Helen by Paris, which, in 1193, gave rise to the Trojan war, and siege of Troy by the Greeks, which continued ten years, when that city was taken and burnt.

1,520 BCE

EXODUS records that when the Children of Israel fled from Egypt, they took with them the "principal spices."

SPICE

1,485 BCE

Hapshepsut, queen of Egypt, as homage to the god Amon, had 31 myrrh trees imported and planted at Thebes.

PLANTS

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1,468 BCE

The Sumerians invented a single-tube seed drill.

Archaeological evidence such as the distinctive axes and swords of China, found at various Middle Eastern sites, indicate there to have been considerable contact and trade between the Far East and the Middle East. Liquor was distilled in parts of Asia. The soybean was cultivated in Manchuria.
Bone inscriptions in Chinese ideograms refer to the making of beer.

PLANTS

1,453 BCE

The Greeks begin the Olympic Games, at which victors were awarded wreaths of bay laurel leaves, a condiment or spice.

PLANTS

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1,370 BCE

Chemical tests of red fabrics from Tell el 'Amara, Egypt show the presence of alizarin, a pigment extracted from *Rubia tinctorum* (madder).

PLANTS

1,325 BCE

Many seed and other plant products were stored in Pharaoh Tutankhamun's tomb, including watermelon, safflower, emmer wheat, barley, lentils, chickpeas, flax, fenugreek, olive (leaves and oil), almond, date palm, garlic, cumin, and coriander.[4]

PLANTS

Monotheistic totalitarian statism had been so thoroughly disgraced during this period that a significant effort was mounted to destroy all traces of it on walls, statuary, and inscriptions.

4. Since this burial and its forgotten treasures would not be recovered, by the Earl of Carnavon and Howard Carter, until 1922, these were not the seeds referred to in WALDEN.

WALDEN: When I ask for a garment of a particular form, my tailoress tells me gravely, "They do not make them so now," not emphasizing the "They" at all, as if she quoted an authority as impersonal as the Fates, and I find it difficult to get made what I want, simply because she cannot believe that I mean what I say, that I am so rash. When I hear this oracular sentence, I am for a moment absorbed in thought, emphasizing to myself each word separately that I may come at the meaning of it, that I may find out by what degree of consanguinity **They** are related to **me**, and what authority they may have in an affair which affects me so nearly; and, finally, I am inclined to answer her with equal mystery, and without any more emphasis on the "they," –"It is true, they did not make them so recently, but they do now." Of what use this measuring of me if she does not measure my character, but only the breadth of my shoulders, as it were a peg to hang the coat on? We worship not the Graces, nor the Parcæ, but Fashion. She spins and weaves and cuts with full authority. The head monkey at Paris puts on a traveller's cap, and all the monkeys in America do the same. I sometimes despair of getting any thing quite simple and honest done in this world by the help of men. They would have to be passed through a powerful press first, to squeeze their old notions out of them, so that they would not soon get upon their legs again, and then there would be some one in the company with a maggot in his head, hatched from an egg deposited there nobody knows when, for not even fire kills these things, and you would have lost your labor. Nevertheless, we will not forget that some Egyptian wheat is said to have been handed down to us by a mummy.

EGYPT

1,100 BCE

Soybean (*Glycine max*) long had been domesticated in China. By 300 BCE it is thought to have become one of two major food crops for northern China; by 100 CE it would have become common throughout China and Korea. By this time the lotus was also being used as a crop.

PLANTS

1,000 BCE

Dyes made from purple murex were being introduced by the Phoenicians.

By this time it is certain that oats were cultivated in central Europe, most probably originating as weeds in wheat and barley fields.

PLANTS

Researchers have found evidence of peanut cultivation in Peru.

PLANTS

Plant	Name	Place
Pear	*Pyrus communis*	Western Asia

999 BCE

Hiram I, King of Phoenicia (in Tyre), described in the Old Testament as an ally of the King David and King Solomon. This king cooperated with Solomon, supplying him with material (including cedars from Lebanon) for the construction of a great temple in Jerusalem. Hiram encouraged extensive trade in the Mediterranean and the Red Sea, which providing his capital city Tyre with great wealth.

PLANTS

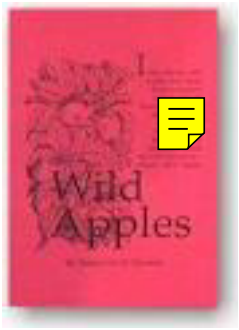
992 BCE

The Queen of Sheba, paying a royal visit to King Solomon, was accompanied by “camels that bear spices” as her principal host-gift. SPICE

PLANTS

900 BCE

Apples presumably arose in the Caucusus, Turkestan, and adjoining areas, where wild apples (*Malus silvestris* and *Malus pumila*) still grow.



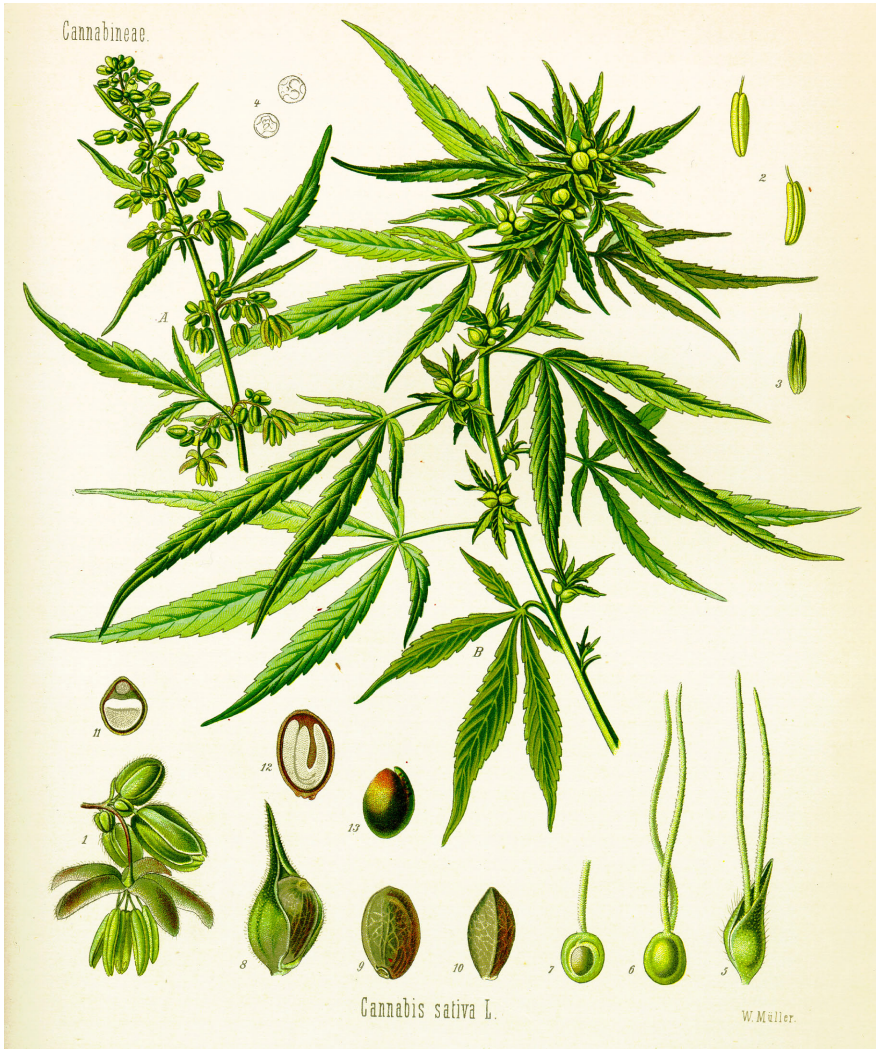
APPLES

Natural hybridization between *M. pumila* and *M. silvestris* gave rise to edible (non-sour) apples similar to modern forms, without the intervention of people. Apples then spread throughout the ancient Fertile Crescent region. The first written account of an apple orchard is found in the ODYSSEY. *Malus silvestris* grew wild in Britain in Neolithic times, evidence for its use as food has been found at the Windmill Hill site in Wiltshire. However, there is no evidence of any attempt to cultivate the trees. Apple trees seem to have been planted near sacred oak groves but these probably served as hosts for the mistletoe, a plant very important to the Druids.

PLANTS

800 BCE

In about this timeframe, Zoroastrians, Therapeutia, Coptics, Essenes, and other African and Eurasian religions were adopting the use of cannabis.



PLANTS

753 BCE

From this point until *circa* 680 BCE, the life of Hesiod, the 1st major Greek poet after Homer, and the 1st of mainland Greece whose works have survived down to the present era. Two of his complete epics survive:

- the WORKS AND DAYS, a description of peasant life

- the THEOGONY, an attempt to resolve conflicting accounts of Greek gods

ALEXANDER CHALMERS

Hesiod mentioned a town near Corinth named Mekonê or "Poppy-town" (the present-day "Sikyon"):

> For when the gods and mortal men were divided at Mekonê, even then Prometheus was forward to cut up a great ox and set portions before them, trying to beguile the mind of Zeus.

This happens to be the 1st record of the poppy in Western literature.

PLANTS

694 BCE

Trees bearing wool (cotton) were introduced to Assyria by Sennacherib.

PLANTS

500 BCE

There is a record that Siddhartha Gautama Buddha survived by eating cannabis. Presumably this was the seed of the hemp plant, which is of significant nutritional value (it is nowadays a principal ingredient of the sort of birdseed one buys in a supermarket in a big sack).

Plant	Name	Place
Artichoke	*Cynara scolymus*	Western Mediterranean
Cabbage	*Brassica oleracea*	Europe
Lettuce	*Lactuca sativa*	Mediterranean/Asia Minor
Carrot	*Daucus carota*	Afghanistan

PLANTS

OTHERS

The oldest known Chinese herbal, the CLASSICAL PHARMACOPOEIA of Tzu-I was written. Although no version of this book has survived since 500 CE, a copy was available to Shen Nung, the writer of the CLASSICAL HERBAL, which was produced as early as 100 BCE.

It is supposed that the radish was introduced to China from Europe.

PLANTS

Papaver somniferum L.

400 BCE

Hippocrates wrote numerous treatises on medicinal plants, such as saffron, cinnamon, thyme, coriander, mint, and marjoram.

OTHERS

Plant	Name	Place
Turnip	*Brassica rapa*	Western Asia
Apple	*Malus Pumila*	Southwestern Asia

PLANTS

399 BCE

The concept of "soul" or "incorporeal life-force" entered mainstream Hellenic thought. The development is attributed to the school of an Athenian philosopher named Aristokles, who was called Plato, or "broad," after the shoulders that he had developed as a wrestler in his youth.

Plato was not present at his master Socrates of Athens's execution/suicide after condemnation in a public assembly, by the drinking of a potion of hemlock (*Conium maculatum*), pleading that at the time he was ill (if his non-eyewitness description of this death is accurate, it is the only time that ingesting such a potion has not caused nausea, contortions, and extreme retching before the onset of the described numbness). Afterward, according to Hermodorus, Plato fled to Megara with other associates of Socrates, where they became guests of an associate of Socrates named Euclid (this of course isn't the Euclid who was a geometer in Alexandria). We lose track of Plato for about a dozen years, until he reaches the age of 40. Some allege that he went to Egypt and to Cyrene to visit the mathematician Theodorus. Some claim he went to Persia and Babylonia and got himself initiated into the Chaldean Mysteries. Some claim he got as far as India. (He did eventually make his way to Sicily to visit the Pythagoreans Philolaus and Eurytus, making friends with Archytas, a ruler.)

PLANTS

Famous Last Words:

"What school is more profitably instructive than the death-bed of the righteous, impressing the understanding with a convincing evidence, that they have not followed cunningly devised fables, but solid substantial truth."

– A COLLECTION OF MEMORIALS CONCERNING DIVERS DECEASED MINISTERS, Philadelphia, 1787

"The death bed scenes & observations even of the best & wisest afford but a sorry picture of our humanity. Some men endeavor to live a constrained life — to subject their whole lives to their will as he who said he might give a sign if he were conscious after his head was cut off — but he gave no sign Dwell as near as possible to the channel in which your life flows."

—Thoreau's JOURNAL, March 12, 1853

399 BCE	Socrates	drinking the hemlock	*"Crito, I owe a cock to Æsclepius."*
27 CE	Jesus	being crucified	*"It is finished."* [John 19:30]
1415	John Huss	being burned at the stake	*"O, holy simplicity!"*
May 30, 1431	Joan of Arc	being burned at the stake	*"Hold the cross high so I may see it through the flames."*
May 4, 1534	Father John Houghton	as he was being disemboweled	*"And what wilt thou do with my heart, O Christ?"*
July 6, 1535	Sir Thomas More	being beheaded	*"The King's good servant, but God's First."*
1536	Anne Boleyn	being beheaded	*"Oh God, have pity on my soul."*
February 18, 1546	Martin Luther	found on his chamber table	*"We are beggars: this is true."*
July 16, 1546	Anne Askew	being burned at the stake	*"There he misseth, and speaketh without the book"*
... other famous last words ...			

Plants known to the ancient Chinese were discussed by Erh Ya. Other treatments from the period mention cultivated crops such as yam (*Dioscorea esculenta*) and taro (*Colocasia*).

PLANTS

Theophrastus (*circa* 372-287 BCE), the father of Greek Botany, taught about plants from his own working knowledge of them, experience reflected in the "Inquiry" (*HISTORIA PLANTARUM*) and "Causes." This text covers 550 kinds of plants, including the strawberry tree (*Arbutus unedo*), the date palm, figs, and water lilies. During the middle ages, these informative Theophrastan works would be generally unavailable, and 2nd-hand versions would be loaded with misinformation — thus the level of botanical knowledge available in writing actually would decline. The rediscovery and printing of his works beginning in 1483 would replace muddled interpretations of plants and help rekindle an interest in botany. For instance, here are amaranth and mandrake as depicted in a 1644 edition of *HISTORIA PLANTARUM*:

PLANTS

Plant	Name	Place
Cherry	*Prunus avium*	Europe and Asia

OTHERS

250 BCE

By this time the Maya are known to have been cultivating cacao intensively in Belize.

PLANTS

241 BCE

Yet another altercation involving our favorite pushy people, the Romans: at Aegates Islands the Romans led by C. Lutatius Catulus defeated the Carthaginians under Hanno (this was not the Hanno who sailed down the west coast of Africa, as that had happened in about 500 BCE), creating the Pax Romana.[5]

Annual tribute demanded after the conquest of Sicily would allow Rome to obtain wheat cheaply for its citizens. War in general had brought benefits for the Romans through the capture of productive acreage for Romans, the opening of markets for Roman plantation-produced wine, and the taking of slaves by the Romans — and after all, this is about the triumph of civilization, isn't it? If we need to have more without end, doesn't it stand to reason that we are also going to need war without end?

PLANTS

216 BCE

The founding of the south China province of Kweilin (the word means Cassia Forest — Kwei River could be translated as Cassia River).[6]

5. You will note that in these records of battles leaving fields littered with corpses, the terms "creating the Pax Romana" and "disrupting the Pax Romana" are terms of art — and are employed arbitrarily. Please don't try to figure out why sometimes the term "creating" is selected, and sometimes the word "disrupting," as this won't get you anywhere at all.
6. Cassia is simply the bark of a laurel tree, a tropical evergreen. Nearly the same as the western cinnamon although not quite as sweet, it is sometimes called Chinese Cinnamon. It is a component of the "Five Spice" flavoring.

PLANTS

200 BCE

Plant	Name	Place
Asparagus	*Asperagus officinalis*	Eastern Mediterranean
Cucumber	*Cucumis sativus*	India
Beet	*Beta vulgaris*	Mediterranean

OTHERS

203 BCE

Yet another battle involving our favorite pushy people: at Great Plains the Romans led by P. Cornelius Scipio Africanus defeated the Carthaginians under Hasdrubal and Syphax, restoring the Pax Romana. Tribute to Rome from Carthage would include 500,000 bushels of wheat and 300,000 bushels of barley.

PLANTS

100 BCE

In about this period in China, paper was being made out of cannabis (hemp) and mulberry fibers.

PLANTS

Rice and iron were imported into Japan by the migration of the Yayoi (related to the Mongols), who also brought a new language and a new religion.

PLANTS

50 BCE

Publius Vergilius Maro, though not a botanist, gave descriptions and information concerning 164 different plants known to the Greeks. Advice included laying fields fallow and allowing a crop of vetch and lupine (legumes) to mature before sowing wheat. Virgil recommended the scattering of manure as well as ashes.

PLANTS

Vergil had it that Mount Etna was the abode of the giant Enceladus while Mount Vesuvius was the abode of the giant Alcyoneus.

24 CE

Aelius Gallus, the Egyptian prefect for Augustus Caesar's Roman empire, went off on an ill-fated expedition to conquer the spice kingdoms of South Arabia.

PLANTS

32 CE

To understand the Biblical account of Palm Sunday, the date palm has long been considered the tree of life in deserts of the Old World. With 70% sugar content the fruit serve humans and other animals. Moreover, the date was associated with fertility and fecundity.

PLANTS

40 CE

The Greek merchant Hippalus is said to have realized at about this point that seasonal monsoons could be used to take sailors back and forth across the ocean from Egypt to the pepper-producing Malabar coast of India. This would lead to extensive Roman fleets that would capture the Indian spice trade from the overland routes controlled by Arab traders. An account of this trade would be recorded in THE PERIPLUS..., a treatise known from about 90 CE.

PLANTS

50 CE

Dioscorides, Father of Medical Botany, was author of an ancient compilation of descriptions and medicinal uses for plants, which was the most widely known western botanical text during the middle ages. The earliest herbals were recapitulations of Dioscorides. With an expanding awareness of the natural world in the 16th-century, herbalists would begin to make their own descriptions of plants, and at last Dioscorides's influence would wane. Dioscorides knew about 650 different species.

PLANTS

65 CE

The funeral rites for Nero's wife Poppaea at Rome consumed a year's supply of cinnamon.

SPICE

PLANTS

70 CE

At about this point Pliny Secundus or Pliny the Elder (Caius Plinius Secundus, 23-79 CE), in his NATURAL HISTORY, was discussing approximately a thousand different plants. Well known throughout the middle ages, this book constituted a major source of information on botany. Primarily a storyteller and historian, Pliny edited uncritically. Once the original, rarer source documents were discovered, the errors in Pliny's account became obvious.

NATURAL HISTORY, I
NATURAL HISTORY, II
NATURAL HISTORY, III
NATURAL HISTORY, IV
NATURAL HISTORY, V
NATURAL HISTORY, VI

PLANTS

That doesn't mean that Pliny was always wrong when he related a marvel. For instance, he reported that he had learned from certain monuments that milk and blood had rained from the lower part of the atmosphere not only during the consulship of Marcus Acilius Glabrio and Marcus Porcius Cato but also at other times, and that flesh had fallen from the sky in the consulship of Publius Volumnius and Servius Sulpicius, "and it is said that what was not devoured by the birds did not become putrid." There is no reason to doubt this ancient account as similar events have been observed during the modern era — it seems that the power of dust devils and waterspouts and tornados is adroit to scoop schools of small fishes from the surface layers of water and drop them flopping on suburban lawns, and to raise even heavy bodies into the air and there shred them to bits and pieces, and then transport these objects a distance through the upper atmosphere and deposit them as a rain of fragments in a calmer atmosphere.

> WALDEN: Our village life would stagnate if it were not for the unexplored forests and meadows which surround it. We need the tonic of wildness.... At the same time that we are earnest to explore and learn all things, we require that all things be mysterious and unexplorable, that land and sea be infinitely wild, unsurveyed and unfathomed by us because unfathomable. We can never have enough of Nature. We must be refreshed by the sight of inexhaustible vigor, vast and Titanic features, the seacoast with its wrecks, the wilderness with its living and its decaying trees, the thunder cloud, and the rain which lasts three weeks and produces freshets. We need to witness our own limits transgressed, and some life pasturing freely where we never wander.... I love to see that Nature is so rife with life that myriads can be afforded to be sacrificed and suffered to prey on one another; that tender organizations can be so serenely squashed out of existence like pulp, — tadpoles which herons gobble up, and tortoises and toads run over in the road; and that sometimes it has rained flesh and blood!

RAINS OF BLOOD, &C.

It is through Pliny that we know the exact costs of many products, and that farmers alternated crops of beans with spelt. He commented on the growing trend of farm land consolidation to create slave-maintained plantations.

BOTANIZING

Pliny's description of the manner of constructing mosaics makes us confident that Marcus Vitruvius Pollio's *DE ARCHITECTVRA* was known to him — despite the fact that his name appears merely in the Table of Contents.

The betrothal ring originated earlier than the wedding band. The giving of an iron ring to mark a betrothal was a Roman custom. It was presumably a marker of the pledge, *pignus*, the contract between families that was to be fulfilled (such rings found in Christian burials in the catacombs of Rome appear to have been more commonly of bronze than of iron). At this point conservative custom still required a plain ring of iron, but the gold band would be becoming usual in the course of the 2d Century. "Even now," according to Pliny's NATURAL HISTORY, "the bridal ring is made of iron and without jewels." Pliny commended the ancient Romans for teaching women "modesty and sobriety" by condemning the wearing of gold "save on the finger, which, with the bridal ring, her husband had sacredly pledged to himself."

At about this point Hero of Alexandria was demonstrating by means of geometry, in *CATOPTRICA*, that a ray of light in reflecting from a plane mirror will follow the shortest path that it can possibly follow, between its source and the point of its observation.
(OK, how does it know to do that?)

HISTORY OF OPTICS

77 CE

Gaius Plinius Secundus or Pliny the Elder was a maker of detailed notes. He never married. He left 160 volumes of such material, on all kinds of scientific and antiquarian subjects — and that was over and above his NATURAL HISTORY. In that encyclopedia, released in this year, he was considering the following topics, declaring his opinion as to what constituted "the best" of each category of being:

- astronomy and meteorology
- geography of the Western Mediterranean
- geography of the Eastern Mediterranean, the Black Sea, continental and northern Europe
- geography of Africa, the Middle East and Turkey
- geography of Asia; summary overview and wrap-up of world geography[7]
- anthropology and human physiology
- land animals:
  elephants, lions, tigers, panthers; cows, horses, asses, mules, sheep, goats; mice, dormice, etc.
- marine animals: whales, dolphins, fish, shellfish, etc.
- birds; animal reproduction; the senses
- insects; comparative zoology; fumblings toward a taxonomy
- exotic plants, spices, and perfumes from India, Egypt, Mesopotamia, etc.
- more plants, such as aquatic plants
- plants: the vine and wine
- plants: the olive tree; oil and its uses; fruit and nut trees
- more trees (mostly evergreens)
- fruit trees and vines, and the art of planting them
- how to run a farm
- garden plants, with a long section on flax
- more about the garden plants, mostly vegetables
- flowers
- miscellaneous plants, including those that produce dyes
- medicinal properties of wine, vinegar, oil, nuts, and fruit
- medicinal properties of trees and herbs
- medicinal properties of herbs
- major medicinal herbs (begins with a section on new diseases)
- minor medicinal herbs, approximately in alphabetical order
- medicinal uses of the human body's own products (with a discussion of charms);
  medicinal uses of animal products
- medicinal uses of animal products, continued
  (beginning with a long expression of hostility toward those who were styling themselves doctors)
- medicinal uses of animal products, continued (beginning with a consideration of magic)
- medicinal uses of marine products: salt, plants, sponges, etc.
- medicinal uses of marine animals
- metals (mostly gold, silver, and mercury)
- metals: bronze and lead (but most of this is in fact a treatise on statuary)
- the uses of earth substances, beginning with pigments
  (this is mostly a discussion of painters, although toward the end he gets back to sulphur)

7. Pliny knew of the existence of 10 volcanos, one of which was Mount Vesuvius.

The first half of this section has to do with stone sculpture;
then there is a bit on the architecture of obelisks, the Pyramids, and the Cretan labyrinth;
there is an analysis of the various building materials, such as plaster, sand, and stone;
finally there is a consideration of glass that leads into a paean to fire, with in the last paragraph an utterly peculiar story:

> A WEEK: The true finish is the work of time, and the use to which a thing is put. The elements are still polishing the pyramids.

EGYPT

then there is more about stones (rock crystal, amber, gemstones and semi-precious stones):

> Pliny. NATURAL HISTORY III.v.66-67: Romulus left the city of Rome, if we are to believe those who state the very greatest number, with only three gates, and no more. When the Vespasians were Emperors and Censors in the year of the building of the city, 826 [73 CE], the circumference of the walls which surrounded it was thirteen and two-fifths miles. Surrounding as it does the Seven Hills, the city is divided into fourteen districts, with 265 crossroads under the guardianship of the Lares [i.e., a little shrine to the Lares would stand at each crossing]. If a straight line is drawn from the mile column placed at the entrance of the Forum to each of the gates, which are at present thirty-seven in number —taking care to count only once the twelve double gates, and to omit the seven old ones, which no longer exist— the total result will be a straight line of twenty miles and 765 paces. But if we draw a straight line from the same mile column to the very last of the houses, including therein the Praetorian camp [in the suburbs] and follow throughout the line of the streets, the result will be something over seventy miles. Add to these calculations the height of the houses, and then a person may form a fair idea of this city, and surely he must confess that no other place in the world can vie with it in size.
> On the eastern side it is bounded by the mound (agger) of Tarquinius Superbus — a work of surpassing grandeur; for he raised it so high as to be on a level with the walls on the side on which the city lay most exposed to attack from the neighboring plains. On all the other sides it has been fortified either with lofty walls, or steep and precipitous hills; yet it has come to pass, that the buildings of Rome —increasing and extending beyond all bounds— have now united many outlying towns to it.
>
> Pliny. NATURAL HISTORY XXXVI.xxiv.101-110 (a rather free translation): In great buildings as well as in other things the rest of the world has been outdone by us Romans. If, indeed, all the buildings in our City are considered in the aggregate, and supposing them —so to say— all thrown together in one vast mass, the united grandeur of them would lead one to imagine that we were describing another world, accumulated in a single spot.
> Not to mention among our great works the Circus Maximus, that was built by the Dictator Caesar —one stadium broad and three in length— and occupying with the adjacent buildings no less

than four iugera [about 2 acres] with room for no less than 160,000 spectators seated — am I not, however, to include in the number of our magnificent structures the Basilica of Paulus with its admirable Phrygian columns [built also in Julius Caesar's day], the Forum of the late Emperor Augustus, the Temple of Peace erected by the Emperor Vespasian Augustus — some of the finest work the world has ever seen? [and many others].

We behold with admiration pyramids that were built by kings, while the very ground alone that was purchased by the Dictator Caesar, for the construction of his Forum, cost 100,000,000 sesterces. If, too, an enormous expenditure has its attractions for any one whose mind is influenced by money matters, be it known that the house in which Clodius [Cicero's enemy] dwelt was purchased by him at a price of 14,800,000 sesterces — a thing which I for my part look upon as no less astonishing than the monstrous follies that have been displayed by kings.

Frequently praise is given to the great sewer system of Rome. There are seven "rivers" made to flow, by artificial channels, beneath the city. Rushing onward like so many impetuous torrents, they are compelled to carry off and sweep away all the sewerage; and swollen as they are by the vast accession of the rain water, they reverberate against the sides and bottoms of their channels. Occasionally too the Tiber, overflowing, is thrown backward in its course, and discharges itself by these outlets. Obstinate is the struggle that ensues between the meeting tides, but so firm and solid is the masonry that it is able to offer an effectual resistance. Enormous as are the accumulations that are carried along above, the work of the channels never gives way. Houses falling spontaneously to ruins, or leveled with the ground by conflagrations are continually battering against them; now and then the ground is shaken by earthquakes, and yet —built as they were in the days of Tarquinius Priscus, seven hundred years ago— these constructions have survived, all but unharmed.

Passing to the dwellings of the city, in the consulship of Lepidus and Catulus [78 B.C.] we learn on good authority there was not in all Rome a finer house than that belonging to Lepidus himself, but yet —by Hercules!— within twenty-five years the very same house did not hold the hundredth rank simply in the City! Let anybody calculate —if he please— considering this fact, the vast masses of marble, the productions of painters, the regal treasures that must have been expended in bringing these hundred mansions to vie with one that in its day had been the most sumptuous and celebrated in all the City; and then let him reflect that, since then and down to the present, these houses had all of them been surpassed by others without number. There can be no doubt that the great fires are a punishment inflicted upon us for our luxury; but such are our habits, that in spite of such warnings, we cannot be made to understand that there are things in existence more perishable than even man himself.

Pliny. NATURAL HISTORY XXXVI.xxiv.121-123: But let us now turn our attention to some marvels that, if justly appreciated, may be pronounced to remain unsurpassed. Quintus Marcius Rex [praetor in 144 B.C.] upon being commanded by the Senate to repair the

> Appian Aqueduct and that of the Anio, constructed during his praetorship a new aqueduct that bore his name, and was brought hither by a channel pierced through the very sides of mountains. Agrippa, during his aedileship, united the Marcian and the Virgin Aqueducts and repaired and strengthened the channels of others. He also formed 700 wells, in addition to 500 fountains, and 130 reservoirs, many of them magnificently adorned. Upon these works too he erected 300 statues of marble or bronze, and 400 marble columns, and all this in the space of a single year! In the work which he has written in commemoration of his aedileship, he also informs us that public games were celebrated for the space of fifty-seven days and 170 gratuitous bathing places were opened to the public. The number of these at Rome has vastly increased since his time.
>
> The preceding aqueducts, however, have all been surpassed by the costly work which has more recently been completed by the Emperors Gaius [Caligula] and Claudius. Under these princes the Curtian and the Caerulean Waters with the "New Anio" were brought a distance of forty miles, and at so high a level that all the hills —whereon Rome is built— were supplied with water. The sum expended on these works was 350,000,000 sesterces. If we take into account the abundant supply of water to the public, for baths, ponds, canals, household purposes, gardens, places in the suburbs and country houses, and then reflect upon the distances that are traversed from the sources on the hills, the arches that have been constructed, the mountains pierced, the valleys leveled, we must perforce admit that there is nothing more worthy of our admiration throughout the whole universe.

79 CE

August 24: Mount Vesuvius, known to be volcanic in origin but perhaps reasonably quiescent for at least a millennium, and not having had a really really big blast since about 1,760BCE, all of a sudden became intensely active between noon and 1PM, blasting a column of pumice twelve miles into the air. The wind happened to be blowing from the northwest at the time, so the volcanic matter began to fall toward the southeast, the direction of Pompeii. The eruption of course produced total darkness, except of course for electrical discharges from the atmospheric disturbances. Ash, pumice, and rock piled up in the streets and on the rooftops, falling into the houses through every open space. Some roofs began to collapse under this weight, and falling debris may also have caused injury — but there was nothing at this point to indicate the total devastation that was to come. This continued for the remainder of the day. The inhabitants of the region wandered around in darkness, pushing their way through the accumulating pumice and debris.[8] Some made their way out of the region, while others attempted to stick it out near their homes. Shortly after midnight, however, there were ground surges of magma and volcanic mud as well as pyroclastic surges (avalanches of noxious gases and ash rushing from the cone of Vesuvius with terrific force at over 100 kilometers an hour). At the base of Vesuvius, Herculaneum was hit with such a surge and was entombed in volcanic mud. Several pyroclastic surges went toward Pompeii but got stopped at the northern wall of the town. At about 7:30AM, enough pumice and debris had piled up against this northern wall that the next pyroclastic surge rolled up over the top of it, shearing off any buildings that were not already buried by volcanic matter. All those who were still present in the town at this point died,

8. There is a story being told, that the inhabitants of Pompeii and Herculaneum had been unaware that they were situating their lives on the slopes of a volcano — that they were supposing Vesuvius to be merely another mountain. This hardly seems plausible.

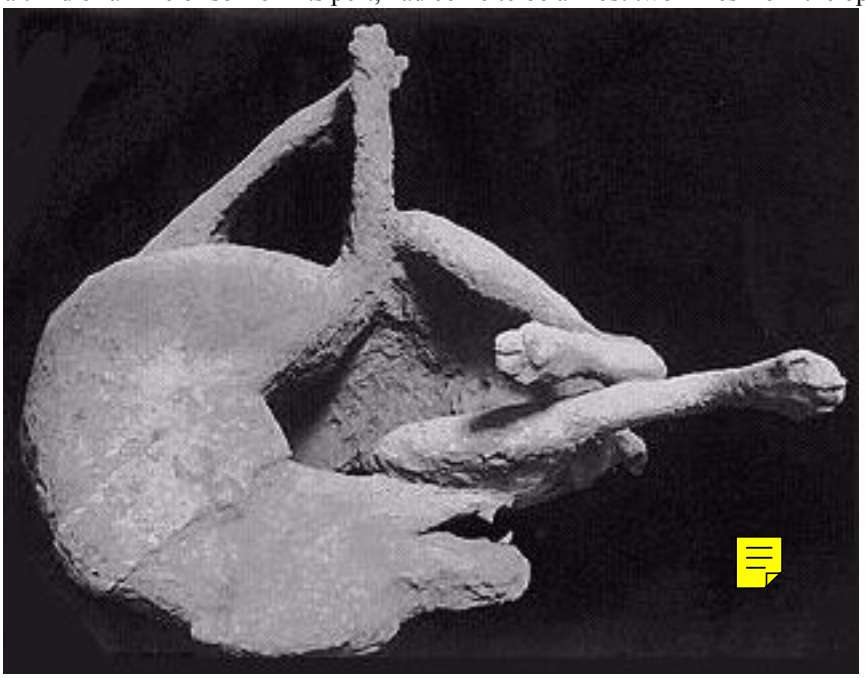
literally baked alive by the hot air of this surge (which is why on many of the plaster casts we have recovered from voids in the deposit, the limbs of the victim are pulled in toward the body — this heat contracted the flexor muscles). Pompeii was beneath 60 feet of ash and mud.

Some 16,000 people living in cities and towns around the base of the volcano had been killed, most of them during the first 30 seconds of that thermal blast. Walnuts were left on a table, uneaten, by priests whose meal had been rudely interrupted A dog would be found, still chained to a post.

PLANTS

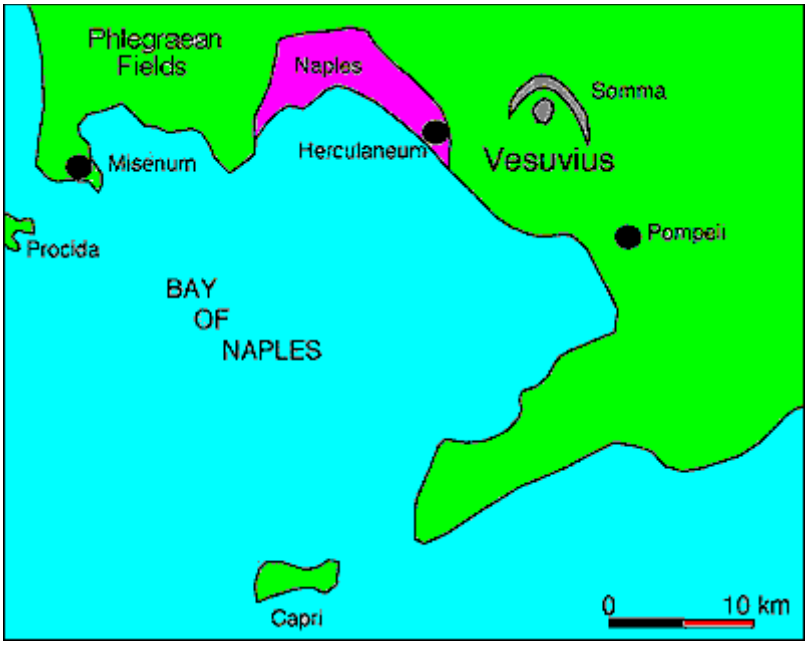
So much new surface material had been deposited in the Gulf of Naples that the remains of city, which had

been only a third of a mile or so from its port, had come to be almost two miles from the open water.

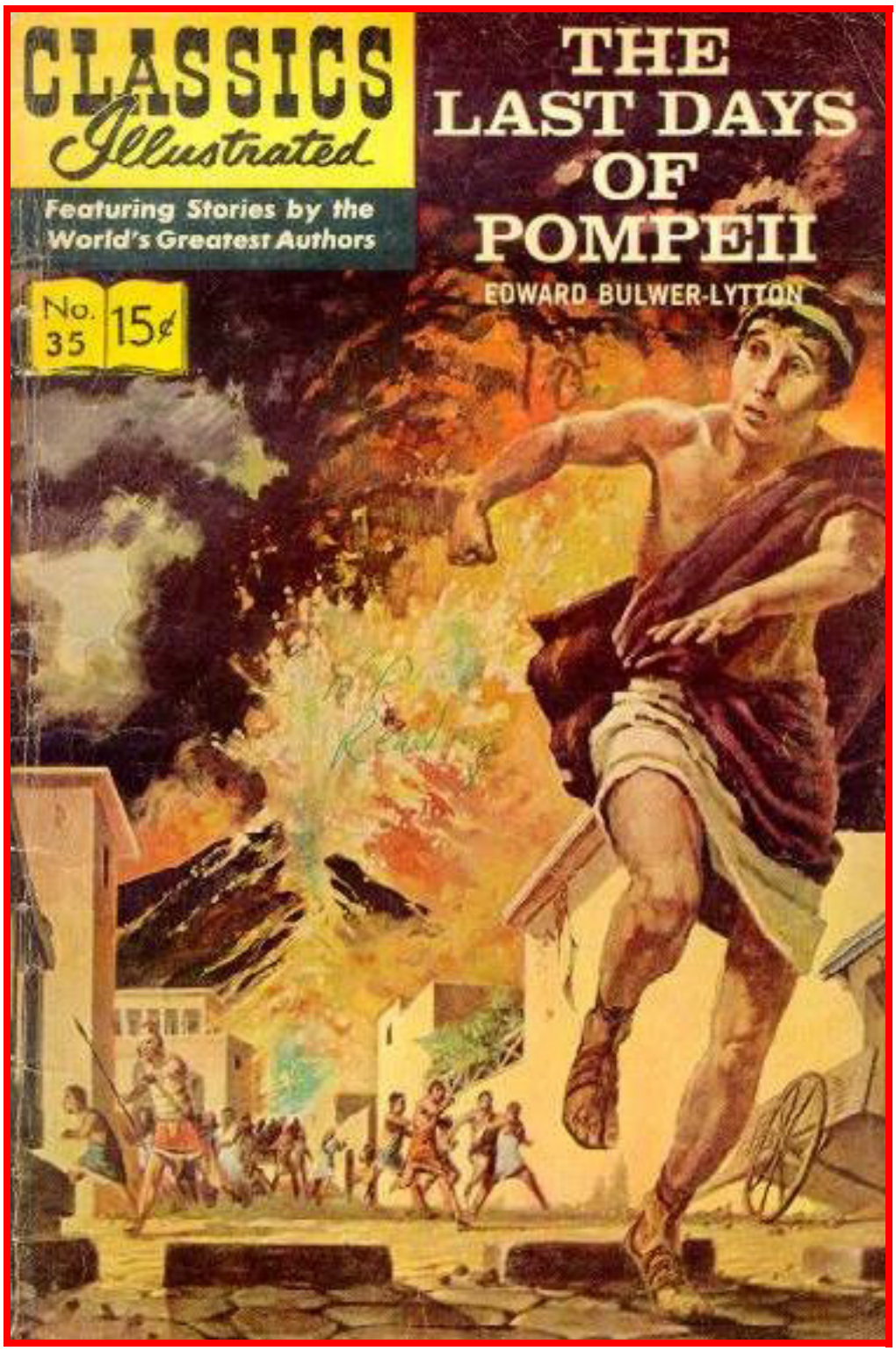


Pliny the Elder, naturalist and author born in 23 CE, who was living with his sister at Misenum, died during this eruption. He had written of the Essenes, and had created ten volumes of NATURAL HISTORY. He had described how local farmers would auction their immature fruit while it was on the trees, a practice still followed in some Kent orchards in England.

APPLES



How it was that Pliny came die during this eruption despite the fact that Misenum was unaffected, we know from a detailed account that his teenage nephew Pliny the Younger would send to the historian Cornelius Tacitus. What happened was due to the fact that Pliny was not only a Roman senator but also commanded the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THE LAST DAYS OF POMPEII
EDWARD BULWER-LYTTON

imperial fleet at the naval base of Misenum. (Two Roman naval bases protected Italian shipping from pirate activity, this one dominating Naples[9] and the Bay of Naples and another other at Aquileia, dominating the Adriatic.) That morning, when his sister had noticed an unusual cloud (now termed the "Plinean column," he had pulled rank and commandeered a naval vessel to go take a closer look. As the boat was being readied, a messenger brought a plea for help from a friend's wife who lived at the foot of Vesuvio. The strange cloud covered an immense eruption, escape by land had become impossible, she was trapped. The "volcano"[10] was releasing as much heat energy as 100,000 atomic bombs the size of the one that we would drop on the city of Hiroshima. As the ship approached the beach below where Pompeii had been (the friend's wife was by this point almost certainly already lost), bits of ash and pumice were landing on the deck. As they drew closer, chunks of blackened rock were pounding the planks. There being so much debris that the sailors could not beach the boat, Pliny told the rowers to make for the harbor at Stabiae a few miles to the south, where Pomponianus, another of Pliny's friends, had a house, and there they were able to get onto the beach. Pliny found that they also would be unable to escape by land. The sea having become too rough to attempt a launch, Pliny ate, bathed, and lay down to sleep while his friends stayed up throughout the night, watching as the ash rose higher and higher outside their door.

> A darkness overspread us, not like that of a cloudy night, or when there is no moon, but of a room when it is shut up and all the lights are extinguished. Nothing then was to be heard but the shrieks of women, the screams of children, and the cries of men ... some wishing to die from the very fear of dying,[11] some lifting up their hands to the gods; but the greater part imagining that the last and eternal night had come, which was to destroy both the gods and the world together.

"Fear of Fear" Trope

As dawn approached it seemed the ash was going to trap Pliny in his bedroom, so they woke him and the party headed for the beach where the ships were waiting. The air was so full of poisonous gases that the corpulent old man, a lifelong asthmatic, needed to lie down to rest on a sheet his friends stretched out for him on the beach. Then, when he tried to rise, he was overcome and died in the arms of his two slaves. Not only should you not be around smokers if you are an asthmatic, you also should plan not to be around any smoking volcanos. When the eruption subsided after a couple of days, his body would be recovered for burial.

It would appear that although this eruption had devastating consequences locally, it was not what you'd term a world-class event. It doesn't seem to have had much influence, for instance, on the weather even in the Mediterranean region:

VOLCANIC EXPLOSIVITY INDEX (Logarithmic)

Timing	Volcanic Event	Logarithmic Explosivity Index
640,000 years ago	Yellowstone, Wyoming	VEI-8
74,000 years ago	Toba, Sumatra (the largest caldera in the world)	VEI-8
5,600 BCE	Mazama (forming Crater Lake)	VEI-7
1,620 BCE	Thera	VEI-7
79 CE	Vesuvius	VEI-5

9. At this point, although hegemony had come to pertain to the Romans, the locals of Naples were still Greek-speakers.

VOLCANIC EXPLOSIVITY INDEX (Logarithmic)

Timing	Volcanic Event	Logarithmic Explosivity Index
April 10, 1815	Tambora, Indonesia	VEI-7
January 20, 1835	Cosigüía, Nicaragua	Very large
August 26, 1883	Krakatau	VEI-6
July 15, 1888	Bandaisan, Japan	Apparently not that much of an explosion
May 10, 1902	Mt. Pelée, Martinique	Apparently not that much of an explosion
January 30, 1911	Taal, Philippines	Apparently not that much of an explosion
June 6-8, 1912	Novarupta (near Mt. Katmai), Alaska	VEI-6
1919	Kelud, Java	Apparently not that much of an explosion

10. Our term "volcano" derives from Vulcano, a small island at the southern boundary of the Aeolian Islands about 25 kilometers from northern Sicily. This last erupted in 1888-1890. Vulcanello, the youngest part of Vulcano Island, began to form only about 2,100 years ago as an isolated island that later became connected with the main island. The latest activity at Vulcanello occurred in the 16th Century — its lava flows now host large hotel complexes.

VOLCANIC EXPLOSIVITY INDEX (Logarithmic)

Timing	Volcanic Event	Logarithmic Explosivity Index
1932	Quizapú, Chile	Apparently not that much of an explosion
1947-1948	Hekla, Iceland	Apparently not that much of an explosion
1956	Bezmianny, Kamchatka	Apparently not that much of an explosion
June 15, 1991	Pinatubo, Philippines	VEI-6
May 18, 1980	Mount Saint Helens, USA	VEI-5
March 20-October 2010	Eyjafjallajökull	VEI-4

VEI5 = Event of a size to be expected about once per decade
VEI6 = Event of a size to be expected about once per century
VEI7 = Event of a size to be expected every other millennium or so
VEI8 = Event of a size to be expected every 10,000 years or so

It is to be noted that after this enormous eruption, Vesuvius would return to behaving in a rather benign manner. There had not seemed to have been any eruptions of significance for at least a millennium, and subsequent to 79 there would be only six eruptions of significance for nearly another millennium, eruptions involving only pyroclastic fragments — none of them producing any lava flows whatever.

Eventually (and here's the nub of it), a pen with a bronze nib would be found among the volcanic residues.

Under the lava at Herculaneum we have discovered a symbol of a cross, leading to speculation that Roman-Christianity was practiced in secret. The cross could be from 64 CE as it appeared to be covered probably during the period of persecution. The cross at this time was, however, the symbol of slavery, whereas the fish was the symbol of Christianity (freedom). To consider the cross as a Christian symbol at this time doesn't compute. To ask someone to take up your cross and follow you would have been like asking someone to take up your gallows and follow you.

90 CE

In about this timeframe, John of Patmos predicted the fall of Rome (disguised as Babylon,) describing how the merchants of that city would mourn the loss of their cinnamon and frankincense.

PLANTS

11. "Some wishing to die from the very fear of dying" — doesn't that sound familiar?

> Maxim 511 of Publilius Syrus: "The fear of death is more to be dreaded than death itself."

105 CE

It was in this year, according to tradition, that the first paper was made — in China. The maker, the eunuch Ts'ai Lun (born *circa* 50 in Kueiyang, Kweichow; died *circa* 110-119), was experimenting with the inner bark of what we now know as the paper mulberry (*Broussonetia papyrifera*), as well as with hemp, tree bark, rags and fishnets, and was finding possibilities that would quickly supersede both silk and bamboo strips.[12]

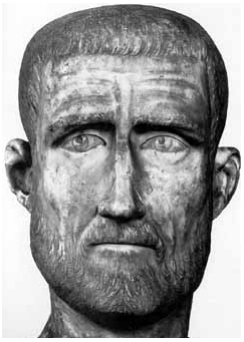
PLANTS

The likelihood per the archeological evidence is that the materials with which he was experimenting had been available for at least 250 years (since *circa* 150 BCE), but for mundane uses such as packing.

280 CE

The emperor Marcus Aurelius Probus rescinded an edict of Domitian which had prohibited the planting of grape vineyards in the Roman provinces.

PLANTS



290 CE

The corpse of a Moche warrior priest of Peru was buried with gold and silver jewelry — that was shaped like peanuts.

PLANTS

The Roman consuls were Diocletian and Maximian.

12. Francis Bacon would characterize the origin of paper as "obscure and inglorious" because of course it was something that had originated in obscure and inglorious China. (Anyone who has ever inspected a huge gray wasp's nest would of course concur with this evaluation by Sir Francis.)

332 CE

The emperor Constantine the Great ensuring continued cultivation of land that might otherwise be abandoned by enacting a measure that bound tenants to country parcels. Which is to say, at one fell gesture the great emperor created serfdom.[13]

335 CE

On the far side of the earth, cloves were delivered to Constantine — this is the first record of this spice having reached so far. The source, flower buds of *Syzygium aromaticum*, had of course been known for centuries in the civilized world, for in the Han court etiquette demanded that a person being received by the Chinese emperor hold a clove in his mouth to sweeten the breath.[14]

PLANTS

13. This has been a perennial temptation. For instance, the ecological writer Fukuoka has recently proposed that Japan's green problems might be solved by making country parcels inalienable, and binding the peasantry to reside permanently upon these parcels — and has been roundly praised by American greens for his **sagacity**.

PLANTS

14. History is silent as to whether these people began to put a clove in their mouth before approaching their Emperor Constantine.

350 CE

During the Middle Ages popular herbals contained no observations beyond those taken from Dioscorides. The various versions of Apuleius's herbals contained unfortunate simplifications both in the body of the text and in the accuracy of the plant illustrations. (The Henry E. Huntington Library of Pasadena, California has a copy of the first printed edition of Apuleius, dating to 1483, and this book is considered to be the first printed herbal.)

PLANTS

400 CE

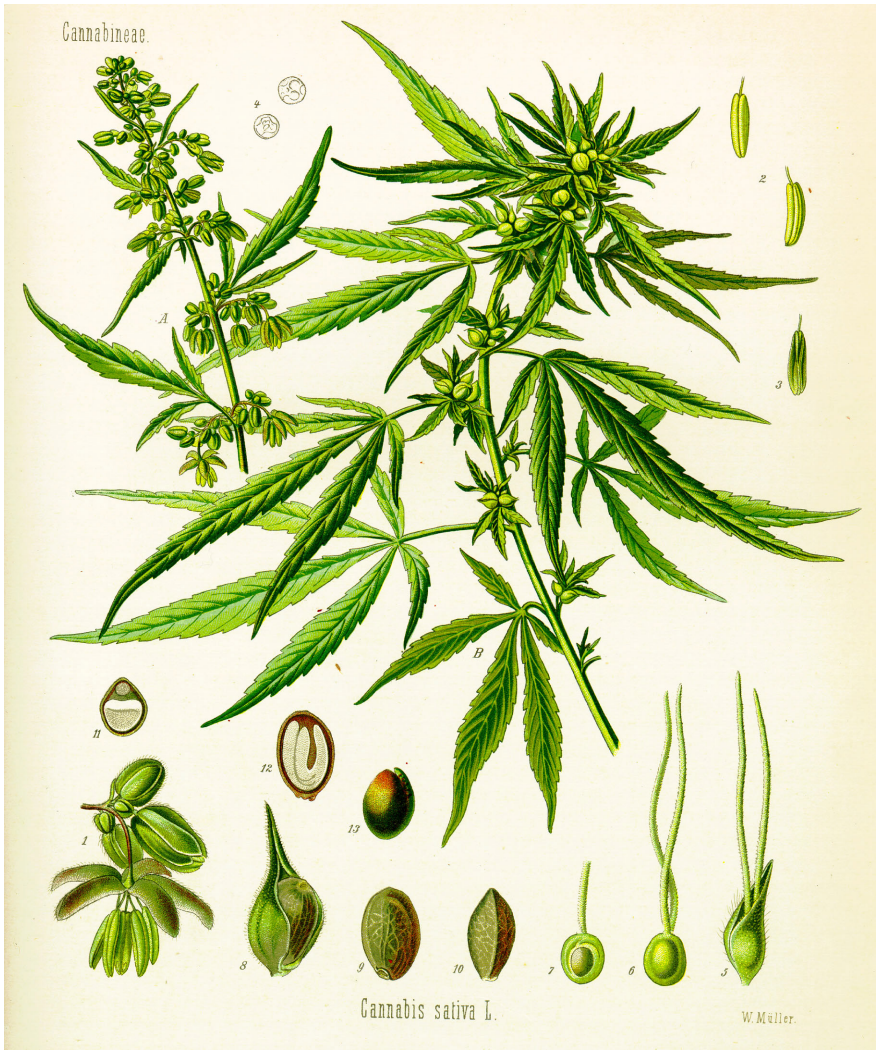
The Goth leader Haric (Alaric) demanded, among other items, 3,000 pounds of black pepper to lift his siege of the city of Rome. His assaults continued and the city would fall after a 3d siege, on August 24, 410 CE.

PLANTS

Fields and ball courts appeared in Mexico.

SPORTS

Cannabis was cultivated for the first time in Britain, at Old Buckeham Mere.



PLANTS

222 About this time the Roman empire begins to sink. The Barbarians begin their irruptions, and the Goths have annual tribute not to molest the empire.
260 Valerius is taken prisoner by Sapor, king of Persia, and flayed alive.
274 Silk first brought from India; the manufactory of it introduced into Europe by some monks, 551; first worn by the clergy in England, 1534.
306 Constantine the Great begins his reign.
308 Cardinals first made.
313 The tenth persecution ends by an edict of Constantine, who favours the Christians, and gives full liberty to their religion.
314 Three bishops or fathers are sent from Britain to assist at the council of Arles.
325 The first general council at Nice, when 318 fathers attended against Arius, where was composed the famous Nicene Creed, which we attribute to them.
328 Constantine removes the seat of empire from Rome to Byzantium, which is thenceforwards called Constantinople.
331 ———— orders all the heathen temples to be destroyed.
363 The Roman emperor, Julian, surnamed the Apostate, endeavours in vain to rebuild the temple of Jerusalem.
364 The Roman empire is divided into the eastern (Constantinople the capital), and western (of which Rome continued to be the capital), each being now under the government of different emperors.
400 Bells invented by bishop Paulinus of Campagnia.
404 The kingdom of Caledonia, in Scotland, revives under Fergus.
406 The Vandals, Alans, and Suevi, spread into France and Spain, by a concession of Honorius, emperor of the West.
410 Rome taken and plundered by Alaric, king of the Vizi-Goths.
412 The Vandals begin their kingdom in Spain.
420 The kingdom of France begins upon the Lower Rhine, under Pharamond.
426 The Romans reduced to extremities at home, withdraw their troops from Britain, and never return; advising the Britons to arm in their own defence, and trust to their own valour.

410 CE

August 23: Yet another altercation involving our favorite pushy people, the Romans: in the Sack of Rome, the Visigoths under Alaric defeated the Romans, disrupting the Pax Romana.

What goes around keeps coming around and around and around...

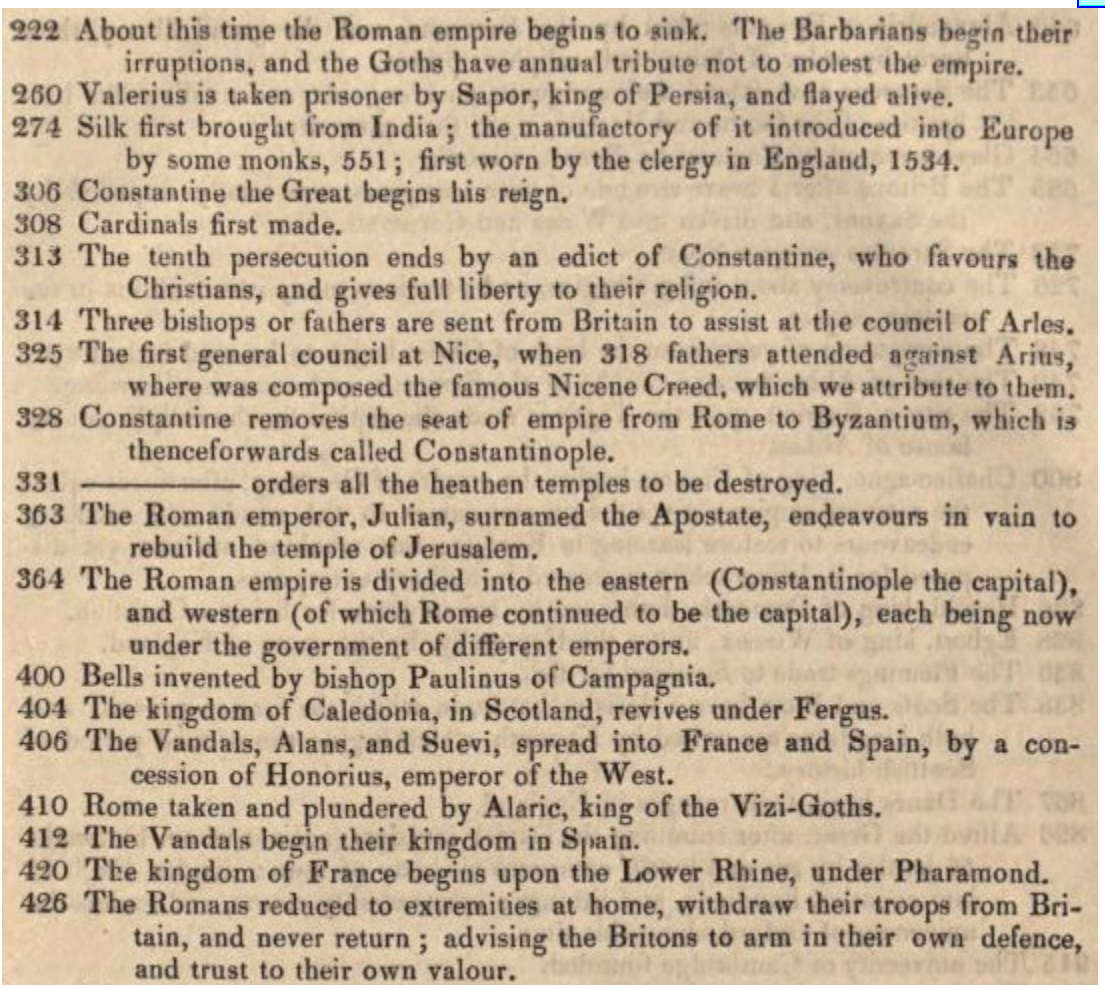
Edward Gibbon notwithstanding, the main importance of this event is that it effectively severed the Western

Roman Empire from the Eastern Roman Empire.

The Visigoths had previously obtained 3,000 pounds of pepper as a ransom for Rome, and two years later

would begin to extract an annual tribute of 300 pounds from the city.

SPICE



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It is customary to say that shock waves ran throughout the Roman world at this event, but actually it is more correct to say that shock waves ran through those citizens of the Roman world prosperous enough to care about expensive symbols of Roman grandeur. A fair number of wealthy Romans fled the city to country estates in Campania, in Sicily, and in north Africa. Enough of them showed up in Hippo for Augustine to warn his flock that they should receive the refugees with open arms and charity.

Not long after the refugees settled on their African estates and began to frequent the salons of Carthage, the more intellectual among them began to wonder aloud whether their new religion might not be to blame for the disaster they had suffered. After all, the argument ran, Rome had been immune from capture for fully eight centuries; but now, just two decades after the formal end of public worship of the pagan gods (commanded by the emperor Theodosius in 391 CE), the city had fallen to the barbarians. Perhaps it was true what pagans had said, that the new Christian god with ideas about turning the other cheek and holding worldly empires in low esteem was not an efficient guardian of the best interests of the ruling class. Most of the people who indulged in these idle speculations were themselves Christian. The "paganism" of these people was no revival of ancient

religion, but only the persistence of the ancient notion of religion as a bargain you struck with the gods in order to preserve your health, wealth, and complacency.

Augustine was invited by the imperial commissioner Marcellinus, who was in Africa to look into the Donatist quarrel for the emperor, to respond to these charges. He knew that it was more than a question of why Rome fell; here were Christians who still did not know what Christianity was about, how it differed from the Roman religions it had replaced. His response was a masterpiece of Christian apologetics, *De Civitate Dei* (The City of God), whose composition stretched over fifteen years. The first books, consoling those the Visigoths had frightened, were published quickly and seem to have done their job. But the work as a whole continued to come forth in installments, revealing a broad vision of history and Christianity.

500 CE

At about this point Tamo brought tea from India to China.[15]

PLANTS

The Hindus of India were beginning to stop eating the beef of cows, and were beginning to stop killing their cows (this may actually have had more to do with the value of cows as a source of labor pulling plows to turn the soil and as a source of fertilizer for the fields than with abstract theology).[16]

From about this point in time until 515 CE the Huns, a nomadic central Asian people, would be destroying the powerful Gupta empire of India.

During this 6th Century CE, Indian mathematicians would be introducing the zero token (0).

The 1st botanical drawing of cannabis appeared in Constantinopolitanus (Constantinople).

Coffee, apparently native to the mountains of Ethiopia, was known during this period as a beverage in Arabia. It is first thought to have been roasted in the 1450s, with drinking of brewed coffee spreading to Egypt by 1510, to Constantinople in 1550, to Venice in 1616, to England in 1650, and to Holland in 1690. By 1600, coffee would be growing in India, Ceylon, and the East Indies. Cultivation would move to the West Indies and Brazil via propagation from a single tree that had been grown in Amsterdam.

PLANTS

Plant	Name	Place
Red Pepper	*Capsicium frutescens*	South America

OTHERS

15. It would be an enormous discovery for the Brits, more than a millennia later, when they would come belatedly to the recognition that this bush growing in China the leaves of which were so valuable to them was also growing, as a tree, in India — and that one of the sources of revenue of their British East India Company could therefore be the production of tea leaves in India! Big duh.
16. In the 2002 news, we learn that there is a Hindu historian who needs to go between lectures with an armed bodyguard, because he acknowledges that once upon a time Hindus ate cows. The political reality is that it is non-PC to admit this in India. Hindu PCness requires that it is Moslems who eat cows — and that therefore India's Moslems deserve to be killed. (You can put your life at risk, nowadays, by suggesting that nobody deserves to be killed.)

548 CE

Cosmas Indicopleustes wrote his *TOPOGRAPHIA CHRISTIANA*, describing the importance of the harvesting and processing of pepper (*Piper nigrum*).

PLANTS

593 CE

Tea was taken from China to Japan, where it would assume a major role in Buddhist ritual.

PLANTS

600 CE

During the 7th century of its existence, the Christian Church would give rise to the doctrine known as "monotheletism" — to wit, that Christ had one person and one nature. However, this would be being replaced in some areas by Islam, which would eventually take over the Arabian Peninsula, Mesopotamia, and North Africa. The more Eastern portion of the Christian domain would upholds marriage for priests. Britain would be completely evangelized, and Christianity would spread into the Frisians.

Isidore appointed an archbishop of Seville.

Mohammed was part owner of a shop in Mecca, trading in plant products such as myrrh, frankincense, and spices.

PLANTS

"According to legend, Mohammed was cured of narcolepsy with coffee."

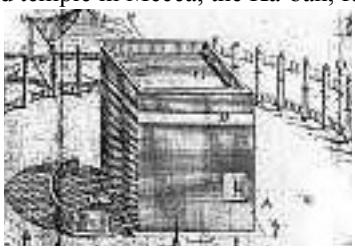
— Wolfgang Schivelbusch, TASTES OF PARADISE: A SOCIAL HISTORY OF SPICES, STIMULANTS, AND INTOXICANTS. NY: Pantheon Books, 1992, page 17.[17]

Moslem teachings would allow the use of cannabis while proscribing the use of alcohol.

Plant	Name	Place
Spinach	*Spinacia oeracea*	Iran

OTHERS

There was at that time a square old temple in Mecca, the Ka'bah, full of idols.



In one of its corners a black-metal meteorite had been set. Eventually people would be telling each other that this heavenly stone had been given by Gabriel to Abraham. They would be kissing it and touching it. It would be worn hollow by centuries of constant frottage.

746 CE

At this point the Dutch and the Germans began adding the dried blossoms of the hops vine to their brewing beer (the Brits would not be adding hops until after 1524).

PLANTS

17. Schivelbusch points out that this legend is a dubious one, since Mohammed died in AD 694; although coffee was in use as medicine "as early as the 10th century" its popularity as a beverage in Islam dates to "certainly no earlier than the 15th century" (nevertheless, might we not recommend this as a form of argumentative outreach, to the Pope?).

750 CE

Collapse of Teotihuacan civilization in Mexico.

Plant	Name	Place
Peanut	*Arachis hypogaea*	South America
Snap Beans	*Phaseolus vulgaris*	The Americas

OTHERS

775 CE

Charlemagne gave the upper slopes of the hill of Corton to the Abbey of Saulieu (wine from the grapes of this zone is still called Corton-Charlemagne).

PLANTS

812 CE

Charlemagne directed that the imperial farms in Germany were to raise anise, fennel, fenugreek, and flax.

PLANTS

857 CE

Several thousand people perished in the Rhine Valley, victims of what they were terming “St. Anthony’s Fire.” Today we know such mass poisonings to have been caused by ergot, a fungus of the rye plant (the poisonous ingredient is now referred to as ergotamine). Although such a pathogen discolors the seed, it gives limited hints otherwise as to its utter dangerousness. Such epidemics would be most serious during times of famine, for under great duress people would attempt to consume grain that might otherwise have been discarded, and outbreaks of this would be occurring time after time between this year and the year 1816. (One suggestion has been that the Salem, Massachusetts witch trials resulted from hallucinations of community members who had been exposed to contaminated rye.)

PLANTS

867 CE

King Charles the Bald granted land on the Loire River at Chablis to the Chapter of St. Martin at Tours for a vineyard. Since the Loire connects to the Seine, this "Chablis" wine would become well-known in Paris.

PLANTS

640 Alexandria in Egypt is taken by the Saracens, and the grand library there burnt by order of Omar, their caliph or prince.
653 The Saracens now extend their conquests on every side, and retaliate the barbarities of the Goths and Vandals upon their posterity.
664 Glass invented in England by Benalt, a monk.
685 The Britons after a brave struggle of near 150 years, are totally expelled by the Saxons, and driven into Wales and Cornwall.
713 The Saracens conquer Spain.
726 The controversy about images begins, and occasions many insurrections in the eastern empire.
748 The computing of years from the birth of Christ began to be used in history.
749 The race of Abbas became caliphs of the Saracens, and encourage learning.
762 The city of Bagdad upon the Tigris is made the capital for the caliphs of the house of Abbas.
800 Charlemagne, king of France, begins the empire of Germany, afterwards called the western empire; gives the present names to the winds and months; endeavours to restore learning in Europe; but mankind are not yet disposed for it, being solely engrossed in military enterprises.
826 Harold, king of Denmark, dethroned by his subjects, for being a Christian.
828 Egbert, king of Wessex, unites the Heptarchy, by the name of England.
836 The Flemings trade to Scotland for fish.
838 The Scots and Picts have a decisive battle, in which the former prevail, and both kingdoms are united by Kenneth, which begins the second period of Scottish history.
867 The Danes begin their ravages in England.
896 Alfred the Great, after subduing the Danish invaders (against whom he fought 56 battles by sea and land), composes his body of laws; divides England into counties, hundreds, and tithings; erects county courts, and founds the university of Oxford about this time.
915 The university of Cambridge founded.
936 The Saracen empire is divided by usurpation into seven kingdoms.
975 Pope Boniface VII. is deposed and banished for his crimes.
979 Coronation oaths said to be first used in England.
991 The figures in arithmetic are brought into Europe by the Saracens from Arabia. Letters of the alphabet were hitherto used.
996 Otho III. makes the empire of Germany elective.
999 Boleslaus, the first king of Poland.

900 CE

Venice was rising as a commercial power, and much of its trade was in spices. At about this point it was reintroducing pepper into a Europe that had forgotten about this spice. Pepper would become so popular that to describe a family as poor, one would say that they lacked pepper. During the Middle Ages, European consumption of pepper would amount to about 33,000 tons per year.

PLANTS

903 CE

Ibn al-Faqih's *MUKHTASAR KITAB AL-BULDAN*, which has been interpreted to describe sorghum and cowpeas as food staples for Ghana.

PLANTS

1000 CE

The Tiahuanaco farmers in Peru were beginning to grow sweet potatoes and maize.

PLANTS

"From a parrot's-eye-view, at least, the Middle Ages stand as the high point of western civilization. People didn't bother them much, tended to view them with reverence and amazement, and credited them with powers far beyond any attributed to them before or since."

— Bruce Thomas Boehrer
PARROT CULTURE: OUR 2,500-YEAR-LONG FASCINATION WITH THE WORLD'S MOST TALKATIVE BIRD
Philadelphia PA: U of Pennsylvania P, 2004, page 50

In about this period on the Iberian peninsula, many plants, including spinach and olive, were being introduced by the Moors.

PLANTS

1000 Paper made of cotton rags was in use; that of linen rags in 1170; the manufactory introduced into England at Dartford, 1588.
1005 All the old churches are rebuilt about this time in a new manner of architecture.
1015 Children forbidden by law to be sold by their parents in England.
1017 Canute, king of Denmark, gets possession of England.
1040 The Danes, after several engagements with various success, are about this time driven out of Scotland, and never again return in a hostile manner.
1041 The Saxon line restored under Enward the Confessor.
1043 The Turks (a nation of adventurers from Tartary, serving hitherto in the armies of contending princes) become formidable, and take possession of Persia.
1054 Leo IX. the first pope that kept up an army.
1057 Malcolm III. king of Scotland, kills the tyrant Macbeth at Dunsinane; and marries the princess Margaret, sister to Edgar Atheling.
1065 The Turks take Jerusalem from the Saracens.
1066 The battle of Hastings fought between Harold and William (surnamed the bastard) duke of Normandy, in which Harold is conquered and slain; after which William becomes king of England.
1070 William introduces the feudal law.
Musical notes invented.
1075 Henry IV. emperor of Germany, and the pope, quarrel about the nomination

At about this point Avicenna (more properly, Abu ibn Sina) of Bukhara was writing on geometry, and on arithmetic. In about this year he gave us our first preserved written description of the medicinal effects of an infusion made from the beans of the coffee plant, which he referred to as *bunchum*. (Actually, we have reason to suspect that the beans of said Ethiopian plant had been being eaten as food by the Galla tribe there beginning as early as the 575-850 CE timeframe.)

Plant	Name	Place
Avocado	*Persea americana*	Central America
Coffee	Avicenna's "*bunchum*"	Ethiopia

OTHERS

In his Al-Quanoon-Fit-Tibb (Cannon of Avicenna), praised in those days as the "Medical Bible," TB was described as "diqq,sul." He prescribed dry air and fresh milk as treatment (Arab physicians used camphor, sugar distilled from grapes, and roses as remedies for tuberculosis).

In about this period the peoples of Central America were using cocoa beans as a form of cash. There were 400 cocoa beans in a *Zontli* and 8,000 in a *Xiquipilli*, which was represented in their picture script by a basketful of the beans.

PLANTS

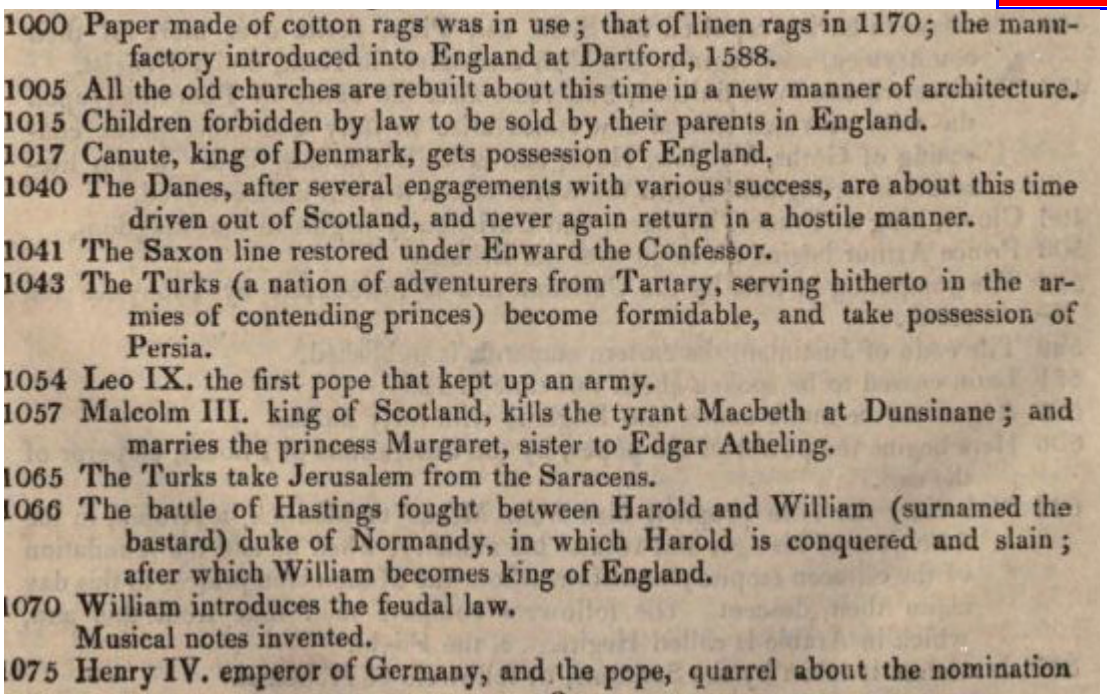
1057 CE

King Macbeth of Scotland died in battle at Lumphanon, three years after the battle at Dunsinane depicted in Shakespeare's famous play (Shakespeare was writing a play, after all, and in a play, story is everything).

The Tibeto-Mongol kingdom of Pagan conquered the Khmer-Mon kingdom of Thaton (this marks the establishment of modern Burmese culture).

The Chinese Emperor Jen Tsung ordered the creation of a new national pharmacopoeia. More than a thousand drawings would be received in Hangchow and the text would cover more than a thousand different plants.

PLANTS



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1150 CE

At Europe's first paper mill, on the Iberian peninsula, Moslems began to use cannabis (hemp) fibers. Most paper made during the next 800 years would include such fibers, to increase the material's tear strength.

PLANTS

1180 CE

A guild of pepper wholesale merchants, a pepperers' guild, was founded in London. Later this organization would merge with a spicers' guild. In 1429 the spicers' guild would become The Grocers' Company (the term "grocer" comes from *vendre en gros*, which is French meaning wholesale). The charter of such organizations was to manage trade in spices, drugs, and dyestuffs: these guild members maintained their exclusive right to "garble" — that is, to select and process spices and medicinal products.

PLANTS

1191 CE

Tea bushes were planted in Japan.

PLANTS

1200

At about this point the opium poppy *Papaver somniferum* was being introduced into China.

PLANTS

The neo-Confucian scholar Chu Hsi died.

1300

Villanova detailed POEMS FOR HEALTH, recommending nut oils for cooking.

PLANTS

1471

The *OPUS RURALIUM COMMODORUM* was printed up making use of the new technological capabilities of the Gutenberg process, based on a manuscript written a century earlier by Peitro Creszenzi of Bologna. Compiled from works of Varro, Columnella, and Cato, with an admixture of Creszenzi's own thoughts, this book would be translated into various languages and consulted extensively. It could be considered the foundation of modern western gardening.

PLANTS

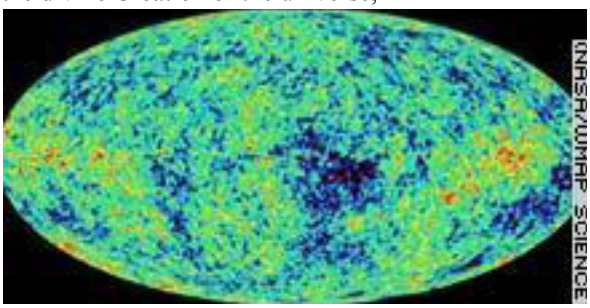
1480

The dry garden at the monastery of Ryoan, in Kyoto, was built during this decade, apparently reaching completion by 1490.

PLANTS

1492

January 2, Monday (Old Style): Because the Nasrid ruler of Granada, Muhammad XII Boabdil, had been getting nervous while waiting to abdicate in May as had been agreed to in principle in the previous November, the Christian flag happened to be being raised over the Alhambra for the first time as negotiations began on this day in the tent city without the walls of Granada between the secretary to King Ferdinand and Queen Isabella, Juan de Colomba, and Father Juan Pérez, a sponsor of the proposal of Christopher Columbus that sailing to the west might well turn up a more direct passage and sources for obtaining for Spain the spice riches of the Orient.[18] Retrospectively, the meeting in the siege tents would come to be regarded as of greater long-term significance than this lowering and raising of flags over the fortress palace atop the hill, but at the time there was no question in anybody's mind that it was the flag ceremony which was the significant, albeit off-schedule, incident of this day. It would not be until 1552 that it would be suggested, by Francisco López de Gómara to King Charles V, that the conquest of the Americas that had begun with Columbus had constituted the most significant event since the divine Creation of the universe,



— or, at least, since the 1st Coming of Christ.

I freely admit that, according to white writers, white teachers, white historians and white molders of public opinion, nothing ever happened in the world of any importance that could not or should not be labeled 'white.'

— W.E. Burghardt Du Bois, "The Superior Race"

This would turn out to be a key year in the history of tourism. Columbus, or Colon, or Colombo or whatever his name was, had made a serious error in calculating the circumference of the earth which could have gotten a whole bunch of white people, including himself, lost while sailing the ocean blue and dying of thirst. Instead it seems he lucked out. Yes, a whole bunch of people would get killed as a result of this ridiculous miscalculation of his, but, by and large, they wouldn't be white people. I will make only one further comment on this year: Bartolomé de las Casas reported,[19] that what this mass-murder Columbus/Colon/Colombo most craved was "to discover more." This is the real world, in which, it seems, it is those of us who most crave who are surest to become craven.

18. He would return with corn (*Zea mays*) and other crop plants.

PLANTS

19. Las Casas, Bartolomé de, 1951, *Historia de los Indies*, *Fondo de Cultura Economica*, Mexico, Volume I, p.146.

For the longest time, only a rather small group of Spanish intellectuals and bureaucrats would have any interest in this crazed figure, Christopher the Christ Carrier, who had supposed the hill of the Garden of Eden to be at

the origin of every strong ocean current which he had encountered. The half-mythicized faces of America, such as that of the Emperor Montezuma (*Motechuzoma*), would for a long time quite overshadow this

genocidal figure.

> Ethnicity gave Columbus a lobby, a prerequisite to public success in US culture. The 1850 census reported only 3,679 individuals of Italian birth. Yet by 1866, Italian-Americans, organized by the Sharpshooters' Association of New York, celebrated the landfall and, within three years, annual festivities were being held in Philadelphia, St. Louis, Boston, Cincinnati, New Orleans, and San Francisco on or around October 12. Italians and Spaniards were just not enough, however, to turn this celebration into a national practice. Fortunately, ethnicity gave Columbus a second –and more numerous– group of lobbyists, Irish-Americans. By 1850, there were already 962,000 Americans claiming Irish descent. Many of them regrouped in organizations like the Knights of Columbus, a fraternal society for Catholic males founded in 1881. In less than ten years, community support and the institutional patronage of the Catholic church swelled the Knights' membership. As the association spread in the northeast with the backing of prominent Irish-Americans, it increasingly emphasized the shaping of "citizen culture." Columbus played a leading role in making citizens out of these immigrants. He provided them with a public example of Catholic devotion and civic virtue, and thus a powerful rejoinder to the cliché that allegiance to Rome preempted the Catholics' attachment to the United States. In New Haven, the 1892 celebration of the landing attracted some forty thousand people –including six thousand Knights and a thousand-piece band conducted by the musical director of West Point– in a joint celebration of holiness and patriotism.

1493

November 22, Friday (Old Style): Christopher Columbus arrived at Hispaniola. On this trip he was bringing with him the seed of the lemon, the lime, and the sweet orange trees. He was also introducing sugar cane to the island, and by 1516 the first processed sugar would be shipping from Santo Domingo to Spain. Soon afterward, Portugal would begin importing sugar from Brazil, and so sugar cane would be, as we know, becoming a driving force for the slave trade.

PLANTS

Peter Martyr wrote that Christopher Columbus brought "pepper more pungent than that from the Caucasus." These capsicum peppers were introduced into Spain in 1493, known in England by 1548, and grown in Central Europe as early as 1585.

PLANTS

1494

Hemp (cannabis) papermaking started in England.

PLANTS

1446 The Vatican library founded at Rome.
The sea breaks in at Dort in Holland, and drowns 100,000 people.
1453 Constantinople taken by the Turks, which ends the eastern empire, 1123 years from its dedication by Constantine the Great, and 2206 years from the foundation of Rome.
1454 The university of Glasgow, in Scotland, founded.
1460 Engraving and etching in copper invented.
1477 The university of Aberdeen, in Scotland, founded.
1483 Richard the III. king of England, and last of the Plantagenets, is defeated, and killed at the battle of Bosworth, by Henry (Tudor) VII. which puts an end to the civil wars between the houses of York and Lancaster, after a contest of thirty years, and the loss of 100,000 men.
1486 Henry establishes fifty yeomen of the guards, the first standing army.
1489 Maps and sea-charts first brought to England by Barth. Columbus.
1491 William Grocyn publicly teaches the Greek language at Oxford.
The Moors, hitherto a formidable enemy to the native Spaniards, are entirely subdued by Ferdinand, and become subjects to that prince on certain conditions, which are ill observed by the Spaniards, whose clergy employ the powers of the inquisition, with all its tortures; and in 1609, near one million of the Moors are driven from Spain to the opposite coast of Africa, from whence they originally came.
1492 America first discovered by Columbus, a Genoese, in the service of Spain.
1494 Algebra first known in Europe.
1497 The Portuguese first sail to the East Indies, by the Cape of Good Hope.
South America discovered by Americus Vespusius, from whom it has its name.
1499 North America ditto, for Henry VII. by Cabot.

Piero de Medici was defeated by Charles VIII of France.

Ferdinand I of Naples died.

When the Catholics of the Iberian Peninsula determined to attack the Catholics of the Italian Peninsula, Gonzalo Fernández de Córdoba y Aguilar was sent off as one of their conquistadores.

Double-entry bookkeeping appeared in Italy.

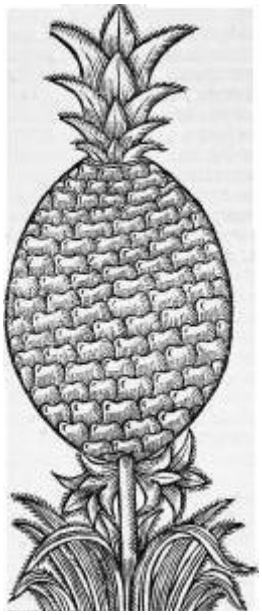
By running his finger down a line of longitude on a map, Pope Alexander VI (formerly Rodrigo Borgia of Spain) divided the non-Christian world between Spain and Portugal (Spain was to have everything west of the line, Portugal everything to the east — this would turn out to be a really really good deal for Portugal, because nobody was able to measure longitude very well at sea in those days and that map line would turn out to have been drawn way, way to far to the west).

Christopher Columbus introduced cucumbers and other vegetables from Europe to Haiti. Columbus's physician, Chanea, described Mexican capsicums (red peppers).

PLANTS

1496

June 8, Wednesday (Old Style): Christopher Columbus reached the coast of Portugal. He had been gone this time for 2 years, $8^{1}/_{2}$ months, and was returning with pineapple and allspice (not having ever seen whole



peppercorns, he was supposing this spice berry to be pepper).

PLANTS

1497

July 8, Saturday (Old Style): The Portuguese captain Vasco da Gama left Lisbon under orders from the King of Portugal, to follow a route discovered by Diaz 11 years before around the Cape of Good Hope. His arrival in India would mark the first voyage from Europe. This trip and the subsequent voyage of Cabral would break the Venetian monopoly on the sugar and the spice trade.

In reference to citrus, Camoes, in recording his voyages to India would write:

> A thousand trees are seen towards heaven rising,
> With beautiful and sweetly-scented apples;
> The orange, wearing on its lovely fruit
> The colour Daphne carried in her hair;
> Bent low, nay almost fallen to the ground,
> The citron, heavy with is yellow load;
> And, last, the graceful lemon with its fruit
> Of pleasant smell and shaped like virgins' breasts.

PLANTS

1498

May 20, Sunday (Old Style): The Portuguese captain Vasco da Gama arrived at Calicut on the west coast of India, a spice-trading center; pepper prices would decline in Europe. De Gama's cargo paid for his expedition sixty times over. (The pepper season begins in Sumatra with the harvesting of small berries near the ground in January. The harvest continues through the spring, with the very finest peppercorns being taken from the tops of the vines during May. Some good pepper reaches the ports along the Acehnese coast of Sumatra even as late as July, and then pepper become unavailable in bulk until the next January. What the pepper traders along this coast desired in exchange was Spanish silver, either in the form of dollars or of pieces of eight, and sacks of these silver coins made excellent ballast for the spice ships on their trip out to Sumatra.)

PLANTS

1500

By this point the sweet potato had been taken to Spain, where by 1550 it would be in cultivation. It would soon be being cultivated in China, India, and Malaya as well.

At about this point the bean and the lima bean, crops native to America, were coming to the attention of white people. By the late 1700s lima beans would be being grown in Africa, Europe, India, and the Philippines.

PLANTS

1505

The Portuguese found out about Ceylon, source of treasured cinnamon. Their exploitation of the cinnamon forests would lead to a system of slavery there, and a monopoly on trade in this spice.

PLANTS

1511

Captain Albuquerque seized Malacca on the Malay Peninsula, one of the most important spice ellipuliums. Western explorers discovered that the Molucca Islands (the Spice Islands) were the source of cloves. Having won battles over Muslim forces, the Portuguese advanced their control over spice producing areas of India, Ceylon, Java, Sumatra — and by 1514, the Spice Islands. For nearly 100 years great Portuguese wealth would flow from control of the spice trade.

PLANTS

1514

Jorge Alvarez was the first European to reach China by sea. In the region of Canton these Portuguese sailors encountered oranges superior in sweetness and fragrance even to those brought from India and Ceylon.

PLANTS

1516

1st published European description of *maizium* (maize, Indian corn), in Peter Martyr Anglerius's DE ORBO NOVE.

The banana was introduced to the New World, from Africa, which is to say that in this year the 1st shipment of plantains from the Canary Islands arrived at Hispaniola. This shipment is of significance because we know that a couple of years later, entire plantations on Hispaniola would be devastated by an ant infestation, "as though fire had fallen from the sky and scorched them." Presumably these ants would have been introduced along with some such plant transfer. (Professor Edward O. Wilson now indicates that the culprit introduced species was likely to have been *Solenopsis geminata*, the tropical fire ant.)

The dyestuff indigo came to Europe.[20]

PLANTS

20. The indigo plant, a member of the pulse family the crushed leaves and stems of which can be used to dye cotton cloth, originated chiefly in India, hence its name *Indigofera Tinctoria*.

1518

To replace the island's fast-disappearing native population, the 28 Spanish sugar cane plantations on Santo Domingo were stepping up importation of slaves from Africa, to do the cane chopping and heavy lifting.

INTERNATIONAL SLAVE TRADE

Hey, that sounds like a plan! There was a problem, however, on many of these plantations in this year. They were being devastated by an ant infestation, "as though fire had fallen from the sky and scorched them." Presumably these ants had been introduced along with some plant that the Spanish had brought in. (Professor Edward O. Wilson now indicates that the culprit introduced species was likely to have been *Solenopsis geminata*, the tropical fire ant.)

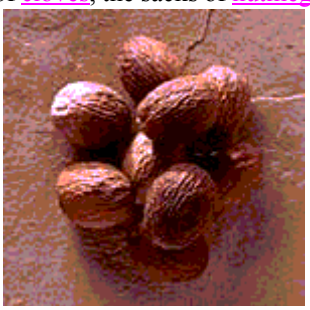
Duarte Barbosa, in AN ACCOUNT OF THE COUNTRIES BORDERING ON THE INDIAN OCEAN AND THEIR INHABITANTS described sweet oranges in Ceylon. A later book by Garcia da Orta, 1562, one of the earliest European books printed in India, would comment that the oranges of Ceylon were "the best of the whole world in regard to sweetness and abundance of juice." Prior to the discovery that China harbored sweet oranges, Europeans were less accustomed to consuming the fruit and considered citrus more valuable for its fragrance.

PLANTS

1519

September 20, Tuesday (Old Style): King Charles V of Spain (Holy Roman Emperor Charles V) having endorsed the design of Ferdinand Magellan and Ruy Faleiro, after a year's preparation their fleet, the *San Antonio*, *Trinidad*, *Concepción*, *Victoria*, and *Santiago*, sailed out into the Atlantic. With them sailed Magellan's brother-in-law, Duarte Barbosa. When they would reach the coast of Brazil, they would sail down the South American coast to the Patagonian bay of San Julián, where they would wintered from March to August 1520. The *Santiago* would be wrecked, and its commander João Serrão and its crew would be taken aboard the other vessels.

Captain Magellan was sailing westward instead of eastward from Spain because he was looking for new spice lands. Nearly 3 years later, on September 8, 1522, 18 of the original 250 crewmen (lacking Magellan, who fell in a local combat on the island of Mactan in the Philippines during April 1521) would return to Seville, precisely one day early by their own reckoning, with but one remaining of the five ships that had started. Even given such great losses, the 26 tons of cloves, the sacks of nutmegs, the dried mace, and the cinnamon bark in



the *Victoria*'s hold, with the load of sandalwood returned to Spain from the very last legs of the voyage, would be enough to cover the entire cost of the expedition. The returning captain, Juan Sebastián de Elcano, would be awarded a pension and assigned a coat of arms that displays two cinnamon sticks, three nutmegs, and 12 cloves. A journal detailing exploits of this voyage would be maintained by Antonio Pigafetta, gentleman-adventurer, and published subsequently as *Primo Viaggio Intorno al Mondo*.

PLANTS

1521

Hernando Cortes conquered Mexico. While on reconnaissance in southeastern Mexico, his soldiers were the first Europeans to discover the delights of the Aztecan spice, vanilla.

PLANTS

The manufacture of silk was introduced to France.

Instead of the Fountain of Youth, Juan Ponce de Léon found death from an Indian arrow in Florida. How sad.

1522

Antonio Pigafetta, following three years of voyage to the Moluccas, wrote that "in all the islands of the Moluccas there are to be found cloves, ginger, sago which is wood-bread, rice, ...pomegranates, both sweet and sour oranges, lemons..." He also wrote that: "the betel-nut is a fruit which they keep chewing together with flowers of jasmine and orange," and "the cannibals of the islands...eat no other part of the human body but the heart, uncooked but seasoned with the juice of oranges and lemons."

PLANTS

1530

Bernardino de Sahagun, missionary in Mexico, distinguished between sweet commercial tobacco (*Nicotiana tabacum*) and coarse *Nicotiana rustica*.

Brunfels published *HERBARIUM VIVAE EICONES*, the first newly written and printed botanical book/herbal.

PLANTS

1533

Richard Harris, fruiterer to King Henry VIII, began to import apple trees from France to England. Harris planted a model orchard at Teynham which would be used to distribute trees to other growers.

A professorship in botany, created at the university in Padua, established plant study as a discipline separate from medicine. That position was filled by Francesco Bonafede. The following year Luca Ghini became a lecturer in botany at Bologna.

PLANTS

The Reverend Doctor Martin Luther helped reform the theology faculty at the University of Wittenberg in Germany. He believed that there were witches and they needed to be killed just as he believed that there were Jews and they needed to be killed:

> Doctor Martinus said a great deal about witchcraft, about asthma and hobgoblins, how once his mother was pestered so terribly by her neighbor, a witch, that she had to be exceedingly friendly and kind to her in order to appease her. The witch had cast a spell over the children so that they screamed as if they were close to death. And when a preacher merely admonished his neighbor in general words [without mentioning her by name], she bewitched him so as to make him die; there was no medicine that could help him. She had taken the soil on which he had walked, thrown it into the water, and bewitched him in this way, for without that soil he could not regain his health.
>
> "I should have no compassion on these witches. I would burn all of them.... Witchcraft is the Devil's own

proper work."

1536

Union of England and Wales.

George Browne, appointed Archbishop of Dublin, was given the task of reforming the Irish Church.

Pedró de Mendóza founded Buenos Aires and sent an expedition to find a route to Peru.

As soon as the Spaniards completed their conquest of Peru, they began to rely on its potatoes as cheap food for their sailors. The earliest English publication describing potatoes, however, would be Gerard's 1597 *HERBALL*. By 1700 these starchy tubers would be important in Germany, and by 1800, in Russia.

PLANTS

1540

An edition of Suetonius' LIVES OF THE TWELVE CAESARS was prepared in France by Robert Estienne. The types used were those of Claude Garamond, and were here used in the italic (this typeface was to become dominant in France and to assume an important position in the typefaces of the Western world).

HISTORY OF THE PRESS

When the Spanish presented a specimen potato tuber to Pope Paul III, he handed it off to a guy who would introduce this into France as an ornamental.

PLANTS

1541

On his 2d visit to the estuary of the St. Lawrence during this year and the following one, Jacques Cartier would attempt to establish a permanent settlement but would fail. The *Hochelaga* (Montréal) village of Iroquoian-speakers was still there — but would have vanished by 1603 when the French would make their next visit. (On Cartier's later two voyages he had three, four, or even five ships, but no greater success at making any permanent white settlement.)

It was on this voyage that Cartier introduced cabbage to Canada (the 1st written record of cabbage in what would become the US would not appear until 1669, which is to say, well over a century later).

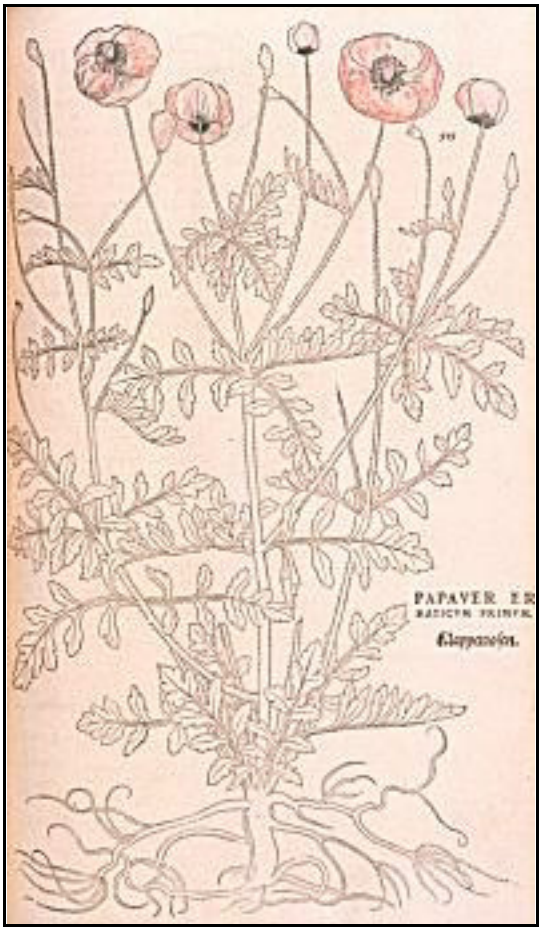
A book to promote cooking with sugar became available in Venice (in a later timeframe, Nostradamus would author the 1st French book on this topic).

PLANTS

1542

Conrad Gesner's *CATALOGUS PLANTARUM.*

Leonhart Fuchs published *DE HISTORIA STIRPIUM COMMENTARII*, which included this illustration of the poppy.



By the following year he would publish also a German version, *NEW KREÜTERBUCH*. Illustrations for his herbals were based on studies of living plants, rather than on the simplified images that had become common in various scribed editions of the Apuleius herbal. The text, however, was taken essentially from Dioscorides. Much later, the plant genus *Fuchsia* would be named in his honor.

PLANTS

1543

In Italy, Professor Andreas Vesalius of the University of Padua was accurately describing the human anatomy.

Up to this point, Galen's "humouralism" had held sway in Western medicine. This "theory of the humours" was a medical form of superstitious numerology based on the magic of the number four. Since there were four elements, Earth, Air, Fire, and Water, there were four associated conditions of being, hot and moist, hot and dry, cold and moist, and cold and dry, and correspondingly, there were four human personalities, Sanguine, Phlegmatic, Choleric, and Melancholic, color-coded for diagnostic symptomology as red, white, yellow, and black biles. However, at this point Vesalius prepared a damning list of the 200-or-so most egregious errors committed by Galen, revealing him to have been given to the wildest leaps of the imagination.

One of the 1st botanical gardens, a garden of "simples," was established by Luca Ghini at the University in Pisa — on a site different from that of the present garden.

PLANTS

1545

The Spanish began cannabis (hemp) cultivation in Peru.

PLANTS

The botanical garden was established at Padua, Italy.

Leonhard Fuchs's (1501-1566) *PRIMI DE STIRPIVM HISTORIA COMMENTARIORVM TOMI UIU IMAGINES, IN EXIGUAM ANGUSTIOREMQ[UE] FORMAN CONTRACT, AC QUAM FIERI POTEST ARTIFICIOSISSIME EXPRESS....* (Basile, 1545 7 p. l., 516 p. of plates (part in color) 17 cm.) Courtesy of Harvey Cushing, there is a copy of this in the Historical Library of Cushing/Whitney Medical Library at Yale University, and the plant illustrations from this volume are now on the Internet.

PLANTS

1550

Introduced to China by this point, corn would grow so quickly in importance that this crop would be a significant factor in the 18th-Century increase in the Chinese population, particularly in inland areas where rice was not such a good crop. (Today, China has become the world's 2d largest producer of corn.)

At about this point Japanese pirates (*waka*) were employing arquebuses during raids into China and Korea. While the success of such pirate raids owed more to disciplined small-unit infantry tactics than to such firearms, in Korea the use of such weaponry would bring about the creation of new military bureaucracies, while in China the military would send acrobats and boxers to instruct peasants in self-defense (the stories of flying swordsmen which now fill our cinemas would not, however, become a staple of Chinese fiction until the late 19th Century).

The training of Ottoman Janissaries is described as including archery, musketry, javelin-throwing, and fencing. There was no pike training, though, since the Janissaries believed that pikes were useful only for men trained to fight like machines.

Spanish expeditions report seeing American Indians living in Sonora and Chihuahua riding horses. Unbranded and unbranded horses and cattle spread rapidly across the Mexican plains and, said Viceroy Martìn Enrìquez in 1580, "Their price was no higher than the fatigue of seizing and killing them."

A former beggar named Gilpin, or "the Cork lad of Kentmere," became a royal wrestler for King Edward VI of England. Gilpin's diet consisted of "thick porridge and milk that a mouse might walk on dry shod, to my breakfast," and meat for his supper when he could get it. Other famous English wrestlers of the day included Robert Dodd of Westmoreland, John Woodall of Gosforth, and Robert Atkinson of Kendal.

Pope Julius III (Giovanni Maria del Monte).

By this year, tomatoes (introduced from the New World) were being regularly consumed by Italians.

Damiao de Goes described oranges being exported from Portugal to Spain. The tradition is that J. de Castro had recently returned from India, bringing with him a sweet orange and planting seeds from it at his country home, known as Penh Verde. From this tree all the Portugal-type sweet oranges have descended.

PLANTS

In Naples, Federico Grisone publishes *GLI ORDINI DI CAVALCARE*. This "ordering of equitation" describes the form of trained riding later known as dressage, a word itself meaning "schooling." There was no training in jumping, but much training in the performance of intricate movements conducted at slow gaits during princely pageants.

The Muscovite government organizes a corps of 3,000 musketeers. The job of these mostly German infantrymen was to deliver massed musket fire from behind breastworks, not to maneuver independently on the battlefield.

In England in the course of the following century, the Anglicans would be withdrawing their support for any festivals held on saints' days. In Scotland, the Netherlands, and Switzerland, the Calvinists would ban sword dances, plays, and dancing around the maypole. In Germany, both Catholics and Lutherans would ban Passion plays. In Italy and Spain, Catholic reformers would burn the images of Carnival. The Russians would ban dancing, fiddlers, masks, and minstrels. In all cases, the clerics would be averring that such entertainments put undue emphasis on sex and violence, which in turn corrupted morals and led young people astray. As a result, wrestlers, fencers, bear-trainers, playwrights, and other entertainers would need to be looking for secular employment.

1551

Jerome Bock published his *KREÜTERBUCH*, one of the 1st herbals in which the author based the plant descriptions on his own 1st-hand observations — rather than merely copying the text of Dioscorides.

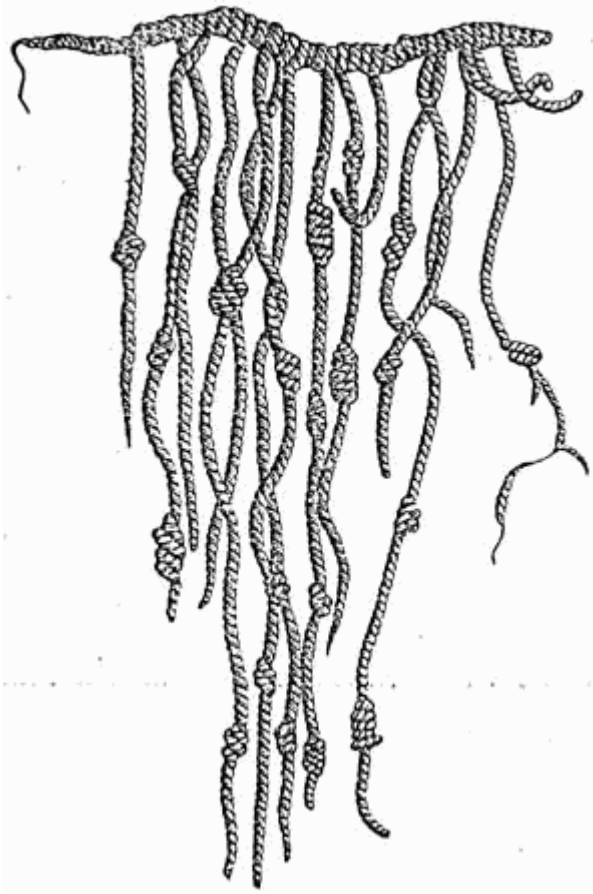
PLANTS

1554

In Antwerp, one “Cruydeboeck” or “CRVYDT-BOECK” prepared the first European illustration of tobacco.

This year produces the 1st written record of the tomato.[21]

Though the 1st description in Europe of kohlrabi was in this year, it would not be grown commercially for 21. Except, perhaps, for the *quipu*!



almost two more centuries, until 1734 (in Ireland). Records of this vegetable in the US do not begin for two and a half more centuries, until 1806.

PLANTS

1556

The seeds of Brazilian tobacco (*Nicotiana tabacum*) were being brought from Rio de Janeiro, Brazil to France by a Franciscan monk, André Thevet, who was characterizing this plant as a creature comfort.

PLANTS

1560

Three olive saplings were planted in Lima, Peru by the Spaniards, one of which would be taken later to Chile. (These three trees would form the basis of today's South American olive industry.)

PLANTS

1561

Tobacco was growing in Spain and Portugal, where it was used as an ornamental plant and for its alleged medicinal properties.

The posthumously published work of Valerius Cordus established new standards for the systematic description of plants — his work was the 1st to uniformly address all aspects of a plant in a standard sequence, granting parallel treatment to each species. Which is to say, for the 1st time we had a published herbal which could be approached with the convenience of a database.

PLANTS

1564

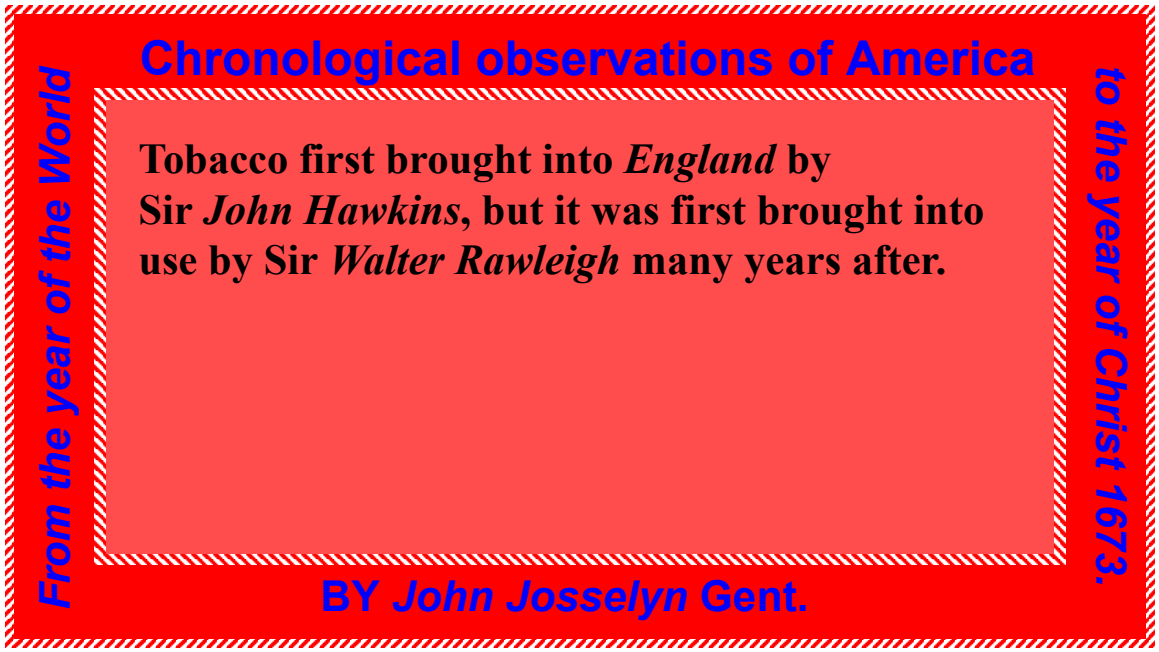
King Philip of Spain ordered cannabis (hemp) to be grown throughout his empire, which stretched from modern-day Argentina to Oregon.

Priests brought the European grape vine to California via Mexico.

PLANTS

1565

John Hawkins introduced tobacco seeds into England from Florida, but smoking would not spread until dashing Walter Raleigh, who was at this point only eleven years of age, would help it become fashionable in the court in the mid-1570s.



(Although there have been popular reports that John Hawkins may have introduced potatoes into Ireland in this year, we don't have an actual confirmation of potatoes in Ireland prior to the year 1586.)

PLANTS

December 13, Thursday (Old Style): His title of nobility availing him not, or at least not much, Conrad von Gesner died of the plague. A genus of flowering plants would in his honor be designated as the *Gesneria* (*Gesneriaceae*).

PLANTS

1569

Dos libros, el uno que trata de todas las cosas que se traen de nuestras Indias Occidentales, que sirven al uso de la medicina, y el otro que trata de la piedra bezaar, y de la yerva escuerçonera, published by Dr. Nicolás Bautista Monardes in Seville in various editions with various titles between 1569 and 1574, to be translated by John Frampton into English in 1577 as Joyfull News out of the Newfounde Worlde. Many new plants were discussed in this book, including tobacco and a 1st mention of the sunflower (by 1596 John Gerard would be growing sunflowers in his garden, but by 1665 John Ray would be describing the flower's popularity as having subsided). This seems also to have contained the 1st reference in Europe to the American native bush *sassafras*.

PLANTS

1573

Sir Francis Drake came home from the Americas with what was being termed by that time *Nicotina tobacum*.

"Willim Honesse" was entered in the Booke of Stoppes of the Company of Grocers of London as having paid his two shillings, dues for the year.

WILLIAM HUNNIS

Clusius became court gardener to Maximilian II in Vienna (he would remain in that position until 1587, later becoming a professor at the University of Leiden in Holland, where he would introduce and popularize the tulip).

PLANTS

The daimyo Oda Nobunaga overthrew the Muromachi bakufu and extended his control over most of Japan.

From this year into 1620, Wan Li would be the Emperor of China: this would be a period of great paintings and porcelain-making; the imperial kilns at Jingde zhen would produce vast quantities of "china."

The peanut is known to have been cultivated in the Chekiang Province of China in this year, presumably having arrived on the basis of port calls that Portuguese vessels had made in Brasil en route to the Orient.

PLANTS

1577

England and the Netherlands entered into an alliance.

John Gerard was hired to supervise the London gardens of Lord Burleigh.

PLANTS

1581

In the Flemish translation of L'Obel's *KRUYDTBOECK* the author wrote of the tomato: "These apples were eaten by some Italians like melons, but the strong stinking smell gives one sufficient notice how unhealthful and evil they are to eat." Smell would be a major consideration in the non-adoption of the tomato in northern Europe.

PLANTS

In a series of letters sent from Portugal, Phillip II of Spain would tell his two daughters about his love of plants and gardening: "The other day I was given what is contained in this box, being told that it was a sweet lime; and, although I do not believe that it is anything else than a lemon, I longed to send it to you because, should it be a sweet lime then I never saw one so big.... I also send you roses and some orange blossoms, that you may see there are some here." It is likely (the Portuguese today describe the Indian sweet orange as *limon doce*) that the Phillip's sweet lime was what we today would term an orange.

PLANTS

Intrusive Spaniards in Mexico were still ignoring the exceedingly obvious ecological changes in the valley above Mexico City which they were coming to term the Valle del Mezquital, changes which we can see that they themselves had been recording in their *relaciones* between 1548 and 1581. In the 1540s this valley, which includes Tula, had been described as being fit to grow wheat, with stands of oak and pine forest, yet, by this point, the *relaciones* were recording almost a neo-Spain, an arid region that was the home merely of mesquite, prickly pear cacti, and the maguey. Overstocking and overgrazing of sheep, their deforestation to acquire mining beams and charcoal, etc., had in only a little more than a generation transformed irrigated Otomi farmland into land fit only for wide-range grazing. The number of sheep per hillside would continue to rise until it would reach its peak in the period 1579 to 1589 ("overshoot"), and by 1599 would be in the most radical decline. By 1600, the only viable economic choice which would remain, since more and more land was less and less fertile and wider and wider ranges were required to graze the same number of sheep, would be the large hacienda. Also, the disastrous drop in the Native American population after the epidemic of 1576-81 was contributing in making sheepraising the logical alternative to more labor intensive practices such as irrigation agriculture. European sheep and other imported plagues would have altered the New World environment as nothing else could. See Elinor G.K. Melville. A PLAGUE OF SHEEP: ENVIRONMENTAL CONSEQUENCES OF THE CONQUEST OF MEXICO. Cambridge: Cambridge UP, 1994.

1583

Andrea Cesalpino's *DE PLANTIS LIBRI.* This would prove to be the botanical text that finally would supersede reliance upon the ancient writings. Cesalpino, a student of Luca Ghini, grouped plants by their morphology (their physical characteristics) rather than by their supposed medicinal properties. The bean genus *Caesalpinia* would be so named in his honor.

PLANTS

1586

Ralph Lane, 1st governor of Virginia, introduced Sir Walter Raleigh to a device apparently of his own devising, a long-stemmed clay pipe for the smoking of tobacco. In Germany, DE PLANTIS EPITOME UTILISSIMA offered one of the 1st cautions against indiscriminate use of this "violent herb."

(man smoking clay pipe)

Upon Thomas Hariot's return to England from the Virginia coast, his patron having fallen into disfavor at the court, he entered the service of Henry Percy, 9th Earl of Northumberland. At Syon House, which was run by the earl's 2d cousin Thomas Percy, he would become a prolific mathematician and astronomer. He has credit for the theory of refraction.

Gunung Api (4.525°S, 129.871°E; summit elevation 640 meters), the volcano on the island of Banda Api that towers over the spice island of Neira in the Banda Sea, erupted. Gunung Api is the most northeasterly volcano in the Sunda-Banda arc, now part of Indonesia. The island of Banda Api is part of a 6-mile-wide caldera, mostly submerged, that is the northernmost of a chain of volcanos. Gunung Api forms a conical peak at the center of this island. At least two episodes of caldera formation are thought to have occurred, with the arcuate islands of Lonthor and Neira considered to be remnants of the pre-caldera volcanoes. (Historical eruptions have mostly consisted of Strombolian eruptions from the summit crater, but larger explosive eruptions have also occurred and, occasionally, lava flows have reached the coast.)

Sir Francis Drake, on landing at Roanoke off the coast of what is now North Carolina, heard tales of colonists who had survived on soup made from *Sassafras albidum*. When he returned to England he took with him what may have been the 1st shipment of this plant. (In 1602 Bartholomew Gosnold would bring more material from the plant to England, and by 1607 it would be in great demand both in English coffeehouses and on the street. The tea was said to cure a wide range of diseases, while the wood was thought to repel insect attack. Today we know that oil of sassafras (once used to flavor root beer but out of use since the early 1960s) is substantially the chemical safrole, now regarded as a definite carcinogen. The most significant commercial use for sassafras today is the manufacture of *filé*, a powder made from young, dried leaves (they do not contain any safrole) used in the making of gumbo.

PLANTS

1587

DE HERBE PANACEA, the first treatise totally on the subject of tobacco, was published in Antwerp, providing numerous recipes and laying claim to cures.

The 1st written description of Brussels sprouts, a form of cabbage common in Belgium (this vegetable would not be grown in the US until about 1800).

PLANTS

1589

The West was beginning to learn about an Eastern temperance drink, tea. A Venetian recorded that "The Chinese have an herb from which they press a delicate juice which serves them instead of wine. It also preserves the health and frees them from all the evils that an immoderate use of wine doth breed in us."

PLANTS

1595

In an age dominated by Portuguese carracks and Spanish galleons, that functioned as warships in addition to carrying cargo, the first Dutch *fluytschip* cargo carrier was launched at Hoorn in the Zuider Zee. This vessel was six times as wide and twice as long, with a nearly flat, rectangular bottom for efficiency in the storage of large quantities of cargo.

In about this year also, the *jacht Duyfken* was under construction in the Netherlands. This was not a lumbering cargo vessel but a fast, lightly-armed ship suitable for small valuable cargoes and for privateering.

SPICE

Bakers in Montpellier, France were forced to use bushes to fire their ovens because there remained no forest in the area to supply firewood. Europe would continue to face energy shortages based on dwindling forest reserves. Eventually reliance would move to coal, then to petroleum (remember, even these fossil fuels are based on plant life), which would mark a major shift in the history of civilization, from renewable to non-renewable energy sources.

PLANTS

The Chinese GREAT HERBAL, a massive work, took up the description of ginseng and published it in this year. This book is still used as a reference today. Many of the medicinal effects of the root are thought to be caused by ginsenosides which, at the molecular level, resemble steroids. Interestingly, a large amount of ginseng will not do more than a small amount.

PLANTS

1596

John Gerard prepared a list of the rare plants cultivated in his garden at Holborn (you can consult this in the British Museum).

PLANTS

L. Shih Chen published *PEN TS'AO KANG MU*, the most well-known and praised of Chinese herbals.

This was a poor harvest year in Europe. Caspar Bauhin published a short notice on the potato *Solanum tuberosum*.

PLANTS

This was the 2d of the three so-called "dear years" of England, during which not only meat but even dairy products were in such low supply that they commanded such a price as to be entirely out of the reach of the poor.[22] In these years wheat flour would often need to be augmented by grinding and boiling the root of the cuckoopint, *Arum maculatum*, until even wheat would become too dear for regular consumption by the poor and the many would shift their menus in the direction of "Horsse corne, beanes, peason, otes, tare and lintels."[23]

IRELAND

Already in existence as of this year was a garden that had been organized by John Gerard on the Strand in London, and another in Hertfordshire (he was in addition maintaining his own garden in Holborn). He was exchanging plants with the Robins in Paris In this year the tomato plant *Solanum lycopersicon* was being introduced into England — as an ornamental; in his HERBALL he would proclaim himself unimpressed with it. After reporting that this strange thing was being eaten in Spain and Italy, he would comment "True it is, that it doth argue also a great moisture wherewith the plant is possessed, but as I have saide, not without great colde, which I leave to every mans censure" (this dual opinion of the tomato would continue to be repeated in British herbals for almost two centuries).

PLANTS

22. A. Appleby, FAMINE IN TUDOR AND STUART ENGLAND (Stanford CA: Stanford UP, 1978), page 5.
23. J.C. Drummond and A. Wilbraham, THE ENGLISHMAN'S FOOD: A HISTORY OF FIVE CENTURIES OF ENGLISH DIET (London: Jonathan Cape, 1958), page 88.

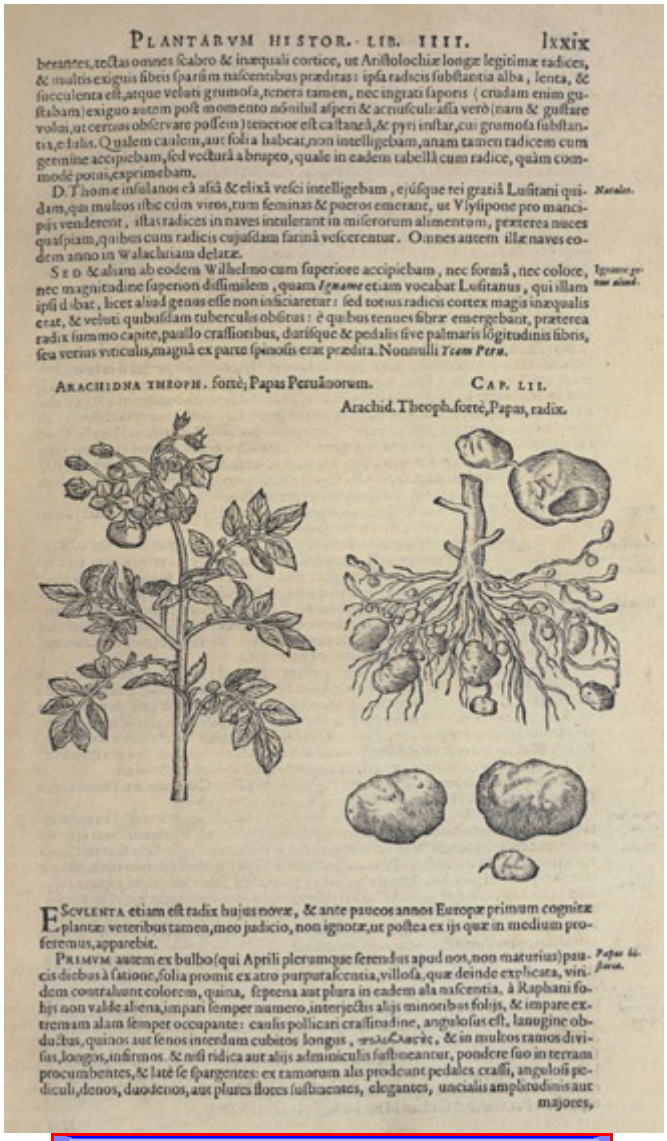
1597

The Queen's printer John Norton had commissioned a Dr. Priest to prepare an English-language translation of a popular herbal by Rembert Dodoens but then, Dr. Priest having died, the press had recruited John Gerard to carry the project through to its completion. Gerard added as-yet-unpublished material by the herbalist l'Obel.

BOTANIZING

We don't know how much of this famous GREAT HERBALL, OR GENERALL HISTORIE OF PLANTES of 1597 (the earliest English publication to describe the potatoes of Peru) had been completed by Dr. Priest before he died,

versus how much of this amounted to a fresh contribution by Gerard.



PLANTARVM HISTOR. LIB. IIII. Ixxix

berantes, teſtas omnes ſcabro & inæquali cortice, ut Ariſtolochiæ longæ legitimæ radices, & multis exiguis fibris ſparſim naſcentibus præditas: ipſa radicis ſubſtantia alba, lenta, & ſucculenta eſt, atque veluti grumoſa, tenera tamen, nec ingrati ſaporis (crudam enim guſtabam) exiguo autem poſt momento nonihil aſperi & acriuſculi: aſſa verò (nam & guſtare volui, ut certius obſervare poſſem) tenerior eſt caſtaneâ, & pyri inſtar, cui grumoſa ſubſtantia, edulis. Qualem caulem, aut folia habeat, non intelligebam, unam tamen radicem cum germine accipiebam, ſed vocturâ à brupeo, quale in eadem tabellâ cum radice, quàm commodè potui, exprimebam.

D. Thomæ inſulanos eâ aſâ & elixâ veſci intelligebam, ejuſque rei gratiâ Luſitani quidam, qui multos ibi cum viros, tum feminas & pueros emerant, ut Vlyſipone pro mancipijs venderent, iſtas radices in naves intulerant in miſerorum alimentum, præterea nuces quaſpiam, quibus cum radicis cujuſdam farinâ veſcerentur. Omnes autem illæ naves eodem anno in Walachriam delatæ. *Natales.*

SED & aliam ab eodem Wilhelmo cum ſuperiore accipiebam, nec formâ, nec colore, nec magnitudine ſuperiori diſſimilem, quam *Ignamè* etiam vocabat Luſitanus, qui illam ipſi dabat, licet aliud genus eſſe non inficiaretur: ſed totius radicis cortex magis inæqualis erat, & veluti quibuſdam tuberculis obſitus: è quibus tenues fibræ emergebant, præterea radix ſummo capite, paullo craſſioribus, durisque & pedalis ſive palmaris longitudinis fibris, ſeu verius vtriculis, magnâ ex parte ſpinoſis erat prædita. Nonnulli *Ycam Peru.* *Ignami genus aliud.*

ARACHIDNA THEOPH. fortè, Papas Peruânorum. CAP. LII.

Arachid. Theoph. fortè, Papas, radix.

ESCVLENTA etiam eſt radix hujus novæ, & ante paucos annos Europæ primum cognitæ plantæ: veteribus tamen, meo judicio, non ignotæ, ut poſtea ex ijs quæ in medium proferemus, apparebit.

PRIMVM autem ex bulbo (qui Aprili plerumque ferendus apud nos, non maturius) paucis diebus à ſatione, folia promit ex atro purpuraſcentia, villoſa, quæ deinde explicata, viridem contrahunt colorem, quina, ſeptena aut plura in eadem ala naſcentia, à Raphani foliis non valde abena, impari ſemper numero, interjectis alijs minoribus foliis, & impare extremam alam ſemper occupante: caulis pollicari craſſitudine, angulosus eſt, lanugine obductus, quinos aut ſenos interdum cubitos longus, πολύκλωνος, & in multos ramos diviſus, longos, infirmos. & niſi ridica aut alijs adminiculis ſuſtineantur, pondere ſuo in terram procumbentes, & latè ſe ſpargentes: ex ramorum alis prodeunt pedales craſſi, angulosi pediculi, denos, duodenos, aut plures flores ſuſtinentes, elegantes, uncialis amplitudinis aut majores, *Papas Indorum.*

GREAT HERBALL OF 1597

PLANTS

In this year Gerard was appointed Junior Warden of the Barber-Surgeons.

This was another poor harvest year in Europe and was the 3d of the three so-called "dear years" of England, during which not only meat but even dairy products were in such low supply that they commanded such a price as to be entirely out of the reach of the poor.[24] In these years wheat flour would often need to be augmented by grinding and boiling the root of the cuckoopint, *Arum maculatum*, until even wheat would become too dear for regular consumption by the poor and the many would shift their menus in the direction of "Horsse corne, beanes, peason, otes, tare and lintels."[25]

Willem Barentsz, a Dutch navigator, died on his return from Nova Zembla, having attempted to find a northeast passage to the Spice Islands.

1601

Smoking tobacco was introduced into Turkey, and rapidly took hold despite the fact that clerics were denouncing it. "Puffing in each other's faces, they made the streets and markets stink," wrote historian Ibrahim Pecevi.

Sir James Lancaster took four merchant ships to the Spice Islands (eastern Indonesian islands now called the Moluccas). The crew of his flagship, the *Red Dragon*, received a daily dose of lemon juice from bottles and there was no scurvy aboard that vessel; on the other three merchantmen in this flotilla many of the sailors were lost to scurvy.

Selected as the *jacht*, or scout, for the "Moluccan Fleet" sailing to the Spice Islands. *Duyfken*'s captain for this voyage, Willem Cornelisz Schouten, with Le Maire, would later discover and name Cape Horn after the city of Hoorn.

On Christmas day the five ships of the Moluccan Fleet reached Bantam (Banten), Java and encountered a blockading fleet of Portuguese ships totalling eight galleons and twenty-two galleys. They engaged this fleet in intermittent battle until on New Years Day they drove them away. This was a turning point in history: the undisputed dominance of the Iberians (Portuguese and Spanish) in the Spice Trade to Europe was over.

Jean Robin published a catalog for his medicinal herb garden.

PLANTS

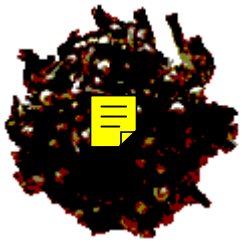
24. A. Appleby, FAMINE IN TUDOR AND STUART ENGLAND (Stanford CA: Stanford UP, 1978), page 5.
25. J.C. Drummond and A. Wilbraham, THE ENGLISHMAN'S FOOD: A HISTORY OF FIVE CENTURIES OF ENGLISH DIET (London: Jonathan Cape, 1958), page 88.

1602

Shareholders formed The United (Dutch) East India Company (VOC), with bad consequences for Portuguese traders. The Dutch government granted the newly formed company a monopoly on trade to the Spice Islands. Over the following two centuries, the Company would pay its investors an average annual dividend of 18%. (The profit margins of the English East India Company would be even higher than this.)

PLANTS

The Dutch ship *Duyfken* was warmly welcomed in Bantam, and was able to repair its battle damage. It surveyed Jakarta Bay, in which the Dutch would later build Batavia their capital in the Indies, and then sailing by way of Tuban, East Java to the Spice Island of Ternate. It loaded cloves at Ternate and proceeded to Banda for a cargo of nutmeg.



It was then sent on a voyage of exploration to the east.

SPICE

On the voyage home from the Indies, the *Duyfken* became separated from the larger ships in a storm off Cape Agulhas, southern Africa. *Duyfken* would reach the Netherlands early in 1603, two months prior to the larger ships.

1603

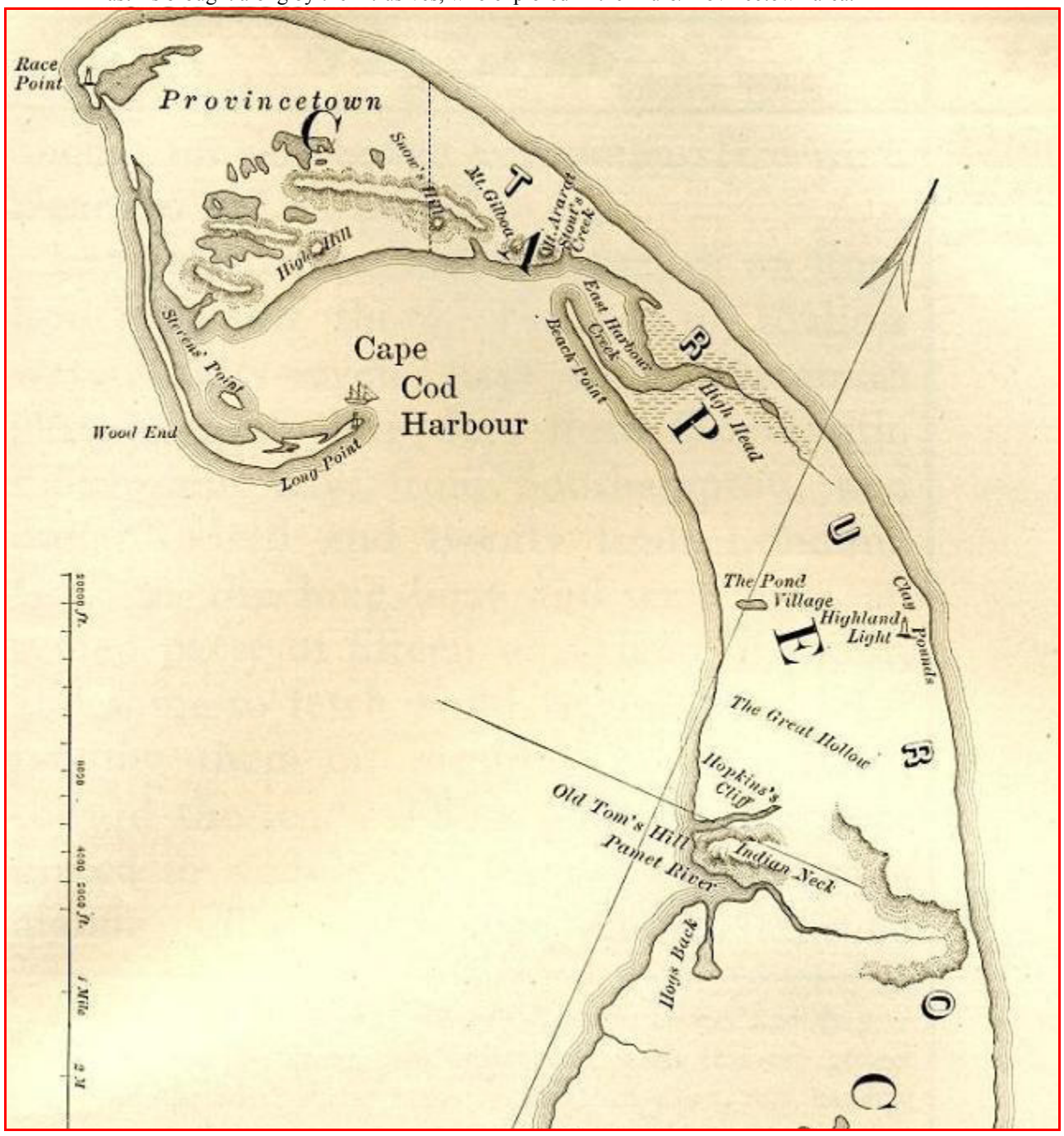
Spigelius published instructions in *ISAGOGES IN REM HERBARIUM* for the creation of dried herbarium specimens. This was a technique that had been being applied for only about fifty years at this point. The collecting, exchange, archiving, and study of such pressed, dried plants, which had been mounted upon sheets of paper according to Spigelius's instructions, would revolutionize taxonomy, floristics, and systematics.

PLANTS

Martin Pring was 23 years old when word of Captain Bartholomew Gosnold and the Reverend John Brereton's voyage inspired a group of merchants in Bristol, England to send him on a 6-month trading voyage to "the northern part of Virginia." He would visit again in 1606, and would continue a distinguished career as a merchant trading captain until his death in 1626. An account of his 1603 voyage would be published in 1625.

The traders made their landfall off the Maine coast and established a trading post somewhere in the vicinity of Cape Cod, perhaps at Plymouth harbor, trading with the Narragansett for sassafras bark and roots on which they could realize a great profit in the London herbals market. The local people were antagonized by the

mastiffs brought along by the intrusives, who explored in the Truro/Provincetown area.[26]



1605

The Dutch began seizing control of Portuguese-held trade with the Spice Islands (the Moluccas), gaining full control by 1621. By 1681 a plan to eliminate trees in most areas of the Moluccas and to concentrate cultivation

of nutmeg and cloves on only two islands had the desirable effect of raising prices and tightening management of supply.

PLANTS

26. “Narragansett” is an Englishing of *Nanhigganeuck* “people of the small point.” The Narragansett confederation was made up of the Aquidneck, Chaubatick, Maushapogue, Mittaubscut, Narragansett, Pawchauquet, Pawtuxet, Ponaganset, and the Shawomet (Shanomet). It was allied with the Coweset (Nipmuc), Eastern Niantic, Manissean (Block Island Indians), and after 1653, the Metoac of Long Island. This was an Eastern Woodland grouping, well organized and with central authority. The Narragansetts governed themselves by reliance upon eight subordinate hereditary sachems under the guidance of a grand sachem who usually resided in the largest village. Their large, fortified villages of medium-sized longhouses were usually located on islands in Narragansett Bay.

RHODE ISLAND

1608

In the Fellows' Garden of Christ's College, the site for which had been purchased in 1554, a mulberry tree was planted in order to boost the English silk industry. This tree is still producing.

The *Duyfken* engaged in a five-hour battle with three Spanish galleys. In June the *Duyfken* would be sent with larger ships to capture the fortress of Taffaso on Makian Island. A month later the ship would be brought inside the reef at Ternate for repairs. It seems that to repair the bottom she was pulled over onto her side — but this caused so much further damage that she was judged unrepairable.

SPICE

Jean Robin and Pierre Valet published the 1st European *florilegium*, *JARDIN DU ROY TRES CHRESTIEN HENRI IV.* This would be followed closely by *FLORILEGIUM NOVUM* (1611-1614) and *FLORILEGIUM RENOVATUM* (1641) by Jean Theodore de Bry, Besler's *HORTUS EYSTETTENSIS* (1613), Emanuel Sweert's *FLORILEGIUM* (1612), and *HORTUS FLORIDUS* by Crispin de Passe (1614). These books covered extensive numbers of horticultural floral forms. For example, Besler's work included 660 species and more than 400 variants (doubles, variegates, etc.); 400 of his plants had medicinal value, 180 were used in cooking, and 250 were grown principally for ornament. Besler's book included numerous forms of lilies, campanulas, delphiniums, hollyhocks, scabiosas, iris, tulips, narcissus, roses, hyacinths, and anemones.

PLANTS

1609

Jamestown colonists were planting cucumbers and carrots in their gardens.

PLANTS

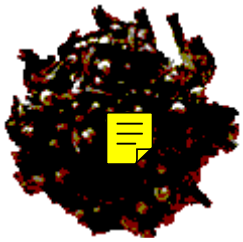
The first book devoted entirely to the subject of chocolate, *LIBRO EN EL CUAL SE TRATA DEL CHOCOLATE,* appeared in Mexico.

PLANTS

A record 116,000-pound shipment of cloves arrived in England.

PLANTS

SPICE



1610

It was at approximately this point that the 1st shipment of Chinese tea arrived in Holland (this suspicious vegetable substance would not arrive in England for another generation, in 1644).

By this year, huge sugar cane plantations in the province of Bahia, Brasil were being run by some 2,000 white settlers, assisted by some 4,000 black slaves and 7,000 red slaves.

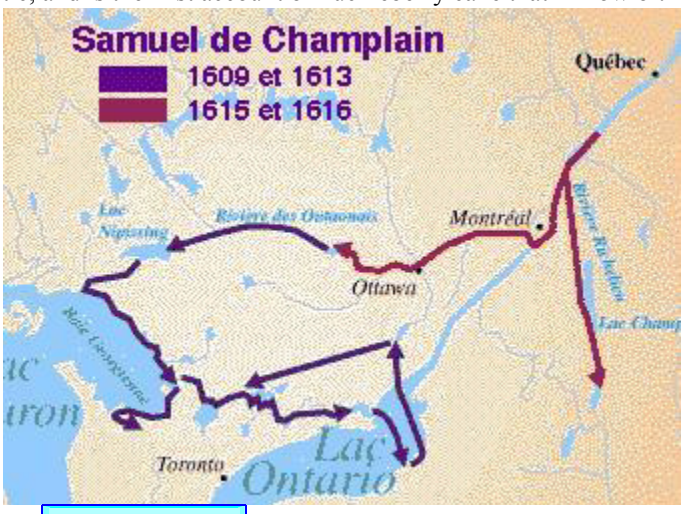
PLANTS

1615

Gunung Api, the volcano towering over the spice island of Neira, erupted dangerously. Richard Wickham wrote from England to a Mr. Eaton, his colleague in Macao: "I pray you buy for me a pot of the best sort of chaw [tea] in Meaco, two Fairbowes and Arrows, some half a dozen guilt boxes square for me to put into bark and whatever they cost I will alsoe be willinge accoumpatable unto for them." [*sic*] According to Antoine de Monchrétien, "The art of industry had made a masterpiece out of nature's miscarriage, and the name of that city created out of a bog was Amsterdam":

> God made the World, but the Dutch made Holland.
>
> Their houses they keep cleaner than their bodies, their bodies cleaner than their souls.
>
> He who cannot master the sea is unworthy of the land.

Samuel de Champlain returned to Canada, bringing with him Père Denis Jamay and two other Recollect priests, in addition to a lay brother (Père Caron, one of these men, soon after his arrival proceeded to the country of the Hurons on the Georgian bay). Champlain ascended the Ottawa River for some distance, and, leaving the river, went partly overland and partly by canoe to the eastern shore of Lake Huron, where, embarking, he sailed to its southern extremity; then going overland to the western extremity of Lake Ontario, he explored that lake and the St. Lawrence River until he arrived at the Sorel River. Along the way he made numerous observations for latitude while estimating his longitudes by dead reckoning. Soon afterward he attacked a town held by a tribe belonging to the Iroquois league but, through the insubordination of the Hurons, was repelled and sustained severe wounds. The Huron carried him back to one of their towns and after recovering from his wounds he would visit several tribes, returning to France in the spring of the following year. Henry Thoreau would write later that "Champlain, the founder of Québec, being far up the Ottawa spying out the land and taking notes among the Algonquins, on his way to the Fresh Water Sea since called Lake Huron — observed that the natives made a business of collecting and drying for winter use, a small berry which he called blues, and also raspberries — the former is the common blueberry of those regions, by some considered a variety of our early low blueberry (*Vaccinium Pennsylvanicum*); and again when near the lake he observes that the natives make a kind of bread of pounded corn sifted and mixed with mashed beans which have been boiled — and sometimes they put dried blueberries and raspberries into it. This was five years before the Pilgrims crossed the Atlantic, and is the first account of huckleberry cake that I know of."



CARTOGRAPHY

PLANTS

1629

John Parkinson's *Paradisi in Sole Paradisus Terrestris*, the first "modern" gardening book, provided descriptions for a thousand species. Parkinson, who had been born in 1567, probably in Nottinghamshire, had founded a botanical garden in Long Acre close by Covent Garden. (John Tradescant, who had his own plantation at Lambeth, presumably visited this garden.)

PLANTS

Descartes moved to Holland.

Christian Huygens (would die in 1695) was born in The Hague.

Gabriel Metsu (would die in 1667) was born in Leiden.

Pieter de Hooch (would die in 1684) was born in Rotterdam.

1633

An enlarged and amended version of John Gerard's 1597 botanical resource, THE HERBALL OR GENERALL HIſTORIE OF PLANTES,[27]

GREAT HERBALL OF 1597

was printed by John Goodyer and Thomas Johnſon, for which they accessed in addition the *MATERIA MEDICA* of Dioscorides, the works of German botanists Fuchs and Gesner, and the work of Italian botanist Matthiolus:

PLANTS

[next screen]

1634

The great tulip mania swept over Holland. This would be going on until the crash of 1637. It would leave behind bankruptcy, ruined speculators, general disillusionment, and a government unable to control the financial repercussions.

In his garden list for this year, John Tradescant named 40 North American plants that were in his botanical garden.

He is credited with being the first to grow the Virginia Creeper (*Parthenocissus quinquefolia*), *Aquilegia canadensis*, *Aster tradescantii*, *Rudbeckia laciniata*, *Tradescantia virginica*, and, possibly *Robinia pseudo-acacia*. Lemmon says they had brought back the first lilac, gladioli, lupins, the pomegranate, the hypericum, and many crocuses.

PLANTS

27. Unfortunately, electronic text does not as yet exist for this 1633 edition consulted by Henry Thoreau, so we are constrained to offer you here merely the page images from the original 1597 edition.

1635

The Jardin des Plantes was established in Paris by royal edict.

PLANTS

It would seem French explorers in Canada had been bringing plants back with them. Dr. Jacques Philippe Cornut's *IAC. CORNUTI ... CANADENSIVM PLANTARVM, ALIARÚMQUE NONDUM EDITARUM HISTORIA...*, published at "Parisiis" by "Venundantur apud Simonem Le Moyne" in this year, was the 1st work to deal specially with the plants of North America. Henry Thoreau would check this volume out of the Harvard Library on May 2, 1860. Cornut (1606-1661), who had not visited the New World, was describing species that were growing in various Parisian gardens, such as the Jardin des Plantes, which Vespasian Robin was beginning under the name Jardin Royal des Plantes Medicinales. (Vespasian Robin, son of the Jean Robin whose garden on the Ile Notre-Dame supplied the new Jardin du Roi with some of its first plants, was the mentor of Robert Morison in horticulture. Jardin du Roi would open to the public in 1640, and in 1693 would become a botanical garden.)

JACQUES CORNUT

1636

A Dutch planter introduced sugar cane from Brazil to Barbados, where the English settlers had been growing cotton, indigo, ginger, and tobacco.

A sailor, mistaking a tulip bulb for an onion, ate it for breakfast with his herring. An investor had hoped to realize, with that bulb in the tulip frenzy of the day, the equivalent of $25,000 to $50,000 in today's money. –And presumably it didn't even taste that good!

PLANTS


Ceres
Pomona
Excidéret ne tibi diuini muneris Author.
Præsentem monstrat quælibet herba Deum.
THE
HERBALL
OR GENERALL
Historie of
Plantes.
Gathered by John Gerarde
of London Master in
CHIRVRGERIE
Very much
Enlarged and Amended by
Thomas Johnson
Citizen and Apothecarye
of
LONDON
THEOPHRASTVS
DIOSCORIDES
London Printed by
Adam Islip Ioice Norton
and Richard Whitakers
Anno 1633.

The Dutch East Indies Company had perfected its control over its nutmeg monopoly. By the ruthless extirpation of all nutmeg trees not in officially sponsored groves, it ensured that the supply of this spice would

never outstrip the world's demand for it at a luxury price. Since this commodity was in no sense a necessity of life, surplus was always more to be intercepted than shortage. Distribution control was a money machine.

Although the Portuguese were expelled from their Japanese trade island Deshima, the Dutch would be allowed on-going contact with Japanese traders, at first through Hirado and eventually, in 1641, through Deshima again.

The Dutch occupied Ceylon, forcing villagers to supply quotas of cinnamon (as had the Portuguese previously).

PLANTS

1637

Tradescant *f.* (*filius*, son of the elder Tradescant) made his 1st trip to Virginia, returning to England with living material of bald cypress and American sycamore (he would make a 2d trip in 1642 and a 3d in 1654).

BOTANIZING

This was the year of the collapse of the Tulip Mania and lots of investors were losing their plants.

PLANTS

1646

J.B. Ferrarius published his 500 page compendium of all known information on citriculture, *Hesperides, sive De Malorum aureorum Cultura et Usus Libri Quator* (Hesperides, or Four Books on the Culture and Use of the Golden Apples). He relates a fable of citrus in which the three daughters of Hesperus, the Hesperides, fled to Italy from Africa. Aegle took her citrons to the country near Lake Garda, Arethusa bore her lemons to Liguria, and Hesperthusa sowed seed of oranges in the Campania Felix. Among his many woodcut illustrations is figured the navel orange, a form we tend to think of as modern.

PLANTS

1647

Sultan Ahmed I of Turkey lifted his prohibition of tobacco. The poet Pecevi described tobacco, coffee, opium, and wine as the four "cushions on the sofa of pleasure."

Connecticut banned public smoking: citizens might smoke only once a day "and then not in company with any other."

Rice was introduced into cultivation in the Carolinas (nowadays California, Arkansas, Louisiana, and Texas are our main rice-producing states).

Correspondence from the Caribbean to Governor Winthrop of Massachusetts confirmed that workers at sugar cane plantations would require food provisions from the outside, because the production of sugar was more profitable than the production of other provisions. The most important export for Massachusetts was salt cod sold to feed slaves in West Indian plantations. Returning ships brought quantities of sugar and molasses sufficient to spur the New England spirits industry.

PLANTS

1648

Robert Morison took a medical degree at Angers. His master in botany was the King's Botanist, Vespasian Robin.

Publication of the collected works of Jan Baptista van Helmont. This physician had coined the term *geist* (which we now spell as "gas"), and had discovered the existence of a "wild spirit" among the gasses — a *spiritus sylvestre*, carbon dioxide. One of the things he had done was plant a five-pound willow sapling in a weighed pot of soil and weigh the tree five years later, speculating as to from where –since the soil in the pot had lost only two ounces of its weight– that additional 164 pounds of wood had been derived. (His guess was that the water with which the plant had been supplied had somehow transformed itself into wood. Investigations such as this would eventually produce our understanding that carbon is absorbed from the air by plants, and incorporated into their substance.)

BOTANY

Sweet potatoes were in cultivation in Virginia.

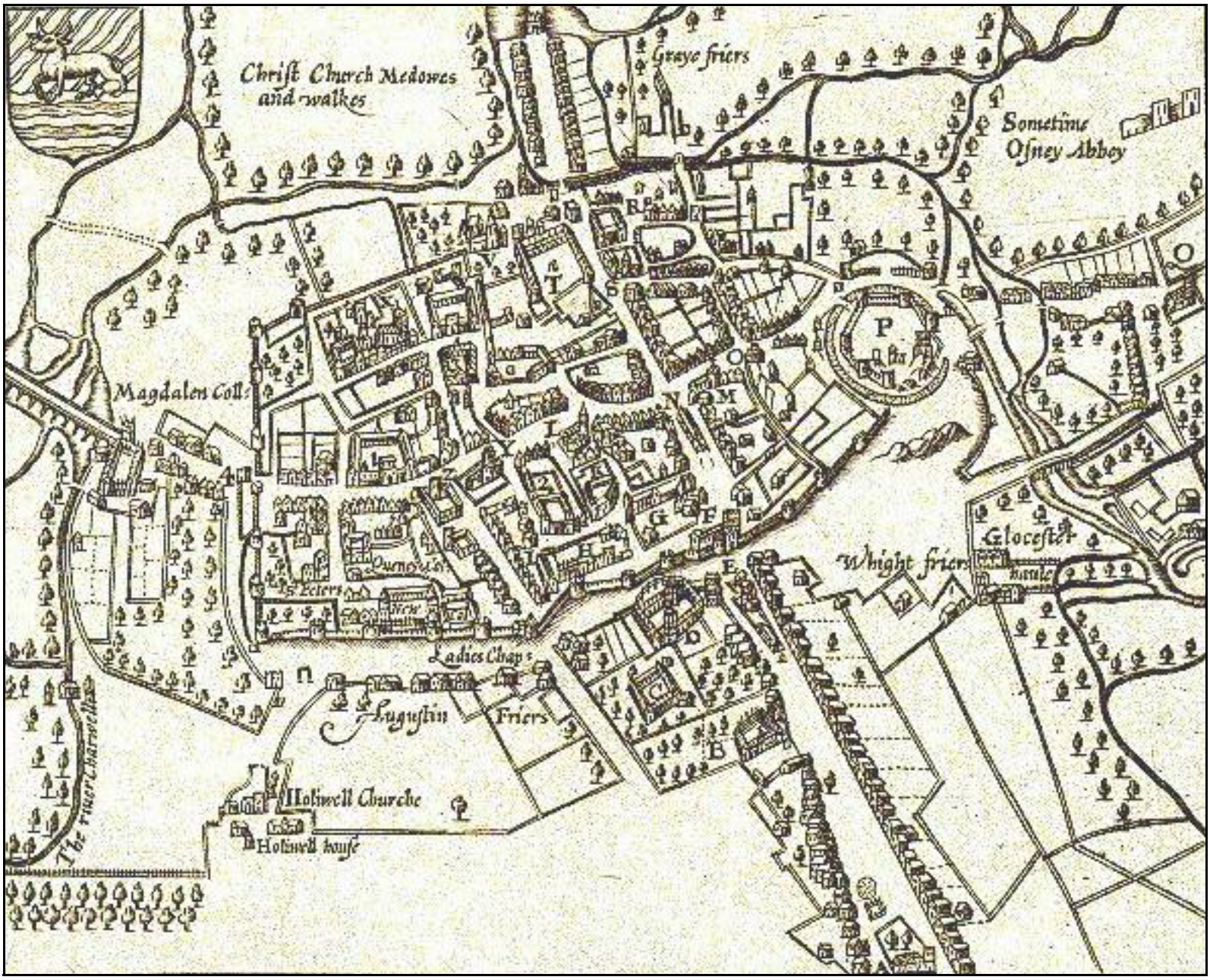
PLANTS

1650

From this time until the 20th Century the Caribbean would be the world center for the growing of sugar cane.

PLANTS

At this point both coffee and tea were virtually unheard-of as hot beverages in Europe and America, although coffee had been playing a minor role as a medication. Tea, *Camellia sinensis*, was still merely a Chinese crop, and it was alcoholic beverages that remained the universal unchallenged daily drink of "Europeans" everywhere. The New England colonies would be attempting to establish a precise definition of drunkenness that would include the time spent drinking, the amount that was drunk, and the related behavior. However, the 1st shipment of tea was received in New Amsterdam during this year, plus, as of this year the beverage made from the scorched Arabica bean was being introduced into England at a head shop "at the [sign of the] Angel in the parish of St. Peter in the East" in the university town of Oxford.



By 1675 there would be over 3,000 such coffee houses in England.

Rumor has it that the proprietor of this 1st coffee shop was a Jew from the Lebanon. Soon there would also be a similar outlet in Exeter in Devonshire, which would be being patronized by the spiritual descendants of Walter Raleigh not only for the consumption of the beverage from Arabia but also for the "drinking" of the smoke from the burning of the leaves of a plant from America, the tobacco. Although many coffee houses would also serve beer and wine, the spread of coffee use in Europe's rapidly growing cities would be facilitated by growing resentment against the effects of alcohol and the need for a center for sober social intercourse and intellectual discussions. In general, tobacco use would begin among the upper classes and aristocrats and then be copied by the lower and middle classes as prices declined.

1651

Rerum medicarum Novae Hispaniae... was published, 80 years late. This work had resulted from one of the earliest explorations of the natural history of the New World, made in 1570 by Francisco Hernández, private physician to Philip II of Spain. He had been sent to assess natural resources and reported on more than 1000 plants that were considered medicinally important by the natives of Mexico. Some of the plants he described and preserved as botanical specimens are now extinct.

1652

Capetown was founded. The Dutch sent two ships to Table Bay, near Cape Town, South Africa to establish a garden to provide fresh foods and fruits for sailors on their voyages by the Cape of Good Hope. By 1679 the garden included ornamental plants from upcountry regions of Africa, as well as edible and decorative plants from China, Java, Zanzibar, etc. By 1700 plants native to Table Bay had become common in Holland. Among those plants were the calla (*Zantedeschia aethiopica*), bird of paradise (*Strelitzia reginae*, named in honor of Queen Charlotte Sophia, wife of George III), and impatiens (*Impatiens holsti*).

PLANTS

1654

John Tradescant the Younger made his 3d and final botanizing trip to America. His introductions included the grapevines *Vitus vulpina* and *Vitus labrusca*, the daffodil called *plenissimus,* the Michaelmas daily *Aster tradescantia*, *Monarda fistulosa*, *Rhus cotinus*, the American sycamore *Platanus occidentalis*, the tulip tree *Liriodendron tulipifera*, the deciduous cypress *Taxodium distichum*, the acacia *Robinia pseudoacacia*, the American walnut, the red maple, and the spiderworts that have been named *Tradescantia* after this family of early plant hunters.

PLANTS

1658

The Dutch ousted the Portuguese from Ceylon, thus obtaining control over the cinnamon trade.

SPICE

They began coffee cultivation in Ceylon.

PLANTS

September 3, Friday (Old Style): Oliver Cromwell died of malaria because he had refused to use the only known treatment (quinine from cinchona).

PLANTS

He had rejected this treatment simply because the cure had been introduced by Jesuits. Amsterdam "was lighted up as for a great deliverance and children ran along the canals, shouting for joy that the Devil was dead." By 1681 cinchona would be universally accepted as antimalarial. The great commoner's shrouded corpse would be interred with great fanfare at the east end of Henry VII's chapel in Westminster Abbey (only to be dug up at the Restoration and ritually hanged and decapitated at Tyburn, and then thrown into an anonymous pit that is now somewhere beneath the Marble Arch).

John Dryden would author "Heroic Stanzas" on the death of Cromwell.

His son Richard Cromwell would become Lord Protector and conflict would renew. John Evelyn's diary entry for this day was in part as follows:

John Evelyn's Diary

Died that archrebell Oliver Cromwell, cal'd Protector.

Friend George Fox also commented in his JOURNAL, of the events surrounding the death:

> *Now was there a great pother made about the image or effigy of Oliver Cromwell lying in state; men standing and sounding with trumpets over his image, after he was dead. At this my spirit was greatly grieved, and the Lord, I found, was highly offended.*

Major-General William Goffe, whom some had been considering as a possible successor to Oliver Cromwell, instead witnessed the Protector's appointment of his son Richard Cromwell as his successor. He would support the son during his brief tenure of power and would advise him to use military force to resist Fleetwood and

Desborough.

REGICIDE

1661

Robert Boyle carefully experimented with the increase in biomass through plant growth (as had Jan Baptista van Helmont) in order to figure out what was happening to all the water that was being taken up by plants. He experimented by boiling the liquid away from plant tissue, discovering that what remained after all water had been removed was a residue that somewhat resembled coal.

PLANTS

1669

Dr. Robert Morison published *PRAELUDIA BOTANICA* and became Professor of Botany at Magdalen College. (This seems to have been the earliest recognition of botany as an academic discipline in England. Professor Morison would become a severe critic of the classification system offered by the Reverend John Ray in his *METHODUS PLANTARUM EMENDATA ET AUCTA* of 1703, and would in his *DIALOGUS* sketch the outlines of a superior one.)

1671

When a kitchen-boy dropped a bowlful of almonds on the floor, the chef boxed his ears and in the process a panful of hot, burnt sugar got spilled over the almonds. Since the Duke of Plesslis-Praslin, a marshal renowned as a gourmet, was ready for his dessert, the chef, out of desperation, coated the almonds with cooled sugar and brought them on a plate. The gourmet, delighted, consented that the new desert be named in his honor, "Praslin." (Since then the word has permuted to "praline.")

Nehemiah Grew published THE ANATOMY OF PLANTS BEGUN and Marcello Malpighi published *ANATOME PLANTARUM IDEA*. These independent studies are the first important descriptions and statements on the subject of plant internal structure (Anatomy). Both researchers continued to work in this field for several more years, resulting in new editions by Malpighi and, in 1682, Grew's ANATOMY OF PLANTS. The studies of Malpighi and Grew proved of such quality that little was added for over 100 years. These men explained the structure of buds, the organization of wood, the character of flowers and their separate parts, the generation of seed and embryo, and many other topics that had never before been explored.

PLANTS

1672

Elihu Yale started a spice business, which through corrupt dealings in India would flourish, eventually in 1718 responding from England to a funding request by sending along at various times various cartons of books, volumes which when retailed would provide the substantial sum of £800 for a building at a college in Connecticut. That college eventually would choose to rename itself Yale College in recognition of Mr. Yale's generous bequest of cartons of books of significant value.

Robert Morison published the first scientific study of a single plant group (the carrot family).

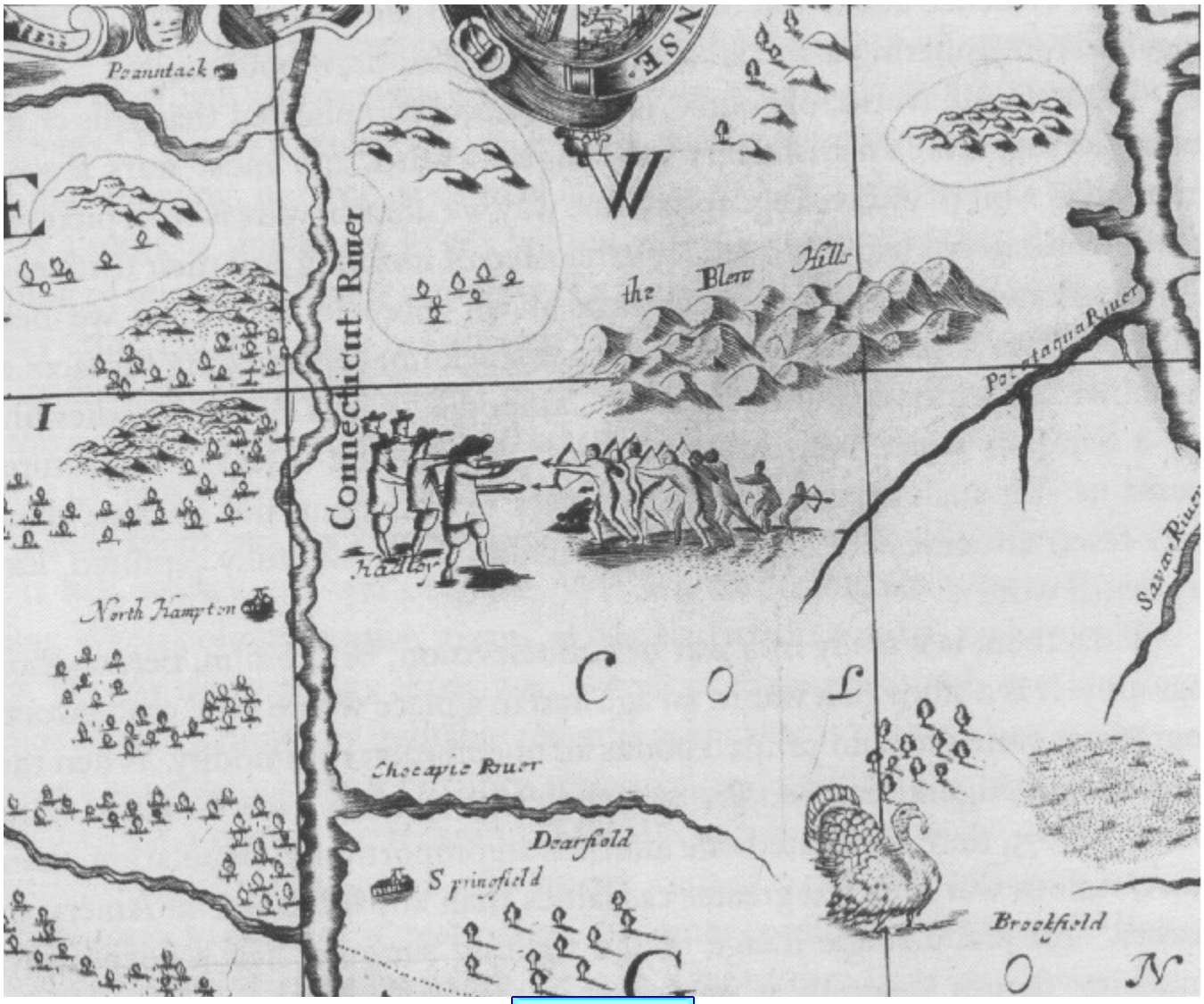
PLANTS

1675

John Seller's *ATLAS MARITIMUS* was published. It contained Captain Henry Southwood's two charts of Newfoundland's English Shore: "The Coast of Newfoundland from Salmon Cove to Cape Bonavista" and "Cape Race to Cape St. Francis." These were the 1st large-scale charts of Newfoundland, naming

over 150 ports and features. This "A Mapp of New England, 1675" appeared in the atlas, describing the region north-east of "Naraganfet Bay" not only as "Plymouth Colony" but also as "King Philhips Country," showing the town of Providence as on the east side of the bay, opposite *Shawowmet* (later known as Warwick) on the west side, and showing Concord as being on the "Noshaway River" leading due north into the "Mierinake

River":



CARTOGRAPHY

[The race war which we term King Philip's War was] a war before television, before film, before photography ... even crude wood engravings were rare and printed books an uncommon commodity. When the English and Algonquian peoples of seventeenth-century New England went to war in 1675, they devastated one another. In proportion to population, their short, vicious war inflicted greater casualties than any other war in American history. Yet a single image of the fighting survives: half a dozen tiny, crouching figures shooting at one another along the creases of John Seller's map of New England printed in an English atlas in 1675. It tells us precious little.... [N]ot even Christian Indians loyal to the English were spared; in the fall of 1675 most were removed from their towns and imprisoned on barren islands, where many died of cold or hunger during the long

winter. Always brutal and everywhere fierce, King Phil[l]ip's War, as it came to be called, proved to be not only the most fatal war in all of American history but also one of the most merciless.

First manufacturing of gunpowder in America. The manufacture of guncotton was fraught. First you have to impregnate cotton with nitric acid, and in this operation, if the mixture gets a whiff of moisture it blows up. Then you have to grind the cotton into powder, and in this operation, if a portion of the mixture starts to dry out it blows up. You need to be at least a mile away while you are doing this kind of work.[28] If that is not possible, you need to be doing this kind of work in scattered small buildings with exceedingly sturdy frames, all the siding of which is exceedingly lightweight and loosely attached. Preferably, the buildings should rural, and be at the base of some steep natural depression in the terrain, so that one does not annoy one's neighbors with frequent loud noises and showers of debris.

It must have been in about this year that slavetraders brought cowpeas to Jamaica. A native of India, this pea has many varieties important in the southeastern US, particularly the black-eye and the crowders.

PLANTS

28. Let's parse that by date, folks: in 1993, "remote control" would be spelled R-O-B-O-T, but in 1675 it was spelled S-L-A-V-E, and in 1859, I-R-I-S-H.

1676

During the "Bacon's Rebellion" of 1675/1676, Major Robert Beverley, Sr. was an ally of Royal Governor Sir William Berkeley. Afterward he would become controversial clerk of the House of Burgesses.

Back in 1616, sixty years before, during Governor Dale's administration of the Virginia colony, some natives seem to have enticed Dale and a few of his men to join them in a dose of an hallucinogen, perhaps *Datura stramonium*, the alkali-bearing plant which the settlers called thornapple or Jamestown or Jimson weed, with the most emphatic result. In this year a group of soldiers sent out to combat Bacon's Rebellion prepared a salad for themselves, mistakenly including some leaves of this plant — and there was another such episode of delusion. The British "turn'd fool" and it required fully eleven days for them to recover.

PLANTS

1678

The first known plant specimens made in the United States would be prepared by the Reverend John Banister (1650-1692), who in this year came to Virginia at the behest of the Reverend Henry Compton, Lord Bishop of London, whose gardens were and still are at Fulham Palace in London. The Reverend Banister's list of 340 North American species would stimulate a number of publications: his collections would be described in Morison's *HISTORIA* (Volume 3, 1699), his drawings would be reproduced in Plukenet's *PHYTOGRAPHIA* (1691-1705), and most of his approximately 340 species, with his descriptive Latin names for the new ones, would be published in Ray's *HISTORIA* (Volume 2, 1688, Volume 3, 1704) and would serve to support later Linnaean classification-names. Among the species he would send back to England would be:

Abies alba
Abies balsamifera
Abies nigra
Aralia spinosa
Baccharis halimifolia
Cornus sericea
Crataegus coccinea
Gleditschia triacanthos
Echinacea purpurea (Purple Coneflower)
Laurus benzoin
Liquidambar styraciflua
Magnolia virginiana

Magnolia glauca
Magnolia longifolia
Menispermum canadense
*Mertensia virginica (*Virginia Bluebell)
Negundo fraxinifolium
Ostyra virginica
Quercus coccinea
Rhododendron viscosum
Rhus copallina
Spiraea opalifolia

BOTANIZING
PLANTS

1683

August 16, Thursday (Old Style): Friend William Penn wrote in a letter from Philadelphia that the Indian plantations included peaches of good quality (the peach, which had been native to Persia, had been cultivated by the Romans since the 1st Century BCE). In the previous year in his CAROLINA, OR A DESCRIPTION OF THE PRESENT STATE OF THAT COUNTRY, Thomas Ashe had observed that "the Peach Tree in incredible numbers grows wild."

PLANTS

1686

The English began purchasing tea directly, in Canton. Since the commodity was so light, the tea clippers would need to carry lots of ballast, and so they would fill their holds with heavy Chinese pottery and porcelain before stowing the valuable boxes and bales of tea on top. This sort of "China" ballast was known as "kentledge," and it would enable the passion for Chinoiserie in England and America.[29]

Benjamin Harris came from England and opened, at the center of downtown Boston a "Coffee, Tea and Chucaletto House, by the Town-Pump near the Change."

CHOCOLATE

John Ray, in his *HISTORIA PLANTARUM* (to be published in volume after volume until 1704) was arriving at an early natural grouping of plants arrived at through looking at their many different characteristics. His study would deal with plants worldwide, establish much of our modern botanical terminology and summarize the current state of botanical knowledge. His definition of species was quite modern: "each produces only its own kind; one must distinguish between essential, accidental, and environmental characters." Ray's summary of plant physiology was so thorough that he could be as considered the founder of that field.

PLANTS

1693

Gunung Api, the volcano towering over the spice island of Neira, erupted.

The first record of the grapefruit in the West Indies was made by Hans Sloane in a catalog of Jamaican plants. It is assumed the grapefruit originated there from chance hybrids between other cultivated citrus. This plant was not introduced to Florida until nearly 1850.

PLANTS

1694

Joachim Camerarius wrote a scientific letter (later published by Valentini in his *POLYCHRESTA EXOTICA*) that made the 1st clear case for the nature of sex in plants and the actual role of pollen and ovule in this process.

PLANTS

29. What, did you suppose that it made good economic sense to transport a heavy and fragile commodity such as pottery halfway around the world rather than manufacture it at home where there would be lesser haulage charges and significantly lower amounts of breakage? No, in fact the pottery was being subsidized by the tea: its weight was what held those sailing ships upright in the water.

1699

Van Neck established the initial Dutch trading posts in Banda, Amboina, and Ternate, the original "Spice Islands."

Gunung Api, the volcano towering over the spice island of Neira, again erupted.

By the end of the 17th Century, the few potato plants fetched from the Andes had created a major Irish crop.[30]

PLANTS

30. By 1845, approximately $^{1}/_{3}$d of the tillable land in Ireland would be devoted to this crop and approximately $^{2}/_{5}$ths of the population would be relying upon this tuber, along with skim milk or buttermilk, as their main source for calories and vitamins and minerals and protein. This was not only because potatoes could be grown on marginal land, such as on bogs and on rocky hillsides, but also because, growing underground, the crop was less liable to seizure by the English overlords and tax collectors than, say, an above-ground crop such as wheat or Indian maize, and because the bulk of the potato and the fact that it could not be stored for long periods meant that it functioned better as a local subsistence crop than as a marketable commodity. These righteous overlords were therefore referring to it as "the lazy crop." The spud was seen to be overly compatible with two things which these notables considered as the notable crimes of the "potato people" — their indolence and their incessant begetting of children.

IRISH POTATO FAMINE

1706

At about this point the term “plantation” was making a transition in meaning, from being a “colonial settlement” involving agriculture, as in “Plimoth Plantation,” to being a “tropical estate worked with forced labor” as in “the plantation of Mount Vernon.” The term was becoming, for the white people, a grand symbol of the Good Life, and, for the others, the representation of life under the lash.

> Whilst the lamp holds out to burn,
> The vilest sinner may return.
> — Book I, Hymn 88

Coffee trees were sent to the botanical garden in Amsterdam from Sri Lanka, where the Dutch had only recently managed to establish plantations, breaking an ancient Arab monopoly. A single one of these trees would survive, which would become the parent of a single tree at the conservatory in Paris. In 1723, de Cliey would carry a single offspring from this Paris tree to Martinique, which by 1777 would yield thousands of trees there. The Martinique coffee plantations would then become the source of the initial plants to be taken to the various coffee-growing regions of South America.

PLANTS

1712

Hans Sloane, M.D.'s purchased the manor of Chelsea, London. This would provide the grounds for the Chelsea Physic Garden and perpetuate his memory in the names of Hans Street, Hans Crescent, Hans Place, Hans Road, Sloane Square, Sloane Street, and Sloane Gardens in the Royal Borough of Kensington and Chelsea.

Engelbert Kaempfer, who had been a physician with the Dutch East India Company at Deshima in Japan from 1690 to 1692, published *AMOENITATES EXOTICAE*, the first western description of the Japanese flora (as well as other information). Other Kaempfer notes, published by Hans Sloane as HISTORY OF JAPAN, include the first Western description of *Ginkgo biloba*.

BOTANIZING

Captain Frezier introduced the Chilean strawberry, *Fragaria chiloensis*, to France. It would arrive in Britain a few years later. This plant, along with the North American species taken to France by Jean Robin in 1624, is part of the ancestry of today's commercial strawberries.

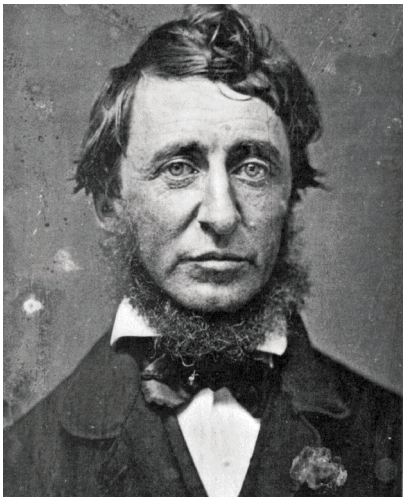
PLANTS

1716

That notorious witch hunter, the Reverend Cotton Mather, was the Ken Starr of Puritan New England. When he wasn't out hunting witches he was busy predicting the end of the world, this year being his second announced End Times (his initial guess had been 1697). When this prediction also failed, he would revise the date of the End of the World yet another time. (Abanes, Richard. END-TIME VISIONS. NY: Four Walls Eight Windows, 1998, page 338)

MILLENNIALISM

"I would not run round a corner
to see the world blow up."
— Henry Thoreau,
"LIFE WITHOUT PRINCIPLE"



Even an idiot doesn't need to be wrong just all the time. The 1st certain account of plant hybridization was provided in a letter written by the Reverend Mather, discussing the "infection" of Indian corn planted alongside yellow corn.[31] The following year a British hybrid dianthus would be described. In 1721 a hybrid cabbage would be reported. By 1750 the controversy of sex in plants would be in the news. By 1760 plant hybridization would have become a professional occupation. The study, hybridization, and selection of corn would of course continue. By 1969 scientists would have come to understand more about the genetics of corn than about the genetics of any other flowering plant.

PLANTS

31. In this timeframe the Reverend was being invited to become FRS (Fellow of the Royal Society), which would be to say that he was being considered as a "scientist."

1718

The name of the Jardin du Roi in Paris was changed to the Jardin Royal de Plantes. The garden provided employment for a number of naturalists: Tournefort, Vaillant, B. de Jussieu, A.-L. de Jussieu, A. de Jussieu, and Buffon.

BOTANIZING

Sébastian Vaillant was one of the earliest supporters of Camerarius's ideas concerning the sexual nature of plants. He contributed to the development of terminology necessary to discuss flower structure and function (some of which was shocking to his contemporaries). Originally had Vaillant delivered his information in a talk at the Jardin du Roi (Jardin Royal de Plantes). In this year he published these remarks as *DISCOURS SUR LA STRUCTURE DES FLEURS…*

PLANTS

1727

Francisco de Mello Palhetta carried coffee seeds and plants from French Guiana to Brazil, where much of the world's coffee eventually would be growing.

Stephen Hales' work in his VEGETABLE STATICKS represented the first significant publication in plant physiology. He explained some aspects of water uptake by roots, movement of liquid through plants, and evaporation of water from leaves. Hales was one of the first to use the equipment and methods of the physical sciences to study plants.

PLANTS

1730

The poppy *Papaver somniferum* began to be cultivated in England, and for awhile local opium production would be able to produce a profit (until the local opium was quite driven off the market by the ready transportability of opium produced in overseas growth centers).

In Virginia the Inspection Acts come into effect, standardizing and regulating tobacco sales and exports to prevent the export of "trash tobacco" (shipments diluted with leaves and household sweepings, which were debasing the value of Virginia tobacco). Inspection warehouses were empowered to verify weight and kind and quality of tobacco.

The 1st American tobacco factories were begun in Virginia — they were small snuff mills.


Papaveraceae
Papaveraceae.
Papaver somniferum L.
Papaver somniferum L.

1733

Ralph Cudworth's THE TRUE INTELLECTUAL SYSTEM OF THE UNIVERSE appeared in Latin with his notes.

John Bartram of Philadelphia began correspondence with Collinson, Miller, and others. Their exchange is the likely source of pawpaw, sourwood, and other American plants introduced to cultivation in Europe.

PLANTS

John Kay patented the fly-shuttle, which quickened the weaving of cloth, thus mechanizing weaving — while the generation of thread through spinning remained a cottage industry. In 1764, James Hargreaves's spinning jenny made the thread generating process more efficient. Further improvements in bleaching and dyeing as well as the steam-powering of looms would change the British textile industry — with production soaring from 2.5 million pounds in 1760 to 22 million pounds in the 1780s.

1737

Carolus Linnaeus authored *HORTUS CLIFFORTIANUS*, with illustrations provided by Ehret, as a record of plants cultivated by George Clifford in his garden at Hartekamp, Holland. This work would be the forerunner of his *SPECIES PLANTARUM*. The illustrations demonstrate Linnaeus's conviction that botanical drawings needed to be done in the most exact detail and must involve close collaboration between the botanist and the artist. Also, *FLORA LAPPONICA* (*FLORA* OF LAPLAND) (Amsterdam) contained the results of his 1732 expedition through Swedish Lapland. Also, *CRITICA BOTANICA* (Leyden). Also, *GENERA PLANTARUM* (Leyden), in which he attempted to provide a single, correct name for each genus of plants then known in the world. Through his efforts, the majority of the plants in the Torrey Botanical Area of field study came to be known by their current scientific names.

BOTANIZING

1739

In this year about 500,000 people would die in Ireland due to a widespread failure of the potato crop. Per the memoirs of Benjamin Franklin, the itinerant preacher George Whitefield came from Ireland to Philadelphia:

FAMINE

In 1739 arrived among us from Ireland the Reverend Mr. Whitefield, who had made himself remarkable there as an itinerant preacher. He was at first permitted to preach in some of our churches; but the clergy, taking a dislike to him, soon refus'd him their pulpits, and he was oblig'd to preach in the fields. The multitudes of all sects and denominations that attended his sermons were enormous, and it was matter of speculation to me, who was one of the number, to observe the extraordinary influence of his oratory on his hearers, and bow much they admir'd and respected him, notwithstanding his common abuse of them, by assuring them that they were naturally half beasts and half devils. It was wonderful to see the change soon made in the manners of our inhabitants. From being thoughtless or indifferent about religion, it seem'd as if all the world were growing religious, so that one could not walk thro' the town in an evening without hearing psalms sung in different families of every street.

And it being found inconvenient to assemble in the open air, subject to its inclemencies, the building of a house to meet in was no sooner propos'd, and persons appointed to receive contributions, but sufficient sums were soon receiv'd to procure the ground and erect the building, which was one hundred feet long and seventy broad, about the size of Westminster Hall; and the work was carried on with such spirit as to be finished in a much shorter time than could have been expected. Both house and ground were vested in trustees, expressly for the use of any preacher of any religious persuasion who might desire to say something to the people at Philadelphia; the design in building not being to accommodate any particular sect, but the inhabitants in general; so that even if the Mufti of Constantinople were to send a missionary to preach Mohammedanism to us, he would find a pulpit at his service.

Mr. Whitefield, in leaving us, went preaching all the way thro' the colonies to Georgia. The settlement of that province had lately been begun, but, instead of being made with hardy, industrious husbandmen, accustomed to labor, the only people fit for such an enterprise, it was with families of broken shop-keepers and other insolvent debtors, many of indolent and idle habits, taken out of the jails, who, being set down in the woods, unqualified for clearing land, and unable to endure the hardships of a new settlement, perished in numbers, leaving many helpless children unprovided for. The sight of their miserable situation inspir'd the benevolent heart of Mr. Whitefield with the idea of building an Orphan House there, in which they might be supported and educated. Returning northward, he preach'd up this charity, and made large collections, for his eloquence had a wonderful power over the hearts and purses of his hearers, of which I myself was an instance.

I did not disapprove of the design, but, as Georgia was then destitute of materials and workmen, and it was proposed to send them from Philadelphia at a great expense, I thought it would have been better to have built the house here, and brought the children to it. This I advis'd; but he was resolute in his first project, rejected my counsel, and I therefore refus'd to contribute. I happened soon after to attend one of his sermons, in the course of which I perceived he intended to finish with a collection, and I silently resolved he should get nothing from me, I had in my pocket a handful of copper money, three or four silver dollars, and five pistoles in gold. As he proceeded I began to soften, and concluded to give the coppers. Another stroke of his oratory made me asham'd of that, and determin'd me to give the silver; and he finish'd so admirably, that I empty'd my pocket wholly into the collector's dish, gold and all. At this sermon there was also one of our club, who, being of my sentiments respecting the building in Georgia, and suspecting a collection might be intended, had, by precaution, emptied his pockets before he came from home. Towards the conclusion of the discourse, however, he felt a strong desire to give, and apply'd to a neighbour, who stood near him, to borrow some money for the purpose. The application was unfortunately [made] to perhaps the only man in the company who had the firmness not to be affected by the preacher. His answer was, "At any other time, Friend Hopkinson, I would lend to thee freely; but not now, for thee seems to be out of thy right senses."

Some of Mr. Whitefield's enemies affected to suppose that he would apply these collections to his own private emolument; but I who was intimately acquainted with him (being employed in printing his Sermons and Journals, etc.), never had the least suspicion of his integrity, but am to this day decidedly of opinion that he was in all his conduct a perfectly honest man, and methinks my testimony in his favour ought to have the more weight, as we had no religious connection. He us'd, indeed, sometimes to pray for my conversion, but never had the satisfaction of believing that his prayers were heard. Ours was a mere civil friendship, sincere on both sides, and lasted to his death.

The following instance will show something of the terms on which we stood. Upon one of his arrivals from England at Boston, he wrote to me that he should come soon to Philadelphia, but knew not where he could lodge when there, as he understood his old friend and host, Mr. Benezet, was removed to Germantown. My answer was, "You know my house; if you can make shift with its scanty accommodations, you will be most heartily welcome." He reply'd, that if I made that kind offer for Christ's sake, I should not miss of a reward. And I returned, "Don't let me be mistaken; it was not for Christ's sake, but for your sake." One of our common acquaintance jocosely remark'd, that, knowing it to be the custom of the saints, when they received any favour, to shift the burden of the obligation from off their own shoulders, and place it in heaven, I had contriv'd to fix it on earth.

The last time I saw Mr. Whitefield was in London, when he consulted me about his Orphan House concern, and his purpose of appropriating it to the establishment of a college.

He had a loud and clear voice, and articulated his words and sentences so perfectly, that he might be heard and understood at a great distance, especially as his auditories, however numerous, observ'd the most exact silence. He preach'd one evening from the top of the Court-house steps, which are in the middle of Market-street, and on the west side of Second-street, which crosses it at right angles. Both streets were fill'd with his hearers to a considerable distance. Being among the hindmost in Market-street, I had the curiosity to learn how far he could be heard, by retiring backwards down the street towards the river; and I found his voice distinct till I came near Front-street, when some noise in that street obscur'd it. Imagining then a semi-circle, of which my distance should be the radius, and that it were fill'd with auditors, to each of whom I allow'd two square feet, I computed that he might well be heard by more than thirty thousand. This reconcil'd me to the newspaper accounts of his having preach'd to twenty-five thousand people in the fields, and to the antient histories of generals haranguing whole armies, of which I had sometimes doubted.

By hearing him often, I came to distinguish easily between sermons newly compos'd, and those which he had often preach'd in the course of his travels. His delivery of the latter was so improv'd by frequent repetitions that every accent, every emphasis, every modulation of voice, was so perfectly well turn'd and well plac'd, that, without being interested in the subject, one could not help being pleas'd with the discourse; a pleasure of much the same kind with that receiv'd from an excellent piece of musick. This is an advantage itinerant preachers have over those who are stationary, as the latter can not well improve their delivery of a sermon by so many rehearsals.

His writing and printing from time to time gave great advantage to his enemies; unguarded expressions, and even erroneous opinions, delivered in preaching, might have been afterwards explain'd or qualifi'd by supposing others that might have accompani'd them, or they might have been deny'd; but litera scripta monet. Critics attack'd his writings violently, and with so much appearance of reason as to diminish the number of his votaries and prevent their encrease; so that I am of opinion if he had never written any thing, he would have left behind him a much more numerous and important sect, and his reputation might in that case have been still growing, even after his death, as there being nothing of his writing on which to found a censure and give him a lower character, his proselytes would be left at liberty to feign for him as great a variety of excellence as their enthusiastic admiration might wish him to have possessed.

...I turn'd my thoughts again to the affair of establishing an academy. The first step I took was to associate in the design a number of active friends, of whom the Junto furnished a good part; the next was to write and publish a pamphlet, entitled Proposals Relating to the Education of Youth in Pennsylvania. This I distributed among the principal inhabitants gratis; and as soon as I could suppose their minds a little prepared by the perusal of it, I set on foot a subscription for opening and supporting an academy; it was to be paid in quotas yearly for five years; by so dividing it, I judg'd the subscription might be larger, and I believe it was so, amounting to no less, if I remember right, than five thousand pounds.

In the introduction to these proposals, I stated their publication, not as an act of mine, but of some publick-spirited gentlemen, avoiding as much as I could, according to my usual rule, the presenting myself to the publick as the author of any scheme for their benefit.

The subscribers, to carry the project into immediate execution, chose out of their number twenty-four trustees, and appointed Mr. Francis, then attorney-general, and myself to draw up constitutions for the government of the academy; which being done and signed, a house was hired, masters engag'd, and the schools opened, I think, in the same year, 1749.

The scholars increasing fast, the house was soon found too small, and we were looking out for a piece of ground, properly situated, with intention to build, when Providence threw into our way a large house ready built, which, with a few alterations, might well serve our purpose. This was the building before mentioned, erected by the hearers of Mr. Whitefield, and was obtained for us in the following manner.

It is to be noted that the contributions to this building being made by people of different sects, care was taken in the nomination of trustees, in whom the building and ground was to be vested, that a predominancy should not be given to any sect, lest in time that predominancy might be a means of appropriating the whole to the use of such sect, contrary to the original intention. It was therefore that one of each sect was appointed, viz., one Church-of-England man, one Presbyterian, one Baptist, one Moravian, etc., those, in case of vacancy by death, were to fill it by election from among the contributors. The Moravian happen'd not to please his colleagues, and on his death they resolved to have no other of that sect. The difficulty then was, how to avoid having two of some other sect, by means of the new choice.

Several persons were named, and for that reason not agreed to. At length one mention'd me, with the observation that I was merely an honest man, and of no sect at all, which prevail'd with them to chuse me. The enthusiasm which existed when the house was built had long since abated, and its trustees had not been able to procure fresh contributions for paying the ground-rent, and discharging some other debts the building had occasion'd, which embarrass'd them greatly. Being now a member of both setts of trustees, that for the building and that for the Academy, I had a good opportunity of negotiating with both, and brought them finally to an agreement, by which the trustees for the building were to cede it to those of the academy, the latter undertaking to discharge the debt, to keep for ever open in the building a large hall for occasional preachers, according to the original intention, and maintain a free-school for the instruction of poor children. Writings were accordingly drawn, and on paying the debts the trustees of the academy were put in possession of the premises; and by dividing the great and lofty hall into stories, and different rooms above and below for the several schools, and purchasing some additional ground, the whole was soon made fit for our purpose, and the scholars remov'd into the building. The care and trouble of agreeing with the workmen, purchasing materials, and superintending the work, fell upon me; and I went thro' it the more cheerfully, as it did not then interfere with my private business, having the year before taken a very able, industrious, and honest partner, Mr. David Hall, with whose character I was well acquainted, as he had work'd for me four years. He took off my hands all care of the printing-office, paying me punctually my share of the profits. This partnership continued eighteen years, successfully for us both.

The trustees of the academy, after a while, were incorporated by a charter from the governor; their funds were increas'd by contributions in Britain and grants of land from the proprietaries, to which the Assembly has since made considerable addition; and thus was established the present University of Philadelphia. I have been continued one of its trustees from the beginning, now near forty years, and have had the very great pleasure of seeing a number of the youth who have receiv'd their education in it, distinguish'd by their improv'd abilities, serviceable in public stations and ornaments to their country.
...another projector, the Rev. Gilbert Tennent, came to me with a request that I would assist him in procuring a subscription for erecting a new meeting-house. It was to he for the use of a congregation he had gathered among the Presbyterians, who were originally disciples of Mr. Whitefield. Unwilling to make myself disagreeable to my fellow-citizens by too frequently soliciting their contributions, I absolutely refus'd. He then desired I would furnish him with a list of the names of persons I knew by experience to be generous and public-spirited. I thought it would be unbecoming in me, after their kind compliance with my solicitations, to mark them out to be worried by other beggars, and therefore refus'd also to give such a list. He then desir'd I would at least give him my advice. "That I will readily do," said I; "and, in the first place, I advise you to apply to all those whom you know will give something; next, to those whom you are uncertain whether they will give any thing or not, and show them the list of those who have given; and, lastly, do not neglect those who you are sure will give nothing, for in some of them you may be mistaken." He laugh'd and thank'd me, and said he would take my advice. He did so, for he ask'd of everybody, and he obtained a much larger sum than he expected, with which he erected the capacious and very elegant meeting-house that stands in Arch-street.

1741

Dr. Carolus Linnaeus was appointed professor of theoretical and practical medicine at University of Uppsala and put in charge of a decaying botanical garden on some marshy land next to the river in the center of the town, that had been first laid out in 1653 and had once incorporated more than 1,800 species of plants used in the teaching of students but had been largely destroyed by a fire in 1702 (the oldest plants now growing there are four laurels that would be planted by Linné). He visited Oland and Gotland.

PLANTS

1747

Andreas Sisismund Margraaf discovered that beets and carrots contain sugar, thus offering to civilized people the prospect of obtaining true sweetness for their temperate climes — without reliance upon foreign slavery. Should we be saying "Hmmm...," or should we be saying "Yummm..."? (It would not be until 1877 that a highly productive process would be devised. At the end of the 19th century, sugar beet production would expand greatly in the US. Through selection by specialists, the sugar content of sugar beets would be increased from just 2% in the 19th century to over 20%.)

SWEETS WITHOUT SLAVERY

PLANTS

Dr. James Lind experimented with 12 sailors who had scurvy and discovered that consuming lemons and oranges for 6 days effected great improvement. Nearly 50 years passed before the British admiralty required that sailors receive daily lemon or lime juice. (Scurvy is, or course, a nutritional disease caused by lack of adequate Vitamin C, which is to say, ascorbic acid. Fresh fruits and vegetables are excellent sources of this ascorbic acid vitamin.)

PLANTS

Bernard de Jussieu received, via Moscow, seed of *Sophora japonica* from French Jesuit Father, Pierre Nicholas le Cheron d'Incarville, stationed at the mission in Beijing. This shipment probably also included *Koelreuteria paniculata*.

BOTANIZING
JAPAN

1751

Peter Kalm sailed for Europe. His herbarium contained about 325 species, many of which Carl von Linné would subsequently describe in *SPECIES PLANTARUM*. During this year, however, Carolus Linnaeus was putting out his *PHILOSOPHIA BOTANICA* (BOTANICAL PHILOSOPHY).

BOTANIZING

Miller planted tree of heaven (*Ailanthus altissima*) seed received from French Jesuit Father, Pierre Nicholas le Cheron d'Incarville, stationed at the mission in Beijing. (Once introduced to North America, this tree would escape and become quite common — even invasive. Its popular fame is as "the tree that grew in Brooklyn.")

First printed record of Chinese cabbage and Chinese mustard in England.

PLANTS

1752

April: Dr. Alexander Garden, a Scotsman, had been invited to Charles Town, South Carolina by Dr. William Rose. Dr. William Bull lent him John Clayton/Gronovius's *Flora Virginica*.

PLANTS

He visited Dr. Cadwallader Colden. While he was there John Bartram arrived. He went to Philadelphia and saw Bartram and Benjamin Franklin.

BOTANIZING

1753

Carolus Linnaeus issued *MUSEUM TESSINIANUM*, and in *SPECIES PLANTARUM* he named the plant genus of tobacco, *Nicotiana*, and described two species of this genus, *Nicotiana rustica* and *Nicotiana tabacum*.

SPECIES PLANTARUM would establish a new standard for plant classification as well as nomenclature. This treatise eventually would be recognized as the beginning-point for today's binomial nomenclature.

From 1748 to 1751 Peter Kalm had collected plant specimens in northeastern North America. His botanical collections were at this point extensively accessed by this Swedish botanist Linné as nomenclatural types for many of our northeastern US and southeastern Canadian species.

Linné also classified *cannabis sativa*.

PLANTS

1759

Dr. Erasmus Darwin, an inveterate tinkerer, devised an improved technique for the steering of carriages, and road-tested it for a total of over 20,000 miles. (It is the system that, patented by others, would be employed for our early modern automobiles.)

Upon the death of his father, Matthew Boulton moved the family manufacturing business to Soho, which was nearer to the jewelry quarter of Birmingham.

1760

The Englishman Joseph Banks (1743-1820) entered as a gentleman commoner at Christ Church, Oxford. Israel Lyonds came to Oxford to teach Banks and others.

The Kew royal botanical gardens opened. It received one of its first tropical orchids *Epidendrum rigidum*. (Kew would receive *Vanilla* sp. by 1765).

PLANTS

Governor Arthur Dobbs discovered the Venus Fly-trap in North Carolina and sent a description to Peter Collinson, in England.

PLANTS

1761

By this year British land grants in New England required that pine trees, most notably white pine, that were suitable as ship masts be conserved — to be cut only under license by the crown. Appointed surveyors marked trees to be protected with the "king's broad arrow," a triangular scar. This decree, among many others, greatly perturbed American colonists. The 1st flag used by Revolutionaries bore the image of a single white pine — representing the colony of Massachusetts, which at that time of course also included the pine forests of Maine.

PLANTS

Knighted by Swedish government, Carl Linné's name was changed to Carl von Linné. This name change was rendered retroactive to the year 1757.

Joseph Kölreuter was the 1st scientist to report making hybrids between plants and the 1st to observe the role of insects in pollination. Having studied the works of Camerarius and others, he was aware of areas requiring more investigation.

1763

Mark Catesby's *HORTUS BRITANNO-AMERICANUS* featured detailed descriptions, illustrations, and instructions for growing, in Great Britain, the 85 species of North American trees and shrubs which could be ordered from the nursery of Christopher Gray, at Fulham.

BOTANIZING

1765

While acting as a tutor at the dissenting Warrington Academy in Lancashire since 1761, the Reverend Joseph Priestley had been writing LIBERAL EDUCATION FOR CIVIL AND ACTIVE LIFE. This book stressed the importance of science, arts, modern languages, and history and argued they were better suited than the classics for those students who wanted a career in industry and commerce.

John Bartram went from Philadelphia to Charleston (where he again visited Dr. Garden), to the Cape Fear River of North Carolina, and back to Charleston. On this trip he traveled from Savannah up the river to Augusta, then back to Ebenezer and south to Fort Barrington on the Altamaha River. It was here the father and son found *Franklinia altamaha* (the Franklin tree) and *Nyssa sylvatica* (the Tupelo). They went back to St. Augustine in Florida and then explored the St. Johns River. They traced this for 400 miles until their way was blocked by water plants. They would turn not back until January of the following year.Not until another trip,

BOTANIZING

in 1773, would the son collect seed in the only known population of Franklin tree, near Fort Barrington GA. In 1774 the supporter of this trip, John Fothergill, would present *Franklinia altamaha* seedlings to the royal botanical garden at Kew. Publication of William Bartram's travel accounts would be completed by 1781, but awaited identification of plants from specimens he had sent to Fothergill. At Fothergill's death in 1780, his herbarium would be purchased by Joseph Banks.

PLANTS

1769

Sweet oranges were established at a Spanish mission near San Diego.

PLANTS

1770

Antoine-Laurent de Jussieu (1748-1836) obtained a doctorate in medicine and became the deputy of L.G. Le Monnier, professor of botany at the Jardin du Roi.

BOTANIZING

It was at about this point that William Hamilton built his magnificent 300 acre estate, The Woodlands, near Philadelphia. His interest in importing exotic plants made the grounds, landscaped in European style, a center for future plant introductions to US gardens.

PLANTS

In this year there were enough potatoes being grown in England, that a few were beginning to appear on the public market. The potato was still, however, a quite unfamiliar foodstuff, and in this year, when Frederick the Great's response to a famine at Kolberg was to send a wagonload of potatoes, the starving peasants would not know what to do with them and would let them rot.

PLANTS

An entire year's supply of nutmegs and cloves was destroyed in Amsterdam on purpose, the goal being the maintaining of high prices. Beginning in the 17th century Dutch traders had gained control of spice production in the Moluccas (at the expense of the Portuguese). Short supply kept prices high enough to create fortunes.

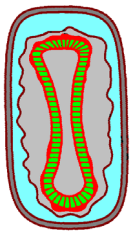
PLANTS

April 29, Sunday: Alexander McDougall, who had been imprisoned on February 8th for distributing subversive fliers, was released on bail by the British. Go thou and sin against empire no more.

Captain James Cook's *Endeavor* stood into Botany Bay, which Cook originally called Sting Ray Harbor, but the great collection of new plants by Banks and Solander provoked him to change the name.

PLANTS

1771



When Dr. Edward Jenner attempted to present info about small pox vaccination to the Royal Society, he was refused permission to present such a “wild idea” which was clearly “at variance with established knowledge.” He was cautioned to fear for his professional reputation.

Erasmus Darwin added his new motto *E conchis omnia*, "Everything from shells," to his bookplate.

He began his long-term sexual liaison with 18-year-old Mary Parker.

(One may wonder how this event is reported in the biography of Erasmus by his grandson Charles. On page 26 he mentions his grandfather's marriage in 1757 to "Miss Mary Howard, aged 17-18 years, who, judging from all that I have heard of her, must have been a superior and charming woman," and mentions that in 1770 she "died after a long and suffering illness." "They seem to have lived together most happily during the thirteen years of their married life, and she was tenderly nursed by her husband during her last illness." Then on pages 30/31, with nothing of significance intervening, he mentions that in 1781, "eleven years after the death of his first wife, Dr. Darwin married the widow of Colonel ... Pole of Redburn Hall. He had become acquainted with her in the spring of 1778, when she had come to Lichfield in order that he might attend her children professionally." One would expect, therefore, in a Victorian family biography of this sort, there to be no mention at all by the grandson of his grandfather's long-term mistress Mary Parker, or of his own two Parker

great-aunts who were the products of that union. Such an expectation is confounded, however, for Charles writes very plainly on page 64: "In the interval between his first and second marriages, Dr. Darwin became the father of two illegitimate daughters. To his credit be it said that he gave them an excellent education, and from all that I have heard they grew up to be admirable ladies, living on intimate terms with his widow and the children by the second marriage.")

He would keep the bookplates, after having his carriage door painted over when he was warned by a high church official that this motto amounted to a declaration of irreligion, and was dangerous to him.

The book his grandson Charles Darwin later wrote about his life now makes fascinating reading.

> It has been the fate of many celebrated men with strongly-marked characters to have been grossly calumniated; and few have suffered more in this respect than Erasmus Darwin.

This helps us understand what Erasmus was up against, what Charles was up against, what Henry Thoreau was up against, and what we are right now up against. Here we have a physician who was for awhile recognized as the most prominent poet in England, on the basis of his long poems about the history of life on earth — and then the establishment would step in and attempted to destroy his reputation because of the evolutionary ideas he was expressing in this poetry.[32]

Before he had begun to write this biography of Erasmus, Charles actually had known very little about him and had not valued his achievements. This was the case, the biographer Desmond King-Hele asserts, for socioeconomic reasons: Erasmus had had to work for his living, but his grandchildren were, by virtue of their inheritances of the earned wealth of their progenitors, gentlemen all, who never needed to work for a living.

> So the Victorian Wedgewoods and Darwins lived affluently and conformed to a well-known syndrome: they preferred to forget the hard work of their grandfathers that made possible their privileged status.

By this year the Prince Nursery on Long Island offered 42 varieties of pear.

PLANTS

32. Imagine parking in the parking lot of your local fundamentalist church, nowadays, with one of those "Darwin" fish-with-legs logos on the trunk lid of your car! Why was such a motto so offensive? –Because the official story then, which would be the official story during Charles Darwin's life as well, and would be the official story during Henry Thoreau's life, and would be the official story at the Scopes monkey trial in Tennessee, and is still the official story right now, as for instance the official belief system of the Wubya administration of born-again Christians — is that our lives, to be of significance to us, to be meaningful to us, must have a divine purpose and legitimation. (That's why we're attacking Iraq — Wubya's God told him he needs to "take Saddam out." Wubya's administration isn't just about stealing from the poor and giving to the rich. Wubya's life, in fact, has divine purpose and legitimation. It is now a life as full of meaning, as it once was full of drunken parties.)

1772

Dr. Erasmus Darwin constructed a speaking machine.

THE LUNAR SOCIETY OF BIRMINGHAM

His grandson would describe this machine as follows:

> His machine, or "head, pronounced the *p*, *b*, *m*, and the vowel *a*, with so great nicety as to deceive all who heard it unseen, when it pronounced the words *mama*, *papa*, *map*, and *pam*; and it had a most plaintive tone, when the lips were gradually closed." Edgeworth also bears witness to the capacity of this speaking head.

(Interestingly, while I was working for the General Electric Armament Systems Department in Burlington, Vermont in 1969, a management trainee brought in an apparatus of tubes and pistons operated by air pressure which he of course blandly claimed to have invented on his own, which could approximate human speech. His idea was that we were to put this apparatus on a bullhorn out in the warehouse, and use it to read out the part numbers and nomenclatures of parts which the warehouse workers were to collect and send to the factory. It was curious to suppose that this just-graduated-from-college trainee would have invented such a Rube Goldberg device as it was far more complex than, and far inferior in performance to, simply placing an existing telephone on an existing squawk-box. His idea of course came to nothing — but I did not think to investigate his assertion that he had invented this device all on his own.)

1773

French explorer Pierre Poivre was able to take propagation material of spices (clove, nutmeg, cinnamon, and black pepper) from the Dutch controlled Molucca Islands to Mauritius and Reunion, breaking the Dutch monopoly.

PLANTS

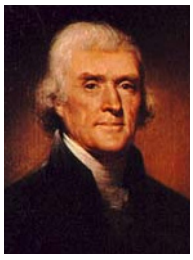
1774

The ladies of Edenton, North Carolina, led by Mistress Penelope Barker, confronted British rule by putting away their teapots — this would become known as the "Edenton Tea Party."

"Thanks, but no thanks."

During this year one of the Virginia slaveholders, Thomas Jefferson, was preparing an anonymous tract SUMMARY VIEW OF THE RIGHTS OF BRITISH AMERICA, by which of course he meant the rights of white men of property and of proper English culture in the British colonies of North America. All and only white. All and only men. All and only propertied. All and only of proper English culture. –No others need apply.

Jefferson had not been asked to draft these instructions – he had a way of producing documents in the hope they might be adopted, which in this case did not happen. His friends nevertheless published his text.



A list of some of the slaves that our hero-of-freedom TJ was holding on his plantation Monticello is shown on the following screen, as a way graphically to illustrate the sad fact that indeed he did mean, and only mean, the rights of white men of property and of proper English culture in the British colonies of North America. All and only white. All and only men. All and only propertied. All and only of proper English culture. –No others need apply. (You will search in vain on this list for the name of dashing Sally Hemings, although she had been born a slave in the previous year.[33])

We say that in this year Jefferson unsuccessfully planted olive cuttings at Monticello — we do not mean to

imply by that, however, that he ever had or ever would hold a spade or hoe in his own hand. (Unaware that the Padres who had established missions along the coast of California were already cultivating olives there by 1769, in 1791 he would have several hundred cuttings sent from France to South Carolina, only to be disappointed when they wouldn't bring in a lot of money.)

PLANTS

Word that he was the author of such a treatise would be spread by the Virginia legislature, and the reputation which he would achieve in this manner would help him, in a few years, gain appointment to the drafting committee of the Continental Congress for the writing of a Declaration of Independence. Samuel Ward, representative from Rhode Island to the convention, would describe Jefferson, on the basis of this pamphlet, as "a very sensible spirited fine Fellow," and one may suppose that indeed he was a very sensible spirited fine Fellow —he certainly did possess the ability and energy to beget slave children, offspring with whom he then was too busy about our nation's business to spend very much of his quality time with. For the remainder of his life this founding father would be able to use his past membership on this committee, and his skills as a scribe assembling draft material for the consideration of others, as his main claim to immortality.

1775

Carl Pieter Thunberg arrived at Nagasaki harbor to work at Deshima with the Dutch East India Company. Thunberg had received medical training in Sweden, and had been a student of Linnaeus. He was surprised to learn he had considerable freedom to collect dried specimens of plants on the mainland around Nagasaki. There he would collect *Hovenia dulcis* and *Rosa rugosa*. Thunberg would return to Europe in 1776, essentially smuggling such specimens out of Japan. He would publish his flora in 1784.

PLANTS

BOTANIZING

1778

Georges Louis Leclerc, *comte de* Buffon's *Epoques de la Nature.*

Joseph Banks began his 42-year stint as president of the Royal Society.

John Fothergill brought *Cymbidium ensifolium* and *Phaius tankervilliae* to England from China. These were the first Asiatic orchids to appear in England.

PLANTS

33. And why was that, we wonder? Why would Dashing Sally, as an infant, not be listed in Jefferson's Farm Book? –Was it, perchance, that since this little almost-white girlie was not yet old enough to perform work and not yet old enough to be marketed and not yet old enough to be sexually entered, she was of no particular interest? –Or would there be some more benign explanation for this neglect?

A Roll of the proper slaves of Thomas Jefferson. Jan. 1. 1774.

Monticello.

* Goliah.
* Hercules.
\+ Jupiter. 1743.
* Gill.
* Fanny
\+ Ned. 1760.
Suckey 1765.
Frankey. 1767.
Gill. 1769.
* Quash
* Nell.
* Bella. 1757.
* Charles. 1760.
Jenny. 1768.
* Betty
— Juno
* Toby junr. 1753.
— Luna. 1758.
* Cate. about 1747.
Hannah 1770.
Rachael. 1772.

Monticello.

\+ George
\+ Ursula.
George.
Bagwell.
Archy. 1773
\+ Frank 1757.
\+ Bett. 1759
\+ Scilla. 1762.

* denotes a labourer in the ground.
\+ denotes a titheable person following some o-

The condition of slavery had effectively been eliminated throughout the British Isles. Since the legal finding of June 22, 1772 some 14,000 persons, having a market value of some £500,000, had been released on their own recognizance.

We note, however, as a minor detail, that this condition had not been eliminated throughout the British empire, but only throughout the British "Isles," to wit, the island of England/Wales/Scotland and the island of Ireland and various little offshore pieces of real estate such as the Orkneys. In fact, in this year, Captain William Bligh was being chartered to sail away and obtain breadfruit seedlings in Tahiti, and transport these seedlings to the British islands in the West Indies — in order to provide a cheap staple diet for England's black slaves, still enslaved, in the Caribbean. England's black slaves in its dependencies were to be freed to eat cheaper food, in order to make their unpaid labor more cost-effective for their owners. Fancy that.

PLANTS

1779

Jan Ingenhousz's EXPERIMENTS UPON VEGETABLES... showed that plants produce oxygen in sunlight and carbon dioxide in darkness. This work added to studies by his friend the Reverend Joseph Priestley, but unlike the Reverend, who was interested primarily in the nature of gases, Ingenhousz was concerned with the physiology of plants.

PLANTS

1780

It was at about this point that the 1st machine-made chocolates began to be manufactured, in Barcelona.

John Hannon, financed by Dr. James Baker, started the 1st chocolate factory in the US, in Dorchester, Massachusetts. Dr. Baker would later found Baker's Chocolate.

Thomas Minton, a potter's apprentice, originated the pattern we call Blue Willow.

John Fraser traveled from England to Canada to collect plants. He would cross the border into US territory in 1785, with financial support from William Forsyth (Curator of the Chelsea Physic Garden), William Aiton (Head Gardener at Kew), and James Smith (President of the Linnaean Society). He would return to America in 1788, and again in 1796. Fraser (and son) would return yet later as collectors for the Russian Czar and Czarina. Their work would be commemorated through plant names: the Fraser fir and the Fraser magnolia.

PLANTS

1784

The Shakers crossed the White China pig from England with the American backwoods varieties, to produce the Poland China breed. This breed would become the mainstay of the American pork industry. In this year, also, the Shakers innovated the practice of selling garden seed in small, labeled paper packets.

A Ryukyuan merchant, Shionja, and a Chinese soldier, Kung Hsiang-chün, arrived together at Okinawa. The soldier would be known in the Ryukyus as Kusanku, and must have been a teacher of the martial arts as one of the oldest of the martial arts disciplines (kata) there has been named for him.

In England in this year, the Commutation Act was reducing to about $^{1}/_{10}$th the previous high rate of taxation, of over 100%, on tea from China, which had been resulting in much loss of revenue due to uncontrollable smuggling activities. We may date the American trade in Oriental goods from this as it would be in February of this year that the *Empress of China* would sail out of New-York harbor destined for the port of Canton in

order to begin our direct trade with China, and this would be also the year in which the *United States* would come to anchor off the coast of India. With most foreign ports denied to them because of the revolutionary war,

the first American ships visited the South China seas. In that region there wasn't all that much distinction being made between an American captain and a British captain, and thus the American vessels were able to purchase opium in India and the Middle East, and distribute it along the China coast.

William Hamilton of Philadelphia imported the Chinese tree of heaven (*Ailanthus altissima*, first planted in Europe by Miller at the Chelsea Physic Garden in 1751), which has become such a hardy "problem tree weed" in many American cities (well, one can't win them all, can one? — the tree of heaven happens to be "The Tree" that grew in Brooklyn). Hamilton also introduced *Acer platanoides*, the Lombardy poplar, and the *Ginkgo biloba* to America (a ginkgo had been in cultivation in the botanical garden at Utrecht since about 1730).

PLANTS

Here is the *Empress of China* arriving in Whampoa harbor:

Once the duties on tea were thus sharply lowered, its use would be much increased. People of merit in England would soon begin, it seems, to criticize the poor for using this tea, and to attribute their poverty not to exploitation by the rich but to humble people's improvident attempts to live beyond their means:

> Tea has become an economical substitute to the middle and lower classes for malt liquor, the price of which renders it impossible for them to procure the quantity sufficient for them as their only drink.... In short, we are so situated in our commercial and financial system, that tea brought from the eastern extremity of the world, and sugar brought from the West Indies and both loaded with the expense of freight and insurance ... compose a drink cheaper than beer.
>
> — MacPherson, David. THE HISTORY OF THE EUROPEAN COMMERCE WITH INDIA. London: Longman, Hurst, Rees, Orme & Brown, 1812, page 132.

The Reverend David Davies, who made detailed budgetary records of the cost of keeping a cow in England during this period, concluded however that rural poor families were drinking tea rather than milk as a matter or economic necessity, and also concluded that they were neglecting "small beer" because of the stiff taxes on malt. He pointed out that the tea which the poor were drinking was not the luxury item imagined by the rich, "fine hyson tea, sweetened with refined sugar, and softened with cream," but rather was "spring-water, just coloured with a few leaves of the lowest-priced tea, and sweetened with the brownest sugar." Thus tea-drinking was found to be "not the cause, but the consequence of the distresses of the poor," and the rich who were scoffing at this were merely playing their usual game of blame-their-victims:

> Under these hard circumstances, the dearness of malt, and the difficulty of procuring milk, the only thing remaining of them to moisten their bread with, was tea. This was their last resource. Tea (with bread) furnishes one meal for a whole family every day, at no greater expense than about one shilling a week, at an average. If any body will point out an article that is cheaper and better, I will venture to answer for the poor in general, that they will be thankful for the discovery.
>
> — The Reverend David Davies. THE CASE OF LABOURERS IN HUSBANDRY. London: G.G. and J. Robinson, 1795, page 37.

1785

William Withering, an English country doctor, published AN ACCOUNT OF THE FOXGLOVE AND SOME OF ITS MEDICAL USES: WITH PRACTICAL REMARKS ON DROPSY AND OTHER DISEASES. His study had begun in 1775 when he had been asked to investigate a home remedy for dropsy. The active principals in foxglove, digitoxins, slow the heart rate and increase the strength of the heart beat, which improves circulation and therefore alleviates edema (edema is the basis for dropsy).

Dr. Edward Bancroft was awarded exclusive rights by the British Parliament to use the yellow coloring agent which he had extracted from black oak (*Quercus velutina*) and named *quercitron*, for the dyeing and printing of fabrics. Taken from the inner bark of the tree, this dye would remain commercially available for over 200 years.

PLANTS

1786

Upon being urged by Professor John Law to expand his lectures the Reverend William Paley published THE PRINCIPLES OF MORAL AND POLITICAL PHILOSOPHY (London). [34]

> "Show how it is that a Writer's Nationality and Individual Genius may be fully manifested in a Play or other Literary Work, upon a Foreign or Ancient Subject – and yet full Justice be done to the Subject."

Thoreau's essay of December 16, 1836 for Professor Channing's assignment above would begin with: "Man has been called a bundle of habits. This truth, I imagine, was the discovery of a philosopher – one who spoke as he thought and thought before he spoke – who realized it, and felt it to be, as it were, literally true. It has a deeper meaning, and admits of a wider application than is generally allowed. The various bundles which we label French, English and Scotchmen, differ only in this, that while the first is made up of gay, showy and fashionable habits, –the second is crowded with those of a more sombre hue, bearing the stamp of utility and comfort; –and the contents of the third, it may be, are as rugged and unyielding as their very envelope. The color and texture of these contents vary with different bundles; but the material is uniformly the same."

College student David Henry Thoreau was making reference above to the Reverend Paley's "There are habits, not only of drinking, swearing, and lying, ... but of every modification of action, speech, and thought: Man is a bundle of habits...."

Anticipating Bentham, his "moral system," such as it was, merely summarized the utilitarianism of the 18th Century. Thoreau would disparage this work in "RESISTANCE TO CIVIL GOVERNMENT":

34. Bishop William Paley on "Virtue," in THE PRINCIPLES OF MORAL AND POLITICAL PHILOSOPHY, 1785:

"RESISTANCE TO CIVIL GOVERNMENT": Paley, a common authority with many on moral questions, in his chapter on the "Duty of Submission to Civil Government," resolves all civil obligation into expediency; and he proceeds to say that "so long as the interest of the whole society requires it, that is, so long as the established government cannot be resisted or changed without public inconveniency, it is the will of God ... that the established government be obeyed, and no longer.... This principle being admitted, the justice of every particular case of resistance is reduced to a computation of the quantity of the danger and grievance on the one side, and of the probability and expense of redressing it on the other." Of this, he says, every man shall judge for himself. But Paley appears never to have contemplated those cases to which the rule of expediency does not apply, in which a people, as well as an individual, must do justice, cost what it may. If I have unjustly wrested a plank from a drowning man, I must restore it to him though I drown myself. This, according to Paley, would be inconvenient. But he that would save his life, in such a case, shall lose it. This people must cease to hold slaves, and to make war on Mexico, though it cost them their existence as a people.

In WALDEN; OR, LIFE IN THE WOODS, Thoreau would write that "The maker of this earth but patented a leaf,"

> WALDEN: Thus it seemed that this one hillside illustrated the principle of all the operations of Nature. The Maker of this earth but patented a leaf. What Champollion will decipher this hieroglyphic for us, that we may turn over a new leaf at last? This phenomenon is more exhilarating to me than the luxuriance and fertility of vineyards. True, it is somewhat excrementitious in its character, and there is no end to the heaps of liver lights and bowels, as if the globe were turned wrong side outward; but this suggests at least that Nature has some bowels, and there again is mother of humanity. This is the frost coming out of the ground; this is Spring. It precedes the green and flowery spring, as mythology precedes regular poetry. I know of nothing more purgative of winter fumes and indigestions. It convinces me that Earth is still in her swaddling clothes, and stretches forth baby fingers on every side. Fresh curls springs from the baldest brow. There is nothing inorganic. These foliaceous heaps lie along the bank like the slag of a furnace, showing that Nature is "in full blast" within. The earth is not a mere fragment of dead history, stratum upon stratum like the leaves of a book, to be studied by geologists and antiquaries chiefly, but living poetry like the leaves of a tree, which precede flowers and fruit, –not a fossil earth, but a living earth; compared with whose great central life all animal and vegetable life is merely parasitic. Its throes will heave our exuviæ from their graves. You may melt your metals and cast them into the most beautiful moulds you can; they will never excite me like the forms which this molten earth flows out into. And not only it, but the institutions upon it, are plastic like clay in the hands of the potter.

JEAN-FRANÇOIS CHAMPOLLION

commenting upon Johann Wolfgang von Goethe's "Urpflanze" in his *VERSUCH DIE METAMORPHOSE DER PFLANZEN ZU ERKLÄREN* (AN ATTEMPT TO EXPLAIN THE METAMORPHOSIS OF PLANTS) that would be published in 1790. You can visit the European fan palm (*Chamaerops humilis* var. *arborescens*) which Goethe used for his illustration of his idea about the Ur-shape of leaves, which Goethe sighted during this year. This palm tree still survives. It had been planted in 1585. It is in the glass house inside the circular garden in the botanical garden of Padua, Italy.

PLANTS

Goethe wrote to Charlotte von Stein:

> What pleases me most at present is plant-life. Everything is forcing itself upon me, I no longer have to think about it, everything comes to meet me, and the whole gigantic kingdom becomes so simple that I can see at once the answer to the most difficult problems. If only I could communicate the insight and joy to someone, but it is not possible. And it is no dream or fancy: I am beginning to grow aware of the essential form with which, as it were, Nature always plays, and from which she produces her great variety. Had I the time in this brief span of life I am confident I could extend it to all the realms of Nature – the whole realm.

Thoreau would be informing himself of Goethe's Italian journey during Spring 1838. Although today this thinking about the Ur-shapes of leaves falls under the category of obsolete science, in that period before the creation of Darwin's theory of evolution, while Thoreau would be studying it, this would still be cutting edge science. Read about it in James McIntosh's THOREAU AS ROMANTIC NATURALIST (Cornell UP, 1974). (Of course, when Darwin would publish in 1859, taking the science of biology beyond this Goethe stage, Thoreau would be one of his very first American readers, and would be open to Darwin's heretical new ideas.)

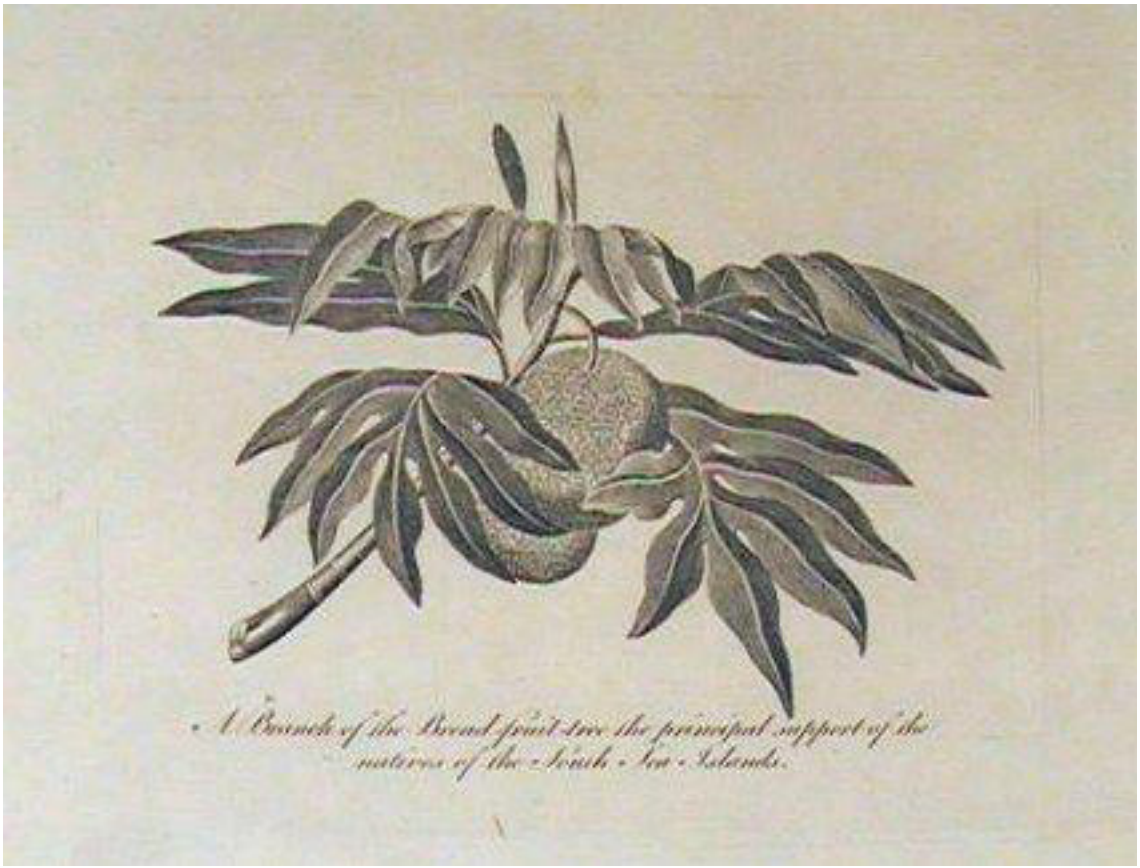
1787

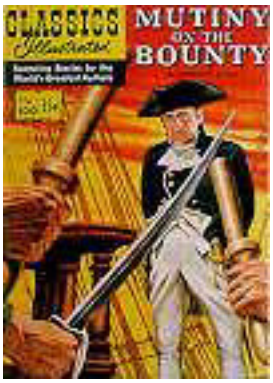
Publication began for Botanical Magazine by William Curtis, the world's longest-running journal, dedicated to introducing exotic plants to an avid audience. To produce this series, Curtis quit his job as Demonstrator in Botany for the Chelsea Physic Garden.

PLANTS

From this year into 1789, the voyage of Lieutenant William Bligh in HMS *Bounty* to the Pacific to find breadfruit plants as the ultimate in cheap food for the slaves on British sugar-cane plantations in the West Indies (since the slaves weren't receiving any pay at all, the only way the plantation masters had of cutting costs of production was by feeding their slave labor more economically). The sailors aboard the *Bounty* discovered that there wasn't enough water aboard for them as well as the 1,000 thirsty pots of breadfruit plants the vessel was transporting. They therefore heaved these plants into the ocean, becoming mutineers, and shortly their captain and those few who remained loyal to him would be offloaded into the vessel's longboat.

(In 1793 the *Providence* would accomplish this breadfruit agenda.)





1788

Erasmus Darwin's paper "Mechanical expansion of air" appeared in the Philosophical Transactions of the Royal Society.

Georges Louis Leclerc, *comte de* Buffon died. He had been succeeded in his post at the Jardin du Roi by the Count de Lacepede, who did research on electricity and in this year published THE NATURAL HISTORY OF OVIPAROUS QUADRUPEDS AND SERPENTS.

Thomas Walter's *FLORA CAROLINIANA* was published.

BOTANIZING

The Linnaean Society was established in London, its first president being the James Edward Smith (1759-1828) who, with Sir Joseph Banks's (1743-1820) encouragement, had in 1784 purchased Carl von Linné's

library and herbarium.

CAROLUS LINNAEUS

President Smith would champion the Linnaean system for the next half century even after it had outlived its usefulness. Robert Brown (1773-1858) and John Lindley (1799-1865) would lead the opposition to this retro-thinking. In France, the changes in social values brought about by the Revolution of 1789 coincided with the acceptance of a natural system of classification: Antoine Laurent de Jussieu (1748-1836), nephew of Bernard de Jussieu and friend of Linné, in 1789 in his *GENERA PLANTARUM*... (Paris), would arrange the genera of the world's plants into 100 families (*ordines naturales*) based on concepts developed by his uncle Bernard, in a continuation of the ideas proposed a generation before by Michel Adanson (1727-1806) in *FAMILLES DES PLANTES* (2 vols., Paris, 1763[-1764]). As had Pierre Magnol (1638-1715), Sloane's professor, long before him, Adanson believed that plants could be arranged into natural families and genera in a classification scheme free of a priori weighting and metaphysical themes, based solely upon empirical observation of similarities and dissimilarities.

Jean Senebier, in his *EXPÉRIENCES SUR L'ACTION DE LA LUMIÈRE SOLAIRE DANS LA VÉGÉTATION* established the relationship between the presence of carbon dioxide in the atmosphere and the production of oxygen by plants. His studies built on the work of Ingenhousz.

PLANTS

According to Charles Corn's THE SCENTS OF EDEN: A HISTORY OF THE SPICE TRADE (NY: Kodansha America, 1999), pages 243-4:

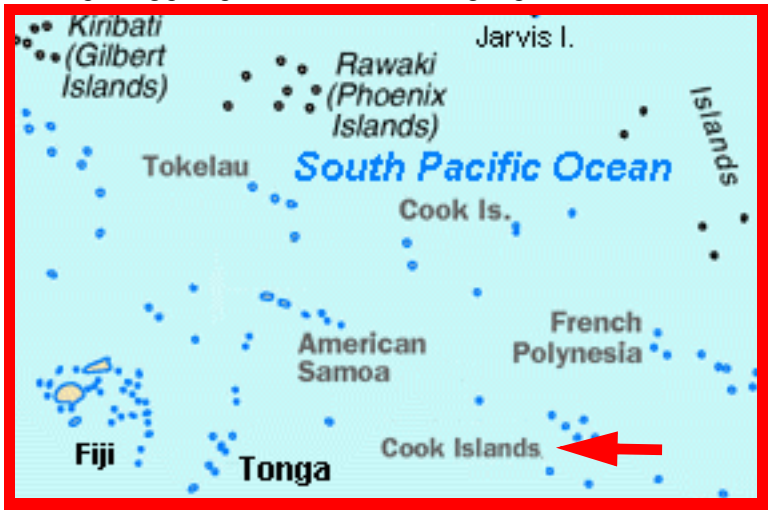
> [O]n a spring morning in 1788, the one-hundred-ton *Cadet*, built at Pembroke on the North River, glided down Salem's harbor "bound for Madeira and from thence to India and the China Seas: Prosperous be her voyage," according to the Salem Mercury of April 15. The daily newspaper celebrated the small brig's leave-taking as it did that of most ships, because in Salem her being fitted out for parts unknown was the sort of pulsating news upon which the port thrived during the heady days after the Revolution. The *Cadet*, once owned by Derby, now belonged to the same William Vans who had sailed with Ebenezer West to Canton in 1785. Vans was aboard again as supercargo, while the brig was commanded by Vans's brother-in-law Jonathan Carnes, who was thirty years old. A month later the *Cadet* made Madeira, and then

she suddenly disappeared, presumably somewhere in Eastern seas — the Indian Ocean or perhaps beyond. Not one of the other half dozen Salem ships in that part of the world could account for her whereabouts. Then, on May 18, 1790, more than two years later, the Salem Gazette finally reported, "Captain Carnes, absent on an India voyage upwards of two years, was at the Cape of Good Hope, February 14, 1790, and was to sail in a few days for the W. Indies." But where Carnes's voyage had taken him remained a mystery. That he had sailed thirteen thousand miles to unknown Sumatra was this young captain's secret.... There are conflicting stories as to what happened next, for there is no surviving log. Nor are there letters home from crew members, and the Salem papers do not mention the *Cadet*'s return, an unusual omission. With the paucity of records, one can only speculate on the fate of the *Cadet*, which remains largely a mystery. Carnes most certainly left the Cape with a fully laden ship to ride an easterly wind back across the Atlantic toward the Caribbean. A likely explanation, though it is by no means conclusive, is that the brig and her cargo were lost on a reef in the West Indies. We know only that somehow Carnes found his way back to Salem with tales of the strangest race of people he had ever seen. But most important, he returned with a profoundly rich secret: the opening of a new channel of trade in pepper, which, to say the least, was arcane cargo in this brash new nation.

SPICE

1789

Captain William Bligh of the *Bounty* landed on Aitutaki in the Cook Islands.
He is credited with importing paw-paw trees to the island group.



PLANTS

Thomas Jefferson brought pasta to the United States after a tour of duty as Ambassador to France. Newly installed in our nation's capital, Philadelphia, as the federal Secretary of State, he began a career of plant introduction that would include vanilla, tea, and tomatoes.

PLANTS

Baptist Reverend Elijah Craig of Scott County, Kentucky, is given credit for first aging Kentucky corn whiskey, thus creating America's first bourbon whiskey.

Ginkgo was planted at Pierce Arboretum (now part of Longwood Gardens) in Kennett Square, Pennsylvania. By 1968 that tree was 105 feet tall and about 13 feet dbh.[35]

According to Charles Corn's THE SCENTS OF EDEN: A HISTORY OF THE SPICE TRADE (NY: Kodansha America, 1999), pages 231-6:

PLANTS

> Early one fine morning in 1789, not long after his inauguration on April 30 at New York City's Wall Street, George Washington departed Boston for Salem, Massachusetts, in a large four-horse coach, followed by a baggage wagon with black lackeys and outriders in rich livery, his white horse haltered behind. Their pace was brisk, for this was another leg of a continuing journey through New England, and there were engagements planned for the day. Standing aloof from party divisions, the unanimously elected nations' first chief executive was keen to emphasize his role as president of the entire country by a tour through the northern states, as later he would travel through the South. The president was especially enthusiastic about visiting Salem, for there was a strange, unprecedented force at work in this modest New England port that had all but overshadowed its larger neighbor, Boston, just a few miles to the southeast. In time, the successes of the two ports would be reversed. In the meanwhile, while Boston's day was yet to come, foreign trade had for more than a century brought great wealth to Salem, and the influence of the Washington administration would see it continued. When the Salem Federal Custom House was opened in 1789, the vast seas east of the Cape of Good Hope awaited exploitation by Salem's merchants. Though the British, having eclipsed the Dutch, still traded in spices, the dissemination of clove and nutmeg seedlings had already reduced the dearth of the "holy trinity." Likewise, the pepper trade was for the English a routine commerce in this bustling era, when tea and opium commanded a premium. But for the traders of Salem, Massachusetts, pepper, as we shall see, was anything but a routine commerce. It was two-o'clock in the afternoon when the fifty-seven-year-old president stepped down from the coach on Salem's Federal Street to take in his large hands the reins of his horse, already bridled and saddled. His party looked on, enjoying the ease and authority with which the old general placed his foot in the stirrup and swung his sturdy-shouldered, six-foot three-inch frame atop his old charger. Washington, an

35. When measuring trees, the convention is to take their diameter at breast height, four and a half feet above the ground. This is referred to as the "dbh" measurement.

experienced rider and foxhunter since his youth, was at home on horseback and cut a commanding figure. People liked to watch him ride. The, preceded by an honor guard, the former head of the colonial forces rode up the line in review of the troops to Boston Street. Since the bleakest days of the Revolution, when Massachusetts troops had stood firmly in support of him, a Virginian, thus solidifying the link between the two most powerful colonies, Washington had maintained close ties to this port city. Hurrahs rang out as the president appeared on the balcony at Town House Square to receive a welcoming address and to hear a choir sing an ode composed for the occasion. Washington made a brief reply, ending with these words: "From your own industry and enterprise, you have everything to hope that deserving men and great citizens can expect. May your navigation and commerce flourish, your industry in all its applications be rewarded, your happiness here be as perfect as belongs to the lot of humanity, and your eternal felicity be complete." When he had finished, a chorus of loud cheers went up. The cheering din followed Washington as he retired from the Town House balcony to the home of Joshua Ward, one of the city's most distinguished merchants. Ward's house was a large, new brick structure well off the street, facing the water. Terraced up in front, the property afforded at the top a stunning view of the busy harbor. As one stood and gazed, there was nothing to impede the vista out to Naugus Head save the long reach of Derby Wharf. The foreground of the harbor as seen from the house provided a lively tableau, as if to illustrate the sentiments expressed in Washington's remarks spoken earlier. At Derby Wharf a large East Indiamen, which had arrived earlier that day from the waters east of the Cape of Good Hope, was berthed and off-loading, her keep embedded in harbor mud. A roar of incessant noise rose from the docks –shouted orders, creaking windlasses, shrieking seagulls, the cacophony of vessels under construction from nearby shipyards– while prostitutes beckoned to sailors from nearby windows and the aromas of cinnamon, clove, coffee, tea, and pepper wafted on the strong-smelling sea air at low tide. Crew members shouldered bags of sugar from Île de France (Mauritius) and bolts of cotton from India to be weighed on the customs scale and the merchant's scale, while dunnage now stacked by the merchantman's bow had been packed around the cargo as a preventative against its shifting in bad weather. Berthed just forward of the off-loading ship was a coasting schooner having its hull coppered; behind Derby's counting house and warehouse on the wharf itself, a lumber schooner was putting in at shipyard with a load of timber. Down the harbor another merchantman was docked in front of the large, striking, and somewhat eccentric dwelling later to be known as the House of the Seven Gables, and beyond it was planned a great finger of construction reaching into the harbor just where it widened. It was to be called India Wharf or Crowninshield Wharf, depending on one's preference, and it promised to rival that of Captain George Crowninshield's arch-competitor Mr. Elias Haskins Derby, who owned by far the most prominent of Salem's swelling number of wharves. Coaches plied the narrow waterfront streets seeking fares from among the shore parties of the several visiting frigates. In the early evening, with powdered hair and dressed

in a black velvet suit with gold buckles, yellow gloves, a cocked hat with an ostrich plume in one hand, and a sword in a white leather scabbard, President Washington arrived at the Assembly Hall on Federal Street, where a party was already gathered. Like the courthouse across town, another notable building of this enlightened day, the hall with its noble Federalist lines was an anomalous structure flanked by gambrel-roofed houses; for it had been built only a few years before expressly for the social events of Salem's most prominent citizens. On this evening the proud building beamed with neoclassical confidence and promise of intoxicating possibilities. The Reverend Dr. William Bentley, the local chronicler who kept a finger on Salem's pulse, noted the scene glowing beneath the candlelit chandeliers with gentle irony: "The ladies were numerous and brilliant, the gentlemen were also numerous!" Washington confided to his diary that there were a hundred handsome, well-dressed people assembled to pay him homage. The cream of Salem's society parted for the presidential party entering the hall, withdrawing left to right with curtsies and bows, as the lofty guest of honor was escorted to a fine armchair at the end of the spacious room offered for the occasion by Mr. Derby and his wife, Elizabeth Crowninshield Derby. French tapestries and portraits of persons and ships adorned the walls; fine silver, crystal, and porcelain pieces graced the tables and hunt boards; Khotan, Samarkand, and Tabriz carpets decorated the floor. In one corner hung a highly polished mahogany spice cabinet where the precious condiments were kept under lock and key. There followed an evening of dancing until the distinguished visitor retired at nine, as it was his custom to rise at five, but not before promising well-wishers that he would be riding out into Essex County at eight the next morning to inspect a new bridge. The festivities continued late into the evening, for if the citizens of Salem knew one thing apart from diligence and hard work, it was how to live and enjoy themselves. One of the most sedate of the revelers was Elias Hasket Derby Sr., who had lent the hall for the evening. Mr. Derby was a bold, visionary maritime merchant and the head of Salem's most prosperous family, a house that had emerged from the Revolution measurably richer, with Derby's privateers having captured nearly 150 British prizes at a profit of one million dollars. "King" Derby has been described as "a tall man, of fine figure and elegant carriage. His deportment was grave and dignified, his habits regular and exact." His contemporaries were especially struck by his eyes, for one was blue, the other brown, and the arresting contrast is vividly revealed in a contemporary portrait. The son of Richard Derby, he had entered his father's business at age fifteen not by way of the quarterdeck, which was the normal way to begin a merchant's career, but with the account books in the counting house. His sons John and Elias Hasket Jr. and other prominent captains and merchants, known as "Derby's Boys," would serve a similar apprenticeship. By the age of thirty-three in 1772, he was running the business, and after his father's death at war's end, when Derby was forty-four, he had complete authority over the port's greatest merchant house, with wharf, warehouses, stores, a distillery, brigs, and ships: all without ever having been to sea or abroad. Refitting his privateers as merchantmen,

he began to broaden his vision, being the first Salem merchant to dispatch ships to such distant ports as Calcutta, Bombay, Madras, and Manila. An innovator, Derby established for Salem ships the role of supercargo, or traveling business agent. He was most likely the first American merchant to send ships to sea with coppered bottoms. Having envisioned a centralized global trade network and developed a system that allowed the consignment of cargoes to a foreign house, he relieved his supercargos of the task of dealing with a succession of buyers. His life was lived in luxury, a style mostly promoted by his wife. The most envied man in Salem, he was also the luckiest, having lost but one ship at sea during his entire career. In the approaching decade, the 1790s, one third of the vessels out of Salem to round the Cape of Good Hope were to be Derby's vessels. Dr. Bentley wrote with some awe of America's first millionaire, "Wealth with full tide flows on in that man." Other merchants looked to Derby as an example to follow in Far Eastern trade. Derby, unsurprisingly, had his enemies present that evening, most notably Captain George Crowninshield, the patriarch of a rival clan of seafarers and from whose family had come Derby's own wife. Crowninshield's rise in the merchant arena had been quick, aggressive, and occasionally litigious. Moreover, the Crowninshields were Republicans, an affront to the aristocratic, Federalist Derbys. Crowninshield had been a captain for Richard Derby before the Revolution and was described as a "bluff, warm-hearted chivalrous seaman" and "a son of nature [with powers] such as are employed only in seafaring." George Crowninshield had a toughness that matched his ambition, and both these qualities helped to elevate his firm to a competitive level with that of Elias Haskins Derby. His five sons who followed him in the family business were diverse and complemented their father's character. Each had mastered navigation at age twelve, sailed to the East Indies at fifteen, and captained a ship by age twenty. After independence their father began acquiring ships of his own, much to Derby's displeasure, who branded the Crowninshields as "base plebeians" and "sons of pride." Derby brought a suit against his brother-in-law for a wharf that extended too far into the channel, causing the bottom adjacent to his own wharf to silt in. After an acrimonious contest, Derby prevailed. A court decision forced Crowninshield to remove twelve feet of his wharf, fueling the animosity. Bitterness between the patriarchs was so rife that when Elizabeth Crowninshield Derby died in 1799, not one Crowninshield attended the funeral. Henry David Thoreau undoubtedly had these two dynamic families in mind when he described the ideal merchant in WALDEN; OR, LIFE IN THE WOODS, published over a half century later, in 1854: "If your trade ... demands a universal knowledge." Many of Salem's maritime achievements and domestic conflicts were to be embodied in these rival dynasties of Derbys and Crowninshields, whose fates were intertwined through collaboration and competition in trade, politics, and marriage. Their story is the story of a growing Salem, for the two families gave great and lasting shape to an American city whose development is indelibly linked to the East Indies pepper trade.

SPICE

April 28, Tuesday: Mutiny aboard HMS *Bounty.* Although the mutineers of Captain William Bligh's *Bounty* appeared off Rarotonga in the Cook Islands, probably they did not come ashore.

PLANTS

1790

The soybean was grown at Kew, but had no crop significance at that time for Europe.

Archibald Menzies journeyed as surgeon-naturalist on Captain George Vancouver's expedition to the Pacific Northwest (Vancouver had sailed with James Cook on his 2d and 3d voyages of discovery) and collected some dried herbarium material.

BOTANIZING

Johann Wolfgang von Goethe's play *Torquato Tasso*.[36] Also, Goethe's most significant biological contribution, *Versuch die Metamorphose der Pflanzen zu erklären* (An Attempt to Explain the Metamorphosis of Plants). This work was done within a developing morphological tradition which would come to be known under the rubric "unity of type."

36. The play would be translated into English in 1861. Henry Thoreau, who could read both Italian and German and very much enjoyed Tasso's poetry in the original Italian, would have in his personal library a copy of Goethe's play in the original German:

The focus in this sort of scientific work of the period was upon discovering some abstract generating form which would enable us to understand all the developed parts of a plant as being merely the diversified products of this one archetypal form. The archetypal form of all the structures of the plant, Goethe hypothesized, was perhaps best exemplified by its leaf. The cotyledon of a plant, and the sepals and petals and pistils and stamen of its flower, and indeed its fruit, were all to be construed as differentiated end results arising out of this one archetypal form observable in its simplest form in its leaf.

WALDEN: The whole bank, which is from twenty to forty feet high, is sometimes overlaid with a mass of this kind of foliage, or sandy rupture, for a quarter of mile on one or both sides, the produce of one spring day. What makes this sand foliage remarkable is its springing into existence thus suddenly. When I see on the one side the inert bank, – for the sun acts on one side first,– and on the other this luxuriant foliage, the creation of an hour, I am affected as if in a peculiar sense I stood in the laboratory of the Artist who made the world and me, –had come to where he was still at work, sorting on this bank, and with excess of energy strewing his fresh designs about. I feel as if I were nearer to the vitals of the globe, for this sandy overflow is something such a foliaceous mass as the vitals of the animal body. You find thus in the very sands an anticipation of the vegetable leaf. No wonder that the earth expresses itself outwardly in leaves, it so labors with the idea inwardly. The atoms have already learned this law, and are pregnant by it. The overhanging leaf sees here its prototype. *Internally* whether in the globe or animal body, it is a moist thick *lobe*, a word especially applicable to the liver and lungs and the *leaves* of fat, λειβο, *labor*, *lapsus*, to flow or slip downward, a lapsing; λοβος, *globus*, lobe, globe, also lap, flap, and many other words,) *externally* a dry thin *leaf*, even as the *f* and *v* are a pressed and dried *b*. The radicals of lobe *lb*, the soft mass of the *b* (single lobed, or B, double lobed,) with a liquid *l* behind it pressing it forward. In globe, *glb*, the guttural *g* adds to the meaning the capacity of the throat. The feathers and wings of birds are still drier and thinner leaves. Thus, also, you pass from the lumpish grub in the earth to the airy and fluttering butterfly. The very globe continually transcends and translates itself, and becomes winged in its orbit. Even ice begins with delicate crystal leaves, as if it had flowed into moulds which the fronds of water plants have impressed on the watery mirror. The whole tree itself is but one leaf and rivers are still vaster leaves whose pulp is intervening earth, and towns and cities are the ova of insects in their axils.

Where Johann Wolfgang von Goethe opinioned that "The organs of the vegetating and flowering plant, though seemingly dissimilar, all originate from a single organ, namely, the leaf," he was not saying that all is leaf, or anything nearly that foolish. What he was saying was that a full account of the various structures of a plant involved a description of the complex interactions among three categories of influences:

- **stability:** the influence of some universal and inherent archetype
- **direction:** the impact upon that archetype of directional influences
- **recurrence:** the impact upon that archetype of cyclical influences

What we see in WALDEN; OR, LIFE IN THE WOODS is that Henry Thoreau would be ready to utilize this sort of scientific speculation to problematize the very distinction between living and inanimate nature.

You can visit the European fan palm (*Chamaerops humilis* var. *arborescens*) which Goethe used for his illustration of his idea about the Ur-shape of leaves, which Goethe had sighted in 1786. This palm tree still survives. It had been planted in 1585. It is in the glass house inside the circular garden in the botanical garden of Padua, Italy.

PLANTS

Goethe wrote to Charlotte von Stein:

> What pleases me most at present is plant-life. Everything is forcing itself upon me, I no longer have to think about it, everything comes to meet me, and the whole gigantic kingdom becomes so simple that I can see at once the answer to the most difficult problems. If only I could communicate the insight and joy to someone, but it is not possible. And it is no dream or fancy: I am beginning to grow aware of the essential form with which, as it were, Nature always plays, and from which she produces her great variety. Had I the time in this brief span of life I am confident I could extend it to all the realms of Nature – the whole realm.

Thoreau would be informing himself of Goethe's Italian journey during Spring 1838. Although today this thinking about the Ur-shapes of leaves falls under the category of obsolete science, in that period before the creation of Charles Darwin's theory of evolution, while Thoreau would be studying it, this would still be cutting edge science. Read about it in James McIntosh's THOREAU AS ROMANTIC NATURALIST (Cornell UP, 1974). (Of course, when Darwin would publish in 1859, taking the science of biology beyond this Goethe stage, Thoreau would be one of his very first American readers, and would be open to Darwin's heretical new ideas.)

Stephen Jay Gould has pointed out, in his essay "More Light on Leaves," that Goethe's system was a whole lot more than a mere theory of the Leaf as the archetypal form of the Plant. In his most fascinating intellectual move, this 18th-Century scientist grafted two additional principals onto the idea of leaf-as-archetype to produce a complete account of plant development which would explain the systematic variation in form which we observe, as we pass up the stem. The two additional principles are:

- **the directionality of time's arrow:** the progressive refinement of the sap
- **the repetition of time's cycle:** cycles of expansion and contraction

Never mind that these principles are no longer accepted today. This theory of his was a good theory given what was known at the time:

- **1. Refinement of sap as a directional principle.** Up and down; heaven and hell; brain and psyche vs. bowels and excrement; tuberculosis as a noble disease of airy lungs vs. cancer as the unspeakable malady of nether parts (see Susan Sontag's important book, Illness as Metaphor): THis major metaphorical apparatus of Western culture almost irresistibly applies itself to plants as well, with gnarly roots and tubers as things of the ground and fragrant, noble flowers as topmost parts, straining towards heaven. Goethe, by no means immune to such thinking in a romantic age, viewed a plant as progressing towards refinement from cotyledon to flower. He explained this directionality by postulating that each successive "leaf" progressively filters an initially crude sap. Flowering is prevented by these impurities and cannot occur until they have been removed. The cotyledons begin both with minimum organization and refinement, and with maximum crudity of sap:

  > We have found that the cotyledons, which are produced in the enclosed seed coat and are filled to the brim, as it were, with a very crude sap, are scarcely organized and developed at all, or at best roughly so.

  The plant moves towards its floral goal, but too much nutriment delays the process of filtering sap, as material rushes in and more stem leaves must be produced for drainage.

A decline in nutriment allows filtering to attain the upper hand, producing sufficient purification of sap for flowering:

> As long as cruder sap remains in the plant, all possible plant organs are compelled to become instruments for draining them off. If excessive nutriment forces its way in, the draining operation must be repeated again and again, rendering inflorescence almost impossible. If the plant is deprived of nourishment, this operation of nature is facilitated.

Finally the plant achieves its topmost goal:

> While the cruder fluids are in this manner continually drained off and replaced by pure ones, the plant, step by step, achieves the status prescribed by nature. We see the leaves finally reach their fullest expansion and elaboration, and soon thereafter we become aware of a new aspect, apprising us that the epoch we have been studying has drawn to a close and that a second is approaching — the epoch of the flower.

- **Cycles of expansion and contraction.** If the directional force worked alone, then a plant's morphology would be a smooth continuum of progressive refinement up the stem. Since, manifestly, plants display no such pattern, some other force must be working as well. Goethe specifies this second force as cyclical, in opposition to the directional principle of refining sap. He envisages three full cycles of contraction and expansion during growth. The cotyledons begin in a retracted state. The main leaves, and their substantial branching on the stem, represent the first expansion. The bunching of leaves to form the sepals at the base of the flower marks the second contraction, and the subsequent elaboration of petals the second expansion. Narrowing of the archetypal leaf to form pistils and stamens identifies the third contraction, and the formation of fruit the last and most exuberant expansion. The contracted seed within the fruit then starts the cycle again in the next generation. Put these three formative principles together —the archetypal leaf, progressive refinement up the stem, and three expansion-contraction cycles of vegetation, blooming, and bearing fruit— and the vast botanical diversity of our planet yields to Goethe's vision of unity:

> Whether the plant vegetates, blossoms, or bears fruit, it nevertheless is always the same organs with varying functions and with frequent changes in form, that fulfill the dictates of nature. The same organ which expanded on the stem as a leaf and assumed a highly diverse form, will contract in the calyx, expand again in the petal, contract in the reproductive organs, and expand for the last time as fruit.

1793

Dr. Erasmus Darwin had Joseph Wright paint his portrait again.

As before, his deep small pox pits were omitted from the portrait.[37]

In this year he had one of his sons send a pie to a Mrs. Day. (She was Mary Parker, his former mistress, the mother of his two illegitimate daughters, who was at this time married to a mechanic of Birmingham.)

Christian Sprengel was the first researcher to publish detailed descriptions of the manner in which different flowers are pollinated. He made the original drawings himself. Sprengel's discoveries would be ignored by botanists until Charles Darwin.

PLANTS

1795

British colonists planted clove trees in Panang. (By the following year the English would have gained control over all the Dutch East Indian possessions and their spice trade, with the exception of Java.)

PLANTS

By this point Julien Dubuque had already planted an apple tree in what will eventually become Iowa. By the middle of the 19th Century, Iowa would be an important center for apple development.

PLANTS

37. Dr. Erasmus Darwin's grandson Charles Darwin would be assured, by relatives who had known his grandfather in his obese old age, that by the time of his death these pits had to a remarkable degree smoothed themselves out.

1797

July 25, Tuesday: Nicholas Marcellus Hentz was born in Versailles, France where for political reasons the family was living under the name Arnold.

The Salem *Gazette* reported the return to the port of New-York of the *Rajah* under Captain Jonathan Carnes with a full load of bulk pepper from Sumatra. The dried seeds had been shoveled into her hold like coal, and weighed out at an astonishing 150,000 pounds. Since pepper pound for pound was worth about as much as gold, there was considerable celebration. Investors would make a 700% profit, spawning investment by other Salem merchants and injecting the United States into the world spice trade (this Salem-based trade would flourish until 1856, creating some of the first great US fortunes).

PLANTS

1798

Augustin Pyramus de Candolle's initial botanical paper, on *Reticularia rosea*.

PLANTS

1799

The dyer's greenwood *Genista tinctoria*, that had been brought to the New World for use in dying wool yellow or green, evidently escaped from cultivation in about this period and colonized dry hilltops and sterile soil.[38]

PLANTS

38. Dying undyed wool with an extract of this plant turns it yellow, while re-dying wool that has been turned blue by woad produces the color known as Kendal green.

John Fraser came back to America, this time with his elder son, John.

John Lyon began collecting North American plants, initially for William Hamilton and later for collectors in Europe. He followed the trails of Mark Catesby, the Bartrams, Michaux, and the Frasiers. Lyon may have by aggressive collecting contributed to the extinction of the Franklin tree. He sent quantities of oakleaf hydrangea to England (this plant would be introduced there by William Hamilton in 1803).

PLANTS

Agriculturists described sweet corn, long grown by Iroquois. (Although its value was not immediately recognized, by 1980 it would become the #1 canned "vegetable" in the United States, surpassing in volume even stewed tomatoes.)

The Dutch East India Company went bankrupt.

A preserved mammoth was discovered in Siberia.

Friedrich Traugott Pursch (1774-1820), also known as Frederick Pursh, had been born in Saxony, where he had studied horticulture under the court gardener before joining the staff of the Royal Botanical Garden at Dresden. Pursh came to the United States in this year as a horticulturist and botanist, and worked as a gardener on estates in Maryland and Pennsylvania before getting himself hired by Dr. Benjamin S. Barton to conduct botanical expeditions and collect specimens. He would serve briefly as Daniel Hosack's gardener at the Elgin Botanical Garden in New-York.

1800

At this point the soybean, although it was known in the West (for instance, in Philadelphia), was getting no particular traction. Its use would not develop until, in 1850, the bean would be introduced afresh, to California agriculture through the port of San Francisco direct from Japan.

PLANTS

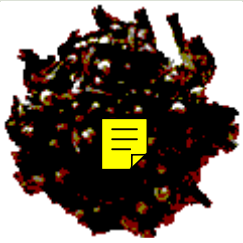
1801

SWEETS WITHOUT SLAVERY

In Germany during this year, the 1st commercial quantities of beet sugar were being produced.

PLANTS

At this point Ambon, Banda, and Ternate of the Spice Islands were in the hands of the English rather than the Dutch. However, the sinister Frenchman Pierre Poivre (he had lost his right arm to a cannonball) would soon be succeeding in his agenda to smuggle eleven nutmeg seedlings and some clove seeds out of the region, thus



ending the monopoly, and the high prices that resulted from the monopoly, of these commodities forever. (Note that this might have happened at any earlier time — and the history of colonialism would have been vastly different. Why had this not happened earlier? –There were doubts that the trees could survive elsewhere, export of seedlings was under the Dutch a crime punishable by a horrible death, and the nutmeg seeds were being shelled, coated with lime, and roasted prior to export.)

PLANTS

SPICE

1804

The 1st shipment of bananas reached New-York, aboard the schooner *Reynard*, Captain John Chester.

(These were not the "Chiquita" banana of today. Bananas would not become common in this country until after 1870, when Captain L.D. Baker would begin to exchange mining equipment for Jamaican bananas. Then the most delicious variety would die out due to the spread of an infection, and the less satisfactory "Chiquita" would of necessity be substituted.)

The 1st sizeable citrus orchard in California was established at the Spanish mission near San Gabriel.

Nicholas T. de Saussure's book *RECHERCHES CHIMIQUES SUR LA VÉGÉTATION* marked the beginning of modern plant physiology because of its well thought-out, documented experiments and attention to good experimental methodology. He achieved advances in our knowledge of plant nutrition and helped prove that carbon from the atmosphere is fixed into the carbon that makes up organic compounds by plants undergoing photosynthesis. Saussure answered questions concerning the role of water in plant growth.

Christopher Gore and his wife began the construction of their home and garden in Waltham, Massachusetts. Their interest in exotic plants was shared with neighbor Theodore Lyman, who at that time was also improving his estate, The Vales. Both families imported plants from Europe and built greenhouses for tropicals.

American and European traders began stripping Pacific Islands for sandalwood for use in Europe and China. Sandalwood trees would be wiped out on Fiji by 1809, on the Marquesas by 1814, on Hawaii by 1825.

England's Royal Horticultural Society was formed. Present at the first meeting were John Wedgewood, William Forsyth (Gardener to King George III at Kensington and St. James, *Forsythia*), Joseph Banks, Charles Greville, Richard A. Salisbury, William Townsend Aiton, and James Dickson.

PLANTS

1805

In this year the first of 30 volumes of the "Voyages of Humboldt and Bonpland" was going through a press in Germany. These volumes would include the 1st accurate maps and records of climate, geology, and measurements of the earth's magnetic field, pertaining to the western hemisphere. Humboldt's personal observations of many different plant habitats resulted in his important generalizations about the relationships of plants to their native climates. He is probably best known for making ecological correlations between the different plant habitats observed with rising elevation and the changing habitats seen when traveling from the tropics to arctic regions. Publication of his *ESSAI SUR LA GÉOGRAPHIE DES PLANTES...* may be considered the beginning of the science of ecology.

PLANTS

At some point during this year of a battle at Trafalgar, which was a British naval victory, and one at Austerlitz, which was a victory of the Napoleonic army over Austro-Russian forces, Napoléon Bonaparte met this scientist Alexander von Humboldt (or vice versa). The words he dropped on him were with regard to the interests of Josefina Tascher Bonaparte, who was a mulatto from the Caribbean region:

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You are interested in botany? So is my wife.
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This is a response very similar to the response which another ruler who ruled by ruling, President Richard Milhouse Nixon, would generate when he was warned by a visiting delegation of computer scientists that there would be a problem with computer dates as of the end of the millennium — unless something was promptly done to correct the Pentagon's computer code. Our leader responded:

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Something's wrong with my TV. Can you fix it?
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This may be an opportune point at which to introduce a fabled exchange between the First Consul and Pierre-Simon Laplace, because it was in this year that Laplace completed the 4th volume of his *MÉCHANIQUE CÉLESTE* and so presumably it would have been at this point that he presented this astronomical work. Napoléon asked some question about the role of deity in the universe, such as whether he needed to presume as Newton had presumed that God would from time to time adjust the machinery of the heavens to keep everything running in synch with everything. Laplace's famous response went something like this: "Je n'avais pas besoin de cette hypothèse-là."

During this year Napoleon not only crowned himself as King of Italy but also abandoned the French revolutionary calendar — which might have offered our visiting delegation of computer scientists a hint as to what to do in regard to our Y2K situation but in fact did not.

The peak of the Sumatra/Salem pepper traffic; exports alone totaled 7,000,000 pounds in one year. It was at about this point that the body of a sailor was brought back home curing in the pepper, and upon arrival was uncovered as still looking "very natural."

SPICE

May 21, Tuesday: In Paderborn, the Germany pharmacist Friedrich Wilhelm Adam Sertürner crystallized a potent alkaloid extract from opium latex. He did this by dissolving the substance in acid and then neutralizing the solution with ammonia. This was the first time any alkaloid had ever been extracted from a plant, and the first time a medicinal plant had been reduced to just its active chemical. He experimented on himself and named the chemical *morphium*, after Morpheus the god of dreams. While this medication would become popular following the 1853 perfection of subcutaneous injection by means of the hypodermic needle, chemical dependency due to prolongued use of this substance would not be well recognized until after the Crimean War, the American Civil War, and the Franco-Prussian War had caused prolonged use to receive the popular name "Soldier's Disease." The three extracts of opium commonly used medicinally are morphine, codeine, and papaverine.

PLANTS

1806

Napoléon Bonaparte offered 100,000 francs to anyone who could create sugar from a native plant — Russian chemist K.S. Kirchhof would later notice that all you really need to do is mash a bowl of potatoes and then, instead of buttermilk and salt, pour in a few pennies worth of readily available sulfuric acid.

SWEETS WITHOUT SLAVERY

1810

Hemp, which had been introduced into *Alta California* by the government in 1804, had become so abundant that it could be relied upon as a cash crop only by farmers prepared to take a great risk. In this year, also, the olive tree was introduced, and in a few years the olive harvest would be prospering.

PLANTS

Liverpool Botanic Garden received the first *Cattleya* known to be cultivated. The plant was sent from Sao Paulo, Brazil, by Mr. Woodforde to Mr. Shepherd at the Garden. Plants from this original introduction are said to have bloomed every subsequent year — though that factoid was never published.

PLANTS

Goats introduced to St. Helena Island began devastation that eventually caused extinction of 22 of the 33 endemic plants.

PLANTS

After the lifting of President Jefferson's destructive embargo, the US pepper trade resumed, and reached a second peak in this year — before the War of 1812 closed it down again.

SPICE

PLANTS

Robert Brown's *Prodromus Florae Novae Hollandiae* marked the beginning of his publications on the flora of Australia. Brown made important comparisons of plants from Australia with other floras, yielding a fresh approach to this type of study. With Brown's work, botanists began to understand that significant information can result from studying the distributions and associations of plants. We also began to realize the distinctive nature of the Australian biota.

PLANTS

1814

1st edition of Friedrich Traugott Pursch[39] or Frederick Pursh's *FLORA AMERICAE SEPTENTRIONALIS*. This was the 1st American flora to include plants from the West Coast — to which Pursh had had access in Philadelphia by way of the collection of Bernard McMahon, a nurseryman who had obtained plants and seeds by way of the Lewis and Clark expedition. He described the collection of Lewis and Clark. He described twice as many species as are to be found in Michaux's *FLORA*. Unwisely, William Roscoe lent John Bradbury's herbarium specimens to Pursh, who proceeded to publish descriptions of all Bradbury's new plants (some 41 of them) in an appendix. This crushed Bradbury and he would never go on another collecting expedition.

BOTANIZING

1816

The first cultivation of a cranberry bog, on Cape Cod, by Captain Henry Hall.

PLANTS

Plant	Name	Place
Cranberries	*Vaccinium oxycoccus*	North America

1818

The wrought iron process was industrialized — eventually this would change the way designers would create conservatory structures for plants.

PLANTS

39. This botanist had been born in Tobolsh, in Siberia, in 1774 of German parentage and educated in Dresden.

1820

Dr. Lewis Caleb Beck botanized extensively in eastern Missouri and in nearby regions of Illinois. After returning to New York, he would prepare a gazetteer of that region's mineral and botanical potential.

French chemists isolated quinine (an alkaloid) from the bark of Cinchona, making possible the production of a purified chemical treatment for malaria.

PLANTS

The new British commissioner of Cooch Behar in India discovered that the *Camellia sinensis* tree was growing in Assam on these southern slopes of the Himalayas just as it grew in China, where kept as shrubs it was the source of Chinese tea. He sent samples down to Calcutta, to Nathaniel Wallich, the newly appointed botanist of the government of India. It would require only the passage of 30 years, before tea would be being produced in the valley of the Brahmaputra on a truly massive scale, and with unheard-of economies. The Chinese monopoly would be ruined.

BOTANIZING

1822

From this year into 1827, the three volumes of Professor Sir William Jackson Hooker's EXOTIC FLORA, INDICATING SUCH OF THE SPECIMENS AS ARE DESERVING CULTIVATION.

From this year into 1834, Thomas Nuttall would be in charge of Harvard College's botanic garden.

The slender fuchsia was introduced from Chile.[40]

John Claudius Loudon's AN ENCYCLOPEDIA OF GARDENING. (In the front and back strips of a semi-detached villa in Bayswater Loudon and his wife Jane Webb Loudon would be growing 2,000 species of plants. "The [florist] operatives of Paisley," said Loudon, "taking them at large, exhibit a condition of improvement very rarely indeed, if at all, to be paralleled among persons of the same rank," suggesting that "the rearing of flowers must tend to improve the genius for invention in elegant fancy muslins.")

PLANTS

40. Charles Plumier had published the first description of fuschia in 1703 after finding the plant on Santo Domingo in the Caribbean. The scarlet fuchsia had been introduced from Chile in 1788 and the tree fuchsia would be introduced from Mexico in 1823.

1823

Philipp Franz Balthasar von Siebold landed in Japan anxious for a career as a scientific explorer, to serve until 1830 as the surgeon major of the Dutch East Indies Army. He would restore order to the botanical garden at Deshima. Because on a trip to Edo he accepted the gift of a map of Japan (foreigners obviously could not be allowed to have access to this type of sensitive military information), he would be imprisoned for a year, but would be pardoned in 1829. Banished from Japan in 1830, he would be forced to abandon his Japanese wife and their child. The deck of the vessel on which he sailed would be filled with plants he would use to establish a nursery in Leiden. Among his introductions would be *Wisteria floribunda*, *Hydrangea paniculata*, *Hydrangea anomala*, *Malus floribunda*, and *Rhodotypos scandens*. Siebold would return to Japan in 1859 and by 1863 would produce a sales catalog that offered 838 species native to that country.

David Douglas was sent by The Royal Horticultural Society to the eastern United States to procure any novel varieties of fruit trees and vegetables that might there be encountered. He would meet Thomas Nuttall (a British native recently appointed professor of Botany at the Harvard Botanic Garden), and others who would assist him. He would return to England with a wide variety of fruit trees, as well as Oregon grape holly.

Charles MacIntosh took out a patent for fabrics could be made waterproof by treating them with natural (or India) "rubber" (this term "rubber" had been coined on the basis of the ease with which the resilient material could remove pencil marks from a sheet of paper).

The end of an era in American botanizing. John Bartram (1699-1777) had been the first American-born botanist. He had grown native plants on his farm near Philadelphia and had been a central figure of botanical activity. The early 1700s had been characterized by a lively traffic in seeds and plants from America to England. Unfortunately, the elder Bartram's early collections had been set aside in England, and not described for many years. John's son William Bartram had then become the central figure in American natural history, until his death in this year.

John Bradbury died in Kentucky. Among the plants he had discovered were the oil-nut, yellow anise, yellowroot, laurel cherry, white buckeye, golden Saint Johnswort, oak-leaved hydrangea, and mountain magnolia.

Thomas Nuttall took up duties at Cambridge.

Joseph Sabine, secretary of the horticultural Society, looking for a collector, had David Douglas recommended to him and sent him on his first trip to America. Douglas visited gardens in New York and Philadelphia and then went up to Lake Erie and then to Buffalo and back to New York. He made a 2d visit to Philadelphia and met Nuttall.

1824

After decades of battles between the Dutch and English over control of the East Indian spice trade, a formal treaty gave the Dutch control of the Malay Archipelago, minus North Borneo. The British were settled with North Borneo, the Malay mainland, India, Ceylon, and Singapore.

PLANTS

1825

Professor William Jackson Hooker's CATALOGUE OF PLANTS IN THE GLASGOW BOTANIC GARDEN.

John Halkett, Esq.'s HISTORICAL NOTES RESPECTING THE INDIANS OF NORTH AMERICA: WITH REMARKS ON THE ATTEMPTS MADE TO CONVERT AND CIVILIZE THEM (London: Printed for Archibald Constable and Co. Edinburgh; and Hurst, Robinson, and Co. 90, Cheapside, and 8, Pall Mall).

RESPECTING THE INDIANS

In this year, or in the following one, Charles Darwin would be reading his grandfather Erasmus Darwin's ZOONOMIA:

> Charles Darwin read ZOONOMIA when he was sixteen or seventeen, and also listened to a panegyric in praise of evolution from his friend Dr Robert Grant at Edinburgh University. "At this time I greatly admired the ZOONOMIA," he says. But neither Grant nor ZOONOMIA had "any effect on my mind." This is true: otherwise he would have become an evolutionist before going on the voyage of the *Beagle*, rather than after.

The biographer Desmond King-Hele, who wrote the above, seems to me not to comprehend why it is that we assign authorship of the theory of evolution to the grandson, Charles, rather than to the grandfather, Erasmus. Therefore, perhaps, I should here explicate why it was that the early reading of ZOONOMIA, with its recognition of evolution, did nothing to help Charles: it is one thing to regard evolution as a fact, and another thing entirely to create a theory which accounts for it by hypothesizing a plausible mechanism and demonstrating the inevitability of this mechanism. Lots of people regarded evolution as a fact, before Charles created his theory. Almost as many people had been perfectly well aware of evolution as a fact in 1770, as had been perfectly well aware in 1491 that the earth was a globe — before Columbus obtained funding to sail west from Spain!

The first steam-locomotive railway was opened, between Stockton and Darlington in England, and George Stephenson's *Locomotion*, the world's first practically moveable steam engine for use on rails, managed to get a train of 29 little 4-wheeled carts up to a sustained speed of 8 mph.

David Douglas set out to explore the Columbia River area in British Columbia, with the cooperation of the Hudson Bay Company.

By mid-February he was off the coast of Oregon, setting ashore at Fort Vancouver. When he had gone 90 miles up that river, he began to have eye trouble due to the blown sand as well as due to the brilliance of the snow under the bright sun. He found *Pinus lambertiana*, which is almost as large as the giant redwoods, and fired his gun to knock some cones off the top of one. This turned out to be a serious mistake, as eight hostile Indians were alerted by the sound of gunfire. Douglas managed to elude them and would still be alive to return to England in 1827. (In 1829 he would return to the Pacific Northwest, collecting all the way from California to Alaska. He would die in Hawaii, while collecting, by falling into a pit trap in which a wild bull had already become ensnared. Douglas would introduce over 200 species to cultivation in Great Britain, including not only the Douglas fir but also the sugar pine, the noble fir, and the giant fir.

BOTANIZING

1826

Dr. Lewis Caleb Beck became Professor of Botany and Chemistry at the Vermont Academy of Medicine.

Professor William Jackson Hooker's BOTANY OF [CAPTAIN WILLIAM EDWARD] PARRY'S THIRD VOYAGE (J. Murray).

Paxton left the Royal Horticultural Society garden to become head gardener to the Duke of Devonshire at Chatsworth.

Jussieu resigned his post as director of the National Museum of Natural History.

Twigs (apparently predominately of basket willow) had long been utilized in England to record tax payments. Notches made in each twig indicated the amount of tax paid. Once split the notched twig yielded two records of payment. When the tax records went to paper transaction in this year, the archive of twigs was burned. The resulting fire escaped control and took with it the Houses of Parliament.

Leopoldo Nobili invented a galvanometer.

The unexploited forests of Burma gave impetus to the British conquest of that country. The first area opened (Tenasserim) "was stripped of teak within twenty years." By the end of the century about 10,000,000 acres of Burma forest were cleared.

PLANTS

An act of the US Congress set off the mania of planting the Chinese silkworm mulberry *Morus multicaulis*, a short-lived industry. SILK

(On the following screen is a depiction of the annual ceremonial picking of mulberry leaves by the empress, as processed through the imagination of a German lithographer.)

1828

Adolphe Brongniart published *PRODROME D'UNE HISTOIRE DES VÉGÉTAUX FOSSILS*, the first complete account of fossil plants, establishing himself as the founder of modern paleobotany. He would be an early proponent of evolutionary theory. His interpretations of the fossil record also contribute to our understanding of historical changes in climates and plant geography.

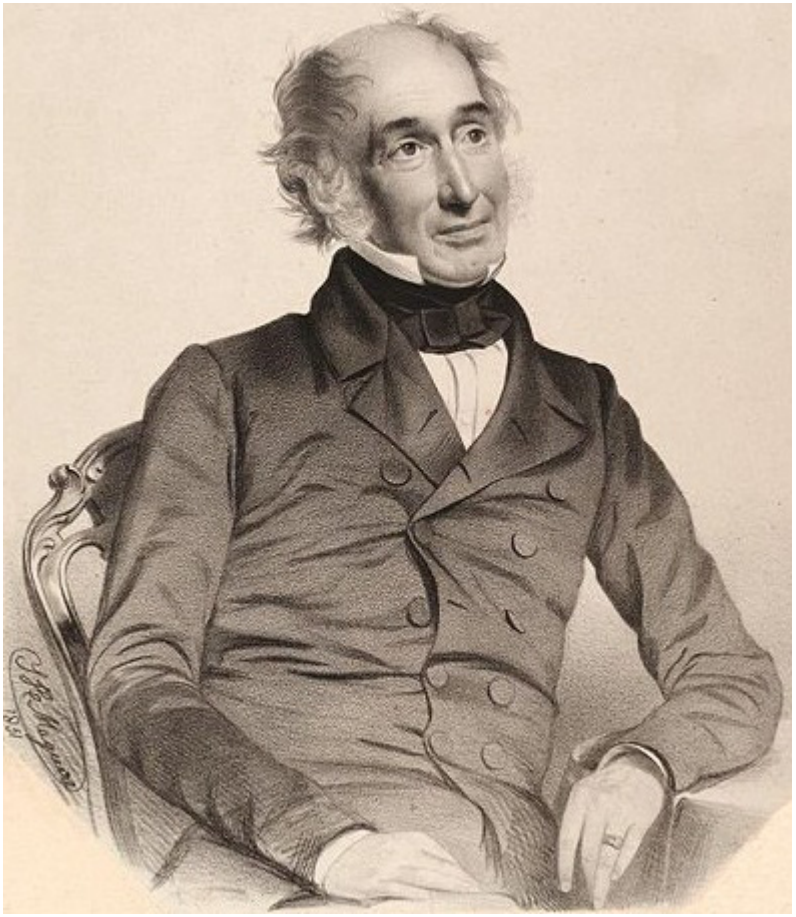
PLANTS

CULTIVATION

CULTIVATION

1830

Professor William Jackson Hooker's CHARACTERS OF GENERA FROM THE BRITISH FLORA, of which several editions would appear, undertaken with Dr G.A.W. Arnott, &c.



From this year until 1842 Professor Hooker's The Journal of Botany (4 volumes).

John Torrey (1796-1873) became professor of Botany at Princeton University (he would be teaching there only during the summers, and would be residing in New-York during the winters). Asa Gray began to exchange plant specimens with Professor Torrey, who would soon come to be recognized as the leading botanist in America.

Sir J. Ross discovered a frosty peninsula in northern North America which he would designate as "Boothia Felix," in honor of Sir Felix Booth who had funded his exploring expedition.

Robert Brown published the first account of a cellular nucleus, which he called the "aureole" in what is also the first publication describing the growth of pollen tubes from the stigma to the ovule: "On the organs and modes of fecundation in Orchideae and Asclepiadae," in The Transactions of the Linnaean Society of London.

PLANTS

1832

Washington Irving returned to New York from Spain, taking up residence in North Tarrytown (today's Sleepy Hollow). During this year his THE ALHAMBRA was being put through the presses.

By this year 137 different European intrusive plants had become naturalized among the New York flora.

PLANTS

1833

October 19, Saturday: In Quito, capital of the new nation of Ecuador (which because of the almost entire absence of either water-closets or privies, he had characterized as "one of the filthiest capitals in Christendom"), due to yet another of the upheavals that had become routine since independence from Colombia — Colonel Francis Hall, plant collector, would not survive to the dawn.[41]

PLANTS

1834

Currants, or "raisins de Corinthe," had been first introduced into England during the 16th Century, when they were called "Corinthes," from the part of Greece in which they are produced in the greatest abundance. An attempt had been made during the reign of King Henry VIII to introduce the culture of this particular vine in England. At this point the duty on currants, which was very high, began to be reduced.

PLANTS

41. *El cadáver ensangrentado del coronel Francis Hall amaneció colgado de uno de los postes de la plaza de San Francisco el 20 de octubre de 1833. Todavía no se sabe si el coronel británico murió lanceado –como se estilaba a la época– o abaleado, de la forma más tradicional. Lo que se conoce con certeza es que Hall murió por conspirador y por defender la libertad de expresión en el recientemente independizado Ecuador.*

1835

Hugh Cuming commenced a 4-year trip to the Philippines. He was probably the 1st to ship living orchids successfully from Manila to England. The plants he would send would include *Phalaenopsis amabilis*, which would be grown 1st at Chatsworth. Overall Cuming would distribute some 130,000 herbarium specimens.

John Gibson accompanied Lord Auckland on his voyage toward India, via Madeira, Rio de Janeiro, and the Cape of Good Hope. They would arrive in Calcutta during March 1836 with plants from Auckland destined for Nathaniel Wallich, director of the Calcutta Botanical Garden. Gibson would also collect in the Khasia Hills (Chirra Poongee), and would dispatch his plants through Wallich to England.

PLANTS

1838

Charles M. Hovey introduced a strawberry grown from seed produced by hybridization. (The “Hovey” is now considered to have constituted the 1st fruit variety to originate through breeding on the North American continent.)

PLANTS

John Wright Boott of Boston received the 1st shipment of tropical orchids to the US of which we now have any record (however, we also know that other Bostonians already had tropical orchids in cultivation in this year). Boott’s collection would pass to John Lowell, and wind up with Edward Rand. When Rand would sell his estate in about 1865, this orchid and tropical plant collection would pass to the Cambridge Botanic Garden of Harvard College.

BOTANIZING

1839

Nathaniel Bagshaw Ward described his Wardian Case in Gardener's Magazine (he would in 1842 expand this into a book).

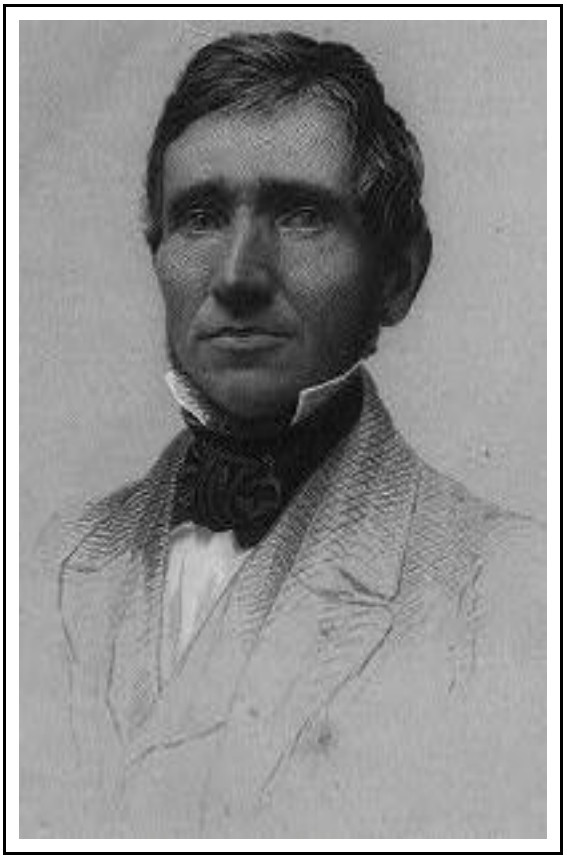
BOTANIZING

Salicylic acid (chemically related to salicin, the compound in willow that gave this plant its pain-relieving powers) was isolated from flowerbuds of *Filipendula ulmaria* (at that time called *Spiraea ulmaria*), a member of the rose family native to Europe. (By 1853 a number of synthetically prepared derivatives would include this acetylsalicylic acid. The Bayer Company would select that chemical as a substitute for the commonly used salicylic acid, designating it "aspirin" by combining the letter "a" from acetyl and "spirin" from *Spiraea*.)

The prickly pear plant was introduced to Australia, for use as hedging. (By 1925 over 60,000,000 acres of Australian land would be infested with it, with prickly pear dominating over nearly half the landscape — control would come eventually in the form of South American caterpillars that can predate this plant.)

PLANTS

Charles Goodyear, who had earlier sold his father's patent for the steel-tine pitchfork to support his own experiments with raw rubber, found a method to "vulcanize" the substance.[42]



Because of this, the first effective rubbers would be making their appearance — not the kind of rubbers we know as “safes” or “condoms” or “English overcoats,” since such devices had been around for almost as long as safe sex has been around, but effective rubber galoshes that would not melt in the sun.

Vulcanization was a heat-driven process of combining sulphur with natural rubber. (The crosslinking of molecular chains known as isoprene units rendered rubber non-sticky, more durable, and more elastic. This would change life in Brazil, causing a rubber boom, with exports rising from 31 tons in 1827 to more than 27,000 tons by 1900. Manaus would become by 1877 a cosmopolitan city.)

PLANTS

Per James Parton’s PEOPLE’S BOOK OF BIOGRAPHY (Hartford: A.S. Hale, 1868):

> In the fifth year of his investigations a glorious success rewarded him. He made one of the simplest, and yet one of the most useful, discoveries which has ever been made in the United States. It was this: Take a piece of common, sticky India Rubber, sprinkle upon it powdered sulphur, put it into an oven heated to 275 degrees, bake it a short time, and it comes out a new material, which has all the good properties of India Rubber, without that liability to harden in cold weather and dissolve in warm, which had hitherto baffled all his endeavors to turn it to useful account. It was found, by subsequent experiments, that, by varying the proportions and the heat, he could make it as soft or as hard as he chose. He could make the softest cloth or the hardest ivory. He could make it as flexible as whalebone

42. Of course, the Aztecs had been able to vulcanize the rubber they used for the eight to ten pound balls of their Tlachtli game, many many centuries before this Mr. Goodyear had even been so much as a gleam in his daddy’s eye, but the Aztecs were not white people and, according to our habitual mode of thinking, only something that comes to be known to a white person can truly be said to be known.

(The athletes, who wore leather belts as above to protect their kidneys against strikes by the eight to ten pounds ball, could propel it only with their feet and hips. The only score in this game was one to nothing, because as soon as the ball passed through one or the other stone hoop, the game was over.)

or as rigid as flint. In short, he had produced not merely a new material, but a new class of materials, applicable to a thousand uses.

Overjoyed with his success he thought his troubles were over. Never was a poor inventor more mistaken. By this time, he had utterly tired out all his friends and acquaintances. He was thought to be India Rubber mad. As soon as he opened his mouth to speak of India Rubber, his friends manifested such signs of repugnance, pity, or incredulity, that he was abashed and ashamed to continue. As to mere acquaintances, they laughed at him. One of them, being asked one day how Mr. Goodyear could be recognized in the street, replied:

"If you see a man with an India Rubber cap, an India Rubber coat, India Rubber shoes, and an India Rubber purse in his pocket, with not a cent in it, that is Charles Goodyear."

He used to say, in after times, that two years passed, after he had made his discovery before he could get one man to believe him. During that period be endured everything that a man can endure and live. Very often he knew not how to get the next loaf for his children. Very often, in the coldest day of a New England winter, he had neither food nor fire. Once he had a dead child in his house, and no means with which to bury it. He was denounced as a man who neglected his family to pursue a ridiculous idea, which could never be of the slightest use to any one.

In New York, at length, he found a man who had faith enough in his discovery to enter into partnership with him for bringing the new material before the public. From that time his children, indeed, had enough to eat; but it was three or four years before his patent began to bring him in any considerable return.

Any one but Charles Goodyear would then have stopped and quietly enjoyed the fruit of his labors. But he, we repeat, was an inventor. He saw that the application of India Rubber to the arts was still in its infancy, and he felt it a kind of religious duty to go on developing his discovery. Therefore, he never entered into the manufacture of India Rubber goods, but, selling rights to manufacture for a low percentage on the sales, he spent all the rest of his life in applying the varied forms of his material to new uses. Like all other inventors, he was tormented with litigation. His right to his discovery was unquestionable, yet men there were who infringed that right; and, though the courts sustained him, the defence of his rights cost him enormous sums.

The present condition of the India Rubber manufacture in the United States and Europe testifies to the ingenuity and devotion of this remarkable man. We are informed, by a gentleman engaged in the business, that a single firm in the city of New York sells two million dollars' worth of India Rubber belting and engine-packing every year; and this firm is only one out of forty engaged in the Rubber business in this city alone. By Goodyear's process one girl can make twenty pairs of India Rubber shoes in a day, so easily is the material worked, — and yet the various branches of the trade give employment to fifty thousand persons in the United States. Take one item, — the new clothes-wringer made of India Rubber rollers, invented three years ago. The companies engaged in the manufacture of this article are now

selling the astonishing number of two hundred thousand per annum in this country; and, recently, a whole shipload was sent to England. During the late war, more than a million blankets of India Rubber were supplied to the armies.

1840

Orlando Jones patented an alkaline treatment for starch extraction, impacting the production of wheat, rice, and corn starches.

PLANTS

1842

Nathaniel B. Ward's ON THE GROWTH OF PLANTS IN CLOSELY GLAZED CASES.

BOTANIZING

THE NATURAL HISTORY OF SELBORNE / BY THE REV. GILBERT WHITE; ARRANGED FOR YOUNG PERSONS. A new ed. with notes. London: Society for Promoting Christian Knowledge; NY: Pott Young and Co.[43]

Matthias J. Schleiden, and, in 1847, Theodor Schwann synthesized their own observations along with known information to reach a reasonable understanding of plant and animal cell structure. Their work established the theory that the cell is the basic unit of all life, helping to create the new general study of biology.

PLANTS

43. The Reverend White's NATURAL HISTORY OF SELBORNE is only the 4th most reprinted book in the English language.

1843

Loring Dudley Chapin's THE VEGETABLE KINGDOM; OR, HANDBOOK OF PLANTS AND FRUITS. WITH ONE HUNDRED AND FORTY ILLUSTRATIONS, A COPIOUS GLOSSARY, ETC.... (New-York: J. Lott), upon which Henry Thoreau would rely.

READ LORING TEXT 1

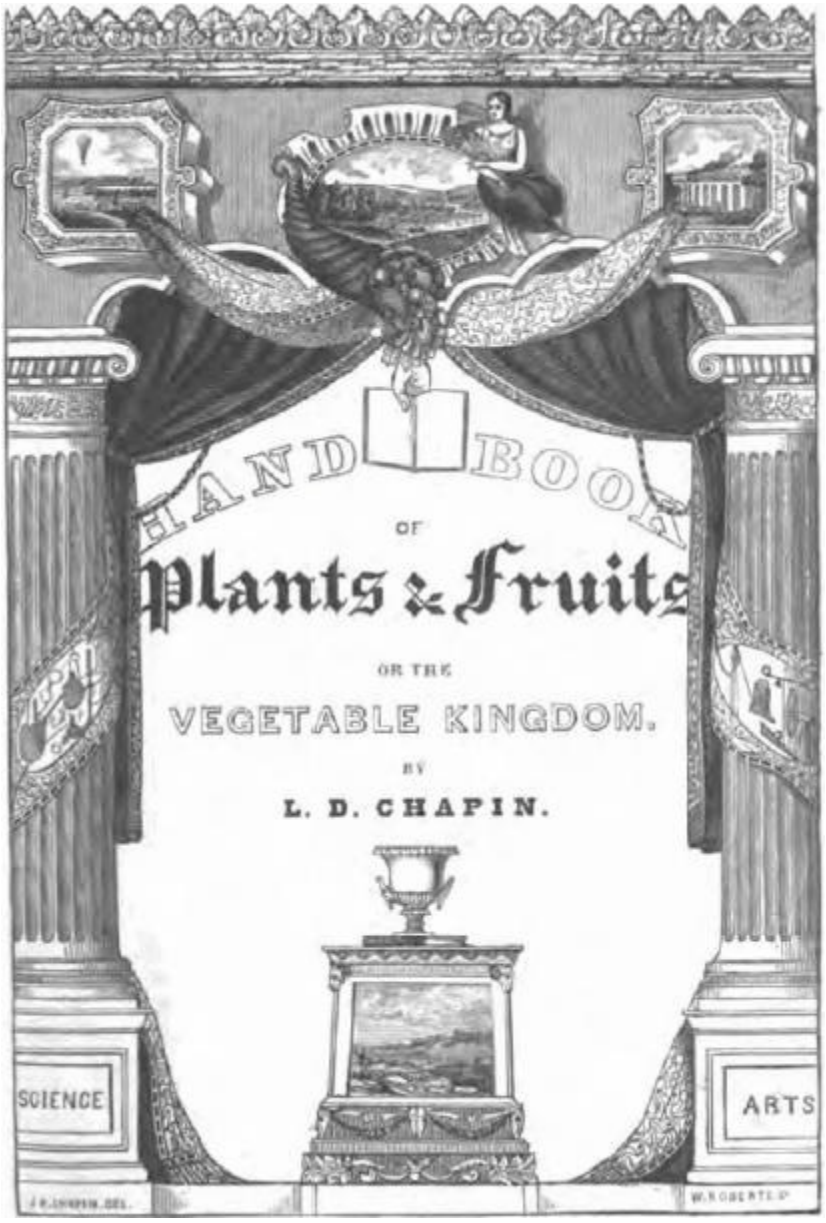
READ LORING TEXT 2

READ LORING TEXT 3

READ LORING TEXT 4

BOTANIZING

PLANTS


HAND BOOK
OF
Plants & Fruits
OR THE
VEGETABLE KINGDOM.
BY
L. D. CHAPIN.
SCIENCE
ARTS

Stamens and Pistils.

The above cut represents the number of stamens in the first 10 classes, according to the number of the class.

This cut represents the class *Icosandria*, (over 10 stamens *inserted on the calyx*.) It may, however, designate more or less than 20 stamens.

This cut shows the class *Polyandria*, (over 10 stamens *inserted on the receptacle*.)

This cut shows the difference in the length of the 4 stamens, 2 short, and 2 long, and is class *Didynamia*.

This is the class *Tetradynamia*, 6 stamens, 4 long and 2 short.

Class *Monadelphia*, stamens united by their filaments in *one set*.

This is class *Diadelphia*, (stamens with their filaments *united in two sets*.)

This class *Syngenesia*, (5 anthers united in a compound flower.)

The last cut represents class *Gynandria*, stamens growing out of the pistil; the two next, class *Monœcia*, stamens and pistils on *separate* corollas on the *same* plant; and the two first, class *Diœcia*, stamens and pistils in separate corollas on *different* plants.

This cut represents the cryptogamous plants, (stamens and pistils invisible.)

Professor Sir William Jackson Hooker's NOTES ON THE BOTANY OF THE ANTARCTIC VOYAGE OF THE *EREBUS* AND *TERROR*.

Publication of the final volume of Professor John Torrey's A FLORA OF NORTH AMERICA (NY: Wiley & Putnam, 1838-1843), with Professor Asa Gray as a full collaborator.

FLORA OF NORTH AMERICA

John Lyons's A PRACTICAL TREATISE ON THE CULTIVATION OF ORCHIDACEOUS PLANTS (a 2nd edition would arrive in 1845), the 1st book on orchid culture.

Jerome Increase Case, a 24-year-old farmer from upstate New York, introduced a threshing machine. The J.I. Case Company would become the largest thresher producer in the world.

The Gardeners' Chronicle contained an advertisement, "Three years ago, a mummy was unrolled in London, and in its hand was a small bag of Wheat. Some grains of it were sown and vegetated. Its produce has again been sown ... and has produced an average of 38 ears or spikes for each grain sown. To be sold in packets of 10 grains each at £1 per packet...."

WALDEN: When I ask for a garment of a particular form, my tailoress tells me gravely, "They do not make them so now," not emphasizing the "They" at all, as if she quoted an authority as impersonal as the Fates, and I find it difficult to get made what I want, simply because she cannot believe that I mean what I say, that I am so rash. When I hear this oracular sentence, I am for a moment absorbed in thought, emphasizing to myself each word separately that I may come at the meaning of it, that I may find out by what degree of consanguinity **They** are related to **me**, and what authority they may have in an affair which affects me so nearly; and, finally, I am inclined to answer her with equal mystery, and without any more emphasis on the "they," –"It is true, they did not make them so recently, but they do now." Of what use this measuring of me if she does not measure my character, but only the breadth of my shoulders, as it were a peg to hang the coat on? We worship not the Graces, nor the Parcæ, but Fashion. She spins and weaves and cuts with full authority. The head monkey at Paris puts on a traveller's cap, and all the monkeys in America do the same. I sometimes despair of getting any thing quite simple and honest done in this world by the help of men. They would have to be passed through a powerful press first, to squeeze their old notions out of them, so that they would not soon get upon their legs again, and then there would be some one in the company with a maggot in his head, hatched from an egg deposited there nobody knows when, for not even fire kills these things, and you would have lost your labor. Nevertheless, we will not forget that some Egyptian wheat is said to have been handed down to us by a mummy.

EGYPT
MARY MINOT

The initial shipment of Peruvian guano arrived in Baltimore nearly two decades after this bird shit had received wide public notice in an American Farmer article by John Skinner. Guano would remain popular for only a couple of decades, because by 1849 US-manufactured chemical fertilizers would be coming onto the market.

James Robert Ballantyne's THE PRACTICAL ORIENTAL INTERPRETER, OR HINTS ON THE ART OF TRANSLATING READILY FROM ENGLISH INTO HINDUSTANI AND PERSIAN and CATECHISM OF PERSIAN GRAMMAR (London and Edinburgh).

Robert Fortune made the first of four journeys to China (until 1860), initially for the Royal Horticultural Society, then for the East India Company (he would send 23,892 young tea plants and 17,000 germinated seedlings to northern India), and then for the US government. The tea plants Fortune would send to Washington DC would not succeed, in part due to our preoccupation with civil war. He used the newly devised "Wardian Case," and the result would be that never before had so many Chinese plants survived all the way to England. He would forward the balloon flower, bleeding heart, golden larch, Chinese fringe tree, cryptomeria, hardy orange, abelia, weigela, winter honeysuckle, and other plants.

PLANTS
BOTANIZING

1848

In Bangor, Maine, John Curtis produced the first commercial spruce gum — a chewing gum made of resin from spruce trees. (By 1852 the Curtises would have built a large chewing gum factory in Portland. As supplies of spruce gum diminished, manufacturers would try other chewables, such as paraffin, eventually turning to the latex from the chicle tree *Manilkara zapota*. Chicle would become the basis of the American Chicle Company, and of their product, "Chicklets.")

PLANTS

Nicholas Marcellus Hentz relocated from Tuskegee, Alabama to Columbus, Georgia.

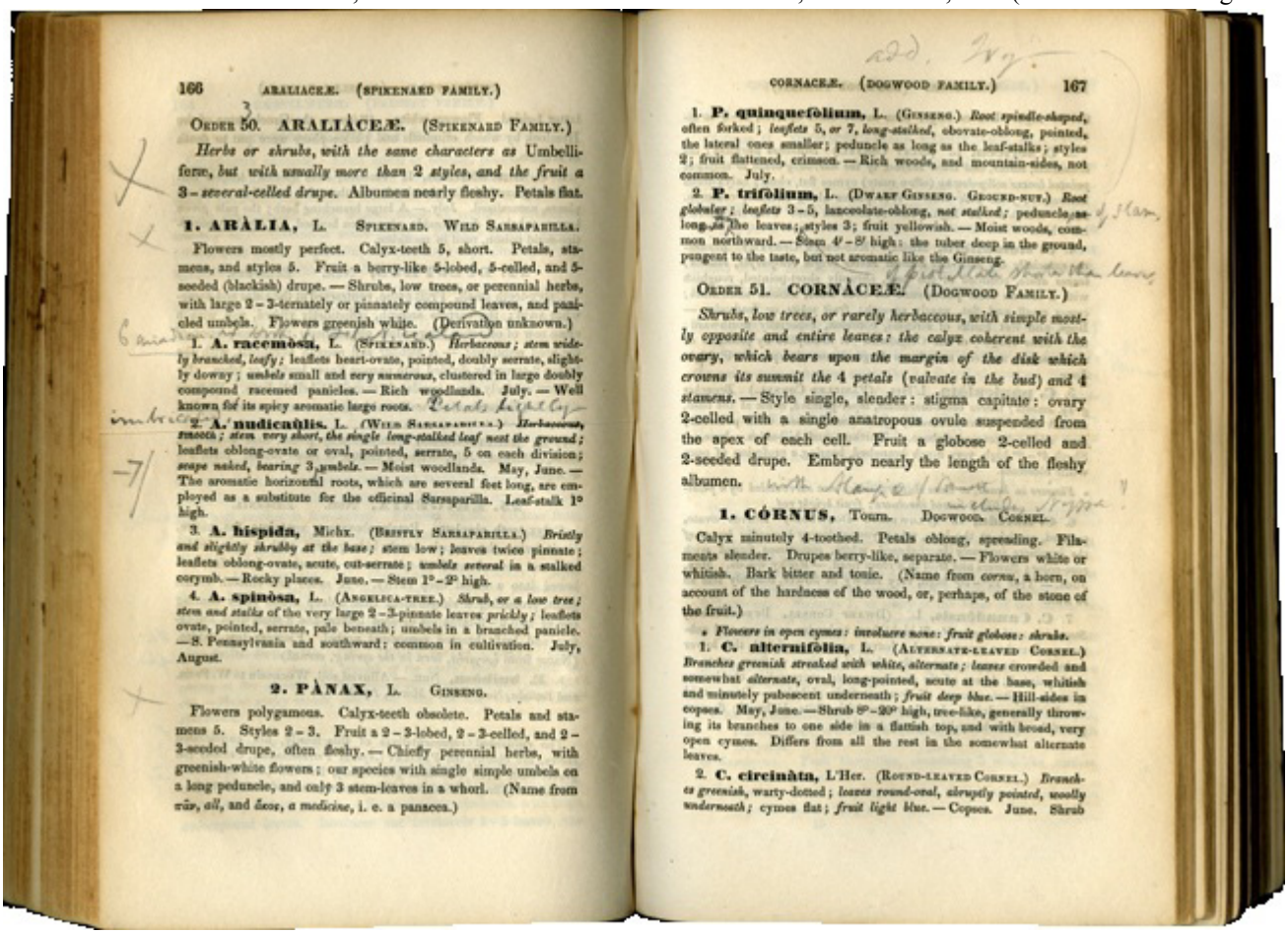
Gregor Mendel, in his 4th year of studies at the Theological College, attended additional lectures on agriculture at the Brünn Philosophical Institute. The teacher was Professor Franz Diebl (1770-1859). In June, Mendel received a certificate of completion from the College, and in early August he became a parish priest in the collegiate church at Altbrünn.

The Boston Society of Natural History, which had been organized in 1830 out of what remained of the Linnaean Society that had flourished from 1813 to 1823, moved into its new quarters on Mason Street in the building known as the Massachusetts Medical College.

PROCEEDINGS, FOR 1848

Up to this point Professor Jacob Bigelow's *FLORULA BOSTONIENSIS*, A COLLECTION OF PLANTS OF BOSTON AND ITS VICINITY had been the standard flora for the New England region. With the publication of Fisher Professor of Natural History in Harvard College Asa Gray, M.D.'s A MANUAL OF THE BOTANY OF THE

NORTHERN UNITED STATES, FROM NEW ENGLAND TO WISCONSIN AND SOUTH TO OHIO AND PENNSYLVANIA INCLUSIVE, (THE MOSSES AND LIVERWORTS BY WM. S. SULLIVANT,) ARRANGED ACCORDING TO THE NATURAL SYSTEM; WITH AN INTRODUCTION, CONTAINING A REDUCTION OF THE GENERA TO THE LINNÆAN ARTIFICIAL CLASSES AND ORDERS, OUTLINES OF THE ELEMENTS OF BOTANY, A GLOSSARY, ETC. (Boston & Cambridge:



166 ARALIACEÆ. (SPIKENARD FAMILY.)

ORDER 50. **ARALIÀCEÆ.** (SPIKENARD FAMILY.)

Herbs or shrubs, with the same characters as Umbelliferæ, *but with usually more than* 2 *styles, and the fruit a* 3- *several-celled drupe.* Albumen nearly fleshy. Petals flat.

1. ARÀLIA, L. SPIKENARD. WILD SARSAPARILLA.

Flowers mostly perfect. Calyx-teeth 5, short. Petals, stamens, and styles 5. Fruit a berry-like 5-lobed, 5-celled, and 5-seeded (blackish) drupe. — Shrubs, low trees, or perennial herbs, with large 2–3-ternately or pinnately compound leaves, and panicled umbels. Flowers greenish white. (Derivation unknown.)

1. **A. racemòsa,** L. (SPIKENARD.) *Herbaceous; stem widely branched, leafy;* leaflets heart-ovate, pointed, doubly serrate, slightly downy; *umbels* small and very *numerous*, clustered in large doubly compound racemed panicles. — Rich woodlands. July. — Well known for its spicy aromatic large roots.

2. **A. nudicaùlis.** L. (WILD SARSAPARILLA.) *Herbaceous, stemless; stem very short, the single long-stalked leaf near the ground;* leaflets oblong-ovate or oval, pointed, serrate, 5 on each division; *scape naked, bearing* 3 *umbels.* — Moist woodlands. May, June. — The aromatic horizontal roots, which are several feet long, are employed as a substitute for the officinal Sarsaparilla. Leaf-stalk 1° high.

3. **A. hispìda,** Michx. (BRISTLY SARSAPARILLA.) *Bristly and slightly shrubby at the base;* stem low; leaves twice pinnate; leaflets oblong-ovate, acute, cut-serrate; *umbels several* in a stalked corymb. — Rocky places. June. — Stem 1°–2° high.

4. **A. spinòsa,** L. (ANGELICA-TREE.) *Shrub, or a low tree; stem and stalks* of the very large 2–3-pinnate leaves *prickly;* leaflets ovate, pointed, serrate, pale beneath; umbels in a branched panicle. — S. Pennsylvania and southward; common in cultivation. July, August.

2. PÀNAX, L. GINSENG.

Flowers polygamous. Calyx-teeth obsolete. Petals and stamens 5. Styles 2–3. Fruit a 2–3-lobed, 2–3-celled, and 2–3-seeded drupe, often fleshy. — Chiefly perennial herbs, with greenish-white flowers; our species with single simple umbels on a long peduncle, and only 3 stem-leaves in a whorl. (Name from *πᾶν, all,* and *ἄκος, a medicine,* i. e. a panacea.)

CORNACEÆ. (DOGWOOD FAMILY.) 167

1. **P. quinquefòlium,** L. (GINSENG.) *Root spindle-shaped,* often forked; *leaflets* 5, *or* 7, *long-stalked,* obovate-oblong, pointed, the lateral ones smaller; peduncle as long as the leaf-stalks; styles 2; fruit flattened, crimson. — Rich woods, and mountain-sides, not common. July.

2. **P. trifòlium,** L. (DWARF GINSENG. GROUND-NUT.) *Root globular; leaflets* 3–5, lanceolate-oblong, *not stalked;* peduncle as long as the leaves; styles 3; fruit yellowish. — Moist woods, common northward. — Stem 4′–8′ high: the tuber deep in the ground, pungent to the taste, but not aromatic like the Ginseng.

ORDER 51. **CORNÀCEÆ.** (DOGWOOD FAMILY.)

Shrubs, low trees, or rarely herbaceous, with simple mostly opposite and entire leaves: the calyx coherent with the ovary, which bears upon the margin of the disk which crowns its summit the 4 *petals* (*valvate in the bud*) *and* 4 *stamens.* — Style single, slender: stigma capitate: ovary 2-celled with a single anatropous ovule suspended from the apex of each cell. Fruit a globose 2-celled and 2-seeded drupe. Embryo nearly the length of the fleshy albumen.

1. CÓRNUS, TOURN. DOGWOOD. CORNEL.

Calyx minutely 4-toothed. Petals oblong, spreading. Filaments slender. Drupes berry-like, separate. — Flowers white or whitish. Bark bitter and tonic. (Name from *cornu,* a horn, on account of the hardness of the wood, or, perhaps, of the stone of the fruit.)

* *Flowers in open cymes: involucre none: fruit globose: shrubs.*

1. **C. alternifòlia,** L. (ALTERNATE-LEAVED CORNEL.) *Branches greenish streaked with white, alternate; leaves* crowded and somewhat *alternate,* oval, long-pointed, acute at the base, whitish and minutely pubescent underneath; *fruit deep blue.* — Hill-sides in copses. May, June. — Shrub 8°–20° high, tree-like, generally throwing its branches to one side in a flattish top, and with broad, very open cymes. Differs from all the rest in the somewhat alternate leaves.

2. **C. circinàta,** L'Her. (ROUND-LEAVED CORNEL.) *Branches greenish,* warty-dotted; *leaves round-oval, abruptly pointed, woolly underneath;* cymes flat; *fruit light blue.* — Copses. June. Shrub

James Munroe and Company, London: John Chapman),[44] Professor Bigelow's contribution had been made

44. This volume would be owned by Henry Thoreau and by Ellery Channing, and Channing's copy, with his typical scrawling all over it, is now at the Concord Free Public Library.

obsolete.

MANUAL OF THE BOTANY

In this year Professor Gray also put out the 1st volume of his GENERA OF THE PLANTS OF THE UNITED STATES (you can now purchase a polyester necktie, guaranteed not to eat you alive, printed with Isaac Sprague's illustration of the Venus Flytrap *Dionæa muscipula* from this volume).

1850

California was admitted to the Union as the 31st state.

(Edward Sherman Hoar was serving as a district attorney for the 4th Judicial District of this new state.)

Seed of alfalfa (*Medicago sativa*) were brought into the state by a gold miner from Chile (this plant would thrive as a forage crop).

PLANTS

H. von Helmholtz measured the speed of nervous impulses in frogs.

E. Du Bois-Reymond invented a galvanometer that could measure the electric impulses in nerves.

The mechanization of agriculture began. Mechanical reapers, and later the internal combustion engine (and consequently the tractor) altered the face of the world — and the growth and increasing urbanization of the world population. Between 1860 and 1920, about 1,000,000,000 acres of new land were brought under cultivation, with another 1,000,000,000 acres coming into production during the following six decades. Improvements in shipping, refrigeration, and processing further industrialized this process. Today's American farmer receives 4% of the price of chicken in the store and 12% of the price of a can of corn.

During this decade Joseph Henry of the Smithsonian Institution, exploiting the popularity of the writings of Humboldt in an utterly typical and enviably wrongheaded manner, would be espousing a novel and dangerous notion: in this best of all possible worlds, rain follows the plow. All we need to do, therefore, in this best of all possible worlds, to transform the arid high grasslands of the center of the North American continent into an edenic paradise, is determinedly to turn that arid sod and till that arid soil. As in baseball's field of dreams, if you build it they will come! "They," in this case, would turn out to be the vast black clouds of dust and despair of the 1930s: the Dustbowl. Ecology will not be mocked. By this point fully half of the native-born Vermonters had abandoned its rocky soil for points west. Sometimes entire towns moved as groups. Herman Melville would comment after a tour during the 1850s, that "Some of these mountain townships … look like countries depopulated by plague and war. Every mile or two a house is passed untenanted." Horace Greeley would embrace this wish-fulfilment fantasy: "Go West, Young Man!" The rolling plains of Illinois would turn out to possess singular advantages not only in terms of a more fertile soil but also in terms of a scale more appropriate to the emergence of labor-saving farm machinery. The dry plateaus of Oklahoma, Kansas, Colorado, and the Texas panhandle would prove to be another, no less rocky, disappointment. And when they did turn the land

into an ecological disaster, where would be Joseph Henry of the Smithsonian to say that "he was sure sorry"; where would be the federal government to make up for its poor imperial advice by the rendering of assistance to the distressed?

Spencer Fullerton Baird became junior assistant secretary at the Smithsonian Institution. The next fifteen years would be made difficult not only for him but for the others there, because of the character of the first secretary of that institution, Joseph Henry. It was perfectly legitimate, Henry felt, since he was the boss and since the reputation of that establishment was upon his shoulders, that he should be able at any time to riffle through the desks, opening and reading any and all correspondence. Woe would be the lot of any person there who had a locked desk, if the first secretary found that the key he had been given was not a working key! When Baird arrived at the new Smithsonian Castle, there were still slave pens behind the structure. On the bright side, Congress had just agreed to the Compromise of 1850 — so these pens were not as jam packed full of human chattel as they had been in previous years.

1851

The San Jose, California Mercury was founded.

An importation of California grapes to Europe introduced white mildew (*oidium*), which eventually was treated with flowers of sulphur. The subsequent introduction of California rootstocks as a possible cure brought phylloxera, a much more problematic root aphid which can devastate entire acreages.

BOTANIZING

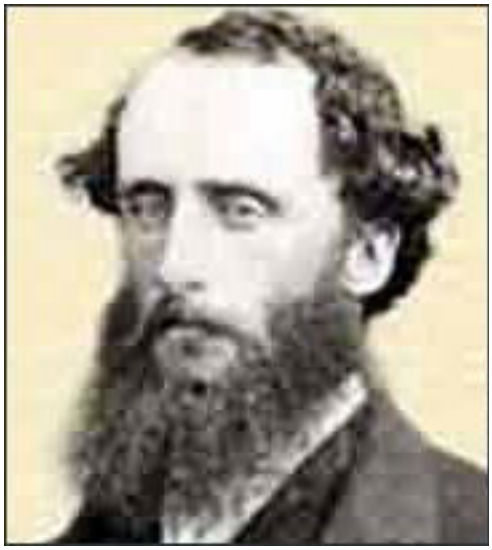
Hugh Low discovered the giant pitcher plant, *Nepenthes rajah*, on Mount Kinabalu in Borneo. (F.W. Burbidge would later introduce this astounding plant to reluctant cultivation.)

PLANTS

1853

Mary Howitt's THE DIAL OF LOVE.

After two years with reasonable success in the gold fields of Australia, William Howitt would return to England, leaving behind his son Alfred William Howitt, who would become himself well-known as an adventurer and explorer.



Richard Henry Horne became Assistant Commissioner of Crown Lands for the Australian gold fields.

Professor Asa Gray issued a 4th edition of his THE BOTANICAL TEXT-BOOK, AND INTRODUCTION TO SCIENTIFIC BOTANY, BOTH STRUCTURAL AND SYSTEMATIC. FOR COLLEGES, SCHOOLS, AND PRIVATE STUDENTS, complete with 1,200 engravings on wood (NY: George P. Putnam & Co.)

BOTANICAL TEXT-BOOK

This would find its way into Henry Thoreau's personal library.

Gregor Mendel returned to Brno, and published the first of two short papers in the journal of the *Zoologisch-botanischer Verein* in Vienna, where he is a member. The papers each concerned crop damage by insects, and one dealt specifically with the *Bruchus pisi* species of beetle that a few years later would undermine some of Mendel's *Pisum* experiments.

In this year the physicist Christian Johann Doppler, whose lectures on experimental physics Mendel had attended at the University of Vienna, died in Venice.

Eucalyptus was introduced into California from Australia.

Albert Kellogg (a South Carolinan who had studied at Kentucky's Transylvania College, and then gone to San Francisco and opened a pharmacy) and six colleagues established the California Academy of Sciences. He brought to a meeting of the group some specimens and stories he had heard from A.T. Dowd about a giant new conifer in the foothills of the Sierra range, southeast of Sacramento. William Lobb, who was at the meeting, left immediately for the area, collecting seed, mature cones, vegetative shoots, and two seedlings. He returned to San Francisco and quickly left for England. The two saplings were planted at the Veitch nursery in Exeter. John Lindley described the new species that December in Gardener's Chronicles as *Wellingtonia gigantea*. The name eventually accepted for this tree was *Sequoiadendron giganteum*.

PLANTS

A

MANUAL OF THE

BOTANY

OF THE

NORTHERN UNITED STATES,

FROM NEW ENGLAND TO WISCONSIN AND SOUTH TO OHIO AND PENNSYLVANIA INCLUSIVE,

(THE MOSSES AND LIVERWORTS BY WM. S. SULLIVANT,)

ARRANGED

ACCORDING TO THE NATURAL SYSTEM;

WITH AN INTRODUCTION, CONTAINING A REDUCTION OF THE GENERA TO THE LINNÆAN ARTIFICIAL CLASSES AND ORDERS, OUTLINES OF THE ELEMENTS OF BOTANY, A GLOSSARY, ETC.

BY ASA GRAY, M. D.,

FISHER PROFESSOR OF NATURAL HISTORY IN HARVARD UNIVERSITY.

BOSTON & CAMBRIDGE:

JAMES MUNROE AND COMPANY.

LONDON: JOHN CHAPMAN.

1848.

September: There was the 1st display of Ephriam Wales Bull's purple Concord grape, in the hall of the Massachusetts Horticultural Society at 300 Massachusetts Avenue in Boston (536-9280):

> The grape is large, frequently an inch in diameter, and the bunches handsomely shouldered, and sometimes weigh a pound. In color it is a ruddy black, covered with a dense blue bloom, the skin very thin, the juice abundant, with a sweet, aromatic flavor. It has very little pulp. The wood is strong, the foliage large, thick, strongly nerved, with a wooly under surface, and does not mildew or rust. It ripens the 10th of September.

PLANTS

1854

Early in this year, New-York shipowners Howland and Aspinwall approached The Manhattan Life Insurance Company for coverage on a cargo of about 700 coolies they were bringing on the clipper *Sea Witch* from China to Panama (this is the ship that still holds the China-to-New-York record for sailing ships). Since they were valuing these coolies at $120.00 each, the responsible officers wanted to purchase $84,000.00 in life insurance for the group. The minutes of the corporate meetings during this period indicate heated discussions as to whether or not this risk should be taken. In any event, the company finally did issue this policy, which, if it was not the very first, was one of the first group policies ever to be written by an American life insurance carrier. The underwriting was based on certain stipulations, such as that a medical doctor recognized by the crew as responsible for sanitary conditions, food, and other factors affecting the mortality of the cargo be on board during such a voyage. For a premium of $840.00 the company assumed a quarter of the total risk, or $21,000.00 and the balance of the risk was reinsured with four other such companies. Actually, 720 coolies would be packed aboard for this voyage, but within the first 24 hours after raising anchor at Swatow port, three of the men in the cargo managed to jump overboard. During the 65-day voyage, arriving March 31, 1854 in the City of Panama, 11 of the remaining cargo of 717 had died of sundry diseases. Therefore, on April 29,

1854, The Manhattan Life Insurance Company would pay out $408.$\frac{00}{}$, a quarter of the total loss, realizing a net profit of $432.$\frac{00}{}$ on this life policy.

Commodore Matthew C. Perry of the USA forcibly "opened" Japan's doors to the West by means of the signing of a trade agreement, the Treaty of Kanagawa. Exchanges between the two countries would include an American agricultural exhibit managed by Dr. James Morrow, assisted by S. Wells Williams, a Protestant missionary to China. Dried specimens from this first trip would go to Williams' boyhood friend, the Harvard College botanist Asa Gray. These specimens would be quickly followed by collections from Charles Wright, who had been working in the North Pacific as botanist on a US Surveying Expedition and would therefore be able to sail directly for Japan as soon as the existence of this new trade agreement became known.

PLANTS

1856

In 1848 Professor Asa Gray had issued an edition that would be owned by Henry Thoreau, A MANUAL OF THE BOTANY OF THE NORTHERN UNITED STATES, FROM NEW ENGLAND TO WISCONSIN AND SOUTH TO OHIO AND PENNSYLVANIA INCLUSIVE (THE MOSSES AND LIVERWORTS BY WM. S. SULLIVANT), ARRANGED ACCORDING TO THE NATURAL SYSTEM (Boston: J. Munroe and company), and in this year he issued a 2d edition (NY: G.P. Putnam & co) that would also be owned by Thoreau (in addition to Professor Gray's BOTANICAL TEXTBOOK).

MANUAL OF THE BOTANY

(The best study of Thoreau's multiple references to Gray's botanies is to be found at the back of THE MAINE WOODS.)

MANUAL OF THE BOTANY

This new edition contained illustrations by Isaac Sprague.

In this year the *Calanthe dominii* flowered, the world's 1st planned orchid hybrid (raised by John Dominy for Veitch & Sons).

PLANTS

1858

Granada produced the crops nutmeg and mace for the first time.

PLANTS

May 19, Wednesday: That morning, some 30 Missourians led by Charles Hamilton had arrived at a trading post in the southern portion of the Kansas Territory. When they set out on the road back toward Missouri, they intercepted along the way 11 unarmed free-state men. It appears that most of these Kansas men had been Hamilton's neighbors while he had been living in the vicinity, and that none had been taking any part in any of the fighting. They evidently did not suspect, therefore, that their former neighbor meant to do them any particular harm. However, when his column came to a defile surrounded by mounds, near the Marais du Cygne of the French voyageurs, they herded their prisoners into line against one side of the defile and formed themselves into another line along the other side.

"BLEEDING KANSAS"

Hamilton himself fired the first shot and 5 of the prisoners were gunned down. Then Hamilton ordered his men to dismount and finalize the job with their pistols. (John Brown, arriving at the scene toward the end of June, would construct a 2-story flat-roofed log fortification some 220 yards south of the site of the massacre, at a

place where water from a spring could seep into a pit at its southwest corner. Friend John Greenleaf Whittier would write a poem, "Le Marais du Cygne," which would appear in the September 1858 issue of The Atlantic Monthly. Although William Griffith of Bates County, Missouri would be arrested during Spring 1863 and hanged on October 30, 1863 for participation in this day's events, Hamilton himself would be able to return to Georgia and there survive until 1880.)

http://www.kshs.org/places/marais/history.htm

Le Marais du Cygne.

A BLUSH as of roses
Where rose never grew!
Great drops on the bunch-grass,
But not of the dew!
A taint in the sweet air
For wild bees to shun!
A stain that shall never
Bleach out in the sun!

Back, steed of the prairies!
Sweet song-bird, fly back!
Wheel hither, bald vulture!
Gray wolf, call thy pack!
The foul human vultures
Have feasted and fled;
The wolves of the Border
Have crept from the dead.

From the hearths of their cabins,
The fields of their corn,
Unwarned and unweaponed,
The victims were torn, —
By the whirlwind of murder
Swooped up and swept on
To the low, reedy fen-lands,
The Marsh of the Swan.

With a vain plea for mercy
No stout knee was crooked;
In the mouths of the rifles
Right manly they looked.
How paled the May sunshine,
O Marais du Cygne!
On death for the strong life,
On red grass for green!

In the homes of their rearing,
Yet warm with their lives,
Ye wait the dead only,
Poor children and wives!
Put out the red forge-fire,
The smith shall not come;
Unyoke the brown oxen,
The ploughman lies dumb.

Wind slow from the Swan's Marsh,
O dreary death-train,
With pressed lips as bloodless
As lips of the slain!
Kiss down the young eyelids,
Smooth down the gray hairs;
Let tears quench the curses
That burn through your prayers.

Strong man of the prairies,
Mourn bitter and wild!

Wail, desolate woman!
Weep, fatherless child!
But the grain of God springs up
From ashes beneath,
And the crown of his harvest
Is life out of death.

Not in vain on the dial
The shade moves along,
To point the great contrasts
Of right and of wrong:
Free homes and free altars,
Free prairie and flood, —
The reeds of the Swan's Marsh,
Whose bloom is of blood!

On the lintels of Kansas
That blood shall not dry;
Henceforth the Bad Angel
Shall harmless go by;
Henceforth to the sunset,
Unchecked on her way,
Shall Liberty follow
The march of the day.

1859

With funding from the Massachusetts legislature, the opening of Professor Louis Agassiz's Museum of Comparative Zoology (FANFARE, APPLAUSE). But Harvard College's department of natural history was under the control of Professor Asa Gray.

BOTANY

In this year Professor Gray published his idea that the north American and Eurasian floras had at one time been homogeneous. He proposed that Pleistocene glaciation had separated the floras and through evolution (a new concept he had learned through personal correspondence with Charles Darwin) the species had become distinct. Gray would become Darwin's leading advocate in US debates.

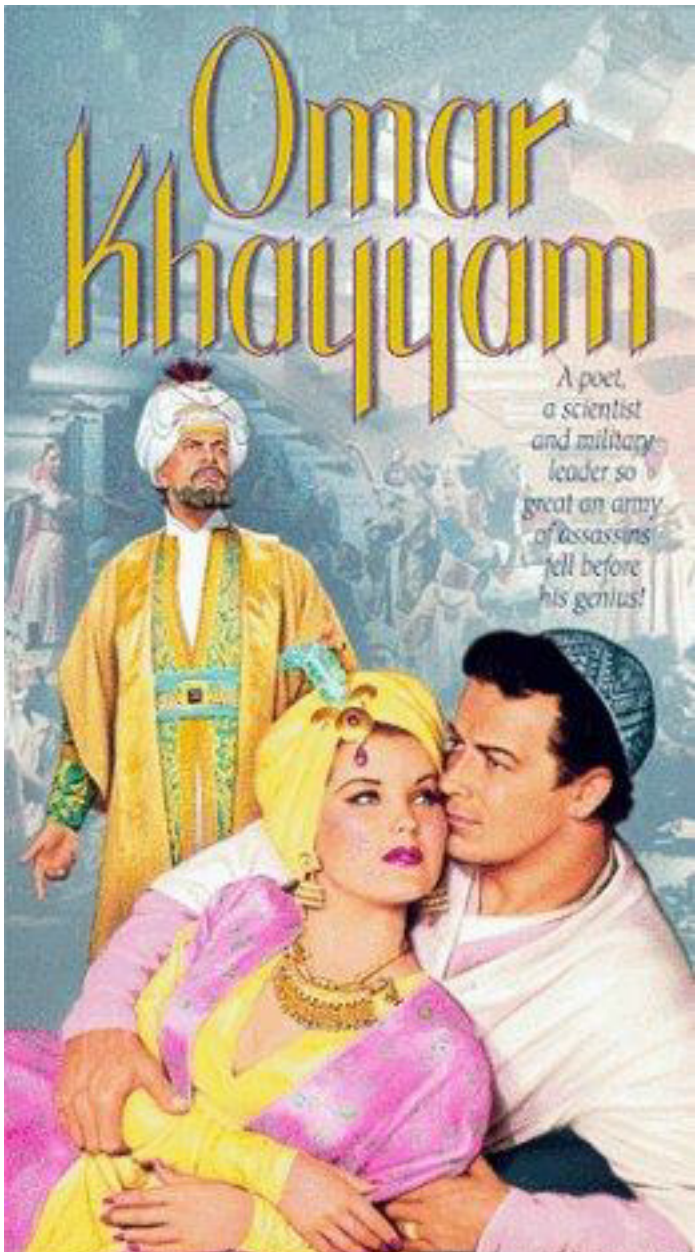
BIOLOGY

Meanwhile, at the end of this year, Darwin was publishing his ON THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION, OR THE PRESERVATION OF FAVORED SPECIES IN THE STRUGGLE FOR LIFE. As explained by Darwin, evolution is a simple change in the overall character of a population of either plants or animals. Gradual change over countless generations can lead to origination of a population sufficiently different to be called a new species. The impact of Darwin's work has been significant in all areas of biology, including the search for natural relationships of plants and interpretations of plant adaptations and ecology.

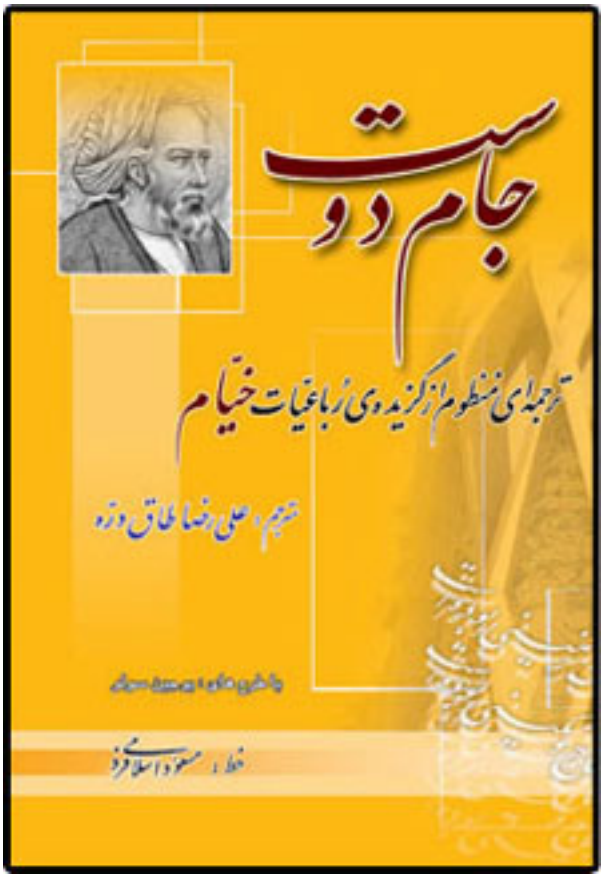
This year would mark the publication not only of the above science but also of Edward J. Fitzgerald's very free "translation" known as THE *RUBAIYAT* OF OMAR KHAYYAM. Did Henry Thoreau have an opportunity to read the following?

> Into this Universe, and Why not knowing,
> Nor whence, like Water willy-nilly flowing:
> And out of it, as Wind along the Waste
> I know not Whither, willy-nilly blowing.

This version of the "quatrains" or *rubáiyát* of Omar Khayyam would attract little attention until it was discovered by other artists and literary figures, such as Dante Gabriel Rossetti, in 1860. The original verses from which Fitzgerald had drawn his inspiration consist of a collection of isolated and separate "quatrains" or *robái* which resemble the Japanese *haiku* in function, if not in form. This *robái* form which is the only form of poetry attributed to Khayyám has remained popular in Persian poetry and nearly every poet who has ever written in Farsi –there happen to have been one whole lot of poets who have written in Farsi– has written some at one time or another.[45]



45. Fitzgerald's RUBÁIYÁT OF OMAR KHAYYÁM, THE ASTRONOMER-POET OF PERSIA. TRANSLATED INTO ENGLISH VERSE (London: Bernard Quaritch, Castle Street, Leicester Square. G. Norman, Printer, Maiden Lane, Covent Garden, London. Small quarto. Brown paper wrappers, 75 quatrains, 22 notes). By way of contrast, here is the most recent publication of these quatrains, by Ali Taghdarreh, done in 2008:



OMAR KHAYYAM,

THE ASTRONOMER-POET OF PERSIA.

BY

EDWARD J. FITZGERALD

(1859; REVISED IN 1868, 1872, AND 1879)

Omar Khayyam was born at Naishapur in Khorassan in the latter half of our Eleventh, and died within the First Quarter of our Twelfth Century. The Slender Story of his Life is curiously twined about that of two other very considerable Figures in their Time and Country: one of whom tells the Story of all Three. This was Nizam ul Mulk, Vizier to Alp Arslan the Son, and Malik Shah the Grandson, of Toghrul Beg the Tartar, who had wrested Persia from the feeble Successor of Mahmud the Great, and founded that Seljukian Dynasty which finally roused Europe into the Crusades. This Nizam ul Mulk, in his Wasiyat –or Testament– which he wrote and left as a Memorial for future Statesmen — relates the following, as quoted in the Calcutta Review, No. 59, from Mirkhond's HISTORY OF THE ASSASSINS.

> One of the greatest of the wise men of Khorassan was the Imam Mowaffak of Naishapur, a man highly honored and reverenced, — may God rejoice his soul; his illustrious years exceeded eighty-five, and it was the universal belief that every boy who read the Koran or studied the traditions in his presence, would assuredly attain to honor and happiness. For this cause did my father send me from Tus to Naishapur with Abd-us-samad, the doctor of law, that I might employ myself in study and learning under the guidance of that illustrious teacher. Towards me he ever turned an eye of favor and kindness, and as his pupil I felt for him extreme affection and devotion, so that I passed four years in his service. When I first came there, I found two other pupils of mine own age newly arrived, Hakim Omar Khayyam, and the ill-fated Ben Sabbah. Both were endowed with sharpness of wit and the highest natural powers; and we three formed a close friendship together. When the Imam rose from his lectures, they used to join me, and we repeated to each other the lessons we had heard. Now Omar was a native of Naishapur, while Hasan Ben Sabbah's father was one Ali, a man of austere life and practise, but heretical in his creed and doctrine. One day Hasan said to me and

> to Khayyam, "It is a universal belief that the pupils of the Imam Mowaffak will attain to fortune. Now, even if we all do not attain thereto, without doubt one of us will; what then shall be our mutual pledge and bond?" We answered, "Be it what you please." "Well," he said, "let us make a vow, that to whomsoever this fortune falls, he shall share it equally with the rest, and reserve no pre-eminence for himself." "Be it so," we both replied, and on those terms we mutually pledged our words. Years rolled on, and I went from Khorassan to Transoxiana, and wandered to Ghazni and Cabul; and when I returned, I was invested with office, and rose to be administrator of affairs during the Sultanate of Sultan Alp Arslan.

He goes on to state, that years passed by, and both his old school-friends found him out, and came and claimed a share in his good fortune, according to the school-day vow. The Vizier was generous and kept his word. Hasan demanded a place in the government, which the Sultan granted at the Vizier's request; but discontented with a gradual rise, he plunged into the maze of intrigue of an oriental court, and, failing in a base attempt to supplant his benefactor, he was disgraced and fell. After many mishaps and wanderings, Hasan became the head of the Persian sect of the Ismailians, a party of fanatics who had long murmured in obscurity, but rose to an evil eminence under the guidance of his strong and evil will. In A.D. 1090, he seized the castle of Alamut, in the province of Rudbar, which lies in the mountainous tract south of the Caspian Sea; and it was from this mountain home he obtained that evil celebrity among the Crusaders as the OLD MAN OF THE MOUNTAINS, and spread terror through the Mohammedan world; and it is yet disputed where the word Assassin, which they have left in the language of modern Europe as their dark memorial, is derived from the hashish, or opiate of hemp-leaves (the Indian bhang), with which they maddened themselves to the sullen pitch of oriental desperation, or from the name of the founder of the dynasty, whom we have seen in his quiet collegiate days, at Naishapur. One of the countless victims of the Assassin's dagger was Nizam ul Mulk himself, the old school-boy friend.[46]

Omar Khayyam also came to the Vizier to claim his share; but not to ask for title or office. "The greatest boon you can confer on me," he said, "is to let me live in a corner under the shadow of your fortune, to spread wide the advantages of Science, and pray for your long life and prosperity." The Vizier tells us, that when he found Omar was really sincere in his refusal, he pressed him no further, but granted him a yearly pension of 1200 mithkals of gold from the treasury of Naishapur.

At Naishapur thus lived and died Omar Khayyam, "busied," adds the Vizier, "in winning knowledge of every kind, and especially in Astronomy, wherein he attained to a very high pre-eminence. Under the Sultanate of Malik Shah, he came to Merv, and obtained

46. Some of Omar's Rubaiyat warn us of the danger of Greatness, the instability of Fortune, and while advocating Charity to all Men, recommending us to be too intimate with none. Attar makes Nizam-ul-Mulk use the very words of his friend Omar [Rub. xxviii.], "When Nizam-ul-Mulk was in the Agony (of Death) he said, 'Oh God! I am passing away in the hand of the wind.'"

great praise for his proficiency in science, and the Sultan showered favors upon him."

When the Malik Shah determined to reform the calendar, Omar was one of the eight learned men employed to do it; the result was the Jalali era (so called from Jalal-ud-din, one of the king's names) — "a computation of time," says Gibbon, "which surpasses the Julian, and approaches the accuracy of the Gregorian style." He is also the author of some astronomical tables, entitled "Ziji-Malikshahi," and the French have lately republished and translated an Arabic Treatise of his on Algebra.

His Takhallus or poetical name (Khayyam) signifies a Tent-maker, and he is said to have at one time exercised that trade, perhaps before Nizam-ul-Mulk's generosity raised him to independence. Many Persian poets similarly derive their names from their occupations; thus we have Attar, "a druggist," Assar, "an oil presser," etc.[47] Omar himself alludes to his name in the following whimsical lines: —

> "'Khayyam, who stitched the tents of science,
> Has fallen in grief's furnace and been suddenly burned;
> The shears of Fate have cut the tent ropes of his life,
> And the broker of Hope has sold him for nothing!'

We have only one more anecdote to give of his Life, and that relates to the close; it is told in the anonymous preface which is sometimes prefixed to his poems; it has been printed in the Persian in the Appendix to Hyde's *Veterum Persarum Religio*, p. 499; and D'Herbelot alludes to it in his *Bibliotheque*, under Khiam.[48] —

> It is written in the chronicles of the ancients that this King of the Wise, Omar Khayyam, died at Naishapur in the year of the Hegira, 517 (A.D. 1123); in science he was unrivaled, — the very paragon of his age. Khwajah Nizami of Samarcand, who was one of his pupils, relates the following story: "I often used to hold conversations with my teacher, Omar Khayyam, in a garden; and one day he said to me, 'My tomb shall be in a spot where the north wind may scatter roses over it.' I wondered at the words he spake, but I knew that his were no idle words.[49] Years after, when I chanced to revisit Naishapur, I went to his final resting-place, and lo! it was just outside a garden, and trees laden with fruit stretched their boughs over the garden wall, and dropped their flowers upon his tomb, so that the stone was hidden under them."

Thus far –without fear of Trespass– from the Calcutta Review.

47. Though all these, like our Smiths, Archers, Millers, Fletchers, etc., may simply retain the Surname of an hereditary calling.
48. "Philosophe Musulman qui a vecu en Odeur de Saintete dans sa Religion, vers la Fin du premier et le Commencement du second Siecle," no part of which, except the "Philosophe," can apply to our Khayyam.
49. The Rashness of the Words, according to D'Herbelot, consisted in being so opposed to those in the Koran: "No Man knows where he shall die." –This story of Omar reminds me of another so naturally –and when one remembers how wide of his humble mark the noble sailor aimed –so pathetically told by Captain Cook –not by Doctor Hawkworth –in his Second Voyage (i. 374). When leaving Ulietea, "Oreo's last request was for me to return. When he saw he could not obtain that promise, he asked the name of my Marai (burying-place). As strange a question as this was, I hesitated not a moment to tell him 'Stepney'; the parish in which I live when in London. I was made to repeat it several times over till they could pronounce it; and then 'Stepney Marai no Toote' was echoed through an hundred mouths at once. I afterwards found the same question had been put to Mr. Forster by a man on shore; but he gave a different, and indeed more proper answer, by saying, 'No man who used the sea could say where he should be buried.'"

The writer of it, on reading in India this story of Omar's Grave, was reminded, he says, of Cicero's ACCOUNT OF FINDING ARCHIMEDES' TOMB AT SYRACUSE, buried in grass and weeds. I think Thorwaldsen desired to have roses grow over him; a wish religiously fulfilled for him to the present day, I believe. However, to return to Omar.

Though the Sultan "shower'd Favors upon him," Omar's Epicurean Audacity of Thought and Speech caused him to be regarded askance in his own Time and Country. He is said to have been especially hated and dreaded by the Sufis, whose Practise he ridiculed, and whose Faith amounts to little more than his own, when stript of the Mysticism and formal recognition of Islamism under which Omar would not hide. Their Poets, including Hafiz, who are (with the exception of Firdausi) the most considerable in Persia, borrowed largely, indeed, of Omar's material, but turning it to a mystical Use more convenient to Themselves and the People they addressed; a People quite as quick of Doubt as of Belief; as keen of Bodily sense as of Intellectual; and delighting in a cloudy composition of both, in which they could float luxuriously between Heaven and Earth, and this World and the Next, on the wings of a poetical expression, that might serve indifferently for either. Omar was too honest of Heart as well of Head for this. Having failed (however mistakenly) of finding any Providence but Destiny, and any World but This, he set about making the most of it; preferring rather to soothe the Soul through the Senses into Acquiescence with Things as he saw them, than to perplex it with vain disquietude after what they might be. It has been seen, however, that his Worldly Ambition was not exorbitant; and he very likely takes a humorous or perverse pleasure in exalting the gratification of Sense above that of the Intellect, in which he must have taken great delight, although it failed to answer the Questions in which he, in common with all men, was most vitally interested.

For whatever Reason, however, Omar as before said, has never been popular in his own Country, and therefore has been but scantily transmitted abroad. The MSS. of his Poems, mutilated beyond the average Casualties of Oriental Transcription, are so rare in the East as scarce to have reacht Westward at all, in spite of all the acquisitions of Arms and Science. There is no copy at the India House, none at the Bibliotheque Nationale of Paris. We know but of one in England: No. 140 of the Ouseley MSS. at the Bodleian, written at Shiraz, A.D. 1460. This contains but 158 Rubaiyat. One in the Asiatic Society's Library at Calcutta (of which we have a Copy), contains (and yet incomplete) 516, though swelled to that by all kinds of Repetition and Corruption. So Von Hammer speaks of his Copy as containing about 200, while Dr. Sprenger catalogues the Lucknow MS. at double that number.[50] The Scribes, too, of the Oxford and Calcutta MSS. seem to do their Work under a sort of Protest; each beginning with a Tetrastich (whether genuine or not), taken out of its alphabetical order; the Oxford with one of Apology; the Calcutta with one of Expostulation, supposed (says a Notice

50. "Since this paper was written" (adds the Reviewer in a note), "we have met with a Copy of a very rare Edition, printed at Calcutta in 1836. This contains 438 Tetrastichs, with an Appendix containing 54 others not found in some MSS."

prefixed to the MS.) to have arisen from a Dream, in which Omar's mother asked about his future fate. It may be rendered thus: —

"O Thou who burn'st in Heart for those who burn
In Hell, whose fires thyself shall feed in turn,
How long be crying, 'Mercy on them, God!'
Why, who art Thou to teach, and He to learn?"

The Bodleian Quatrain pleads Pantheism by way of Justification.

"If I myself upon a looser Creed
Have loosely strung the Jewel of Good deed,
Let this one thing for my Atonement plead:
That One for Two I never did misread."

The Reviewer,[51] to whom I owe the Particulars of Omar's Life, concludes his Review by comparing him with Lucretius, both as to natural Temper and Genius, and as acted upon by the Circumstances in which he lived. Both indeed were men of subtle, strong, and cultivated Intellect, fine Imagination, and Hearts passionate for Truth and Justice; who justly revolted from their Country's false Religion, and false, or foolish, Devotion to it; but who fell short of replacing what they subverted by such better Hope as others, with no better Revelation to guide them, had yet made a Law to themselves. Lucretius indeed, with such material as Epicurus furnished, satisfied himself with the theory of a vast machine fortuitously constructed, and acting by a Law that implied no Legislator; and so composing himself into a Stoical rather than Epicurean severity of Attitude, sat down to contemplate the mechanical drama of the Universe which he was part Actor in; himself and all about him (as in his own sublime description of the Roman Theater) discolored with the lurid reflex of the Curtain suspended between the Spectator and the Sun. Omar, more desperate, or more careless of any so complicated System as resulted in nothing but hopeless Necessity, flung his own Genius and Learning with a bitter or humorous jest into the general Ruin which their insufficient glimpses only served to reveal; and, pretending sensual pleasure, as the serious purpose of Life, only diverted himself with speculative problems of Deity, Destiny, Matter and Spirit, Good and Evil, and other such questions, easier to start than to run down, and the pursuit of which becomes a very weary sport at last!

With regard to the present Translation. The original Rubaiyat (as, missing an Arabic Guttural, these Tetrastichs are more musically called) are independent Stanzas, consisting each of four Lines of equal, though varied, Prosody; sometimes all rhyming, but oftener (as here imitated) the third line a blank. Somewhat as in the Greek Alcaic, where the penultimate line seems to lift and suspend the Wave that falls over in the last. As usual with such kind of Oriental Verse, the Rubaiyat follow one another according to Alphabetic Rhyme — a strange succession of Grave and Gay. Those here selected are strung into something of an Eclogue, with perhaps a less than equal proportion of the "Drink and make-merry," which (genuine or not) recurs over-frequently in the Original. Either way, the Result is sad enough: saddest perhaps when most ostentatiously merry: more apt

51. Professor Cowell.

to move Sorrow than Anger toward the old Tentmaker, who, after vainly endeavoring to unshackle his Steps from Destiny, and to catch some authentic Glimpse of TO-MORROW, fell back upon TO-DAY (which has outlasted so many To-morrows!) as the only Ground he had got to stand upon, however momentarily slipping from under his Feet.

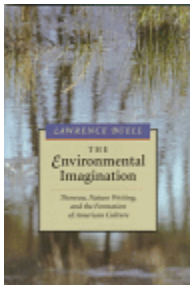
Edward J. Fitzgerald[52]

52. Actually I took this from the 3d Edition, not of 1859 but of 1872.

1860

Elizabeth Wright's LICHEN TUFTS, FROM THE ALLEGHANIES. Eventually Lawrence Buell, *cherchez*ing for the *femme* on page 45 of THE ENVIRONMENTAL IMAGINATION, would discover the gender of this author to have been of interest:

> The first fictional recreation of Thoreau was by a woman, Louisa May Alcott (MOODS). The first book, to my knowledge, published by an outsider to the transcendentalist circle that celebrates nature as a refuge from hypercivilization with explicit invocation of Thoreau as model and precursor was written by a woman: Elizabeth Wright's LICHEN TUFTS, FROM THE ALLEGHANIES (1860). The first Thoreau Society was founded by a group of young women (1891)....



John Gould Veitch sent 17 new species of conifer from Japan to England, as well as seed and plants of other horticulturally valuable stock. His most popular introduction from that trip, however, became Boston ivy, *Parthenocissus tricuspidata*.

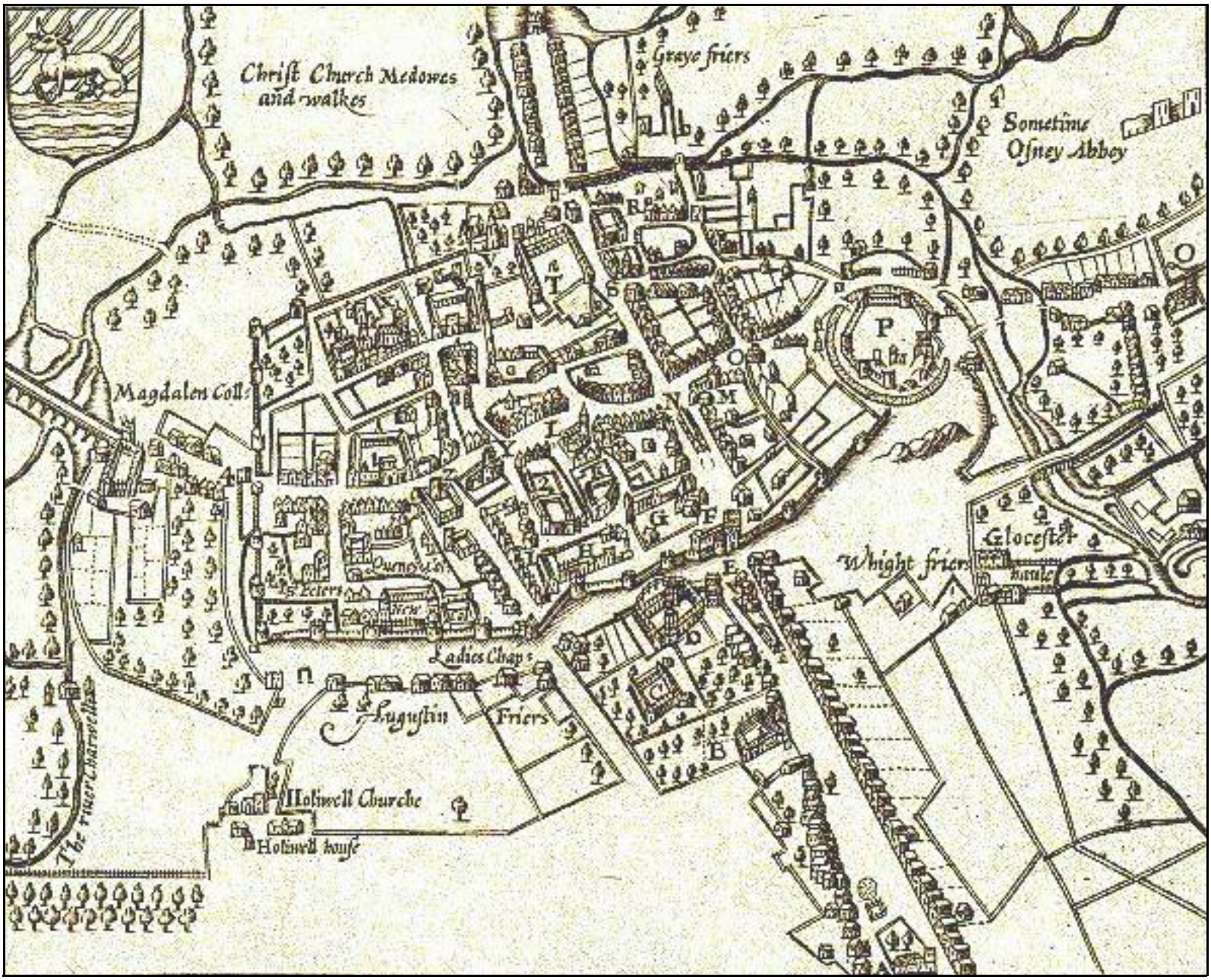
Using a pseudonym, E. Douwes Dekker published his novel MAX HAVELAAR. A former Dutch Colonial Officer in Java, Dekker in this book revealed the inhumane treatment of native workers in Dutch East Indian colonies. The resulting arousal of public concern would force governmental reforms. The Dutch would retain control of Javan and Sumatran spice production until WWII.

PLANTS

The Tufts College Alumni Association was formed.

Victoria and Albert visited Oxford privately, to find out how Edward, Prince of Wales was faring at Christ

Church.


Christ Church Medowes and walkes
Graye friers
Sometime Osney Abbey
Magdalen Coll:
Gloceſter
Whight friers
Ladies Chap:
Augustin Friers
Holiwell Churche
Holiwell house
The River Charwell

January 13, Friday: Barclay Coppoc, having unlike his brother Edwin Coppoc escaped from Harpers Ferry, and then having eluded capture, wrote to Franklin Benjamin Sanborn of the Secret "Six" conspiracy to bring him up to date on developments: "but five of our little band now away and safe, namely Owen [Owen Brown], Tidd [Charles Plummer Tidd], Meriam [Francis Jackson Meriam], O.P. Anderson [Osborn Perry Anderson], or as we used to call him Chatham Anderson, and myself.… We were together eight days before [John E. Cook and Albert Hazlett were] captured, which was near Chambersburg, and the next night Meriam left us and went to Shippensburg, and there took cars for Philadelphia. After that there were but three of us left, and we kept together, until we got to Centre County, Pa., where we bought a box and packed up all heavy luggage, such as rifles, blankets, etc., and after being together three or four weeks we separated and I went on through with the box to Ohio on the cars. Owen [Owen Brown] and Tidd [Charles Plummer Tidd] went on foot towards the north-western part of Penn." Osborn Perry Anderson, Barclay Coppoc, and Francis Jackson Meriam, traveling separately, would eventually find safe exile in the area of St. Catharines, Canada. Owen Brown and Charles Plummer Tidd would find work and safety, under assumed names, on an oil well in the vicinity of Crawford County, Pennsylvania.

During this month, in Iowa, at his monthly meeting of the Religious Society of Friends, Friend Barclay Coppoc was being disowned on account of his failure to adhere to the Peace Testimony.

THE QUAKER PEACE TESTIMONY

January 13. Tuttle was saying to-day that he did remember a certain man's living with him once, from something that occurred. It was this: The man was about starting for Boston market for Tuttle, and Mrs. Tuttle had been telling him what to get for her. The man inquired if that was all, and Mrs. Tuttle said no, she wanted some nutmegs. "How many," he asked. Tuttle, coming along just then, said, "Get a bushel." When the man came home he said that he had had a good deal of trouble about the nutmegs. He could not find so many as were wanted, and, besides, they told him that they did not sell them by the bushel. But he said that he would take a bushel by the weight. Finally he made out to get a peck of them, which he brought home. It chanced that nutmegs were very high just then, so Tuttle, after selecting a few for his own use, brought the remainder up to town and succeeded in disposing of them at the stores for just what he gave for them.

NUTMEGS

One man at the post-office said that a crow would drive a fox. He had seen three crows pursue a fox that was crossing the Great Meadows, and he fairly ran from [them] and took refuge in the woods.

Farmer says that he remembers his father's saying that as he stood in a field once, he saw a hawk soaring above and eying something on the ground. Looking round, he saw a weasel there eying the hawk. Just then the hawk stooped, and the weasel at the same instant sprang upon him, and up went the hawk with the weasel; but by and by the hawk began to come down as fast as he went up, rolling over and over, till he struck the ground. His father, going up, raised him up, when out hopped the weasel from under his wing and ran off none the worse for his fall.

The surface of the snow, now that the sun has shone on it so long, is not so light and downy, almost impalpable, as it was yesterday, but is somewhat flattened down and looks even as if [IT] had had a skim-coat of some whitewash. I can see sparkles on it, but they are finer than at first and therefore less dazzling.

The thin ice of the Mill Brook sides at the Turnpike bridge is sprinkled over with large crystals which look like asbestos or a coarse grain. This is no doubt the vapor of last evening crystallized. I see vapor rising from and curling along the open brook and also rising from the end of a plank in the sun, which is net with melted snow, though the thermometer was 16° only when I left the house.

I see in low grounds numerous heads of bidens, with their seeds still.

I see under some sizable white pines in E. Hubbard's wood, where red squirrels have run about much since this snow. They have run chiefly, perhaps, under the surface of the snow, so that it is very much undermined by their paths under these trees, and every now and then they have come to the surface, or the surface has fallen into their gallery. They seem to burrow under the snow about as readily as a meadow mouse. There are also paths raying out on every side from the base of the trees. And you see many holes through the snow into the ground where they now are, and other holes where they have probed for cones and nuts. The scales of the white pine cones are scattered about here and there. They seek a dry place to open them, — a fallen limb that rises above the snow, or often a lower dead stub projecting from the trunk of the tree.

January 13: Farmer says that he remembers his father's saying that as he stood in a field once, he saw a hawk soaring above and eying something on the ground. Looking round, he saw a weasel there eying the

hawk. Just then the hawk stooped, and the weasel at the same instant sprang upon him, and up went the hawk with the weasel; but by and by the hawk began to come down as fast as he went up, rolling over and over, till he struck the ground. His father, going up, raised him up, when out hopped the weasel from under his wing and ran off none the worse for his fall.

1861

The new treaty entered into with Japan in 1858 had led to a race by American and European plant collectors to distribute plants from these islands. The field collectors who went to Japan included Carl Maximowicz who sent plants to Russia, Max Ernst Wichura from Germany, and Richard Oldham from the Royal Botanic Gardens at Kew (re. *Bambusa oldhamii*). At this point George Rogers Hall, an American resident of Yokohama, sent a huge shipment to Francis L. Lee of Chestnut Hill, Massachusetts. Lee went off to fight in the civil war and left Francis Parkman, explorer, neighbor, and friend, to curate his growing collection (Parkman would in 1871 become Professor of Horticulture at Harvard). Thomas Hogg (son of a Scottish emigrant and nurseryman, sent to Japan by Abraham Lincoln as a US Marshal) shipped plants to his brother James Hogg as well as to the Parson firm in Flushing on Long Island. His introductions included the Japanese *stewartia*, the fragrant snowbell, the sapphire berry, and the *katsura* tree.

PLANTS

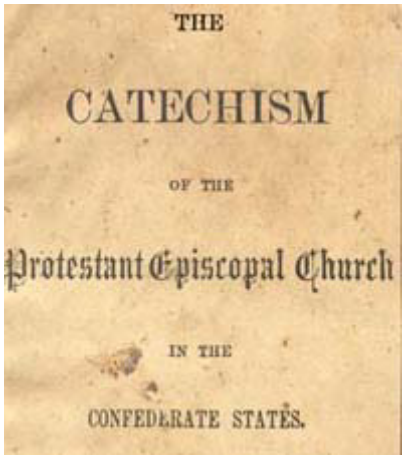
1862

Treasury Secretary Salmon P. Chase appointed the abolitionist Reverend Dr. William Henry Brisbane who had manumitted his many slaves, despite the fact that he was a former repeat business failure, as the Union tax commissioner for occupied Beaufort, South Carolina. The Reverend would oversee the auctioning of confiscated slave plantations.

Nonvoting Americans on a Beaufort, South Carolina plantation
(each person worth 5/8ths of a federal vote, to the local white men of property)

Stephen Elliott became the first and only Presiding Bishop of the Protestant Episcopal Church in the Confederate States of America, while his friend Bishop John Henry Hopkins of Vermont would be the

equivalent for the northern-states portion of the church.[53]



1867

In about this year Professor Asa Gray was issuing his FIELD, FOREST AND GARDEN BOTANY.

Through the work of Oliver Kelly, the first Granges (the Patrons of Husbandry, i.e. the Grange) were organized. Kelly had been sent as an agent of the US Department of Agriculture to the South "to proceed immediately through the States lately in hostility against the Government ... the relations ... having prevented this Department from obtaining the usual statistical and other information." While on this venture Kelly, according to his own statement formulated "the idea of a Secret Society of Agriculturists, as an element to restore kindly feelings among the people."

PLANTS

1870

California began growing mustard seeds.

During this decade the Red Delicious apple would be discovered, in Iowa (the Golden Delicious apple would not appear, on a farm in West Virginia, until 1910).

PLANTS

53. This is not the Professor Stephen Elliott of South Carolina whose botany textbook Henry Thoreau consulted, but his son.

In Japan, Meiji dismantled the feudal system and forbade the lords their private armies.

Prussian military advisers made gymnastics (*Turnbewegungen*) part of Japanese recruit training (beginning in around 1902, Japanese university physical education departments would follow suit). Simultaneously, French military advisers made equestrianism part of Japanese officer training. While riding horses would soon become as popular among Japanese aristocrats as tennis and golf, gymnastics would not become popular with working-class Japanese athletes until the 1930s, when Asahi Breweries would begin to sponsor gymnastics competitions.

In this year a grower in Vacaville, California imported the Japanese plum (*Prunus salicina*) from Japan.

PLANTS

1873

A generous bequest by C.S. Sargent and H.H. Hunnewell would allow Professor Asa Gray to retire from his teaching duties and work fulltime on his NORTH AMERICAN FLORA.

BOTANIZING

The navel orange was brought from Brasil in 1870 by Saunders and given to the USDA for use as grafting stock for the industry. Riverside resident Mrs. Luther Tibbets received two especially successful trees from which propagation material was taken. Her plants may be the source for all navel orange trees in North America today.

By the end of the Dutch war on the Acehnese, piracy and native hostility had finally been snuffed out in America's direct pepper trade with Sumatra, and the 967th of the 967 pepper voyages was completed.

SPICE

Sander built his first greenhouse at St. Albans, England. His firm began a system of tracking orchid hybrid (grex) names that would later be institutionalized by the Royal Horticultural Society.

Legislation created Yellowstone, the 1st National Park.

PLANTS

1878

Alfred Russel Wallace's TROPICAL NATURE, AND OTHER ESSAYS.

He moved to Croydon. He was one of the first to consider the causes of latitudinal diversity gradients and related aspects of what are now known as "r-selection" and "K-selection." He wrote on a suburban forest management issue.

Charles Curtis was sent by James Veitch & Sons to Mauritius and Madagascar to collect plants. He sent back *Angraecum sesquipedale*.

BOTANIZING

Luther Burbank relocated from Massachusetts to Santa Rosa, California to continue his plant breeding program.

PLANTS

Based on a new Hungarian mechanical process, the Washburn experimental flour mill in Minneapolis marked the beginning of modern milling in the US.

1879

The chestnut tree in Cambridge, Massachusetts under which Henry Wadsworth Longfellow's village smithy had stood was felled for a widening of Brattle Street. A chair made from the wood, paid for by the pennies of schoolchildren, was presented to the poet on his 72nd birthday. (Subsequent analysis of this chair indicated the tree had really been a horse chestnut, native to Europe — not at all closely related to the American chestnut most readers of the poem would have imagined.)

PLANTS

The Village Blacksmith

Under a spreading chestnut tree
  The village smithy stands;
The smith, a mighty man is he,
  With large and sinewy hands;
And the muscles of his brawny arms
  Are strong as iron bands.

His hair is crisp, and black, and long,
  His face is like the tan;
His brow is wet with honest sweat,
  He earns whate'er he can,
And looks the whole world in the face,
  For he owes not any man.

Week in, week out, from morn till night,
  You can hear his bellows blow;
You can hear him swing his heavy sledge
  With measured beat and slow,
Like a sexton ringing the village bell,
  When the evening sun is low.

And children coming home from school
  Look in at the open door;
They love to see the flaming forge,

And hear the bellows roar,
And watch the burning sparks that fly
Like chaff from a threshing-floor.

He goes on Sunday to the church,
And sits among his boys;
He hears the parson pray and preach,
He hears his daughter's voice,
Singing in the village choir,
And it makes his heart rejoice.

It sounds to him like her mother's voice,
Singing in Paradise!
He needs must think of her once more,
How in the grave she lies;
And with his hard, rough hand he wipes
A tear out of his eyes.

Toiling,—rejoicing,—sorrowing,
Onward through life he goes;
Each morning sees some task begin,
Each evening sees it close;
Something attempted, something done,
Has earned a night's repose.

Thanks, thanks to thee, my worthy friend,
For the lesson thou hast taught!
Thus at the flaming forge of life
Our fortunes must be wrought;
Thus on its sounding anvil shaped
Each burning deed and thought!

1880

Colonel Francis Hall, a botanist and plant collector, had been preparing a volume of botanical and entomological drawings during an expedition to Ecuador, but had been left as yet another bloody corpse after a night of revolution in Quito. His unpublished, unknown manuscript volume was at this point received by Sir Joseph Hooker, and so its illustrations of South American plants, moths, butterflies, spiders, and caterpillars would become available to us.

PLANTS

Farmers began to cure tobacco using clean hot air rather than the smoky air of charcoal fires, thus producing a milder, more popular form of tobacco.

In this decade more than one sailor out of every four in the Japanese navy would be developing beriberi — a nutritional disease resulting from insufficient quantities of thiamine. Beriberi had become more common because of the introduction of improved polishing techniques that removed the brown outer layers of the rice

grain in which thiamine occurs. An expanded diet would correct this endemic condition, but not until several years later would C. Eijkman, a Dutch physician working in the East Indies, demonstrate that the older naval diet, based on brown rice, could easily have forestalled the disease.

For decades, German importers gained growing control of markets in natural dye sources. BASF (the Baden Dye and Soda Company) had achieved control of indigo, a dye produced principally in India. By this point, after much work, Adolf von Baeyer and his laboratory had successfully synthesized indigo. The strength of this industry quickly galvanized, and in 1890 German exports of dyes would account for 90% of the world's supply. In 1914 German companies would form a color cartel known as I.G. Farben (*interessen Gemeinschaft Farben*) that would soon expand into the production of fine chemicals and pharmaceuticals.

1881

The eastern portion of Orange County was combined with the western tip of Wake County to form a new county centered on the growing city of Durham, North Carolina, named of course Durham County.

W. Duke Sons and Company introduced a "Duke of Durham" brand of machine-manufactured cigarette. Duke's factory alone would be producing 9,800,000 cigarettes, seizing 1.5% of the existing market.[54]

54. Interestingly, near the mansion of Buck Duke in Durham, North Carolina was the mansion of General Julian Shakespeare Carr, one of Buck Duke's competitors, the manufacturer of the Bull Durham line of tobacco products — and at this time Carr was in the process of acquiring a protégé of sorts, a teenager by the name of Hann Card-son (1866-1918) or something like that who had run away from his boat family in South China and gone to sea and made his way to Boston and who for various interesting reasons was beginning to use the name Soon Chiao-chun or Soon Yao-ju or Charlie Jones Soon. While at Trinity College (Trinity College had not yet relocated to Durham) the yellow young man romanced Ella Carr, white daughter of white Professor O.W. Carr, that college's instructor in Greek and German. When their romance was detected, his yellow ass was abruptly thrown out of the house and out of the college. Charlie found himself enrolled overnight at Vanderbilt University, in Nashville, Tennessee — because that was far away from his Ella. The official explanation was of course pious, as shown by this Methodist Church version of the Soong legend as recounted in the Raleigh News and Observer in 1936: "Dr. Craven, with whom [Charlie Soon] had many long talks about his missionary career, took the matter up with the members of the Board of Missions of the Methodist Church and they advised him that the young Chinese would make more progress at Vanderbilt, where he could at the same time continue his education and receive training for the mission fields through contacts with members of the board and returned missionaries in Nashville." The suitor-reject would go on to sell Bibles and become arguably the richest man in the world. His children Eling, Chingling, Tseven, Mayling, Tseliang, and Tsean would marry well: eventually Charles Soong would have Sun Yat-sen and Chiang Kai-shek as sons-in-law. You can read about this at the beginning of Sterling Seagrave's THE SOONG DYNASTY (London: Korgi Books, 1996).

SOONG DYNASTY

Chile defeated Bolivia in a war to take control of coastal and island areas where huge deposits of guano (bird shit) could be harvested for sale to developed nations for use in agricultural fertilizers, in formulating sulfuric and nitric acids, and in the formulation of saltpeter (sodium nitrate) for gunpowder. The result of the war was that Bolivia became landlocked.

H.F.C. Sander established a 4-acre orchid nursery near St. Albans in England. Sander would do more to popularize orchids than nearly any other grower of the time, by making them affordable.

The loganberry was introduced to commerce by James Logan from his garden in Santa Cruz County, California.

As early as 1858, Professor Asa Gray had noted that grains of corn can be of different colors (the coloration being due to pigments in the endosperm), and that botany offered no explanation for this phenomenon. In this year, prior to any scientific understanding of double fertilization, Focke applied the term "xenia" to the obvious effects of pollen on the endosperm.

PLANTS

1882

Alfred Russel Wallace received an honorary doctorate from the University of Dublin. He proposed the establishment of greenbelts in the vicinity of urban areas. He proposed that the legislature give protection to rural areas and historic monuments. He made the suggestion that were explosives routinely stored underwater, this would considerably reduce the damage in accidental explosions. He drew attention to, and extended, Müller's work on mimicry. In an analysis of the epidemiology of small-pox he made himself one of the 1st to use the statistical modes of inference with which we are now familiar. (This guy sponsored a whole lot of unpopular causes, and was a teleologist to the bitter end — but we have to give him credit, he really did know how to think.)

Bordeaux University professor Millardet noticed that the copper sulfate spray that was being applied by growers to grapes on the vine in order to deter hungry children from nibbling them was also deterring the downy mildew. By adding lime, to cause the copper to precipitate and stick to the leaves, he invented something termed "Bordeaux mixture" — an important early fungicide and one salvation of the French wine industry.

PLANTS

1883

Addis Ababa became the Ethiopian capital. Within twenty years, the surrounding zone, 100 miles in radius, was stripped of trees for charcoal production.

PLANTS

Adrien Rouquette met and became friends with Lafcadio Hearn, who was on his way (more or less) from Cincinnati to Japan.

Viscount Itsujin Fukuba built the first greenhouse (9 x 36 feet) in Japan and imported a collection of tropical orchids from England and France.

PLANTS

1884

Kate Greenaway, author of children's books, published her LANGUAGE OF FLOWERS, one of the more popular dictionaries on this topic.

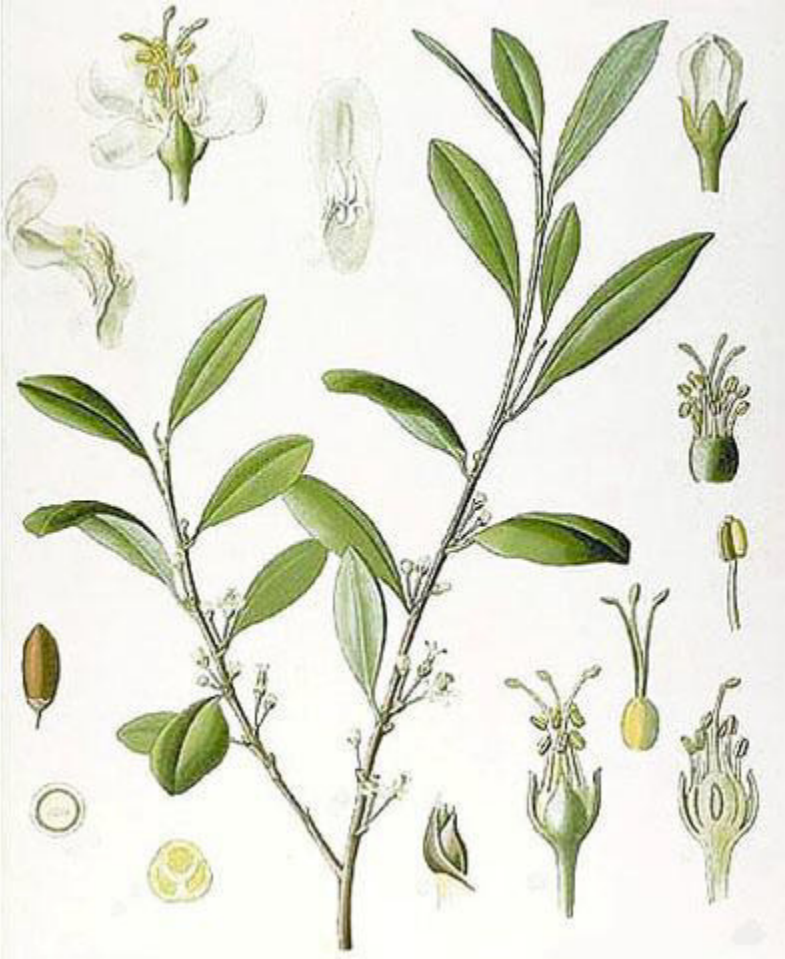
PLANTS

In 1827 Leroux had extracted Salicin, an ingredient of willow bark used to relieve fever and rheumatic pain. In 1838, salicyclic acid had been manufactured from salicin. In 1853, acetylsalicyclic acid had been synthesized by Charles Gerhardt. Beginning in this year and continuing to 1894, the aspirin family of pain and fever relievers would be being introduced by the German chemical industry — think Bayer.

In Finland, drunkenness had come to be such a major problem among unskilled urban laborers that a prohibition movement had developed. In this year all beverages containing over 22% alcohol came to be regulated, and in the following year rural sales would be banned.

Between 1880 and 1904 the prohibition movement in the USA would succeed in enacting many new laws against alcohol at the state level.

An assistant to Sigmund Freud touched purified cocaine to his tongue and discovered a numbing sensation. Dr. Freud termed cocaine "magical," suggesting its use in localized anesthesia. Carl Koller demonstrated its usefulness in eye surgery. (Eventually, however, when this drug would turn out to be more addictive even than morphine, Freud would be attacked for having participated in loosing "the third scourge of mankind." A similar chemical compound would be produced synthetically, "procaine" commonly sold under the trade name 'Novocain," and by now this has replaced cocaine for medicinal purposes.)



1885

In France early in this year, the Statue of Liberty was dismantled into 350 pieces and shipped to New York harbor aboard the frigate *Isere*, in 214 crates.

Sponsored by the Royal Horticulture Society, the first Orchid Conference was held in England.

PLANTS

1886

The tumbleweed, a thistle, came from Russia. (Our "Kentucky" bluegrass had already arrived, from Eurasia.)

PLANTS

1887

On Manhattan Island, the New York School for the Training of Teachers (later renamed Teachers College) was founded.
Stephen Alfred Forbes's The Lake as a Microcosm detailed his insights about lake ecology.

The Hatch Act established an annual budget to support an agricultural experiment station in each state. Within a decade stations across the country would be engaged in basic research. This experiment station system would become the basis for the US Agricultural Extension service.

PLANTS

1889

Alfred Russel Wallace was awarded an honorary doctorate by Oxford University. He had described what we now term the "Wallace effect," the process of selection for reproductive isolation. He had emphasized the significance of symmetrical color patterns in animals. He had presented a criticism of the popular field of eugenics. He had developed a model of "human selection" that emphasized our crying need to improve the economic status of adult human females. He attempted to publicize important work being done by others in the investigation of glaciation episodes in the Southern Hemisphere.

Heinrich Gustav Reichenbach died in Leipzig, Germany, leaving his orchid herbarium to the Vienna museum with instructions that it should remain closed for 25 years. Because the British had expected his collection to go to either Kew or the British Museum, this action, clearly designed as it was to thwart upcoming British orchid taxonomists, stirred up a tempest in a teapot.

The Pajaro Valley Evaporation Company of Watsonville, California began small-scale production of dehydrated onions. (In 1950 tins of their product, deemed still enjoyable, would be discovered in a storeroom in Skagway, Alaska.)

Amorphophallus titanum, a gigantic aroid from Sumatra, flowered for the first time in cultivation at Kew.

PLANTS

1890

It would be during the early 1890s that the anti-pest campaign would begin in New England in real earnest against the accidentally-on-purpose introduced "European" gypsy moth *Porthetrea dispar* (which, actually, had originated in Japan prior to its denuding the woodlands of Europe and then being introduced into America). The moth was spreading, and would continue to spread, in all directions at a rate of about 15 miles per year. Immediately about one in ten of the sprayers were poisoned by the arsenic they were using.

A St. Louis physician formulated peanut butter as a food for invalids. (In 1893 the health food faddist famous for breakfast cereals, J.H. Kellogg, would offer a peanut butter to patients with poor teeth. Nowadays we have little signs to warn people of anything that might ever have touched a peanut — because the plant is for some so utterly toxic, one little crumb stopping their breathing.)

PLANTS

1892

Charles Sprague Sargent traveled to Japan to inaugurate the Arnold Arboretum's 1st Asian mission.

On September 28th, the 1st Corn Palace in Mitchell, South Dakota opened to the public. Conceived as successor to the series of palaces that had been built in Sioux City, Iowa beginning in 1887, the Mitchell building would be made permanent in 1921 and is now the only remaining exemplar of a former genre, "palace of the product of the soil."

The boll weevil crossed the Rio Grande River into Texas cotton fields. Within a decade it would threaten to destroy the US cotton industry. The USDA would begin investigations in 1894 and a culturally based approach to the problem would be proposed by 1897.

The 1st gasoline-powered tractor was built, by John Froelich of Froelich, Iowa.

PLANTS

1893

The Prohibition Party's venture into partisan politics having collapsed, an Anti-Saloon League took over leadership of the abolition movement. The movement's appeal was spreading primarily among middle-class, nativist Protestants, who had become so desperate to maintain their prerogatives in society against threats from massive immigration, industrialization, and urbanization that they were embracing "family values" such as industry, frugality, sobriety, and religiosity.

The state of Washington banned the sale and use of cigarettes.

Under pressure from Joshua Rowntree and the Anglo Oriental Society for the Suppression of the Opium Trade, the British Government of India appointed a royal commission to inquire into the prevalence of opium use on that subcontinent. The commission would discover oral use to be so common as to be impossible to prohibit, but would describe this primarily medical or quasi-medical use as nonproblematic. The commission would report that the East's reliance upon opium was rather similar to the West's reliance upon alcohol, in that it was a practice against which the government would have no real need to crusade. The smoking of the substance, although more dangerous, was found to be still "comparatively rare and novel."

Initial presentation of the Glass Flowers to Harvard University (created under the guidance of Harvard Professor Ware by artists Leopold Blaschka and his son, Rudolph).

A Supreme Court decision written by Justice Horace Gray declared the tomato to be a vegetable based on common usage of the term "vegetable" as opposed to the term "fruit." On this basis tomato importer John Nix would be obligated to pay a 10% vegetable tariff on shipments of tomatoes (declared to be honorary vegetables for tax purposes) grown in the West Indies.[55]

PLANTS

55. It would be on this basis that, eventually, the Reagan administration would determine that in the planning of the child's nutritional needs in the public school lunch program, french fries with catsup was to count as "two servings of vegetables."

May 1, Monday: The World's Columbian Exposition opened in Jackson Park in Chicago. Commemorating the 400th anniversary of the discovery of America by Columbus, the exposition would run for six months and attract 27,539,000 visitors (that's almost half the total number of human beings then alive in the USA; during this year for instance 6-year-old John Robinson Jeffers got an eyefull of the exhibits).

Reid's Yellow Dent Corn gained the grand prize as "the world's most beautiful corn" at the Exposition. Reid's corn would become a major force in Midwestern agriculture and an important parent to modern hybrids.

PLANTS

Featured at the Exposition was an extensive display of psychological apparatus arranged by Joseph Jastrow. Jastrow had replicated Francis Galton's Anthropometric Laboratory in London. For a small fee, the mental and physical qualities of the visitors could be measured. Should you be allowed to reproduce?[56]

PSYCHOLOGY

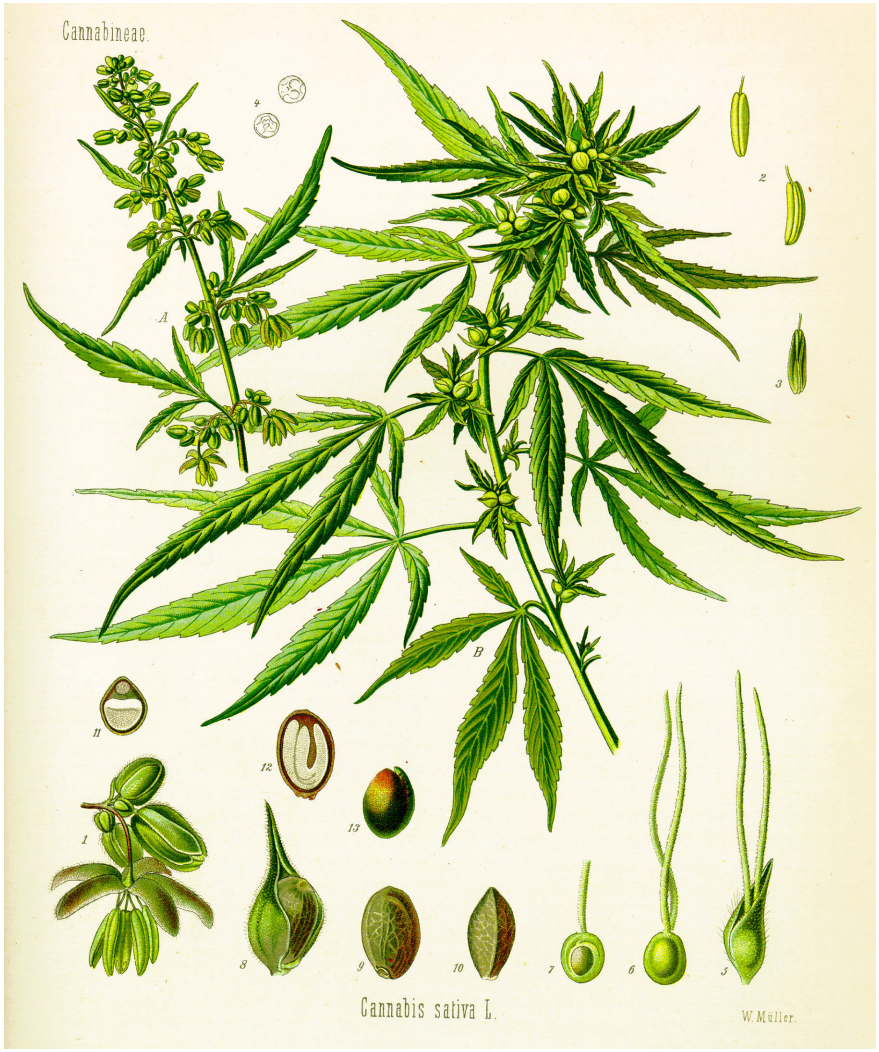
George Ferris had built his first "Ferris" wheel for this Chicago's World's Fair.

Adelaide Johnson carved portrait busts of Elizabeth Cady Stanton, Susan B. Anthony, and Friend Lucretia Mott for the Court of Honor of the Woman's Building at the Exhibition.

56. Street, W.R. A CHRONOLOGY OF NOTEWORTHY EVENTS IN AMERICAN PSYCHOLOGY. Washington DC: American Psychological Association, 1994

1895

As the 1st recorded use of the term *marijuana* for cannabis, by supporters of Pancho Villa in Sonora, Mejico, the song "*La Cucaracha*" described a soldier looking to score a stash of *marijuana por fumar* (to smoke).



Johannes Eugenius Bülow Warming's OECOLOGY OF PLANTS (*PLANTESAMFUND – GRUNDTRÆK AF DEN ØKOLOGISKE PLANTEGEOGRAFI*) Basing his ecological system on water use and plant growth form, he essentially founded the modern methods of descriptive plant ecology. The terms xerophyte, mesophyte, hydrophyte, monocarpic, and polycarpic date from his usage.

PLANTS

1896

Charles W. Morse cornered New-York's ice market, incorporating as the American Ice Company.

The New-York Botanical Garden was established, in accordance with legislation that had been drafted way back in 1891.

Hirase and Ikeno published their discovery of motile sperm in *Ginkgo* and *Cycas*.

PLANTS

1898

Wheat rust cost the US $67,000,000. By 1904 significant research programs would be established to discover control measures. The German scientist H. de Bary had earlier detailed the life cycle of wheat rust, but it would not be until 1917 that sufficient study would be completed to support a barberry eradication program, and the eradication of barberry bushes would be legalized in North Dakota.

Bayer pharmaceutical corporation registered and marketed Felix Hoffman's diacetylmorphine under the brand name "Heroin," from the German *heroisch* meaning heroic, as a substitute for morphine and codeine cough suppressants which had proven to offer difficulties. Their marketers may have chosen this designation because of the ease with which this opium derivative reduced pain and eased the breathing, or they may have chosen it because of the way test subjects described its effects.

> "The first cause of problems is solutions."

By 1917 this new drug would be causing such problems of its own that its use in over-the-counter cough syrups would be discontinued.

PLANTS

1899

Henry Chandler Cowles's ECOLOGICAL RELATIONS OF THE VEGETATION ON THE SAND DUNES OF LAKE MICHIGAN reported evidence of ecological succession in the vegetation and the soil in Indiana sand dunes at the tip of Lake Michigan with relation to age and established him as one of the founders of the emerging study of "dynamic ecology."

Richard Cadbury died at the age of 63. By this point the Bournville factory had trebled in size and was employing more than 2,600 workers. The business became a private limited company, Cadbury Brothers Ltd.

CHOCOLATE

Minor Cooper Keith (the American builder of an 1871 Costa Rican railroad and subsequent planter of bananas) and the Boston Fruit Company merged to form the United Fruit Company. Today, half of all world banana exports come to the US.

PLANTS

Founding of the American Society of Landscape Architects.

William Orton was sent to the South Carolina coastal islands by the US Department of Agriculture to investigate cotton wilt, a fungal disease. Orton learned that local grower Elias Rivers had cotton plants resistant to the disease, and had been saving the seed. (By the following year Orton would have published the earliest report on the value of selective breeding for crop resistance.)

Navaschin described double fertilization, explaining the problem of xenia as well as establishing yet another distinction between flowering plants and gymnosperms.

1900

Many of the holograph letters which the Reverend Gilbert White's had written to the gentleman naturalist Daines Barrington and to the zoologist Thomas Pennant over a period of two decades in the late 18th Century, which the Reverend had then edited into his THE NATURAL HISTORY OF SELBORNE, and which had over the course of time made their way into the British Library, were transcribed and published in an arrangement by R. Bowdler Sharpe titled GILBERT WHITE'S SELBORNE.[57]

The British owned Pacific Islands Company purchased rights to all minerals on 3-mile- long Ocean Island for £50 a year. Within 80 years 20,000,000 tons of phosphate for agricultural fertilizer (shipped to Australia and New Zealand for crops exported mainly to Britain) were extracted from the island, obliterating the original tropical vegetation and destroying the homeland of the 2,000 native islanders. The same fate befell neighboring Nauru (8.5 square miles) and its original 1,400 inhabitants.

> The language of birds is very ancient, and, like other ancient modes of speech, very elliptical: little is said, but much is meant and understood.
>
> — Gilbert White's THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE, as quoted on page 417 of William Least Heat-Moon's PrairyErth (a deep map) [Boston MA: Houghton Mifflin, 1991].

Ethanol Consumption
in Annual Gallons per US Adult

1790	5.8
1830	7.1
1840	3.1
1860	2.1
1890	2.1
1900	2.1
1920	0.9
1940	1.56
1980	2.76

57. The Reverend White's NATURAL HISTORY OF SELBORNE is only the 4th most reprinted book in the English language.

1901

A Japanese chemist living in Chicago, Satori Kato, invented water soluble instant coffee (he would obtain a US patent for this on August 11, 1903).

When Friend William Cadbury of Cadbury Chocolates visited the island of Trinidad in the Caribbean he was alerted to the fact that the cocoa workers on Sao Thome and Principe Islands were still for all practical purposes enslaved.

William G. Mortimer's PERU HISTORY OF COCA: THE DIVINE PLANT OF THE INCAS presented the favorable medical opinion of the day in regard to cocaine.

PLANTS

1904

By means of a surprise attack of undeclared war, the Japanese destroyed a Russian naval group at Port Arthur, and invaded Korea. (Battle of Port Arthur, Russo-Japanese war. Heads up, this is an alert of things to come. Those who do not remember history are condemned to repeat it — and things that happen the first time as tragedy, tend to happen the second time as farce. :-)

Chestnut blight from Japan was detected in the New York City area, with the first reported case at the Bronx Zoological Park. It is thought the fungal pathogen, *Cryphonectria parasitica*, arrived with importation of Asian chestnut trees in 1890. This disease quickly advanced to destroy nearly the entire native population of American Chestnut, until that time the largest of eastern trees and one of the most significant forest dominants in the Eastern mixed mesophytic association. Rupp indicates that the pathogen arrived in 1895 amid a shipment of Chinese chestnut trees that would eventually be planted at the newly founded New York Botanical Garden. Rupp also calculated the loss in lumber alone at $400 billion.

PLANTS

1906

Dr. David Fairchild, US Department of Agriculture official, imported 75 flowering cherry trees and 25 single-flowered weeping types from the Yokohama Nursery Company in Japan. As a test of their hardiness he planted these on a hillside on his own land in Chevy Chase, Maryland.

The first county agent, W.C. Stallings, began work in Smith County in Texas. Employed to work with farmers to combat the ravages of the boll weevil on the cotton crop, this model would quickly be adopted in other Southern states. (By 1914 the Smith-Lever Act for cooperative extension had been passed.)

PLANTS

1908

Brooklyn was being connected with Manhattan by an underwater link, termed a "subway." During this year and the following one a German Jew named Otto Frank would be working in New-York, at Macy's department store. Who could imagine what the future had in store?

ANNE FRANK

New-York tea importer Thomas Sullivan introduced the tea bag, as a means of marketing samples. (By 1934, 8 million yards of gauze would be being used annually, sewn into tea bags.)

Avocados were planted at San Marino Ranch (today, the Henry E. Huntington Botanical Gardens in Pasadena), constituting what was apparently the first commercial avocado grove in California (however, the Haas avocado would not arrive until later).

PLANTS

1909

Dr. Colville and Ms. White began making crosses to produce the first 18 cultivars of modern blueberries, from native stock.

PLANTS

1910

California began production of chili pepper.

PLANTS

A chemist with the Corn Products Refining Company (now Corn Products Company International) discovered a process that would allow the refining of corn oil for cooking, thus giving rise to the product "Mazola."

1911

At about this point, on Okinawa, Yabiku Moden was organizing the Ryukyu Ancient Research Association, the initial school to publicly teach Okinawan *kobudo* or ancient weapons arts. Yabiku's student Taira Shinken would be responsible for founding in 1940 in Tokyo the more famous Society for the Promotion and Preservation of Ryukyu Martial Arts.

Due to large numbers of semi-trained performers entering the professional ranks of *sumo,* the rules were modified to allow what you see now, pushing and shoving as well as grips on the belt.

The hand-cranked initial version of the Gatling machine gun was declared obsolete by the United States military.

GATLING'S MACHINE GUN

Kudzu was brought to the US from Japan for soil improvement, erosion control, and livestock forage (seemed like a good idea at the time).

PLANTS

1912

The GooGoo Cluster, a chocolate, caramel, & peanut candy, was created in Nashville, Tennessee.

PLANTS

Frederick Hopkins showed that there were chemical substances (additional to fats, carbohydrates, and minerals) obtained from food that are essential to human growth and maintenance, and Casimir Funk coned a term for such substances: "vitamines."

By this point perhaps 35% of the US male population was being circumcised. The practice was on its way to becoming routine. In a text on the philosophy, application, and technique of "orificial surgery," the beneficial effect of the emerging standard was duly noted:

> The little sufferer lay in his mother's lap. The dropsy ... had taken the form of hydrocephalus ... I then circumcised the child ... The head [of the child's penis] diminished in size and in two weeks the condition of hydrocephalus had disappeared and the child was once more dismissed as cured.

In a text dating to this year, on sex hygiene for the male, we find:

> Circumcision promotes cleanliness, prevents disease, and by reducing oversensitiveness of the parts tends to relieve sexual irritability, thus correcting any tendency which may exist to improper manipulations of the genital organs and the consequent acquirement of evil sexual habits, such as masturbation.

The tuberculosis patient Ogai Mori translated Arthur Schnitzler's 1894 novel *Der Sterben* (The Death) into the Japanese language as *Miren*, depicting the tragic *dolce vita* of a tubercular patient. This novel would greatly influence Tatsuo Hori, a central figure of the so-called "sanatorium literature."

Czech pathologist Anton Ghon's *Der primäre Lungenherd bei der Tuberkulose der Kinder*.

Hans Meyer and Josef Mally described *Isoniazid* in "*Über Hydrazinderivate der Pyridincarbonsäuren*" in *Monatshefte Chemie verwandte Teile anderer Wissenschaften* (33: 393-414), that was to become our first-line medication in avoidance and treatment of tuberculosis.

1916

The corn borer arrived in the US (note that in Stephen Vincent Benet's THE DEVIL AND DANIEL WEBSTER, Jabez Stone lost his crop to corn borers although Daniel Webster had died 64 years before this arrival of the corn borer).

Typhoid outbreaks forced the closure of Staten Island oyster beds.

Youth Farm Clubs, established during World War I, concentrated on tomatoes as a crop, helping to popularize it.

PLANTS

1917

Knibbs calculated that (exclusive of the Arctic and Antarctic) with a land area of 33 billion acres, Earth could yield 752.4 trillion bushels of corn, which could support a population of 132 billion.

PLANTS

("Gee, Clem, how many SUVs is that?")

In this year the Ford corporation's Fordson tractor was introduced at $397.

1919

The publication of INBREEDING AND OUTBREEDING by E.M. East and D.F. Jones gave scientific underpinnings to corn breeding and introduced Jones's system of double crossing through the use of four inbred lines.

PLANTS

1921

George Washington Carver appeared before the congressional Ways and Means Committee to promote a protective tariff on peanuts.

PLANTS

1922

W.J. Robbins initiated plant tissue culture studies.

Knudson published his asymbiotic method of seed germination; “Nonsymbiotic Germination of Orchid Seeds” in Botanical Gazette. This would revolutionize the propagation of orchids, both sexually and vegetatively, and lead to techniques of mericloning and meristemming that are used widely today for production of many crop species.

1928

Following up on success with *Drosophila*, Stadler used X-rays to produce mutations in corn (*Zea mays*).

PLANTS

1930

The Sanforizer Company introduced an ammonia-based process, devised by Sanford Cluett, that causes cotton fibers to swell, preventing shrinkage when washed.

1937

Professor Albert Szent-Györgyi was awarded a Nobel Prize for his research with paprika, in the course of which he had discovered Vitamin C.

PLANTS

1938

THE WRITINGS OF Gilbert White OF SELBORNE, selected and edited by H.J. Massingham; with wood-engravings by Eric Ravilious. London, The Nonesuch Press.[58]

Blomquist, H.L. "Peat mosses of the southeastern States." Jour. Elisha Mitchell Sci. Soc. 54: 1-21. Also, "The North Carolina Academy of Science." Science, New Series 88 (2272): 59-60.

Szent-Györgyi withdrew his recent suggestion that "citrin" (which had come to be understood to consist of various flavonoids), which was present along with vitamin C in citrus peels, could help maintain small blood vessels. These bioflavonoids were termed Vitamin P, and would become the subject of much discussion (the US Food and Drug Administration has since concluded that bioflavonoids are neither vitamins nor of nutritional value).

PLANTS

1940

First commercial paprika crops grown, in California.

PLANTS

Steroids discovered in the yam (*Dioscorea*) proved useful for the manufacture of cortisone and sexual hormones. (Consequently, the cost of hormones dropped from $80 to $2 per gram. This was amplified through the work of Russell Marker, who while assigned to study steroids during a research fellowship at Pennsylvania State University discovered he could manufacture progesterone from steroids in the yam. Unable to receive support to further this work, he moved to Mexico City and formed a joint venture named Syntex. Though Marker abandoned his research, Syntex continued work with other chemists. Eventually Syntex manufactured testosterone and 19-norprogesterone, an analog of progesterone that was even more effective at inhibiting ovulation. Administered in an oral version, this would become in 1956 "The Pill.")

58. The Reverend White's NATURAL HISTORY OF SELBORNE is only the 4th most reprinted book in the English language.

1943

While looking for methods of easing the pain of childbirth, the Swiss biochemist Albert Hofmann discovers the hallucinogenic effects of rye ergot fungus. By 1948, the CIA and KGB were interested in Hofmann's discovery, and over the next twenty years their financing caused the development of synthetic hallucinogens such as LSD-25, DMT, BZ, and EA-1475. The uses that the Cold Warriors imagined that they would get from these developments included improvements in brainwashing techniques. What they got was an increase in urban street crime.

At the instigation of S.L.A. Marshall, a Detroit journalist turned military historian, and Curtis LeMay, a B-17 group commander, the United States Army develops post-combat debriefings. The purpose of these after-action reports, as they became better known, was to learn precisely what happened during a battle.

That way systemic problems could be identified and resolved. The methodology involved getting everyone from private to colonel in one place, then, in LeMay's words, asking "what went right, what went wrong, and why it went wrong. And each of you is in the act. Everybody has his say. If you think your group commander is a stupid son-of-a-bitch, now is the time to say it. And why." When the questions were asked by someone as frank as LeMay or as insightful as Marshall, observations could be surprising. For example, Marshall's most surprising (and controversial) observation was that just 20-25% of Army infantry fired their individual weapons against human targets. Ever. Now Marshall was never above stretching a fact to prove a point, and many subsequent writers contested the exact percentage of firers and non-firers. No matter; during the Korean War, the Army treated these numbers as gospel and went about improving them. In a 1995 book called On Killing, Army psychologist Dave Grossman says that the Army did this through desensitization, conditioning, and denial. Desensitization involved teaching soldiers to view non-soldiers and potential enemies as sub-humans, to applaud group violence, and to develop a culture where excessive drinking was strongly approved. Conditioning involved building rifle ranges where soldiers took quick shots at human silhouette targets rather than carefully aimed shots at bull's eyes. And denial included stressing that individual soldiers fired only upon order, and never upon their own initiative. ("Ich musste," said all the Nazis during the Nürnberg trials: "I had to.") These changes evidently increased unit lethality. (Unverified Army data reports infantry firing rates at 55% in 1951 and 90% in 1971.) They apparently also contributed to increased risk of postwar alcoholism, suicide, and divorce.

About 3,000,000 people died of starvation, and of the various ailments and incidents that accompany general starvation, in Bengal.

PLANTS

1949

In Japan, although the widespread use of methamphetamine came to be restricted to cases under a doctor's prescription, intravenous use would spread among bohemians, novelists, artists, and entertainers. They would derive their supplies of the substance from the black market.

English phycologist (a scientist who studies algae) Kathleen Drew-Baker described the complex life cycle of *Porphyra* (*nori* is in this genus). This new understanding allowed commercial farming of *nori* to flourish. A statue of Drew-Baker now stands in a Tokyo park overlooking the bay.

PLANTS

In Japan, it had never been possible to get away with a statement such as "That government is best which governs least" or "That government is best which governs not at all." Such statements would be taken to be not only nonsupportive of the current activities of the existing government, and thus treasonous, but also nonsupportive of the role government must play in forcing the people to restrain themselves and behave decently toward one another, and therefore supportive of all sorts of insane excess, cruelty, and abandon. In 1947, when an edition of excerpts titled THOREAU'S WORDS (*THOREAU NO KOTOBA*) had been published, some excerpts from "A PLEA FOR CAPTAIN JOHN BROWN" and "THE LAST DAYS OF JOHN BROWN" were included but "RESISTANCE TO CIVIL GOVERNMENT" was entirely omitted. In 1949, however, Akira Tomita, Thoreau's

biographer in the Japanese language, was able to translate and present "Resistance to Civil Government." However, the president of the Japanese Thoreau Society, Masayoshi Higashiyama, has issued the following statement:

> For anyone whose eyes can see what is going on in this evil world and whose brain can understand what his eyes have seen during the two wars, it would be difficult to accept Thoreau's opinion that "That government is best which governs least" or "That government is best which governs not at all." Since the age of Franklin Delano Roosevelt, the role of government has become much more important and significant in our lives than it had been before. It has become our belief that unless social and international security are established, the freedom of individual beings is always in crisis, and that unless force backs us up, we cannot maintain a world of justice.

In Professor Higashiyama's defense, I will add that this seems also to be the attitude of any number of American academic Thoreauvians. I recall in particular one such gentleman who –at the Thoreau *Jubilee* of Summer 1992 in Worcester– after expressing to me his personal contempt for the principle of nonresistance to evil as expressed by Jesus and for all cowards such as Gandhi who attempt passively to submit to the violence of their fellows, insisted that had our hero Thoreau been in better health in 1862, he would most assuredly have volunteered for the unit which, on the anniversary of the North Bridge battle of the 18th Century, marched to the train station in Concord to fight in the Union army.

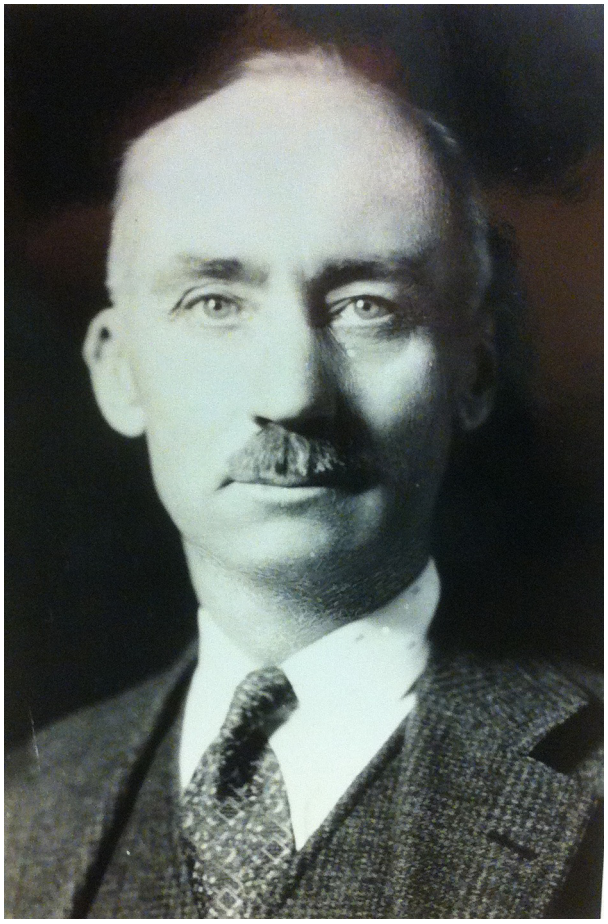
1953

The American consumer was introduced to freeze-dried chives.

Richard Bartlett Gregg insisted, in "The Structure of a Non-violent Society" that Non-Violence and Voluntary Simplicity would merely "leave most people hanging in mid-air," leaving people without meaning and purpose in their lives, and that what we must do in order to restore meaning and purpose to modern existence is construct an "entirely new civilization" stressing cooperative arrangements and considering agriculture to constitute "the most important part of the life of the nation."

1957

At Duke University in Durham, North Carolina, Professor Hugo Leander Blomquist became Emeritus Professor of Botany. In this year, Blomquist, H.L. A revision of *Hexastylis* of North America. Brittonia 8(4): 255-281.



Publication of the correspondence of John Custis (1678-1749) of Williamsburg, Virginia with Friend Peter Collinson of London, as E.G. Swem's BROTHERS OF THE SPADE. Custis, whose garden "means all the world to me," heard of Collinson's desire for the "mountain cowslip" or Virginia bluebell (*Mertensia virginica*) and sent this "beautifull out of the way plant and flower" to London, in the first of a series of 39 letters. He provided botanicals from the marshland and forests of eastern Virginia, for instance the fringe tree and the umbrella magnolia. Collinson in turn dispatched to America the latest in European garden fashion — striped crown imperial lilies, white foxgloves, and variegated evergreens.

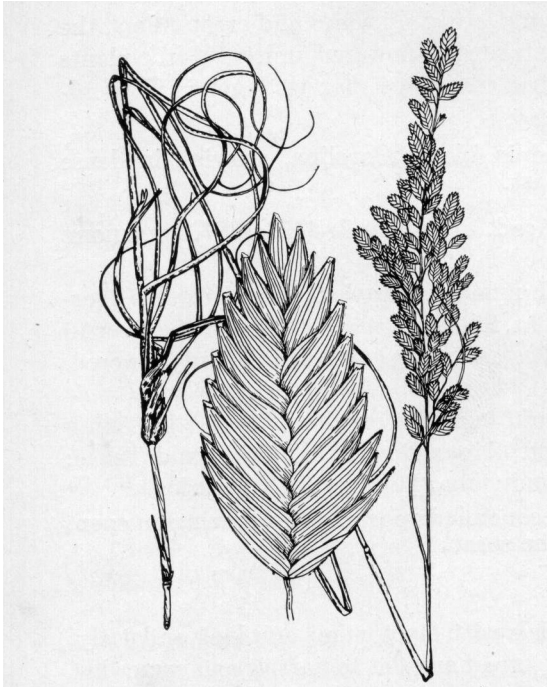
BOTANIZING

Extracts from the common periwinkle were found effective in the treatment of childhood leukemia.

PLANTS

1968

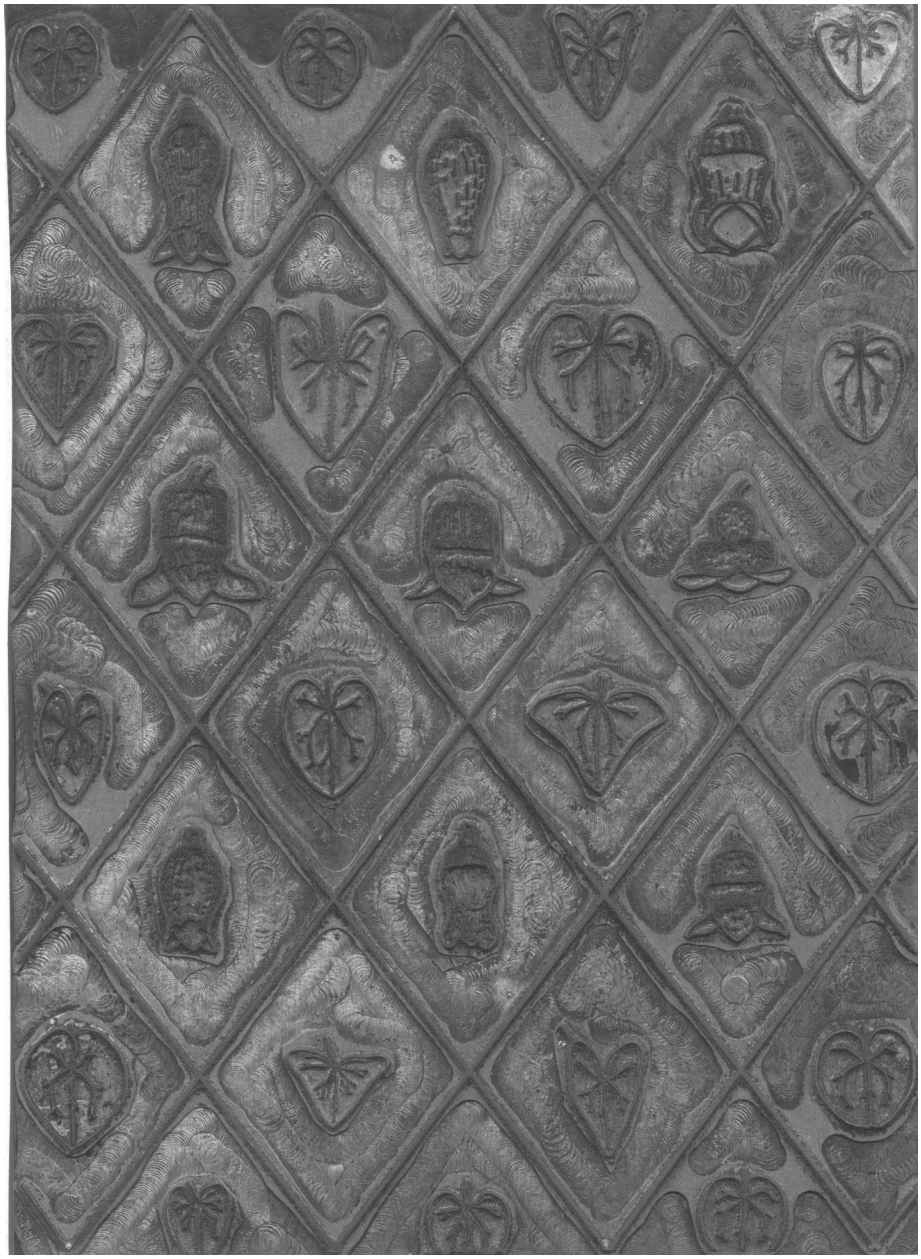
Albert E. Radford and C. Ritchie Bell's MANUAL OF THE VASCULAR FLORA OF THE CAROLINAS. Most of the grasses and ferns of this manual had been collected by Professor Hugo Leander Blomquist of Duke University.



BOTANIZING

The University of North Carolina Herbarium has so far databased approximately 3,500 specimens as having been collected by Professor Blomquist and no doubt, as its cataloging effort continues, thousands more will be noted — in fact, the University of North Carolina holds several type specimens of taxa that have been named in his honor, such as the dwarf-flower heartleaf *Hexastylis naniflora* Blomquist (illustrated), and *Hexastylis pilosiflora* Blomquist.

PLANTS



1970

Norman Borlaug was awarded the Nobel Peace Prize. As the “Father of the Green Revolution” he had, while working at the Rockefeller-financed CIMMYT Agricultural Station near Mexico City, developed high yielding dwarf strains of wheat. The idea was that such seed would enable tropical countries to double their wheat productivity. Of course, subsistence farmers were still outa luck, because such seed could be obtained only by those able to purchase it, and able to obtain the commercial fertilizers needed to nourish it, and the commercial pesticides needed to protect it.

PLANTS

1972

US domestic production of spices reached 30% of total US spice consumption for the 1st time.

String trimmers were introduced.

Robert Helmer MacArthur’s GEOGRAPHICAL ECOLOGY.

1975

Members of the United Farm Workers union would no longer need to use the short-handled hoe while working in lettuce cultivation.

PLANTS

1977

The American Spice Trade Association completed its first complete nutritional analysis of spices.The

SPICE

perfectly preserved corpse (from the 2nd century BC) of the wife of the Marquis of Tai was found in Ch'ang-sha. In addition to melon seed discovered in her intestines, the tomb contained a bowl of peaches. Belief since the Ch'in Dynasty held that peaches "eaten in time" would preserve the body from deterioration forever. This custom survives today in the tradition of *shoutao* — the long life peach — a steamed roll served on birthdays.

PLANTS

During this year and the following one, Deng Xiaoping was emerging as the preeminent leader of China.

1981

For the 1st time, spice usage in the US passed the half billion pound mark.

Hundreds of people in Spain became sick and died from consuming cheap olive oil that had been adulterated with French rapeseed oil. The rapeseed oil contained industrial aniline dyes and had been manufactured only for use in steel mills.

PLANTS

1982

Gilbert White's YEAR: PASSAGES FROM THE GARDEN KALENDAR & THE NATURALIST'S JOURNAL / SELECTED BY JOHN COMMANDER; INTRODUCTION BY RICHARD MABEY. Oxford, NY: Oxford UP.

The1st genetically engineered crop was developed at Washington University in St. Louis, Missouri. (By 1994 the Flavr-Savr tomato would become the 1st such plant approved for commercial marketing. The Flavr-Savr tomato was designed for slow fruit ripening and increased shop life.)

PLANTS

1983

With some 750,000 bathing visits to the pond per year, the urine content of the waters of Walden Pond was greater than that of any other fresh waters in the Commonwealth of Massachusetts.

Kary B. Mullis devised the polymerase chain reaction, a system to replicate large quantities of DNA from a small initial sample. The ability to create a large sample of DNA for testing and study had extraordinary impact on various fields of study, from areas of paleobiology to forensic analysis.

Barbara McClintock received the Nobel Prize for her work with the complex color patterns of Indian corn, studies that revealed moveable genetic elements termed "jumping genes."

PLANTS

A British study discovered powdered ginger to be twice as effective as Dramamine in the prevention of Motion Sickness.

When the US invaded Grenada, nutmeg production there ceased and world prices temporarily escalated.

SPICE

1994

Marcus Woodward (ed.), GERARD'S HERBAL. THE HISTORY OF PLANTS (London: Senate).

PLANTS

Also in this year, Duane Isely's ONE HUNDRED AND ONE BOTANISTS (Iowa State UP).

BOTANIZING

2004

The H.L. Blomquist Garden of Native Plants of Duke Gardens in Durham, North Carolina offered a home to Steven Church's collection of 24 species of rare and endangered native plants.

PLANTS

"It's all now you see. Yesterday won't be over until tomorrow and tomorrow began ten thousand years ago."

– Remark by character "Garin Stevens" in William Faulkner's INTRUDER IN THE DUST

Prepared: December 5, 2013

ARRGH AUTOMATED RESEARCH REPORT

GENERATION HOTLINE

This stuff presumably looks to you as if it were generated by a human. Such is not the case. Instead, someone has requested that we pull it out of the hat of a pirate who has grown out of the shoulder of our pet parrot "Laura" (as above). What these chronological lists are: they are research reports compiled by ARRGH algorithms out of a database of modules which we term the Kouroo Contexture (this is data mining). To respond to such a request for information we merely push a button.

Commonly, the first output of the algorithm has obvious deficiencies and we need to go back into the modules stored in the contexture and do a minor amount of tweaking, and then we need to punch that button again and recompile the chronology — but there is nothing here that remotely resembles the ordinary "writerly" process you know and love. As the contents of this originating contexture improve, and as the programming improves, and as funding becomes available (to date no funding whatever has been needed in the creation of this facility, the entire operation being run out of pocket change) we expect a diminished need to do such tweaking and recompiling, and we fully expect to achieve a simulation of a generous and untiring robotic research librarian. Onward and upward in this brave new world.

First come first serve. There is no charge.
Place requests with <Kouroo@kouroo.info>. Arrgh.