BOTANY, AND NEW-WORLD BOTANY

And yet — in fact you need only draw a single thread at any point you choose out of the fabric of life and the run will make a pathway across the whole, and down that wider pathway each of the other threads will become successively visible, one by one.

— Heimito von Doderer, *DIE DÂIMONEN*

300 BCE

Theophrastus, 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*:

Plant	Name	Place
Cherry	*Prunus avium*	Europe and Asia

OTHERS

50 CE

Pedanius Dioscorides, a Roman army surgeon, was author of an ancient compilation of descriptions and medicinal uses for plants *De Materia Medica*, 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

70 CE

At about this point Caius Plinius Secundus or Pliny the Elder, 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, many errors in Pliny's account would become all too 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 tornadoes 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

500 CE

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

512 CE

Townspeople in a district of Constantinople presented an illuminated manuscript of the 1st-Century *De Materia Medica* of Pedanius Dioscorides of Anazarbus Πεδάνιος Διοσκουρίδης to their patron, Princess Anicia Juliana, daughter of puppet emperor Flavius Anicius Olybrius, as a "coffee-table" book.
For a millennium "Juliana's codex" would be recognized as the best compilation of Western knowledge available about botany — and this illuminated manuscript, slightly the worse for wear in a hospital over the years, happens to be still in existence at the *Österreichische Nationalbibliothek* in Vienna.

PLANTS

1483

The plant descriptions of Theophrastus, such as his *HISTORIA PLANTARUM*, had during the middle ages been generally unavailable, and 2d-hand versions had been loaded with misinformation, but the rediscovery and printing of his works by Teodoro of Gaza in the Latin language began at this point — and would help to rekindle a Western interest in botany.

BOTANIZING

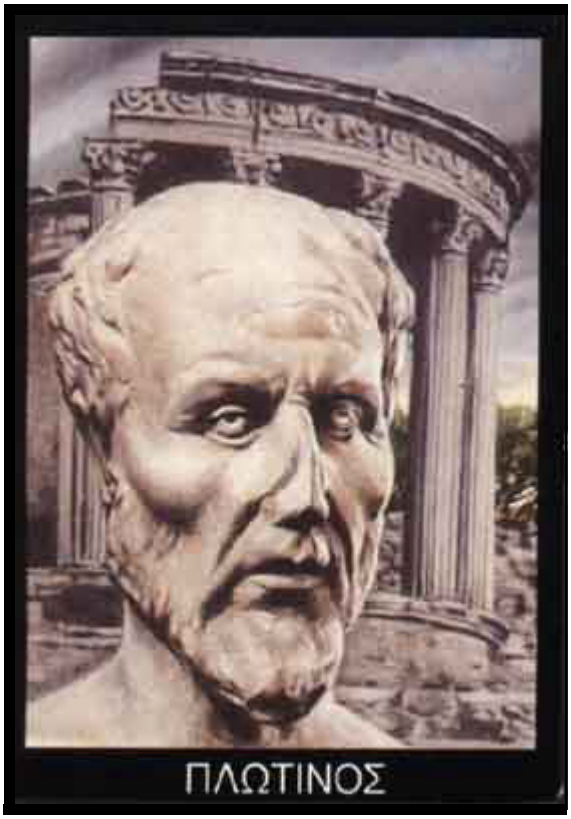
Here, for instance, are amaranth and mandrake:

1484

One of the 1st vernacular herbals, Johan Veldener's *HERBARIUS IN DIETSCHE* (Würzburg).

1492

The profession of publisher began to emerge. It consisted of the vertical integration of three previously separate trades: type founder, printer, and bookseller. The *ENNEADS* of Plotinus first appeared in book form, at Florence, in a Latin translation by Marsilio Ficino.



A proxy war of pamphlets arose when the physician Niccolò Leoniceno of Vicenza pointed out manifold inaccuracies in Pliny the Elder's translations of Greek medical texts into Latin for inclusion in his NATURAL HISTORY (while not failing to drop the news that this Roman had been supposing the moon to be preposterously twice the size of the planet Earth about which it circled). His concern was that if physicians relied on Pliny, they might well prescribe medications for their patients that would be ineffective or harmful because obtained from the wrong plant. Faced with this challenge to the prestige of the classic Western scholars, outraged humanists hired Pandolfo Collenuccio, a lawyer and historian, to write in defense. Pamphlet skirmishing would continue until 1509.

1501

Leonhard Fuchs, father of German Botany, was born.

1530

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

Otto Brunfels's *HERBARIUM VIVAE EICONES* with woodcuts by Hans Weiditz, the 1st newly written and printed botanical book/herbal.

PLANTS

1540

During this year and the following one Conrad Gesner visited the medical university of Montpellier.

Dietrich Dorsten's BOTANICON.

BOTANIZING

BOTANICON,

CONTINENS HERBARVM, ALIORVMQVE simplicium, quorum usus in Medicinis est, descriptiones, & Icones ad uiuum effigiatas: ex præcipuis tam Græcis quàm Latinis Authoribus iam recens concinnatum. Additis etiam, quæ Neotericorum obseruationes & experientiæ uel comprobarunt denuo, uel nuper inuenerunt.

AVT. THEODERICO DORstenio Medico.

Cum Gratia & Priuilegio Cæsareo.

FRANCOFORTI, Christianus Egenolphus excudebat.

1543

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

Girolamo Fracastoro expounded a germ theory of disease. He alleged that infection might spread through direct contact, clothes, and airborne germs.

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 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

1570

In Geneva, the printing house of Estienne or that of Stephanus produced: Henri Estienne, ARRANGEMENTS OF GREEK AND LATIN ORATIONS. The types, Greek and Roman, had been designed by the famous type designer Claude Garamond (six recuttings of Garamond types have been made since 1919, by various typefounders).

What is asserted to have been the initial botanical book on tobacco was created by Pena and Lobel of London.

In London, Barclay's SHIP OF FOOLES OF THE WORLD was printed by John Cawood using a mixture of English black-letter and roman types. The English priest Alexander Barclay's translation of Sebastian Brant's *NARRENSCHIFF* had been 1st printed in England early in 1509, but this "translation" is more a ship of fools of 16th-Century England than it is a translation of the earlier book. What it presents is an understanding of the poverty-stricken priests and court-ridden life of the common people during the reigns of Kings Henry VIIth and VIIIth. Both the original author, Brant, and the translator, Barclay, held to the general design "to ridicule the prevailing follies and vices of every rank and profession under the allegory of a ship freighted with fools. Fools are evil and malicious people to be displayed and scolded." Barclay installs himself as captain, "I am the firste fole of all the hole navy." These writers ridiculed 110 categories in verse. Zeydal states that this book "played an important role in outmoding medieval allegory and morality and in directing literature into the channels of the drama, the essay and the novel of character." The woodcuts which added much to the popularity of Barclay's translation are crude copies of those which appeared in the original Basle edition, often attributed to young Durer. John Cawood, who printed this 2d edition of the SHIP OF FOOLES in 1570, had been appointed Royal Printer by Queen Mary in 1553. He would be allowed to retain this lucrative post under Queen Elizabeth, but she would require him to share the honor and privileges of this title with another printer, Richard Jugge.

HISTORY OF THE PRESS

1575

The Roman Catholic authorities of Mejico enacted an ordinance against smoking in any place of worship within the Spanish colonies of the New World. From this year until 1600 in Europe, although smoking for pleasure was still controversial, tobacco would come into almost universal approval as a medication. Nicolas Monardes had devoted the 2d part of his book (which had been published in 1571 and in 1574) on the plants of the New World to a lengthy discourse on the plant, recommending it as an infallible cure for 36 different ailments. Summing up current beliefs regarding this much praised *herba panacea* or holy herb, this botanical treatise would become the fundamental source for all subsequent pro-tobacco literature. Sultan Murad II would cultivate tobacco, but only as a novelty and a medicine, and smoking would be introduced into Turkey by the English. In South China and in Japan, limited smoking would during this period become apparent — perhaps the practice was being introduced by Portuguese sailors and merchants. Sir Walter Raleigh would be introducing the practice of smoking this herb into the court of England, to the point at which smoking would become the "duty" of every man of fashion. In England, the leaves would come to be worth their weight in silver. Numerous publications would praise their medicinal virtues, initially in 1577 with John Frampton's translation of Nicolas Monardes's herbal, titled JOYFUL NEWES OUTE OF THE NEWE FOUNDE WORLDE. Although tobacco would be cultivated as a medicinal herb in Tuscany and Rome, there seems to be no evidence that it was there being widely smoked.

1583

Andrea Cesalpino's *De Plantis libri* ordered the plant species in families. 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

1585

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

PEOPLE OF WALDEN

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

GEOLOGY

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. This palm tree still survives. It had been planted in this year. It is in the glass house inside the circular garden in the botanical garden of Padua, Italy.

Goethe would write to Charlotte von Stein in 1786, the year in which he would sight this palm tree that had been planted in 1585:

> 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.

Henry 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.)

THE AGE OF REASON WAS A PIPE DREAM, OR AT BEST A PROJECT.
ACTUALLY, HUMANS HAVE ALMOST NO CLUE WHAT THEY ARE DOING,

BOTANY **BOTANY**

WHILE CREDITING THEIR OWN LIES ABOUT WHY THEY ARE DOING IT.

Walter Raleigh became Sir Walter. His fleet of seven vessels under Sir Richard Grenville and Ralph Lane, with 108 men, reached North Carolina's Roanoke Island on the Virginia coast in June (he had also sent a fleet to South America). With the expedition was Thomas Hariot, who in 1588 would publish an account of Virginia

A

Chronological TABLE

Of the moſt remarkable paſſages in that part of America, *known to us by the name of* NEW-ENGLAND.

Anno Dom.

1585. *Nova Albion* diſcovered by Sir *Francis Drake*, and by him ſo Named.

1585. *April* 9. Sir *Richard Greenevile* was ſent by Sir *Walter Rawleigh* with a Fleet of Seven Sail to *Virginia*, and was ſtiled the General of *Virginia*.

in which he would comment on its many exotic plants and animals (he had assisted in the design of the ships and was serving as Sir Walter's accountant and provided navigational expertise, while learning the Algonquian language). Neither the North American fleet nor the South American fleet would find any gold whatever, which was a major disappointment. Asked by Sir Walter to find the most efficient way to stack cannon balls on deck, Hariot whipped up a mathematical analysis of the close-packing of spheres that is remarkably prescient in regard not only to atomism but also to modern atomic theory (later he would stand accused of a

belief in atomism, which of course was an unholy materialism and entirely unsafe).

BOTANIZING

Chronological observations of America

Cautionary Towns and Forts in the low-Countries delivered unto Queen *Elizabeths* hands.

Sir *Richard Greenville* was sent by Sir *Walter Rawleigh April* the Ninth, with a Fleet of 7 sail to *Virginia*, and was stiled the General of *Virginia*. He landed in the Island of St. *John de porto Rico May* the Twelfth, and there fortified themselves and built a *Pinnasse*, &C. In *Virginia* they left 100 men under the Government of Mr. *Ralph Lane*, and others.

Sir *Francis Drake's* voyage to the *West-Indies*, wherein were taken the Cities of St. *Jago*, St. *Domingo Cartagena*, and the Town of St. *Augustine* in *Florida.*

Now (say some) Tobacco was first brought into *England* by Mr. *Ralph Lane* out of *Virginia*.

From the year of the World

to the year of Christ 1673.

BY *John Josselyn* Gent.

FLORIDA

TOBACCO

READ ABOUT VIRGINIA

THE FUTURE CAN BE EASILY PREDICTED IN RETROSPECT

1588

William Hunnis's wife died at Ilford. He would no longer be associated with the Company of Grocers of London.

Thomas Hariot, who in later years would be recognized as a preeminent natural philosopher (scientist), had been part of a group sent by Sir Walter Raleigh to establish the first English colony in the New World. During 1585-1586 on Roanoke Island, while most of his party had fitfully searched for gold while bitching at how there were not "in Virginia any English cities, or fine houses, or their accustomed dainty food, or any soft beds of down or feathers," he had been taking accurate stock of the land and its bounties. It is he who is reputed to have carried back home on Sir Francis Drake's ship two strange plants: the tobacco and the potato. At this point he had returned to London and issued A BRIEF AND TRUE REPORT OF THE NEW FOUND LAND OF VIRGINIA, DIRECTED TO THE INVESTORS, FARMERS, AND WELL-WISHERS OF THE PROJECT OF COLONIZING AND PLANTING THERE:

> There is an herb called *uppówoc*, which sows itself. In the West Indies it has several names, according to the different places where it grows and is used, but the Spaniards generally call it tobacco. Its leaves are dried, made into powder, and then smoked by being sucked through clay pipes into the stomach and head. The fumes purge superfluous phlegm and gross humors from the body by opening all the pores and passages. Thus its use not only preserves the body, but if there are any obstructions it breaks them up. By this means the natives keep in excellent health, without many of the grievous diseases which often afflict us in England.
> This *uppówoc* is so highly valued by them that they think their gods are delighted with it. Sometimes they make holy fires and cast the powder into them as a sacrifice. If there is a storm on the waters, they throw it up into the air and into the water to pacify their gods. Also, when they set up a new weir for fish, they pour *uppówoc* into it. And if they escape from danger, they also throw the powder up into the air. This is always done with strange gestures and stamping, sometimes dancing, clapping of hands, holding hands up, and staring up into the heavens. During this performance they chatter strange words and utter meaningless noises.
> While we were there we used to suck in the smoke as they did, and now that we are back in England we still do so. We have found many rare and wonderful proofs of the *uppówoc*'s virtues, which would themselves require a volume to relate. There is sufficient evidence in the fact that it is used by so many men and women of great calling, as well as by some learned physicians.

The above was part of a compendium of "commodities" he intended to help maintain interest in Sir Walter Raleigh's doomed attempts to make money out of his commercial explorations to the New World. In providing a list pertaining to the "Virginia" coast, this has amounted to the 1st book in English to mention the flora and fauna of any part of what is now the United States. After Hariot's return to England, he would meet and become buddies with Raleigh and would be his main contact with the outside world during the 13 years of residence in the Tower of London (where, in fact, Raleigh was able to grow his own tobacco as well as set up his own little distillery).[1]

BOTANIZING

READ ABOUT VIRGINIA

1. Sir Walter Raleigh reportedly would have a pipe of his home-grown for solace while on his way to have his head surgically excised in 1618. Hariot, on the other hand, would be during that same period suffering terribly from a "cancerous ulcer of the nose," presumably inoperable and caused one may suspect by tobacco, till his death at the age of 61 in 1621. Life just ain't fair.

1590

In Paris during this decade, Jean Robin and his nephew Vespasien would be growing and describing several species of plants they had obtained from Canada and New England.

BOTANIZING

1597

John Gerard (or Gerratt) escaped from the Tower of London after being tortured.

John Arden (or Ardent), a resident of the Cradle Tower of the Tower of London since 1586, made good his escape.

LONDON

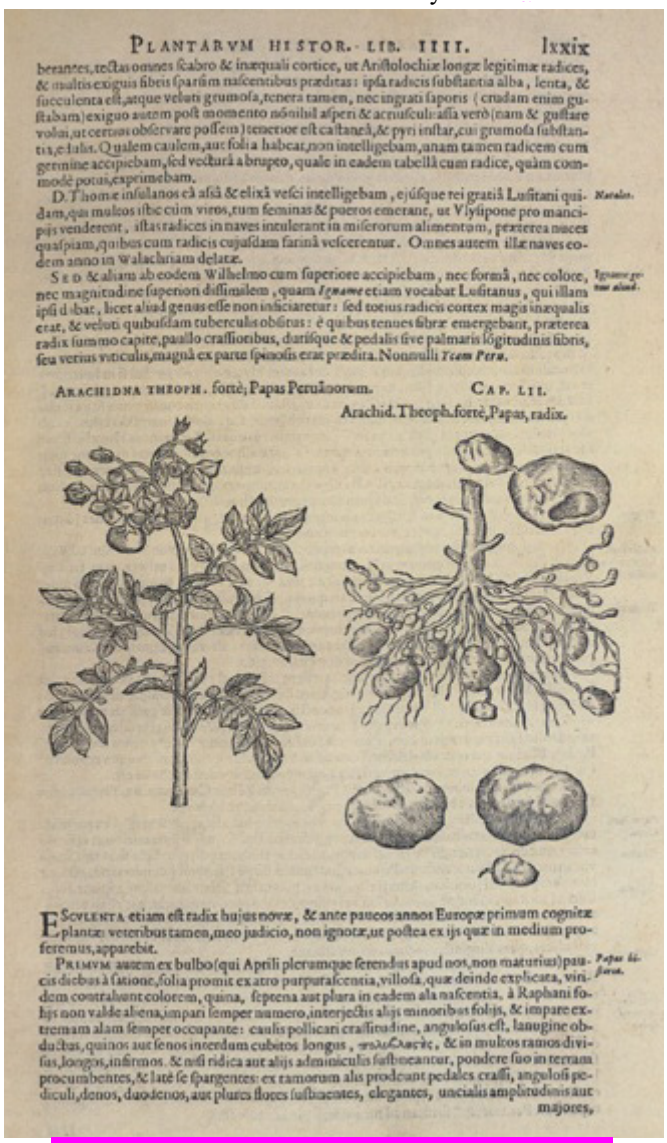
John Gerard published the unreliable HERBALL, OR GENERALL HISTORIE OF PLANTES (we're not speaking here of John Gerard the Jesuit, above, imprisoned and tortured meanwhile in the Tower of London). Midway through the printing process, he was accused of copying the work of a fellow botanist, Mathias de L'Obel, and sloppily at that.

BOTANIZING

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. lxxix

beantes, 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 & acrusculi: assa verò (nam & gustare volui, ut certius observare possem) teneriore est castanea, & pyri instar, cui grumosa substantia, edulis. Qualem caulem, aut folia habeat, non intelligebam, unam tamen radicem cum germine accipiebam, sed vectura à brumeo, quale in eadem tabella cum radice, quàm commodè potui, exprimebam.

D. Thomæ insulanos eâ assâ & elixâ vesci intelligebam, ejúsque rei gratiâ Lusitani quidam, qui multos ibi cum viros, tum feminas & pueros emerant, ut Vlyssipone pro mancipijs venderent, istas radices in naves inculerant in miserorum alimentum, præterea nuces quasdam, 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 *Ignamo* 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 vuiculis, magnâ ex parte spinosis erat prædita. Nonnulli *Ycam Peru.* *Ignamo genus aliud.*

ARACHIDNA THEOPH. fortè, Papas Peruanorum. 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 absena, 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, πολύκλαδος, & in multos ramos divisus, longos, infirmos. & nisi ridica aut alijs adminiculis sustineantur, pondere suo in terram procumbentes, & latè se spargentes: ex ramorum alis prodeant pedales crassi, angulosi pediculi, denos, duodenos, aut plures flores sustinentes, elegantes, unciales amplitudinis aut majores. *Papas Peruanorum flores.*

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.[2] 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.”[3]

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

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

1605

In the early 17th century in London there were a number of botanical gardens: John Parkinson's at Long Acre, Ralph Tuggy's, John Gerard's at Holborn, and toward Whitehall that of Edward Morgan, who specialized in the primula family. Recognizing the excellence of this, King James I issued letters of incorporation to London's Worshipful Company of Gardeners.

1609

John Tradescant the elder (born 1570) started his life career in botany with Robert Cecil, 1st Earl of Salisbury, at the new Hatfield House in Hertfordshire. He provided a sum of money so that in this year Captain Samuel Angall would be able to establish what was the very best route to Virginia.[4]

BOTANIZING

4. John Tradescant was of yeoman stock. He would make himself the greatest gardener of his day. He would introduce to Britain the greatest number of new, strange and exotic trees. It would be he who would bring over the tulip. He would establish a garden of his own at South Lambeth near Lambeth Palace, the official residence of the Archbishop of Canterbury.

1611

John Tradescant set off on what amounted to a shopping expedition for new plants, on behalf of Robert Cecil. (On one of these shopping trips of his he would meet and become a lifelong friend of Jean Robin, Royal Herbalist to King Henry IV and King Louis XIII. He would also become friends with Rene Morin, who would make himself one of the greatest French nurserymen of his day and become a famous collector of natural history objects.)

BOTANIZING

1614

John Tradescant the elder left Robert Cecil's employment and turned to farming as a sideline. The next we will hear of him, he will have begun to work in Canterbury, as a gardener with Sir Edward Wotton at St. Augustine's Palace.Presumably the *Datura stramonium* jimsonweed was brought along with some *Nicotiana tabacum*

BOTANIZING

imported from Trinidad, unless it had already been imported to the continent as a native American trade item for use in initiation ceremonies.

It was perhaps as early as this that the evening primrose *Oenothera biennis* was taken from the New World to Europe. (Later, it would be re-introduced to its native land, from Germany, as "rampion.")

1616

From the very founding of the New World colonies, botanists avidly gathered North American plants. The Gardeners' Company of London had been among the City companies which contributed to the founding of Virginia, so it was nothing new when in this year John Tradescant agreed to be a shareholder in the plan to establish a plantation in Virginia under the leadership of Captain Samuel Argall. Mea Allan has reason to suspect that John Tradescant the Younger (1608-1662) went along on this expedition, and sent plants back. A plant the expedition sent back, *Tradescantia virginiana*, is now called "Spiderwort."

BOTANIZING

READ ABOUT VIRGINIA

1620

In *PRODOMUS THEATRI BOTANICI*, Caspar described plants being grown in Europe from seeds gathered by Champlain, as well as some of the New World plants that had been found by English explorers.

BOTANIZING

1621

The botanist John Tradescant joins the service of the Duke of Buckingham, George Villiers. At Oxford, founding of the 1st botanic garden in Britain, by Lord Henry Danvers, the Earl of Danby, 76 years after the founding of the 1st continental garden. This was probably inspired by John Tradescant's garden of exotic plants in South Lambeth.

THE SCIENCE OF 1621

1623

Vespasien Robin's botanical catalog included some new exotics from America.

Gaspard Bauhin's *Pinax Theatri Botanici Sive Index in Theophrasti, Dioscoridis, Plinii Et ...* accounted for about 6,000 botanical species, pulling together uncoordinated plant names and descriptions that had appeared in Theophrastus and Dioscorides as well as in later herbals and other plant records. By accepting Bauhin's compilation, Linnaeus would be able to avoid many of the complications of the ancient literature.

1625

Francis Bacon published his essay “Of Gardens” in which he imagined a princely 30-acre botanical Eden.

The botanist John Parkinson was Royal Apothecary.

The Prince of Wales became at the age of 25 King Charles I ruling as “Charles, by the Grace of God, King of England, Scotland France and Ireland, Defender of the Faith, etc.” (this rule over France was nominal) to his execution for treason in 1649:

Charles would marry a 15-year-old, Henrietta Maria, a sister of King Louis XIII of France, and the royal couple would produce four sons (Charles, who died as a teenager, Charles again, who would become Charles II, James, and Henry) and five daughters (Mary, Elizabeth, Anne, Catherine, and Henrietta Anne). At some point during this year or later, Mary Dyer was able to visit the court at Buckingham Palace (presumably she would have been using the name Marie Barrett), in “a dress worked in many colored silks, with gold and silver thread, the groundwork [of which was] ... rich white satin [and the embroidery of which was] butterflies, flowers, grasshoppers [and] other insects.” She would be taking this fancy gown with her to the New World — and according to report some pieces of it are still in the family. (The family also still preserves a gold bodkin bearing the initials MD.)

DYER OR DYRE

1626

Guy de la Brosse, physician to King Louis XIII, persuaded the French government to issue an edict that their ought to be a state Physic Garden. (As such things went, about 9 years later he would be able to obtain another edict, granting him permission to initiate the actual building and planting of such a botanical establishment.)

1628

John Tradescant the elder retired, to cultivate his own garden at Lambeth for the following two years.

BOTANIZING

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.

1630

During this decade, nearly a hundred different North American trees would be in cultivation in various European botanical gardens.

Appointment of John Tradescant to be Keeper of His Majesty's Gardens, Vines, and Silkworms, at Oatlands, near Weybridge. (This botanical garden would be destroyed under Lord Protector Cromwell.)

1633

At the Oxford botanical gardens, in this year the wall and the gate were completed.

An enlarged and amended version of John Gerard's 1597 botanical resource, THE HERBALL OR GENERALL HIſTORIE OF PLANTES,[5]

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]

5. 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.


Ceres
Pomona
Excideret 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.

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.

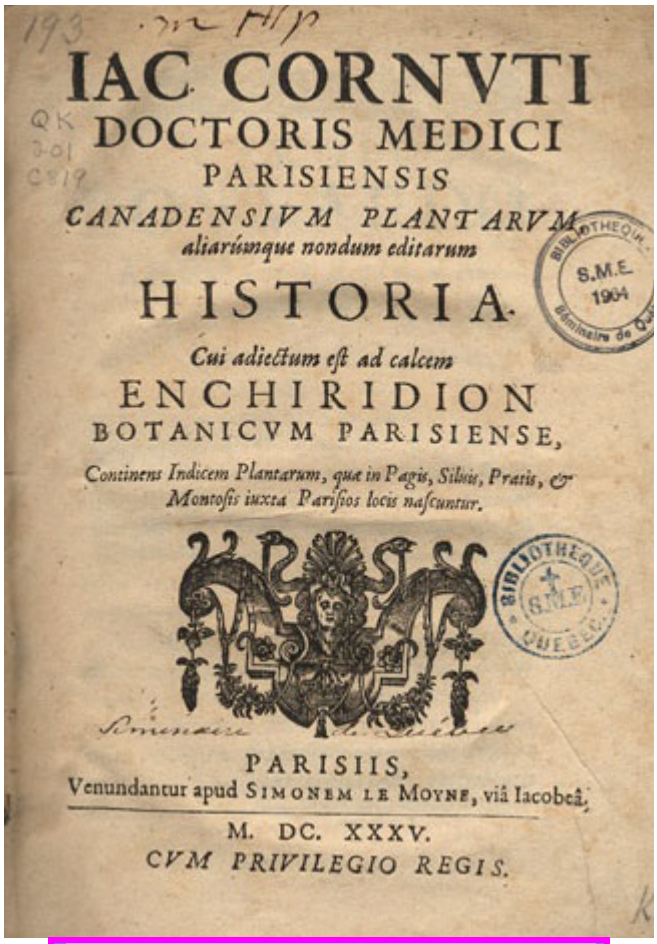
PLANTS

1635

By royal edict the Jardin des Plantes was established in Paris.

PLANTS

It would seem French explorers in Canada had been bringing plants back with them. Dr. Jacques Philippe Cornut or Cornutus's *IAC. CORNUTI DOCTORIS MEDICI CANADENSIVM PLANTARVM, ALIARÚMQUE NONDUM EDITARUM HISTORIA; CUI ADIECTUM EFT AD CALCEM ENCHIRIDION BOTANICVM PARISIENSE ...* , 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. Dr. Cornut, 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.


IAC. CORNVTI
DOCTORIS MEDICI
PARISIENSIS
CANADENSIVM PLANTARVM
aliarúmque nondum editarum
HISTORIA.
Cui adiectum eſt ad calcem
ENCHIRIDION
BOTANICVM PARISIENSE,
Continens Indicem Plantarum, quæ in Pagis, Siluis, Pratis, & Montoſis iuxta Pariſios locis naſcuntur.
PARISIIS,
Venundantur apud SIMONEM LE MOYNE, viâ Iacobeâ,
M. DC. XXXV.
CVM PRIVILEGIO REGIS.

JACQUES PHILIPPE CORNUT

(The 1st part of the above, *CANADENSIUM PLANTARUM,* describes more than 40 new species, but the 2d part, *BOTANICUM PARISIENSE*, is incomplete. 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.)

1637

John Tradescant the elder, who had spent his life importing plants from Virginia to England, died. His son John

Tradescant the younger (1608-1662) would make in all three botanizing visits: 1637, 1642, and 1654, and would settle in the vicinity of Yorktown and Belfield, Virginia.

The two Tradescants would together bring back more than 90 plants, and would be responsible for what would amount to a monopoly of plant introductions into England. “There is scarcely one garden in all Virginia that has not many of John Tradescant’s trees and plants growing in it.”

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

1638

John Tradescant the younger (1608-1662) took his father's gardening position at Oatlands.

BOTANIZING

1640

THEATRUM BOTANICUM, by John Parkinson, described more than 3,000 plants.

BOTANIZING

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

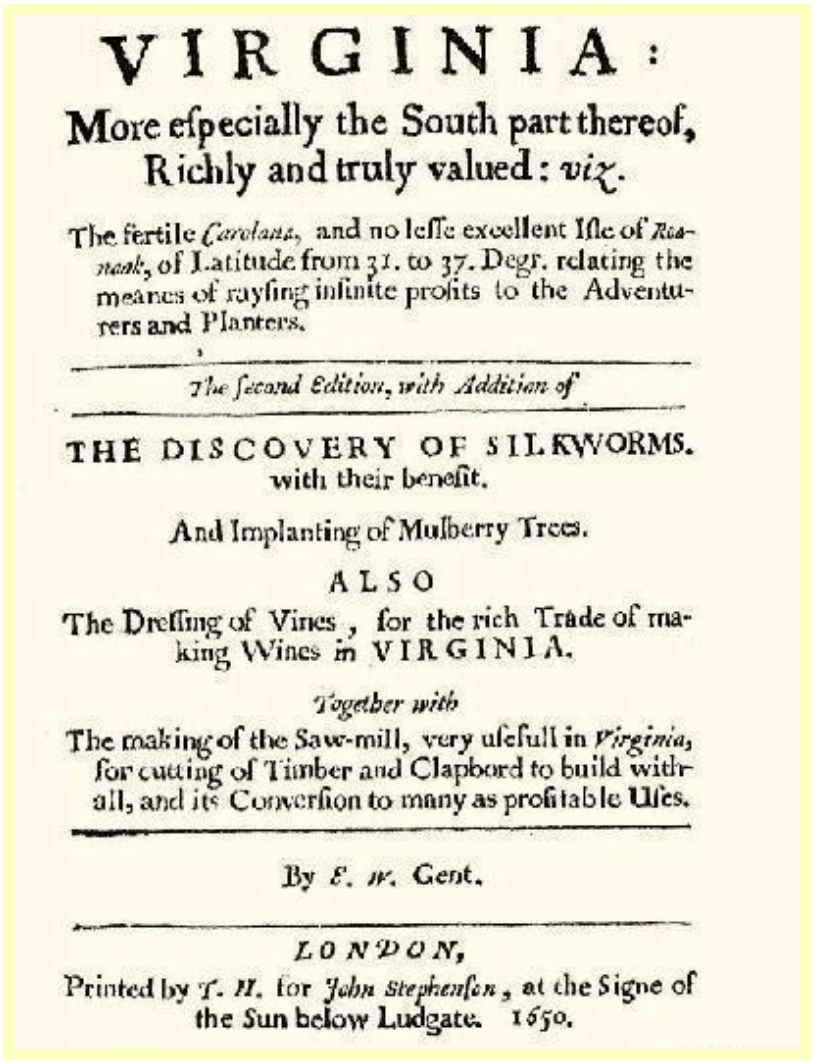
1650

John Parkinson died.

Today, the genus *Parkinsonia*, consisting of two species of trees from tropical America, has been named in his memory.

BOTANIZING

Publication, in London, of VIRGINIA, MORE ESPECIALLY THE SOUTH PART THEREOF, RICHLY AND TRULY VALUED VIZ. THE FERTILE CAROLANA, AND NO LESSE EXCELLENT ISLE OF ROANOAK, OF LATITUDE FROM 31 TO 37 DEGR. RELATING THE MEANES OF RAYSING INFINITE PROFITS TO THE ADVENTURERS AND PLANTERS:



VIRGINIA:

More especially the South part thereof, Richly and truly valued: *viz.*

The fertile *Carolana*, and no lesse excellent Isle of *Roanoak*, of Latitude from 31. to 37. Degr. relating the meanes of raysing infinite profits to the Adventurers and Planters.

The second Edition, with Addition of

THE DISCOVERY OF SILKWORMS. with their benefit.

And Implanting of Mulberry Trees.

ALSO

The Dressing of Vines, for the rich Trade of making Wines in VIRGINIA.

Together with

The making of the Saw-mill, very usefull in *Virginia*, for cutting of Timber and Clapboard to build withall, and its Conversion to many as profitable Uses.

By *E. W.* Gent.

LONDON,

Printed by *T. H.* for *John Stephenson*, at the Signe of the Sun below Ludgate. 1650.

SILK

BOTANIZING

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.

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

1656

A comment which might have led Parliament to anticipate an eventual American revolution: James Harrington predicted a tendency for Britain's colonies, as they "come of age," to wean themselves from reliance upon the mother country.

Sir Henry Vane's pamphlet A HEALING QUESTION PROPOUNDED AND RESOLVED, UPON OCCASION OF THE LATE PUBLIC AND SEASONABLE CALL TO HUMILIATION, IN ORDER TO LOVE AND UNION AMONG THE HONEST PARTY, AND WITH A DESIRE TO APPLY BALM TO THE WOUND BEFORE IT BECOME INCURABLE, proposing a new form of government for England, would result in his imprisonment in Carisbrooke Castle on the Isle of Wight for 9 months at the order of Lord Protector Oliver Cromwell.

THE QUESTION propounded is, What possibility doth yet remain (all things considered) of reconciling and uniting the dissenting judgments of honest men within the three nations, who still pretend to agree in the spirit, justice, and reason of the same good cause, and what is the means to effect this?

Answ. If it be taken for granted (as, on the magistrate's part, from the ground inviting the people of England and Wales to a solemn day of fasting and humiliation, may not be despaired of) that all the dissenting parties agree still in the spirit and reason of the same righteous cause, the resolution seems very clear in the affirmative; arguing not only for a possibility, but a great probability hereof; nay, a necessity daily approaching nearer and nearer to compel it, if any or all of the dissenting parties intend or desire to be safe from the danger of the common enemy, who is not out of work, though at present much out of sight and observation.

The grounds of this are briefly these: First, the cause hath still the same goodness in it as ever, and is, or ought to be, as much in the hearts of all good people that have adhered to it: it is not less to be valued now, than when neither blood nor treasure were thought too dear to carry it on, and hold it up from sinking; and hath the same omnipotent God, whose great name

is concerned in it, as well as his people's outward safety and welfare; who knows, also, how to give a revival to it when secondary instruments and visible means fail or prove deceitful. Secondly, The persons concerned and engaged in this cause are still the same as before, with the advantage of being more tried, more inured to danger and hardship, and more endeared to one another, by their various and great experiences, as well of their own hearts as their fellow-brethren. These are the same still in heart and desire after the same thing, which is, that, being freed out of the hands of their enemies. they may serve the Lord without fear, in holiness and righteousness all the days of their life.

As they have had this great good finally in their aims (if declarations to men and appeals to God signify anything), so, as a requisite to attain this, they did with great cheerfulness and unanimity draw out themselves to the utmost in the maintenance of a war, when all other means, first essayed, proved ineffectual. In the management of this war, it pleased God, the righteous Judge (who was appealed to in the controversy), so to bless the counsel and forces of the persons concerned and engaged in this cause, as in the end to make them absolute and complete conquerors over their common enemy; and by this means they had added unto the natural right which was in them before (and so declared by their representatives in Parliament assembled), the right of conquest, for the strengthening of their just claim to be governed by national councils, and successive representatives of their own election and setting up. This they once thought they had been in possession of, when it was ratified, as it were, in the blood of the last king. But of late a great interruption having happened unto them in their former expectations, and, instead thereof, something rising up that seems rather accommodated to the private and selfish interest of a particular part (in comparison) than truly adequate to the common good and concern of the whole body engaged in this cause: hence it is that this compacted body is now falling asunder into many dissenting parts (a thing not unforeseen nor unhoped for by the common enemy all along as their last relief); and if these breaches be not timely healed, and the offences (before they take too deep root) removed, they will certainly work more to the advantage of the common enemy than any of their own unwearied endeavours and dangerous contrivances in foreign parts put all together.

A serious discussion and sober enlarging upon these grounds will quickly give an insight into the state of the question, and naturally tend to a plain and familiar resolution thereof.

That which is first to be opened is the nature and goodness of the cause; which, had it not carried in it its own evidence, would scarce have found so many of the people of God adherers to it within the three nations, contributing either their counsels, their purses, their bodily pains, or their affections and prayers, as a combined strength; without which, the military force alone would have been little available to subdue the common enemy, and restore to this whole body their just natural rights in civil things, and true freedom in matters of conscience.

The two last-mentioned particulars, rightly stated, will

evidence sufficiently the nature and goodness of this cause.
For the first of these, that is to say, the natural right, which the whole party of honest men adhering to this cause are by success of their arms restored unto, fortified in, and may claim as their undeniable privilege, that righteously cannot be taken from them, nor they debarred from bringing into exercise, it lies in this:
They are to have and enjoy the freedom (by way of dutiful compliance and condescension from all the parts and members of this society) so set up meet persons in the place of supreme judicature and authority among them, whereby they may have the use and benefit of the choicest light and wisdom of the nation that they are capable to call forth, for the rule and government under which they will live; and through the orderly exercise of such measure of wisdom and counsel as the Lord in this way shall please to give unto them, to shape and form all subordinate actings and administrations of rule and government so as shall best answer the public welfare and safety of the whole.
This, in substance, is the right and freedom contained in the nature and goodness of the cause wherein the honest party have been engaged; for in this all the particulars of our civil right and freedom are comprehended, conserved in, and derived from their proper root; in which, while they grow, they will ever thrive, flourish, and increase; whereas, on the contrary, if there be never so many fair branches of liberty planted on the root of a private and selfish interest, they will not long prosper, but must, within a little time, wither and degenerate into the nature of that whereinto they are planted; and hence, indeed, sprung the evil of that government which rose in and with the Norman Conquest.
The root and bottom upon which it stood was not public interest, but the private lust and will of the conqueror, who by force of arms did at first detain the right and freedom which was and is due to the whole body of the people; for whose safety and good, government itself is ordained by God, not for the particular benefit of the rulers, as a distinct and private interest of their own; which yet, for the most part, is not only preferred before the common good, but upheld in opposition thereunto. And as at first the conqueror did, by violence and force, deny this freedom to the people, which was their natural right and privilege, so he and his successors all along lay as bars and impediments to the true national interest and public good, in the very national councils and assemblies themselves, which were constituted in such a manner as most served for the upholding of the private interest of their families; and this being challenged by them as their prerogative, was found by the people assembled in Parliament most unrighteous, burdensome, and destructive to their liberty. And when they once perceived that by this engine all their just rights were like to be destroyed especially (being backed, as it was, with the power of the militia, which the late king, for that purpose, had assumed into his hands, and would not, upon the people’s application to him in Parliament, part with into the hands of that great council, who were best to be intrusted with the nation’s safety), this was the ground of the quarrel, upon a civil account between the king and his party, and the whole body of adherents to the cause

of the people's true liberty; whereof this short touch hath been given, and shall suffice for the opening of the first branch of this clause.

The second branch which remains briefly to be handled is that which also upon the grounds of natural right is to be laid claim unto, but distinguishes itself from the former as it respects a more heavenly and excellent object wherein the freedom is to be exercised and enjoyed, that is to say, matters of religion, or that concern the service and worship of God.

Unto this freedom the nations of the world have right and title by the purchase of Christ's blood, who, by virtue of his death and resurrection, is become the sole Lord and Ruler in and over the conscience; for to this end Christ died, rose, and revived, that he might be Lord both of the dead and of the living, and that every one might give an account of himself, in all matters of God's worship unto God and Christ alone, as their own Master, unto whom they stand or fall in judgment, and are not in these things to be oppressed, or brought before the judgment-seats of men. For why shouldst thou set at naught thy brother in matters of his faith and conscience, and herein intrude into the proper office of Christ, since we are all to stand at the judgment-seat of Christ, whether governors or governed, and by his decision only are capable of being declared with certainty to be in the right or in the wrong?

By virtue, then, of this supreme law, sealed and confirmed in the blood of Christ unto all men (whose souls he challenges a propriety in, to bring under his inward rule in the service and worship of God), it is that all magistrates are to fear and forbear intermeddling with giving rule or imposing in those matters. They are to content themselves with what is plain in their commission, as ordained of God to be his minister unto men for good, while they approve themselves the doers of that which is good in the sight of men, and whereof earthly and worldly judicatures are capable to make a clear and perfect judgment: in which case the magistrate is to be for praise and protection to them. In like manner, he is to be a minister of terror and revenge to those that do evil in matters of outward practice, converse, and dealings in the things of this life between man and man, for the cause whereof the judicatures of men are appointed and set up. But to exceed these limits, as it is not safe or warrantable for the magistrate (in that he who is higher than the highest, regards, and will show himself displeased at it), so neither is it good for the people, who hereby are nourished up in a biting, devouring, wrathful spirit one against another, and are found transgressors of that royal law which forbids us to do that unto another which we would not have them do unto us, were we in their condition.

This freedom, then, is of high concern to be had and enjoyed, as well for the magistrate's sake as for the people's common good; and it consists, as hath been said, in the magistrate forbearing to put forth the power of rule and coercion in things that God hath exempted out of his commission: so that all care requisite for the people's obtaining this may be exercised with great ease, if it be taken in its proper season, and that this restraint be laid upon the supreme power before it be erected, as a fundamental constitution, among others, upon which the free

consent of the people is given, to have the persons brought into the exercise of supreme authority over them and on their behalf; and if, besides, as a further confirmation hereunto, it be acknowledged the voluntary act of the ruling power, when once brought into a capacity of acting legislatively, that herein they are bound up, and judge it their duty so to be (both in reference to God, the institutor of magistracy, and in reference to the whole body by whom they are intrusted), this great blessing will hereby be so well provided for that we shall have no cause to fear, as it may be ordered.

By this means a great part of the outward exercise of anti-Christian tyranny and bondage will be plucked up by the very roots, which, till some such course be held in it, will be always apt to renew and sprout out afresh, under some new form or refined appearances, as by late years' experience we have been taught: for, since the fall of the bishops and persecuting presbyteries, the same spirit is apt to arise in the next sort of clergy that can get the ear of the magistrate, and pretend to the keeping and ruling the conscience of the governors, although this spirit and practice hath been all along decried by the faithful adherents to this cause as a most sore oppression and insufferable yoke of bondage, most unrighteously kept up over the consciences of the people, and therefore judged by them most needful to be taken out of the way; and in this matter the present governors have been willing very eminently to give their testimony in their public declarations, however in practice there is much of grievance yet found among us, though more, in probability, from the officiousness of subordinate ministers than any clear purpose or design of the chief in power.

Having thus showed what the true freedom is, in both the branches of it, that shines forth in the righteous cause, wherein the good people of these nations have so deeply engaged, it will not be improper, in the next place, to consider two particulars more that give still farther light into the matter in question, as, first, the qualifications of the persons that have adhered to this cause; secondly, the capacity wherein they have been found from time to time carrying it on.

As to their qualification, they have, in the general, distinguished themselves and been made known by a forwardness to assist and own the public welfare and good of the nation, for the attaining and preserving the just rights and liberties thereof, asserted and witnessed unto in the true stating of this cause, according to the two branches thereof already spoken to. They have showed themselves, upon all occasions, desirers and lovers of true freedom, either in civils or in spirituals, or in both. To express their value thereof, and faithfulness to the same, they have largely contributed, in one kind or other, what was proper to each in his place to do; which actions of theirs proceeding from hearts sincerely affected to the cause, created in them a right to be of an incorporation and society by themselves, under the name of the good party, having been from the beginning unto this day publicly and commonly so acknowledged, by way of distinction from all neuters, close and open enemies, and deceitful friends or apostates. These, in order to the maintaining of this cause, have stood by the army, in defence and support thereof, against all opposition whatever,

as those that, by the growing light of these times, have been taught and led forth in their experiences to look above and beyond the letter, form, and outward circumstances of government, into the inward reason and spirit thereof, herein only to fix and terminate, to the leaving behind all empty shadows that would obtrude themselves in the place of true freedom.

Secondly, as to the capacity wherein these persons, thus qualified, have acted, it hath been very variable, and subject to great changes: sometimes in one form, and sometimes in another, and very seldom, if ever at all, so exactly and in all points consonant to the rule of former laws and constitutions of government as to be clearly and fully justified by them any longer than the law of success and conquest did uphold them who had the inward warrant of justice and righteousness to encourage them in such their actings.

The utmost and last reserve, therefore, which they have had, in case all other failed, hath been their military capacity, not only strictly taken for the standing army, but in the largest sense, wherein the whole party may (with the army, and under that military constitution and conduct which, by the providence of God, they shall then be found in) associate themselves in the best order they can for the common defence and safety of the whole; as not ignorant that when once embodied in this their military posture, in such manner as by common consent shall be found requisite for the safety of the body, they are most irresistible, absolute, and comprehensive in their power, having that wherein the substance of all government is contained, and under the protection whereof, and safety that may be maintained thereby, they can contrive and determine in what manner this irresistible, absolute, and boundless power, unto which they are now arrived in this their military capacity, shall have just and due limits set unto it, and be drawn out in a meet and orderly way of exercise for the commonweal and safety of the whole body, under the rule and oversight of a supreme judicature, unto the wisdom of whose laws and orders the sword is to become most entirely subject and subservient; and this without the least cause of jealousy or unsafety, either to the standing army, or any member thereof, or unto the good people adhering to this cause, or any of them, since the interest of both, by this mutual action of either, will be so combined together in one (even in that wherein before they were distinct), that all just cause of difference, fear, animosity, emulation, jealousy, or the like, will be wholly abolished and removed.

For when once the whole body of the good people find that the military interest and capacity is their own, and that into which necessity at the last may bring the whole party (whereof, of right, a place is to be reserved for them), and that herein they are so far from being in subjection or slavery, that in this posture they are most properly sovereign, and possess their right of natural sovereignty, they will presently see a necessity of continuing ever one with their army, raised and maintained by them for the promoting this cause against the common enemy, who in his next attempt will put for all with greater desperateness and rage than ever.

Again, when once the standing army and their governors shall

also find that, by setting and keeping up themselves in a divided interest from the rest of the body of honest men, they withhold from themselves those contributions in all voluntary and cheerful assistances, by the affections and prayers, by the persons and purses of the good party, to the weakening themselves thereby, as to any vigorous support from them, in the times of most imminent danger (whereof the late king had an experience, that will not suddenly be out of memory, when he undertook the war, in the beginning of these troubles, against the Scots, and was, in a manner, therein deserted by all the good party in England), they will then find (if they stay not till it be too late) that, by espousing the interest of the people, in submitting themselves with their fellow-adherents to the cause, under the rule and authority of their own supreme judicature, they lose not their power or sovereignty, but, becoming one civil or politic incorporation with the whole party of honest men, they do therein keep the sovereignty, as originally seated in themselves, and part with it only but as by deputation and representation of themselves, when it is brought into an orderly way of exercise, by being put into the hands of persons chosen and intrusted by themselves to that purpose.

By this mutual and happy transition, which may be made between the party of honest men in the three nations virtually in arms, and those actually so now in power at the head of the army; how suddenly would the union of the whole body be consolidated, and made so firm as it will not need to fear all the designs and attempts of the common enemy, especially if herein they unite themselves in the first place to the Lord, as willing to follow his providence, and observe his will in the way and manner of bringing this to pass! in which case we shall not need to fear what all the gates of hell are able to do in opposition thereunto.

It is not, then, the standing and being of the present army and military forces in the three nations that is liable to exception of offence from any dissenting judgments at this time among the honest, well-affected party. In and with them, under God, stand the welfare and outward safety of the whole body; and to be enemies to them, or wish them hurt, were to do it to themselves; and, by trying such conclusions, to play the game of the common enemy, to the utter ruin and destruction, not only of the true freedom aimed at and contended for in the late wars, but of the very persons themselves that have been in any sort active or eminent promoters thereof.

The army, considered as it is in the hands of an honest and wise general, and sober, faithful officers, embodied with the rest of the party of honest men, and espousing still the same cause, and acting in their primitive simplicity, humility, and trust, in reference to the welfare and safety of the whole body, is the only justifiable and most advantageous posture and capacity that the good party at present can find themselves in, in order to the obtaining that true freedom they have fought for, and possessing of it in the establishment thereof upon the true basis and foundation, as hath been showed, of right government. That wherein the offence lies, and which causes such great thoughts of heart among the honest party (if it may be freely

expressed, as sure it may, when the magistrate himself professes he doth but desire and wait for conviction therein), is, in short, this:

That when the right and privilege is returned, nay, is restored by conquest unto the whole body (that forfeited not their interest therein), of freely disposing themselves in such a constitution of righteous government as may best answer the ends held forth in this cause; that, nevertheless, either through delay they should be withheld as they are, or through design they should come at last to be utterly denied the exercise of this their right, upon pretence that they are not in capacity as yet to use it, which, indeed, hath some truth in it, if those that are now in power, and have the command of the arms, do not prepare all things requisite thereunto, as they may, and, like faithful guardians to the Commonwealth, admitted to be in its nonage, they ought.

But if the bringing of true freedom into exercise among men, yea, so refined a party of men, be impossible, why hath this been concealed all this while? and why was it not thought on before so much blood was spilt, and treasure spent? Surely such a thing as this was judged real and practicable, not imaginary and notional.

Besides, why may it not suffice to have been thus long delayed and withheld from the whole body, at least as to its being brought by them into exercise now at last? Surely the longer it is withheld, the stronger jealousies do increase, that it is intended to be assumed and engrossed by a part only, to the leaving the rest of the body (who, in all reason and justice, ought to be equally participants with the other in the right and benefit of the conquest, for as much as the war managed at the expense and for the safety of the whole) in a condition almost as much exposed, and subject to be imposed upon, as if they had been enemies and conquered, not in any sense conquerors.

If ever such an unrighteous, unkind, and deceitful dealing with brethren should happen, although it might continue above the reach of question from human judicature, yet can we think it possible it should escape and go unpunished by the immediate hand of the righteous Judge of the whole world, when he ariseth out of his place to do right to the oppressed.

Nay, if, instead of favouring and promoting the people's common good and welfare, self-interest and private gain should evidently appear to be the things we have aimed at all along; if those very tyrannical principles and anti-Christian relics, which God by us hath punished in our predecessors, should again revive, spring up afresh, and show themselves lodged also and retained in our bosoms, rendering us of the number of those that have forgot they were purged from their old sins, and declaring us to be such as, to please a covetous mind, do withhold from destruction that which God hath designed to the curse of his vengeance: if all those great advantages of serving the Lord's will and design in procuring and advancing his people's true welfare and outward safety, which (as the fruit of his blessing upon our armies) have so miraculously fallen into our hands, shall at last be wrested and misimproved to the enriching and greatening of ourselves — if these things should ever be found among us (which the Lord in mercy forbid!), shall we need to

look any farther for the accursed thing? will not our consciences show us, from the light of the Word and Spirit of God, how near a conformity these actions would hold therewith? which sin (Josh., vii.) became a curse to the camp, and withheld the Lord from being any more among them, or going out with their forces. And did the action of Achan import any more than these two things: First, he saved and kept from destruction the goodly Babylonish garment, which was devoted by God thereunto; secondly, he brought not in the fruit and gain of the conquest into the Lord's treasury, but covetously went about to convert it to his own proper use? To do this is to take of the accursed thing, which (Josh., vii.) all Israel was said to do in the sin of Achan, and to have stolen and dissembled likewise, and put it among their own stuff. This caused the anger of the Lord to kindle against Israel, and made them unable to stand before their enemies, but their hearts melted as water. And thus far the Lord is concerned, if such an evil as this shall lie hid in the midst of us. But to return to what we were upon before.

The matter which is in question among the dissenting parts of the whole body of honest men is not so trivial and of such small consequence as some would make it. 'Tis, in effect, the main and whole of the cause; without which all the freedom which the people have or can have is in comparison but shadow and in name only, and therefore can never give that peace and satisfaction to the body which is requisite unto a durable and solid settlement. This is that which makes all sound and safe at the root, and gives the right balance necessary to be held up between sovereignty and subjection in the exercise of all righteous government; applying the use of the sword to the promoting and upholding the public safety and welfare of the whole body, in preference, and, if need be, in opposition unto any of the parts; while yet, by its equal and impartial administration in reference unto each, it doth withal maintain the whole body in a most delightful harmony, welfare, and correspondency. The sword never can, nor is it to be expected ever will do this, while the sovereignty is admitted and placed anywhere else than in the whole body of the people that have adhered to the cause, and by them be derived unto their successive representatives, as the most equal and impartial judicature for the effecting hereof.

Where there is, then, a righteous and good constitution of government, there is first, an orderly union of many understandings together, as the public and common supreme judicature or visible sovereignty, set in a way of free and orderly exercise, for the directing and applying the use of the ruling power or the sword, to promote the interest and common welfare of the whole, without any disturbance or annoyance from within or from without; and then, secondly, there is a like union and readiness of will in all the individuals, in their private capacities, to execute and obey (by all the power requisite, and that they are able to put forth) those sovereign laws and orders issued out by their own deputies and trustees.

A supreme judicature, thus made the representative of the whole, is that which, we say, will most naturally care, and most equally provide for the common good and safety. Though by this it is not denied but that the supreme power, when by free consent 'tis

placed in a single person or in some few persons, may be capable also to administer righteous government; at least, the body that gives this liberty, when they need not, are to thank themselves if it prove otherwise. But when this free and natural access unto government is interrupted and declined, so as a liberty is taken by any particular member, or number of them, that are to be reputed but a part in comparison of the whole, to assume and engross the office of sovereign rule and power, and to impose themselves as the competent public judge of the safety and good of the whole, without their free and due consent, and to lay claim unto this, as those that find themselves possessed of the sword (and that so advantageously as it cannot be recovered again out of their hands without more apparent danger and damage to the whole body than such attempts are worth), this is that anarchy that is the first rise and step to tyranny, and lays grounds of manifest confusion and disorder, exposing the ruling power to the next hand that on the next opportunity can lay hold on the sword, and so, by a kind of necessity, introduces the highest imposition and bondage upon the whole body, in compelling all the parts, though never so much against the true public interest, to serve and obey, as their sovereign rule and supreme authority, the arbitrary will and judgment of those that bring themselves into rule by the power of the sword, in the right only of a part that sets up itself in preference before, or at least in competition with, the welfare of the whole.

And if this, which is so essential to the well-being and right constitution of government, were once obtained, the disputes about the form would not prove so difficult, nor find such opposition, as to keeping the bone of contention and disunion, with much danger to the whole; for if, as the foundation of all, the sovereignty be acknowledged to reside originally in the whole body of adherents to this cause (whose natural and inherent right thereunto is of a far ancienter date than what is obtained by success of their arms, and so cannot be abrogated even by conquest itself, if that were the case), and then if, in consequence hereof, a supreme judicature be set up and orderly constituted, as naturally arising and resulting from the free choice and consent of the whole body taken out from among themselves, as flesh of their flesh and bone of their bone, of the same public spirit and nature with themselves, and the main be by this means secured, what could be propounded afterward as to the form of administration that would much stick?

Would a standing council of state, settled for life, in reference to the safety of the Commonwealth, and for the maintaining intercourse and commerce with foreign states, under the inspection and oversight of the supreme judicature, but of the same fundamental constitution with themselves — would this be disliked? admitting their orders were binding, in the intervals of supreme national assemblies, so far only as consonant to the settled laws of the Commonwealth, the vacancy of any of which, by death or otherwise, might be supplied by the vote of the major part of themselves: nay, would there be any just exception to be taken if (besides both these) it should be agreed (as another part of the fundamental constitution of the government) to place that branch of sovereignty which chiefly respects the execution of laws in a distinct office from that

of the legislative power (and yet subordinate to them and to the laws), capable to be intrusted into the hands of one single person, if need require, or in a greater number, as the legislative power should think fit; and, for the greater strength and honour unto this office, that the execution of all laws and orders (that are binding) may go forth in his or their name, and all disobedience thereunto, or contempt thereof, be taken as done to the people's sovereignty, whereof he or they bear the image or representation, subordinate to the legislative power, and at their will to be kept up and continued in the hands of a single person or more, as the experience of the future good or evil of it shall require?

Would such an office as this, thus stated, carry in it any inconsistency with a free state? Nay, if it be well considered, would it not rather be found of excellent use to the wellbeing of magistracy, founded upon this righteous bottom, that such a lieutenancy of the people's sovereignty in these three nations may always reside in some one or more person, in whose administration that which is reward and punishment may shine forth?

And if now it shall be objected that (notwithstanding all these cautions), should once this sovereignty be acknowledged to be in the diffused body of the people (though the adherents to this cause, not only as their natural, but as their acquired right by conquest), they would suddenly put the use and exercise of the legislative power into such hands as would, through their ill qualifiedness to the work, spoil all by mal-administration thereof, and hereby lose the cause instead of upholding and maintaining it.

The answer unto this is, first, that God, by his providence, hath eased our minds much in this solicitude by the course he hath already taken to fit and prepare a choice and selected number of the people unto this work, that are tried and refined by their inward and outward experiences in this great quarrel, and the many changes they have passed through; in respect whereof well qualified persons are to be found, if due care be but taken in the choice of them. And if herein this people of the Lord shall be waiting upon him for his guidance and presence with them, we may have grounds and hope that God (whose name hath all along been called upon in the maintaining of this cause) will pour out so abundantly of his spirit upon his people attending on him in righteous ways, and will also move their hearts to choose persons bearing his image into the magistracy, that a more glorious product may spring up out of this than at first we can expect, to the setting up of the Lord himself as chief judge and lawgiver among us. And unto this the wisdom and honesty of the persons now in power may have an opportunity eminently to come into discovery; for in this case, and upon the grounds already laid, the very persons now in power are they unto whose lot it would fall to set about this preparatory work, and by their orders and directions to dispose the whole body, and bring them into the meetest capacity to effect the same, the most natural way for which would seem to be by a general council, or convention of faithful, honest, and discerning men, chosen for that purpose by the free consent of the whole body of adherents to this cause in the several parts of the nations, and

observing the time and place of meeting appointed to them (with other circumstances concerning their election) by order from the present ruling power, but considered as general of the army:

Which convention is not properly to exercise the legislative power, but only to debate freely, and agree upon the particulars that by way of fundamental constitutions shall be laid and inviolably observed as the conditions upon which the whole body so represented doth consent to cast itself into as civil and politic incorporation, and under the visible form and administration of government therein declared, and to be by each individual member of the body subscribed in testimony of his or their particular consent given thereunto: which conditions so agreed (and among them an Act of Oblivion for one) will be without danger of being broken or departed from, considering of what it is they are the conditions, and the nature of the convention wherein they are made, which is of the people represented in their highest state of sovereignty, as they have the sword in their hands unsubjected unto the rules of civil government, but what themselves orderly assembled for that purpose do think fit to make. And the sword, upon these conditions, subjecting itself to the supreme judicature thus to be set up, how suddenly might harmony, righteousness, love, peace, and safety unto the whole body follow hereupon, as the happy fruit of such a settlement, if the Lord have any delight to be among us!

And this once put in a way, and declared for by the general and army (as that which they are clearly convinced, in the sight of God, is their duty to bring about, and which they engage accordingly to see done) how firmly and freely would this oblige the hearts and persons, the counsels and purses, the affections and prayers, with all that is in the power of this whole party to do, in way of assistance and strengthening the hands of those now in power, whatever straits and difficulties they may meet with in the maintenance of the public safety and peace!

This, then, being the state of our present affairs and differences, let it be acknowledged on all hands, and let all be convinced that are concerned, that there is not only a possibility, but a probability, yea, a compelling necessity, of a firm union in this great body, the setting of which in joint and tune again, by a spirit of meekness and fear of the Lord, is the work of the present day, and will prove the only remedy under God to uphold and carry on this blessed cause and work of the Lord in the three nations, that is already come thus far onward in its progress to its desired and expected end of bringing in Christ, the desire of all nations, as the chief Ruler among us.

Now unto this reuniting work let there be a readiness in all the dissenting parts from the highest to the lowest, by cheerfully coming forth to one another in a spirit of self-denial and love instead of war and wrath, and to cast down themselves before the Lord, who is the father of all their spirits, in self-abasement and humiliation, for the mutual offence they have been in, for some time past, one unto another, and great provocation unto God, and reproach unto his most glorious name, who expected to have been served by them with reverence and godly fear; for our God is a consuming fire.

And, as an inducement unto this, let us assure ourselves the means of effecting it will not prove so difficult as other things that have been brought about in the late war, if the minds and spirits of all concerned were once well and duly prepared hereunto by a kindly work of self-denial and self-abasement, set home by the spirit of the Lord upon their consciences, which, if he please, he may do we know not how soon: nay, we shall behold with a discerning eye the inside of that work which God hath been doing among us the three years last past: it would seem chiefly to have been his aim to bring his people into such a frame as this; for in this tract of time there hath been (as we may say) a great silence in heaven, as if God were pleased to stand still and be as a looker on, to see what his people would be in their latter end, and what work they would make of it, if left to their own wisdom and politic contrivances. And as God hath had the silent part, so men, and that good men too, have had the active and busy part, and have, like themselves, made a great sound and noise, like the shout of a king in a mighty host; which, while it hath been a sound only and no more, hath not done much hurt as yet; but the fear and jealousy thereby caused, hath put the whole body out of frame, and made them apt to fall into great confusions and disorder.

And if there be thus arisen a general dissent and disagreement of parts (which is not, nor ought to be, accounted the less considerable because it lies hid and kept in under a patient silence), why should there not be as general a confession and acknowledgment of what each may find themselves overtaken in, and cannot but judge themselves faulty for? this kind of vent being much better than to have it break out in flames of a forward and untimely wrathful spirit, which never works the righteousness of God, especially since what hath been done among us may probably have been more the effect of temptation than the product of any malicious design; and this sort of temptation is very common and incident to men in power (how good soever they may be) to be overtaken in, and thereupon do sudden unadvised actions, which the Lord pardons and overrules for the best, evidently making appear that it is the work of the weak and fleshly part, which his own people carry about with them too much unsubdued; and therefore the Lord thinks fit, by this means, to show them the need of being beholden to their spiritual part to restore them again, and bring them into their right temper and healthful constitution.

And thus, while each dissenting part is aggravating upon it self-faultiness and blame, and none excusing, but all confessing they deserve, in one sort or other, reproof, if not before men, yet in God's sight, who knows how soon it may please God to come into this broken, contrite, and self-denying frame of spirit in the good people within the three nations, and own them, thus truly humbled and abased, for his temple and the place of his habitation and rest, wherein he shall abide forever? of whom it may be said, God is in the midst of her, she shall not be moved; God shall help her, and that right early, or with his morning appearance; at which time he will sit silent no longer, but Heaven will speak again, and become active and powerful in the spirits and hearts of honest men, and in the works of his providences, when either they go out to fight by sea or by land,

or remain in council and debates at home for the public weal, and again hear the prayers of his people, and visibly own them as a flock of holy men, as Jerusalem in her solemn feasts: "I will yet for this be inquired of by the house of Israel, saith the Lord, to do it for them: and then they shall know that I the Lord their God am with them, and that they are my people, and that ye my flock, the flock of my pasture, are men that have showed yourselves weak, sinful men, and I am your God, that have declared myself an allwise and powerful God, saith the Lord God."

Postscript

READER,— Upon the perusal of this discourse, thou wilt quickly perceive that these two things are principally aimed at in it by the author: First, to answer in some measure that which is called for by those in power, when they publicly profess they desire nothing more than conviction, and to find out the hidden provocations which either have or yet may bring forth the Lord against these nations, in the way which at present they are in. Secondly, to remove out of the minds and spirits of the honest party, that still agree in the reason and justice of the good old cause, all things of a private nature and selfish concern (the tendency whereof serves but to foment and strengthen wrath and divisions among them), and in place thereof to set before them that common and public interest, which, if with sincerity embraced, may be the means of not only procuring a firm union among them, but also of conserving them herein.

In order to do this, the author hath not been willing so much to declare his own opinion, or deliver any positive conclusions, as to discuss the business by way of question and answer, and thereby make as near a conjecture as he can of that wherein the several dissenting parts may with better satisfaction meet together, and agree upon a safe and righteous bottom, than to remain at the distance they do, to the apparent advantage of the common enemy, the approaching ruin of themselves, and needless hazard, if not loss, of the cause they have been so deeply engaged in; especially considering that, when once they shall be found beginning to come forth to one another in such a condescending, self-denying spirit, cleansed from the stain of hypocrisy and deceit, they may be well assured that light will spring up among them more and more unto a perfect day; and then those things which at present we have next in view, will prove as shadows ready to flee away before the morning brightness of Christ's heavenly appearance and second coming, through which they will be heightened and improved to their full maturity, to the bringing in that kingdom of his that shall never be moved.

And because an essay hath been already made in a private way to obtain the first thing, that is to say, conviction, which chiefly is in the hand of the Lord to give, the same obligation lies upon the author, with respect to the second, for the exposing of it as now it is unto public view, and therein leaving it also with the Lord for his blessing thereunto.

1660

The beverage made from the scorched Arabian bean coffee was at this point being introduced into France as a substitute for the consumption of wine.

Dr. Robert Morison had fought on the royalist side in the Civil War and had been obliged to take refuge in Paris. While in France Morison had obtained the post of curator of the Duc d'Orleans's garden at Blois, the garden which inspired Sibbald to found the first Edinburgh Botanic garden. In this year he returned to England at the request of King Charles II, to become not only the Keeper of the Royal Garden at Oxford, but also the King's Physician.

BOTANIZING

Sir Kenelm Digby lectured at Gresham College on the vegetation of plants.

THE SCARLET LETTER: Such was the young clergyman's condition, and so imminent the prospect that his dawning light would be extinguished, all untimely, when Roger Chillingworth made his advent to the town. His first entry on the scene, few people could tell whence, dropping down as it were out of the sky or starting from the nether earth, had an aspect of mystery, which was easily heightened to the miraculous. He was now known to be a man of skill; it was observed that he gathered herbs and the blossoms of wild-flowers, and dug up roots and plucked off twigs from the forest-trees like one acquainted with hidden virtues in what was valueless to common eyes. He was heard to speak of Sir Kenelm Digby and other famous men –whose scientific attainments were esteemed hardly less than supernatural– as having been his correspondents or associates. Why, with such rank in the learned world, had he come hither? What, could he, whose sphere was in great cities, be seeking in the wilderness? In answer to this query, a rumour gained ground –and however absurd, was entertained by some very sensible people– that Heaven had wrought an absolute miracle, by transporting an eminent Doctor of Physic from a German university bodily through the air and setting him down at the door of Mr. Dimmesdale's study! Individuals of wiser faith, indeed, who knew that Heaven promotes its purposes without aiming at the stage-effect of what is called miraculous interposition, were inclined to see a providential hand in Roger Chillingworth's so opportune arrival.

BOTANIZING

1665

The beginning of the botanical garden of Uppsala.

1666

While Hans Sloane was 6 years of age, his father died. After his education he would go to London for the study of medicine, and would concentrate on botany, *materia medica*, and pharmacy.

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.)

1670

The beginning of the botanical garden of Edinburgh.

At this point the Reverend John Wray, learning that such had been the practice in his family in earlier generations, began to write his name as John Ray.

1672

John Josselyn, Gent commented in his *NEW-ENGLANDS* RARITIES DISCOVERED: IN *BIRDS*, *BEASTS*, *FISHES*, *SERPENTS*, AND *PLANTS* OF THAT COUNTRY... that the American Passenger Pigeon, *Ectopistes migratorius* was "much diminished, the *English* taking them with Nets," implying a cause-and-effect relationship.

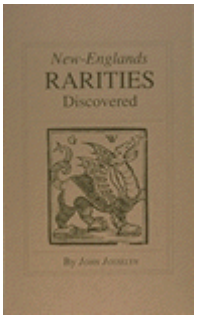
> Pliny and Isadore write there are not above 144 kinds of Fishes, but to my knowledge there are nearer 300; I supposed that America was unknown to Pliny and Isadore.

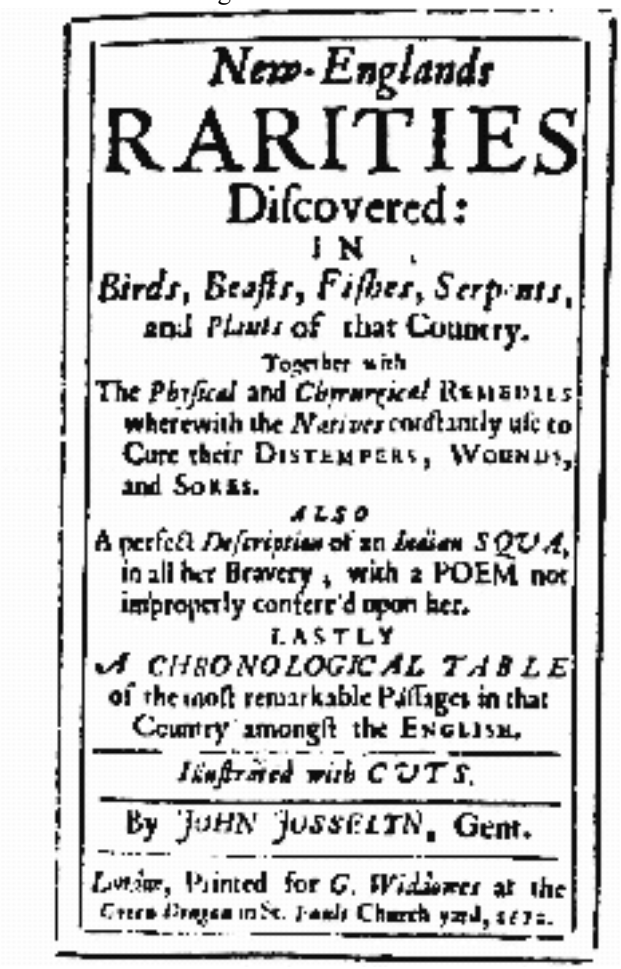
PLINY

This was the 1st book to focus upon New England animal and plant life, medicinal recipes of the native Americans, and associated nature lore. His estimate was that there were, order of magnitude, at least a thousand new species of plants alone, awaiting discovery.

BOTANIZING

It concluded with a chronology of events in New England from 1492 to 1672.




New-Englands
RARITIES
Discovered:
IN
Birds, Beasts, Fishes, Serpents,
and Plants of that Country.
Together with
The Physical and Chirurgical REMEDIES
wherewith the Natives constantly use to
Cure their DISTEMPERS, WOUNDS,
and SORES.
ALSO
A perfect Description of an Indian SQUA,
in all her Bravery, with a POEM not
improperly conferr'd upon her.
LASTLY
A CHRONOLOGICAL TABLE
of the most remarkable Passages in that
Country amongst the ENGLISH.
Illustrated with CUTS.
By JOHN JOSSELYN, Gent.
London, Printed for G. Widdowes at the
Green Dragon in St. Paul's Church yard, 1672.

JOHN JOSSELYN CHRONOLOG

JOHN JOSSELYN TWO VOYAGES

The author boosted that the bog iron to be found here (such as in the swamps in the vicinity of Concord) was "in abundance, as good bog iron as any in the world."[6] The deposits had been exploited already since

1658. Thoreau, however, would be more interested in huckleberry riches than in metal riches.

"HUCKLEBERRIES": John Josselyn — in his NEW ENGLAND RARITIES, published in 1672 — says under the fruits of New England, 'Billberries, two kinds, black and sky colored, which is more frequent.... The Indians dry them in the sun and sell them to the English by the bushel, who make use of them instead of currence, putting of them into puddens, both boyled and baked, and into water gruel.'

JOHN JOSSELYN

6. The swamp deposits had been being exploited already since 1658.

1673

The Chelsea Physic Garden was begun by the Worshipful Society of Apothecaries of London, through their leasing of land from Charles Cheyne on his Chelsea estate. (Not much would be made of this leased land until Sir Hans Sloane, M.D. would purchase the entirety of the manor at Chelsea from Cheyne and donate, at his death, the land of their garden to the Society.)

BOTANIZING

1674

The Royal Society having given favorable notice to his previous effort *NEW-ENGLANDS* RARITIES DIſCOVERED: IN *BIRDS*, *BEAſTS*, *FIſHES*, *SERPENTS*, AND *PLANTS* OF THAT COUNTRY..., spicy poem notwithstanding, John Josselyn, Gent. put out an addendum AN ACCOUNT OF TWO VOYAGES TO NEW-ENGLAND ("The Porcupine I have treated of, only this I forgot to acquaint you with, that they lay Eggs, and are good meat."):

> THE MAINE WOODS: Tahmunt thought that the whites called it Moosehead Lake, because Mount Kineo, which commands it, is shaped like a moose's head, and that Moose River was so called "because the mountain points right across the lake to its mouth." John Josselyn, writing about 1673, says, "Twelve miles from Casco Bay, and passable for men and horses, is a lake, called by the Indians Sebug. On the brink thereof, at one end, is the famous rock, shaped like a moose deer or helk, diaphanous, and called the Moose Rock." He appears to have confounded Sebamook with Sebago, which is nearer, but has no "diaphanous" rock on its shore.

JOHN JOSSELYN

This book emphasized the importance to farming of many New England plants.

BOTANIZING

The reception of this 2d book and its 1675 reprinting seems not to have been much impacted by its author's flip –and often marvelous– ridiculing of the Puritans. Twice while in New-England he had been disciplined for attempting to ignore them, and now he was responding with a racist slur:

> ...of a Linsie-woolsie disposition, of several professions in religion, all alike Aethopians white in the teeth only....

This racist slur to the contrary notwithstanding, Josselyn faults the European intrusives for their behavior toward the indigenous Americans, adopting for himself a paternalistic attitude of concern:

> Thus instead of bringing of them to the knowledge of Christianitie, we have taught them to commit the beastly and crying sins of our Nation, for a little profit.

A staunch Royalist out of step with theocracy in both New World and Old, Josselyn could seldom resist an opportunity for raillery. Addressing the Fathers, he says of his tales:

> I have taken some pains in recollecting of them to memory, and fetting of them down for their benefit from whence I may expect thanks; but I believe my reward will be according to Ben Johnson's proverbs,
>
> "Whiftle to a Jade and he will pay you with a fart, Claw a Churl by the britch and he will fhit in your fift!"

Small wonder that this bachelor of nature would in a later era find a strong admirer in another robust sailer against the current, Henry Thoreau:

> What a strong and healthy but reckless, hit or miss style had some of these early writers of New England like Josselyn....

Thoreau would marvel, when he had borrowed Josselyn's books from Harvard Library in 1851 and 1854, that

> they spoke with a relish, smacking their lips like a coach-whip, caring more to speak heartily than scientifically true.... They were not to be caught napping....

Thoreau recognized a kindred spirit in “Old Jossely,” who hewed his words

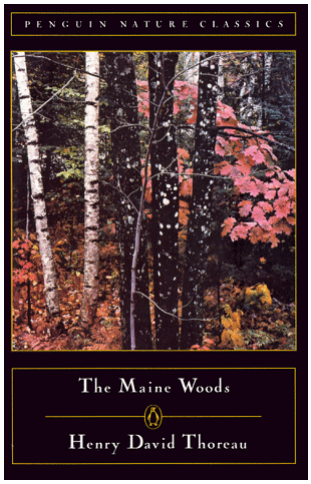
> tough, like hardened things, the sinews of a deer, or the roots of the pine.

Nature, Thoreau would declare in A WEEK ON THE CONCORD AND MERRIMACK RIVERS, was served only by such lines written

> as if its author, had he held a plow instead of a pen, could have drawn a furrow deep and straight to the end.

Thoreau would return again to praise the “strong new soil” that spoke through Josselyn’s rich old prose in The Atlantic’s “Chesuncook” (1858) and in the posthumous THE MAINE WOODS (1864). Both writers shared a style thick with feral metaphors, shaping

> sentences that are verduous and blooming as evergreen and flowers, because they are rooted in fact and experience.



It was in this 2d book that John Josselyn reported that residents of the Massachusetts colony had in 1639 made claims to him of

> ...a *sea-serpent* or snake, that lay quoiled up like a Cable upon a Rock at *Cape-Ann*....

— a report which constitutes the 1st know mention of American sea serpents in print.

SEA SERPENT SIGHTINGS

Appended to this book was a chronology of sorts, of the “observations of America” prior to this one.

JOHN JOSSELYN’S TAKE ON HISTORY

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

1682

The beginning of the botanical gardens of Amsterdam

Nehemiah Grew, a London physician, inferred on purely theoretical grounds that since animals reproduce in a sexual manner, plants must also.
The Laws and Constitution for the island of St. Helena were reaffirmed by the East India Company in London as “agreeable to the nature of the people and not contrary to the laws and statutes of the Kingdom of England.”

ST. HELENA RECORDS

1683

Oxford opened the Ashmolean Museum, the world's 1st public museum (the museum's practice of allowing entry to anyone who paid an admission fee horrified scholars visiting from continental Europe).

After studying medicine in London for four years, Hans Sloane had travelled through France, spending some time at Paris and Montpellier. In this year he took his M.D. degree at the University of Orange. He would return to London with a considerable collection of plants, which he would send to the Reverend John Ray and would be used for his *HISTORIA PLANTARUM* (HISTORY OF PLANTS).

BOTANIZING

1685

In this year or the following one, the Reverend John Banister described the Walking Fern *Camptosorus rhizophyllus*:

BOTANIZING

> In September last we occasionally took a journey towards, I might have said to the mountains, had not the Indians which were our guides been afraid as they pretended but I am apt to think it was policy not fear retarded them, and that they were unwilling to let us be acquainted with the recesses so far up in the country. ...our small path brought us to a vast rock ... overspread with a swift fall of water.... A little lower down this rivulet is received into a natural basin and from thence conveyed into a small vault of craggy rocks, where with its fall it makes a dead hollow sound, something like that of a kettle-drum, but more like an Indian one, which is a skin stretched over an earthen pot half full of water. ...where among other Capillaries grows this small but rare kind of Harts Tongue [Walking Fern *Camptosorus rhizophyllus*]. This plant grows erect as other of the like kind till nature calls it down to propagate; and when its offsets are strong enough to draw in their own alignment it leaves them and grows up as before.

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.[7]

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

The Reverend 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." The Reverend's summary of plant physiology was so thorough that he could be as considered the founder of that field.

PLANTS

7. 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.

1687

Hans Sloane, M.D. became a fellow of the College of Physicians, and went to Jamaica as physician in the suite of the Duke of Albemarle (the duke died soon after landing).

In fifteen months Sloane would record some 800 new species of plants. Sloane encountered cocoa while he was in Jamaica, where the locals drank it mixed with water, and is reported to have found it nauseating. However, he devised a means of mixing it with milk to make it more pleasant. When he would return to England, he would bring his chocolate recipe back with him. Initially, this would be manufactured and sold by apothecaries as a medicine; though, by the 19th Century, the Cadbury Brothers would be vending tins of "Sir Hans Sloane's Milk chocolate, prepared after the original recipe."

BOTANIZING

1688

Within two years of his arrival on the Virginia coast of the New World, the Reverend John Banister had sent the Reverend John Ray a “Catalogue of Plants observed by me in Virginia,” and this catalogue was in this year published in the 2nd volume of the Reverend Ray’s *HISTORIA PLANTARUM*. (The Reverend Banister would die after being accidentally shot by one of his companions while on an excursion into Virginia, either of the gunshot or of his consequent fall from a rock, before being able to write a natural history of Virginia. His introductions included *Magnolia virginiana*, *Rhododendron viscosum*, *Echinacea purpurea*, *Mertensia virginica,* and possibly *Dodecatheon meadia*, though this has also been attributed to John Tradescant and to Mark Catesby.)

BOTANIZING

1692

In France, so many physicians were opposed to the drinking of coffee that at first there was only limited use of the bean among the upper classes and at court. King Louis XIV attempted to create a coffee monopoly for purposes of state revenue, but at first this would be unsuccessful as he had set the price too high. He would try again, but his monopoly would always be unpopular.

The Reverend John Banister was accidentally shot by one of his companions while on an excursion into Virginia (he died either of the gunshot or of his consequent fall from a rock before being able to write a natural history of Virginia).[8]

TIMELINE OF ACCIDENTS

Robert Hooke read a “curious discourse” on the Tower of Babel before the Royal Society.

A member of the Temple Coffee House Botany Club in London, Leonard Plukenet, prepared a *PHYTOGRAPHIA* which described many of the Reverend Banister’s Virginia plant specimens.

BOTANIZING

8. The Reverend John Banister’s works have been compiled by Joseph and Nesta Ewan in JOHN BANISTER AND HIS NATURAL HISTORY OF VIRGINIA 1678-1692 (U of Illinois P, 1970).

1694

John Clayton was born in England. He would collect plants in Virginia, in 1715. In this year Jannsonius created this map of the Virginia coast:

A sect of German pietists led by Kelpius established on the lower Wissahickon a garden in which to raise medicinal plants for use and study. This was the 1st garden in America in which an attempt was made to arrange the plants in botanical sequence.

Study of the sexuality of plants began in this year with the publication of Camerarius's *De sexu plantarum epistola* (Letter concerning the Sex of Plants). He separated those flowers which had stamens only from those flowers which had pistils only.

1696

Hans Sloane, M.D. published a catalogue of the plants he had discovered in Jamaica, in Latin.

Hugh Jones was sent to the North American coast as a replacement for the deceased Reverend John Banister. Disembarking in Maryland, he began to collect American plants, but none too successful — so William Vernon was also sent. A third botanist to be sent from England to Maryland would be David Krieg, and among the three of them they would be able to gather together more than 650 of Maryland's species.

BOTANIZING

1698

James Petiver published a book on Maryland's plants.

BOTANIZING

1700

In this year Professor Joseph Pitton de Tournefort (1656-1708), Professor of Botany at the Jardin du Roi (his pupils in Paris included Sir Hans Sloane and William Sherard, the benefactor of the Botany School at Oxford), went to the Levant.

BOTANIZING

Leonard Plukenet published about Maryland's plants.

BOTANIZING

1702

Dr. Johann Heinrich Burkhard of Wolfenbuttel proposed that the number and arrangement of the stamens and the pistils be used as the basis for an artificial system of classification for plants. (Carl von Linné, still unborn, would never be made aware of this proposal by the German doctor.)

BOTANIZING

1703

The Reverend John Ray's *METHODUS PLANTARUM EMENDATA ET AUCTA*.

This British pastor and enthusiastic amateur botanist had made himself the founder of Taxonomy as an independent branch of Biology, by distinguishing plants with flowers from plants without flowers, and by distinguishing between plants that have monocot seeds and plants that have dicot seeds. That is, he built his system of classification on the basis on the structure and appearance of a plant's fruits, flowers, leaves, and other organs. (Joseph Pitton de Tournefort developed such a system — but his attempt was based on the structure of the corolla alone.)

BOTANIZING

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

April 23, Wednesday (Old Style): Mark Catesby, inspired by the Reverend John Ray, was not exactly the first professional full-time plant collector in America — but at least his movements are reasonably well known. His father died when he was 23 and he went to Virginia to be with his elder sister Elizabeth and her husband R. William Cocke. On this day he reached Williamsburg. He would make the acquaintance of Colonel William Byrd, another amateur naturalist. He would send packets of seeds to Bishop Compton, who had sent out the Reverend John Banister to collect, and to the Reverend Ray's friend, the botanist Samuel Dale.

BOTANIZING

1713

Spring: Seeds collected by Mark Catesby were sent to Bishop Compton.

BOTANIZING

1714

Traveling up the James River to the foothills of the Appalachian mountains, Mark Catesby found the rose acacia *Robinia hispida*. However, before he could return to collect seed the district had been burnt over by "ravaging Indians."

BOTANIZING

1715

John Clayton (1694-1773) arrived in Virginia and collected plants in the Shenandoah Valley. His name would be immortalized in the genus name of the Spring Beauty (*Claytonia virginica*). He left no accounts of his passage beyond the Blue Ridge, but mentioned in his *FLORA VIRGINICA* that he had brought back the glade mallow *Napaea dioica* “only from the calcareous rocks in the great western valley between the dark blue mountains and ... in the woods of Augusta County.”

BOTANIZING

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

1719

Fall: Mark Catesby returned to England with the notes and drawings which he would use to produce NATURAL HISTORY OF CAROLINA, GEORGIA, FLORIDA AND THE BAHAMA ISLANDS (1730-1747).

BOTANIZING

1722

Philip Miller began management of the Chelsea Physic Garden.

Mark Catesby returned to the New World for a 2d extended trip, for this revisit acquiring a number of sponsors such as William Sherard and Sir Hans Sloane, M.D., the founder of the British Museum, for whom he would collect and sketch botanical samples. On this trip into South Carolina he did collect the promised botanical samples, but he also took to sketching the birds, plants and animals that he was seeing on his wanderings throughout rural southeastern America. Upon his return to England his friends and sponsors would encourage him to publish his drawings and notes, which he would do beginning in 1731.

BOTANIZING

May 23, Wednesday (Old Style): New Orleans became the capital of Louisiana.

Mark Catesby arrived in Charleston. Sherard had arranged for him to return to America in the company departing to create a new colony of Carolina under Governor Colonel Francis Nicholson. In this month they arrived at Charleston. Catesby would introduce the people he met in Charleston to some of the plants he had found in the interior, such as the catalpa and perhaps the spice-bush *Calycanthus floridus*. The plants he would convey to Britain would include *Callicarpa americana*, *Coreopsis lanceolata,* and the American wisteria. (The people who were facilitating this collection journey to the Carolinas also were sending Thomas More to make plant collections in New England. More was probably between 50 and 60 years of age when he arrived in Boston. He would arrange to send some plants back, but also, he would become embroiled in local politics.)

During this month Philip Miller, author of the best-selling DICTIONARY OF GARDENING, was settling in as the Gardener at Chelsea. (Miller would be the first to raise, from seed sent from China to London by d'Incarville, the Tree of Heaven *Ailanthus altissima*. Carl von Linné, when he would visit England, would be able to persuade Miller that he needed to modify his system of plant classification.)

BOTANIZING

1724

The plant collector Thomas More returned from New England to England, to introduce there the American Ash *Fraxinus americana* and the Poison Tree *Rhus vernix* (Mark Catesby also had sent seeds of these plants).

BOTANIZING

1725

Dr. Christopher Witt (1675-1765) had been with the German Pietists at Wissahickon. Two decades before Friend John Bartram, he started the 1st botanical garden in America. He corresponded with Peter Collinson and discoursed with Bartram.

BOTANIZING

Mark Catesby visited Bermuda as the guest of Governor Phenny.

BOTANIZING

1726

Mark Catesby returned to England.

BOTANIZING

Theophilus Leigh, whose chief qualification was that he was the nephew of somebody important, was elected Master. The election was achieved by declaring one of the nay votes to be invalid, as having been cast by a person who was insane. The torpor for which 18th-Century Oxford would become notorious would soon begin.

After a rather bad spell, from 1726 onwards the Oxford garden was immensely improved by the learning and generosity of an amateur botanist, Dr. William Sherrard. He had persuaded Dillenius to come to England and made him Superintendent of his own garden at Eltham in Kent, where the German made a Hortus Elthamensis for his patron. According to Carl von Linné, Sherrard made Oxford pre-eminent among all the universities of Europe for the study of botany.

BOTANIZING

1727

Carl von Linné enrolled at the University of Lund, Sweden to study medicine — to which botany was during that period considered adjunct.

BOTANIZING

Cadwalader Colden (1688-1776) developed Coldengham, a country seat west of Newburgh, New York. He would become a leading American scientist (not to mention, Lieutenant Governor of New York) and rub shoulders with all the important native scientists of his time.

February 28, Tuesday (1726, Old Style): Friend Abraham Redwood got married with Martha Coggeshall of Newport. Soon after their marriage, the couple would build their town house on the west side of Thames Street, across from Fair Street, where Salas's Restaurant is now located. They would have their entire plot, including its gardens, enclosed by brick walls fitted with ornamental wrought iron gates they would import from London in 1731. The private wharf for the family's sailing vessels, a distribution point for the sugar produced on his slave plantation "Cassada Garden" on the island of Antigua, was located behind this house, in what is now referred to as the Perry Mill Wharf Area. In addition to their town house, the family owned an estate of more than 140 acres on West Main Road across from Union Street in Portsmouth, extending down to the Narragansett Bay, which they purchased from Martha Coggeshall Redwood's father, Daniel Coggeshall. There they would build their summer house in 1743. They would develop one of the first botanical gardens in America and introduce all sorts of tropical fruits and flowers. They would live the good life.

Presumably, since they had beaucoup black slaves down on the island of Antigua –chopping cane for them in the tropical sun– they would have had black servants around their home, there in Rhode Island as well.

1728

Carl von Linné enrolled at the University of Uppsala, Sweden, founded in 1477, the oldest university in the Nordic countries, which he considered to be superior to the University of Lund. The medical faculty at Uppsala consisted at this time of Olof Rudbeck the younger, son of the famous rector of the university, and Lars Roberg. Rudbeck had a fine reputation through his studies of native Swedish birds.

Sherrard died, leaving the university money to endow the salary of a Professor of Botany. One condition of the bequest was that the first Sherrardian Professor be Dillenius.

BOTANIZING

1729

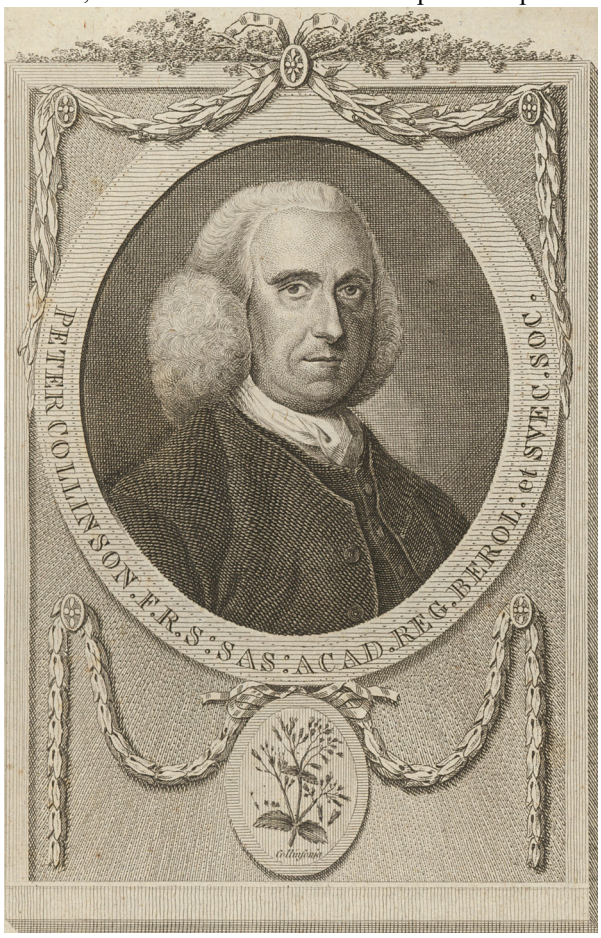
BIOLOGY

BOTANY

Mark Catesby began work on what would become the 1st natural history of American flora and fauna, THE NATURAL HISTORY OF CAROLINA, FLORIDA AND THE BAHAMA ISLANDS: CONTAINING THE FIGURES OF BIRDS, BEASTS, FISHES, SERPENTS, INSECTS AND PLANTS: PARTICULARLY THE FOREST-TREES, SHRUBS, AND OTHER PLANTS, NOT HITHERTO DESCRIBED, OR VERY INCORRECTLY FIGURED BY AUTHORS.

MARK CATESBY, VOL. I

October 10, Friday (Old Style): Friend John Bartram got married with Friend Ann Medinghall (Mendenhall?). They would get themselves nine more children. One of his sons by this 2d marriage would be the William Bartram (named after his grandfather who had been killed by native Americans) who would become an explorer, naturalist, and man of letters. Over the course of the next two years John would be remodeling a small cabin from the days of the old Swedish colony. He had been teaching himself botany. His 1st wife had not been very supportive of this but his 2d wife would be more so. He seems to have started his garden about the time of his 2d marriage. He would expand his property holdings to 261 acres in all. The Joseph Breintnall of Philadelphia recommended Bartram to Peter Collinson, a wholesale wool merchant of London. Bartram would provide Collinson with boxes of seeds, to introduce several hundred species of plants to England.



BOTANIZING

1730

By about this point in time *Ginkgo biloba* was in cultivation in the botanical garden at Utrecht.

Carolus Linnaeus's *PRAELUDIA SPONSALIORUM PLANTARUM* (PRELUDE TO THE BETROTHAL OF PLANTS). In this essay Carl von Linné presented the doctrine of the sexuality of plants. The view that the stamens and pistils of plants are specifically sexual organs had been advanced by a few botanists: the Englishman Nehemiah Grew (1641-1711), the German Rudolph Jacob Camerarius (1665-1721), and the Frenchman Sebastien Vaillant (1669-1721), but had received little support. Linné was named lecturer, that is, assistant to the professor of Botany, at the University of Uppsala, quite a bit of recognition for a student who was merely in his 3rd year of studies. He toyed with physico-theology, the attempt to demonstrate through the study of nature the purposeful harmony of creation. He studied Tournefort's system but based his early work on the sexuality of plants on the experimental results of Camerarius. Direct observation was combined with study of the findings of the botanist Nehemiah Grew and the zoologist Reverend John Ray. Convinced that God had chosen him to arrange all of nature, he began at this point the great botanical works *BIBLIOTHECA BOTANICA* (BOTANICAL DICTIONARY), *CLASSES PLANTARUM* (CLASSES OF PLANTS), *CRITICA BOTANICA* (BOTANICAL CRITICISM), and *GENERA PLANTARUM* (GENERA OF PLANTS).

BOTANIZING

1731

The raw beginnings of the garden by John Bartram that eventually would become the historic Bartram's Garden, 15 minutes from the city hall of Philadelphia on the banks of the Schuylkill at 54th and Lindbergh, the first US botanical garden, date back to this point in time. Although Linnaeus would refer to Bartram as the world's "foremost natural botanist," George Washington, with an aristocratic eye for the tidy and the dignified, would refer to his garden as a "heap of things." On the greenhouse wall Bartram had inscribed "Slave to no sect, who takes no private road / But looks through Nature up to Nature's God!"

Johann Jakob Scheuchzer's *Kupfer-Bibel, in Welcher Die Physica Sacra, Oder Geheiligte Natur-Wissenschaft Derer in Heil. Schrifft Vorkommenden Natürlichen Sachen, Deutlich Erklärt und Bewährt* (Sacred Physics) provided a neato pictorial account of the earth's history based on Old Testament stories (he included a description of what he inferred must have been a fossilized victim of the Noah-and-the-Ark flood, which actually had been a large ancient salamander).

Sacred Physics

PALEONTOLOGY

At this point Nils Rosen, professor of anatomy, returned to the University of Uppsala from his trip abroad and tension developed between him and Carl von Linné. Rosen wanted to give the botany lectures as well as his lectures in anatomy, but Rudbeck, Linné's sponsor, blocked this. However, some unpleasantry in Rudbeck's household soon resulted in Linné's losing his benefactor's confidence and needing to find himself another place to live.

The Science of 1731

BOTANIZING

BIOLOGY

BOTANY

Publication of the 1st of the two volumes of Mark Catesby's THE NATURAL HISTORY OF CAROLINA, FLORIDA AND THE BAHAMA ISLANDS: CONTAINING THE FIGURES OF BIRDS, BEASTS, FISHES, SERPENTS, INSECTS AND PLANTS: PARTICULARLY THE FOREST-TREES, SHRUBS, AND OTHER PLANTS, NOT HITHERTO DESCRIBED, OR VERY INCORRECTLY FIGURED BY AUTHORS, the 1st natural history of American flora and fauna.

MARK CATESBY, VOL. I

FLORIDA

This work eventually would include 220 prints (as of 1743 when the other volume would be issued), for the first time systematically illustrating American birds, animals and plants. The work "Printed at the Expence of the Author" was about as much a one-man band as anything of this type could be. Not only did he do his own field research and sketches, in his self-taught style, but since he could not afford a professional engraver, he took etching lessons from Joseph Coupy and did his own etching for all his plates but two. He even supervised the coloring for the 1st edition prints, though for the 2nd edition his good friend George Edwards, an important natural philosopher in his own right, would provide the coloring. (Only about 300 copies were prepared for the 1st and 2nd editions combined.) Besides being the 1st to produce an American natural history, Catesby was the 1st to place his birds and animals in their natural habitats, a style of natural history representation that was later used by such artists as Alexander Wilson and John James Audubon.

He was the first to attempt to establish scientific names based on generic relationships. Carolus Linnaeus, working on his *SYSTEMA NATURAE* at this time, used Catesby's work as the basis of his system of binomial nomenclature for American species. For all these and many other reasons, these are magnificent prints both for their beauty and significance. Elsa G. Allen, in AMERICAN ORNITHOLOGY BEFORE AUDUBON, page 465, has characterized Catesby as the first real naturalist of colonial America:

http://www.philaprintshop.com/catesby1.html

http://www.philaprintshop.com/catesby2.html

American Passenger Pigeon *Ectopistes migratorius*

In about 1852 Henry Thoreau would copy from the 1771 edition of this 1st volume, into his Indian Notebook #6.

1732

The Uppsala Scientific Society packed Carolus Linnaeus off to Swedish Lapland and Finland to conduct a botanical expedition. This would occupy him for five months.

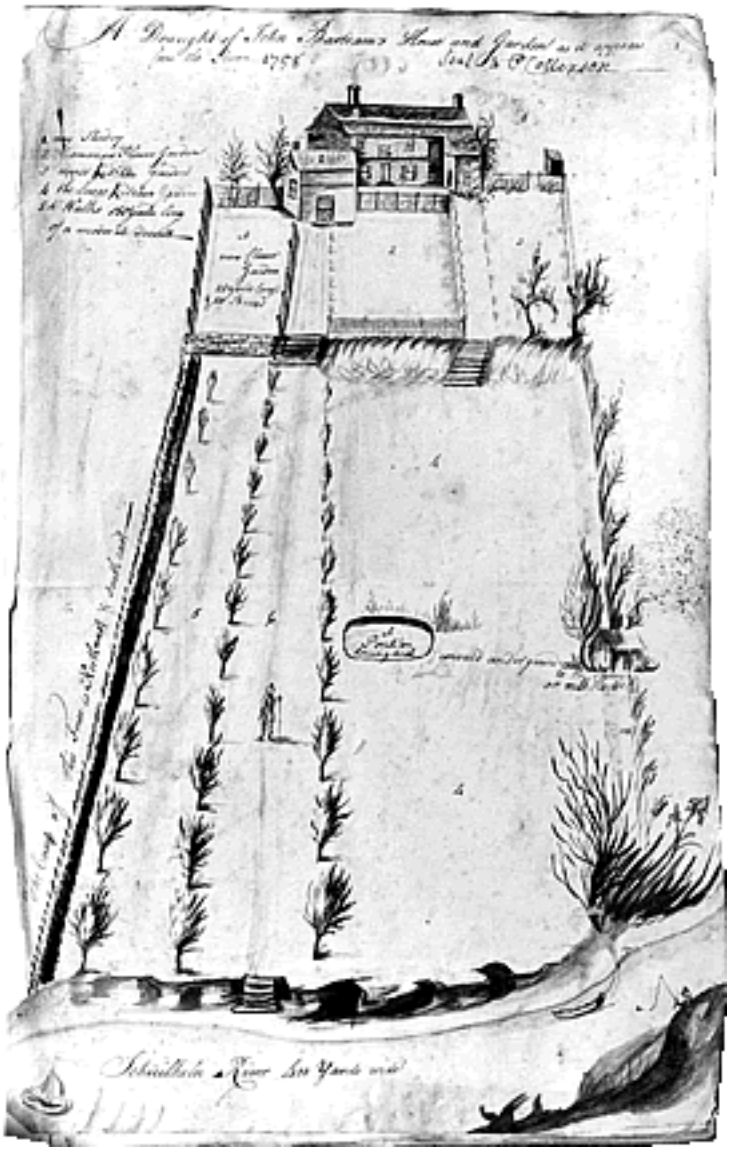
July 12, Saturday: During his tour in Swedish Lapland which would produce *FLORA LAPPONICA* in 1737, Carolus Linnaeus, obviously at the time deprived and terminally horny, selected the poetical name he would assign to the water andromeda plant:

> *Andrómeda polifòlia* was now (June 12) in its highest beauty, decorating the marshy grounds in a most agreeable manner. The flowers are quite blood-red before they expand; but, when full grown, the corolla is of a flesh-color. Scarcely any painter's art can so happily imitate the beauty of a fine female complexion; still less could any artificial color upon the face itself bear a comparison with this lovely blossoom. As I contemplate it, I could not help thinking of Andromeda, as described by the poets; and the more I meditated upon their descriptions, the more applicable they seemed to the little plant before me; so that, if these writers had it in view, they could scarcely have contrived a more apposite fable. Andromeda is represented by them as a virgin of most exquisite and unrivalled charms; but these charms remain in perfection only so long as she retains her virgin purity, which is also applicable to the plant now preparing to celebrate its nuptuals. This plant is always fixed on some little turfy hillock in the midst of the swamps, as Andromeda herself was chained to a rock in the sea, which bathed her feet, as the fresh water does the roots of this plant. Dragons and venomous serpents surrounded her, as toads and other reptiles frequent the abode of her vegetable resembler, and, when they pair in the spring, throw mud and water over its leaves and branches. As the distressed virgin cast down her blushing face through excessive affliction, so does this rosy-colored flower hang its head, growing paler and paler till it withers away.... At length, comes Perseus, in the shape of summer, dries up the surrounding water, and destroys the monsters, rendering the damsel a fruitful mother, who then carries her head (the capsule) erect.

1734

Friend John Bartram began collecting plants. He would elaborate and elaborate his botanical garden on a plot of ground along the Schuylkill River outside Philadelphia, Pennsylvania, which is now a part of that city's park system.[9]

9. According to Joseph Kastner's A SPECIES OF ETERNITY (NY: 1977, page 49), of the nominal 8,000 plant species unique to the eastern seaboard of the North American continent, six were taken to Europe before the 17th Century, another fifty during the first half of the 17th Century, and, by 1734, the total had reached 300. Although the American revolution would temporarily interrupt the flow, by 1776 the number of plants transported by Bartram and others like him would reach about 600.



1735

SYSTEMA NATURAE laid the groundwork for the system of binomial nomenclature that would continue for over two centuries.

The author Carl von Linné gave his sweetie Sara Elisabeth Moreau a ring, and although it was promptly returned to him, nevertheless an engagement did result. Dr. Johan Moraeus (Moreau) agreed to a 3-year absence of his future son-in-law, and his daughter was bound by a written pledge. Whereupon, Linné visited Lubeck, then Hamburg, then Amsterdam. By this point Linné had persuaded the Swedish East India Company to allow periodical free passages for some of his pupils to wherever ships might be trading. The 1st to be sent out would be the Reverend Christopher Ternstroem, who sailed in about this year.

BOTANIZING

September: Dr. Carl von Linné became the personal physician of an Anglo-Dutch merchant banker, George Clifford (*circa* 1685-1760), in Amsterdam and also became overseer of this burgomaster's private botanical and zoological garden in Hartekamp, near Haarlem in Holland, full of specimens which Clifford had been able to obtain courtesy of the Dutch East Indies company. This exotic garden would inspire Linné's *HORTUS CLIFFORTIANUS*.

BOTANIZING

Augustus Gootlieb Spangenberg established near Savannah the 1st Moravian community in America (it would relocate to Pennsylvania in 1741).

Either in this year or in the following one, Friend John Bartram journeyed up the Schuylkill River to its source.

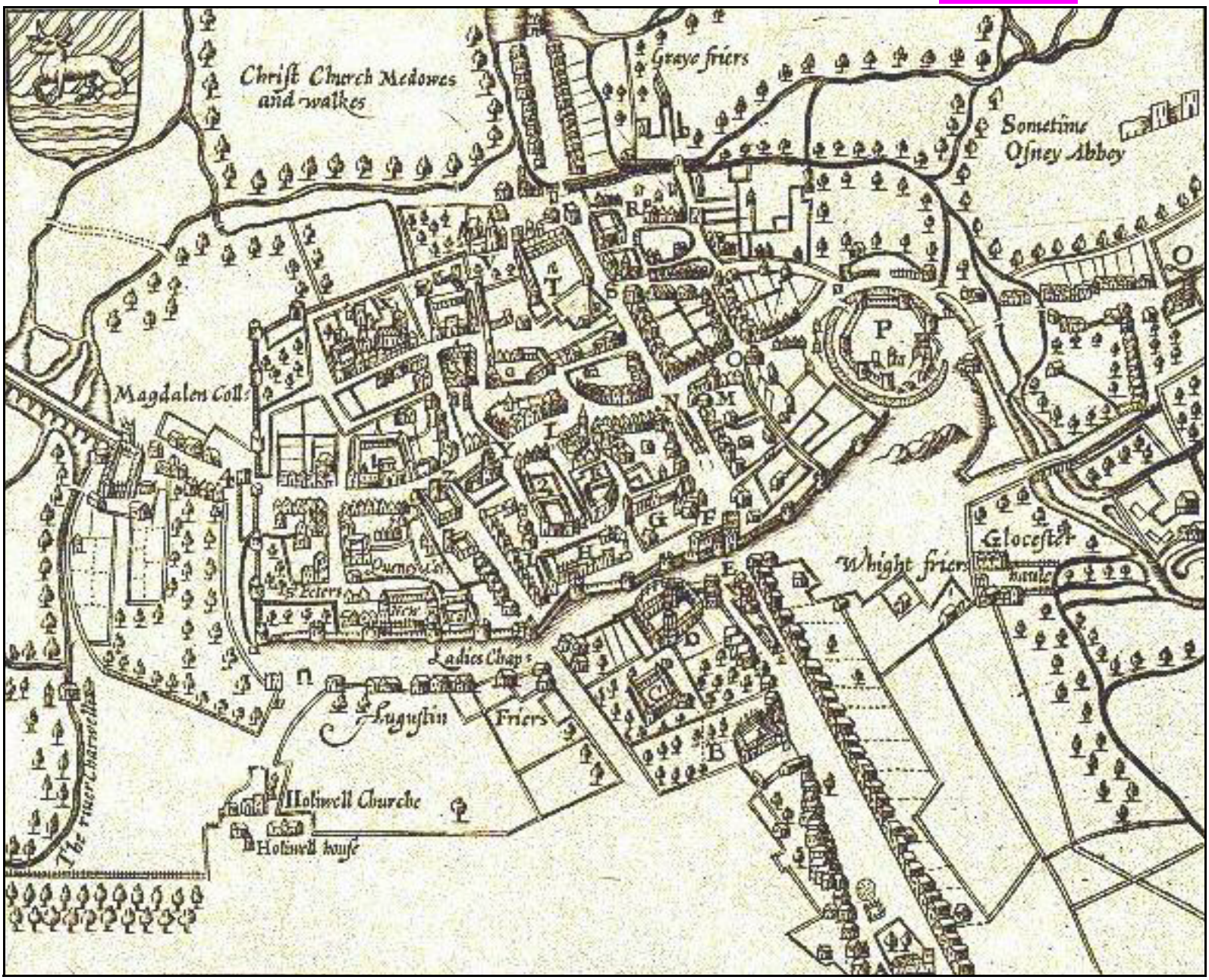
BOTANIZING

1736

Carolus Linnaeus visited England, where he had heard that Dillenius was improving the Oxford Garden. Although Dillenius disagreed with Linné's system, he so admired this young botanist that he offered him half his salary and half his house if only he would remain at Oxford — and burst into tears when the young Swede turned him down. *BIBLIOTHECA BOTANICA* (Amsterdam). *FUNDAMENTA BOTANICA* (FUNDAMENTALS OF BOTANY) (Amsterdam). *MUSA CLIFFORTIANA FLORENS HARETCAMPI* (CLIFFORD'S FLOWERING BANANA AT HARTEKAMP) (Leyden) Johan Friedrich Gronovius, botanist and physician, realizing the importance of his *SYSTEMA NATURAE* (SYSTEM OF NATURE), paid for its Leyden publication. This was Linné's fundamental work in which plants, animals, and minerals were organized into classes, orders, genera, and species. In an important sense, he was working up the idea of the "economy of nature." Because of the simplicity that his binomial naming system brought to the chaotic nomenclatures currently in use, his classifications would be rapidly accepted throughout Europe, England, and North America. The work would grow to 12 editions during his lifetime, the 10th in 1758 and the 12th in 1766 being multivolume compendia. In *GENERA PLANTARUM* and the *SPECIES PLANTARUM* of 1753, which would become the basis for modern systematic botany, Linné was

classifying plants in accordance with their reproductive equipment.

BOTANIZING

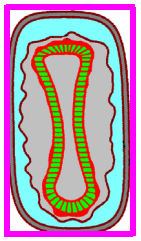


Spring: John Bartram began his travels in search of plants and seeds (his first excursion outside the environs of Philadelphia was to Cedar Swamp in New Jersey).

Fall: John Bartram traveled toward the headwaters of the Schuylkill River in the Pennsylvania mountains.

BOTANIZING

Over this period until the following spring in Philadelphia, of the 129 persons who had been inoculated against small pox only one, a child, would die.



This situation did not, however, obtain among Philadelphians who had elected not to seek inoculation:

- un-inoculated whites under 12 years of age 63 deaths
- un-inoculated adult white men and women 33 deaths
- un-inoculated negroes young and old 28 deaths
- un-inoculated mulattoes 4 deaths

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

Fall: John Bartram botanized throughout the eastern shore of Maryland and Virginia.

BOTANIZING

December: Peter Collinson wrote to John Custis, future father-in-law of Martha Dandridge Custis and a major gardener, indicating that he was sending Friend John Bartram to visit.

BOTANIZING

1738

Dr. John Mitchell of England was admitted to the scientific group which would organize in 1743 as the American Philosophical Society. (He would come to Virginia in 1735 and remain until illness would force him to return in 1746. He would begin sending Virginia plants to Europe in 1738. In 1742 he would send a collection of 560 Virginia plant specimens along with a long manuscript to Friend Peter Collinson.)

BOTANIZING

Carolus Linnaeus's *HORTUS CLIFFORTIANUS* (THE CLIFFORD GARDEN) was published in Amsterdam.

BOTANIZING

May: John Bartram discovered North American ginseng (*Panax quinquefolium*) on the Susquehanna River.

BOTANIZING

Early Summer: Dr. Carl von Linné departed from Holland after publishing *CLASSES PLANTARUM*, visited Antwerp, visited Paris, and returned to Sweden by sea to marry Sara Elisabeth Moreau and publish *METHODUS SEXUALIS*.

BOTANIZING

September: Dr. Carl von Linné began practice as a physician in Stockholm.
His *CLASSES PLANTARUM* was printed in Leyden.

BOTANIZING

September 25, Thursday (Old Style): From this point until October 26, John Bartram would be botanizing along the western shore of Virginia, up the Shenandoah Valley, and in the Blue Ridge Mountains.

BOTANIZING

1739

John Clayton sent his collection to J.F. Gronovius. Gronovius authored the first book on North American flora, *FLORA VIRGINICA*. The 1st edition was done without Clayton's approval or assistance, but the 2nd edition would be coauthored by Gronovius and Clayton.

BOTANIZING

In this year the Governor of Pennsylvania, James Logan, published a botanical essay in Leyden, Holland.

Friend John Bartram traveled to the Catskills. He met Dr. Cadwallader Colden (1688-1766), Surveyor General of the Colonies and a member of the King's Council of New York, who lived in Coldingham, nine miles north of Newburgh, New York, along the Hudson River. Dr. Colden had served as the state's Lieutenant Governor, and temporary as its Governor, and had actively opposed the large landowners of the state, which had brought him into open conflict with many famous families. He was introducing the Linnaean system in America, and furnishing Linné with descriptions of several hundred American plants. He had written several medical works, and in 1727 had authored a HISTORY OF THE FIVE INDIAN NATIONS OF CANADA. A plant, our "Missouri railroad weed," was named *Coldenis* for him by Linné. Jane Colden, his daughter, was America's first woman botanist. She was written about as one of the charming examples of what women in the New World could accomplish. Linné himself received approving reports of her efforts. She used the Linnaean system to classify her wildflowers. She had been born in 1724, and in 1759 had married a Dr. Farquhar. She would die in 1766. She wrote an article on the subject of St. Johnswort, *Hypericum virginicum*, about which she and Dr. Garden of South Carolina had corresponded. She wanted it named for him, but John Ellis, also acquainted with Dr. Garden, had already decided to name the cape jasmine, *Gardenia jasminoides*, for him. John Clayton and Bartram were both Jane Colden's contemporaries and acquaintances.

BOTANIZING

The Finnish/Swedish Peter Kalm (Pietari Kalm) of Aobo, Sweden was one of Linné's students, particularly involved with medicinal and dye-yielding plants. In this year he and his gardener Lars Youngstroem landed in Philadelphia, visiting Benjamin Franklin and Friend John Bartram. At Raccoon (now Swedesboro), New Jersey, Kalm would preach when no regular clergyman was available, and he would marry this town's pastor's widow. In 1757 he would receive a doctor's degree in theology from the University of Lund and in 1777 would be elected a member of the Swedish Academy of Sciences.

BOTANIZING

Franklin would advise this visitor from Finland that his father Josiah Franklin had introduced herring into a river where they had never before propagated themselves.

Franklin evidently also related this story to the Reverend Joseph Morgan, for we find the reverend passing it along it in an essay on fish ladders and other ways of making fish more plentiful in rivers and streams, in The Pennsylvania Gazette for June 8, 1732: “There is a Pond and Brook from it, nigh Plymouth in N.E. (as I am informed) where never Herring had been seen, while other Brooks were full; but a certain Man carried a Tub full of Water with a Number of them newly taken, and emptied ’em into that Pond; and ever after they went up that Brook.”


July 19, 1764. NUM. 1856.

The PENNSYLVANIA GAZETTE

Containing the freshest Advices, Foreign and Domestic.

1740

September: John Bartram botanized north of Philadelphia, into the blue Mountains, and to the Delaware Water Gap.

BOTANIZING

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

Henry Middleton began creating his gardens at Middleton Place, South Carolina.

BOTANIZING

The Russian expedition headed by the Danish navigator Vitus Bering approached the coast of British Columbia — but a landfall has not been confirmed. Nevertheless Russia would claim Alaska.

CARTOGRAPHY

The naturalist Steller accompanied this expedition, collecting specimens along the coast of Alaska. During the six hours he was ashore at one spot, Steller compiled a catalog of plants.

BOTANIZING

Arctic Explorations

Date	Explorer	Nation	Discovery
1501	Gaspar Corte Real	Portuguese	Newfoundland
1536	Jacques Cartier	French	St. Lawrence River, Gaspe Peninsula
1553	Richard Chancellor	English	White Sea
1556	Stephen Burrough	English	Kara Sea
1576	Martin Frobisher	English	Frobisher Bay
1582	Humphrey Gilbert	English	Newfoundland

Arctic Explorations

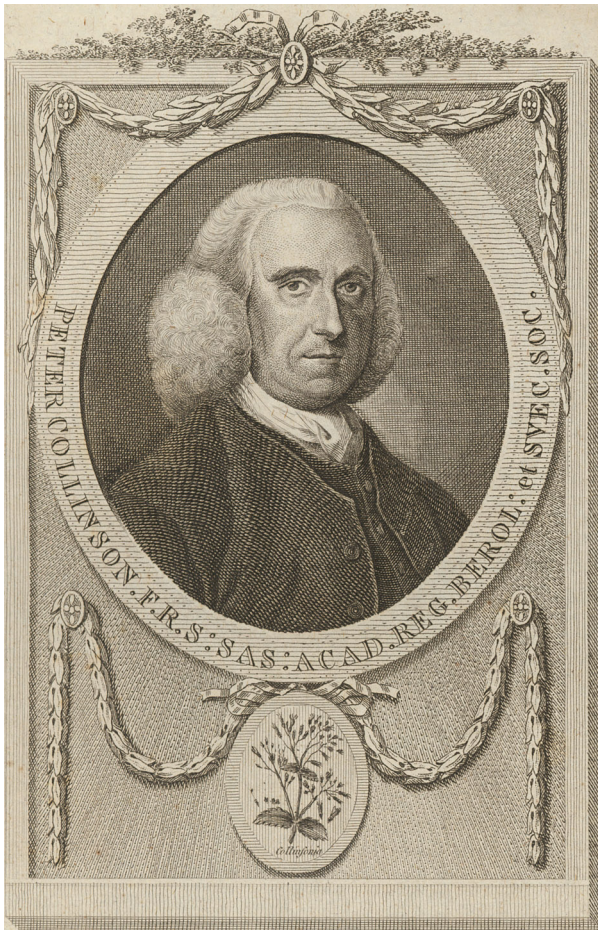
Date	Explorer	Nation	Discovery
1587	John Davis	English	Davis Strait
1597	Willem Barents	Dutch	Spitsbergen, Novaya Zemyla
1611	Henry Hudson	English	Hudson Bay
1616	William Baffin	English	Ellesmere and Devon Islands
1632	Thomas James	English	James Bay
1741	Vitus Bering	Russian	Alaska
1772	Samuel Hearne	English	Coppermine River to the Arctic Ocean
1779	James Cook	British	Vancouver Island, Nootka Sound
1793	Alexander Mackenzie	English	Bella Coola River to the Pacific
1825	Edward Parry	British	Cornwallis, Bathurst, Melville Islands
1833	John Ross	British	North Magnetic Pole
1845	John Franklin	British	King William Island
1854	Robert McClure	British	Banks Island, Viscount Melville Sound

1742

Professor Carl von Linné of practical medicine at the University of Uppsala exchanged departments with Professor Rosen of botany and was put in charge of the Botanical Gardens.

BOTANIZING

Dr. John Mitchell sent a collection of 560 Virginia plant specimens along with a long manuscript to Peter Collinson in London.



1743

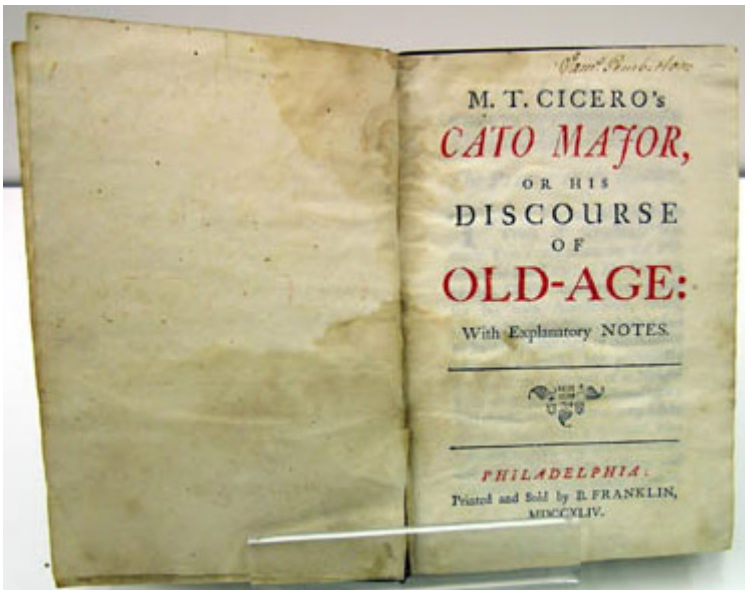
The American Philosophical Society ("philosophical," at this point, meant precisely what we now mean by "scientific") was founded by Benjamin Franklin, John Bartram, and others, who also were proposing a plan for an Academy which would be adopted in 1749, and eventually would develop into the University of Pennsylvania.

Dr. Cadwalader Colden, another of the founding members of the Society, would be responsible for introducing the Linnaean system of plant and animal species classification to America — he would never, however, be fully happy with that system, preferring one that would be more natural.

BOTANIZING

Printed in Philadelphia, by Benjamin Franklin, CATO MAJOR. This was prepared in the types of John Caslon, which have proved perhaps the most durable of all typefaces (Caslon had issued his first specimen sheet in

1734).



Printed in Germantown, Pennsylvania, by Christopher Sauer (1693-1758), the First Germantown BIBLE. Sauer had left his native Germany at the age of 31 to settle in the New World. Sauer at the time was classed as an "arch separatist." In the year 1740, no one had the right or could obtain the necessary royal license to print a Bible, and Sauer was risking prosecution and bankruptcy. He met with the most bitter opposition from the Reverend Henry Muhlenberg, strong leader of the German Lutheran Church, and the Reverend Casper School of the German Reformed Church. To please all factions of the German population, Sauer made his Bible a composite of Luther's Bible with Berleberg's Bible, himself preparing an appendix to the new Testament. It would require three years to print this edition and then it would require twenty years before all of the 1,200 copies had been sold. "The price," as Sauer wrote, "of our early finished Bible in plain binding with clasp will be eighteen shillings, but to poor and needy we have no price."

HISTORY OF THE PRESS

BOTANY
BIOLOGY

The 2d volume of Mark Catesby's THE NATURAL HISTORY OF CAROLINA, FLORIDA AND THE BAHAMA ISLANDS: CONTAINING THE FIGURES OF BIRDS, BEASTS, FISHES, SERPENTS, INSECTS AND PLANTS: PARTICULARLY THE FOREST-TREES, SHRUBS, AND OTHER PLANTS, NOT HITHERTO DESCRIBED, OR VERY INCORRECTLY FIGURED BY AUTHORS. London, printed at the expence of the author.

FLORIDA

Pictured is the Eastern Woodlands Bison, referred to then as *Bos Bison*, a species which is now extinct although once upon a time it ranged from the Eastern seaboard all the way to Minnesota.
(Notice how very much smaller it was than the Great Plains *Bison Bison* which is still extant!)

July 3, Wednesday (Old Style): At the age of 44, Friend John Bartram departed for his travels in Canada, sent with Conrad Weiser by James Logan on a peace mission to negotiate with the Iroquois at Onondaga on Lake Ontario after a skirmish between them and some Virginian backwoodsmen. They would reach Shamokin (now Sundbury) where they would pick up Headman Shikillamy. On this trip Bartram would discover "a great mountain Magnolia, three feet in diameter, and above an hundred feet high." This was the Cucumber Tree (*Magnolia acuminata*). By this point people were referring to his garden outside Philadelphia as the finest collection of wild plants in North America.

BOTANIZING

1747

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

Dr. Cadwallader Colden provided a carefully cataloged and described collection of plants and Professor Carolus Linnaeus published it in "Plantae Coldenghamiae" in *ACTA UPSALIENSIS*. In *FLORA ZEYLANICA,* Linné designated a plant the *Coldenia*.

BOTANIZING

1748

Michel Adanson, a student of Bernard de Jussieu, arrived in Africa to collect until 1754.

Professor Peter Kalm of London disembarked in Philadelphia, as the locals were coming on board his vessel to inquire if it carried any letters addressed to them. He noted that, strangely, the unclaimed letters from abroad were then dropped off at the local coffee-house — it did not seem to have occurred to these Philadelphians as yet, that such unclaimed correspondence from abroad should be being distributed by the local postoffice. The visitor would write as well of his travels through the territory of the Iroquois.

"HUCKLEBERRIES": Kalm, in his travels in this country in 1748-49, writes, 'On my travels through the country of the Iroquois, they offered me, whenever they designed to treat me well, fresh maize bread, baked in an oblong shape, mixed with dried huckleberries, which lay as close in it as the raisins in a plumb pudding.'

PETER KALM

After William Penn, the most important visitor to early Germantown was Prof. Peter Kalm, of Aobo, Sweden, a naturalist, who with his servant, Lars Youngstroem, a skilled gardener, came to America to study its natural resources, and who is remembered in Kalmia Latifolia, the laurel common to our woods. In America, Peter Kalm spent three and a half years, much of this time being passed in eastern Pennsylvania, in the vicinity of Philadelphia, and at Raccoon, now Swedesboro, in western New Jersey, he leaving the country by the way of Canada, and on reaching Stockholm, published his "Travels in America" an interesting book, translated and reprinted in two volumes, which gives much valuable information. Peter Kalm made three visits to Germantown, spending each time from two to three days with his countryman and friend Peter Cook, who had a farm on west side of Main Street, immediately above Limekiln Road, now Mermaid Lane.

— Jellett, Edwin Costley (1860-1929), GERMANTOWN GARDENS AND GARDENERS (Germantown: Horace F. McCann, 1914).

Friend John Bartram, tongue in cheek, informed the visiting Swedish botanist that when an American bear catches a cow, it kills the cow by biting a hole in its hide and blowing with full force into the hole, "till the animal swells excessively and dies, for the air expands greatly between the flesh and the hide." (Kalm turned out to be so credulous, that he actually would print this preposterous jape by his "American cousin" as if it were fact.)

PEOPLE C
CAPE CC

CAPE COD: It is generally supposed that they who have long been conversant with the Ocean can foretell, by certain indications, such as its roar and the notes of sea-fowl, when it will change from calm to storm; but probably no such ancient mariner as we dream of exists; they know no more, at least, than the older sailors do about this voyage of life on which we are all embarked. Nevertheless, we love to hear the sayings of old sailors, and their accounts of natural phenomena, which totally ignore, and are ignored by, science; and possibly they have not always looked over the gunwale so long in vain. Kalm repeats a story which was told him in Philadelphia by a Mr. Cock, who was one day sailing to the West Indies in a small yacht, with an old man on board who was well acquainted with those seas. "The old man sounding the depth, called to the mate to tell Mr. Cock to launch the boats immediately, and to put a sufficient number of men into them, in order to tow the yacht during the calm, that they might reach the island before them as soon as possible, as within twenty-four hours there would be a strong hurricane. Mr. Cock asked him what reasons he had to think so; the old man replied, that on sounding, he saw the lead in the water at a distance of many fathoms more than he had seen it before; that therefore the water was become clear all of a sudden, which he looked upon as a certain sign of an impending hurricane in the sea." The sequel of the story is, that by good fortune, and by dint of rowing, they managed to gain a safe harbor before the hurricane had reached its height; but it finally raged with so much violence, that not only many ships were lost and houses unroofed, but even their own vessel in harbor was washed so far on shore that several weeks elapsed before it could be got off.

PETER KALM
"A MR. COCK"

September 5, Friday, 1851: … It is remarkable that Kalm says in 1748 (being in Philadelphia)– "Coals have not yet been found in Pensylvania; but people pretend to have seen them higher up in the country among the natives. Many people however agree that they are met with in great quantity more to the north, near Cape Breton" As we grow old we live more coarsely–we relax a little in our disciplines–and cease to obey our finest instincts. We are more careless about our diet & our chastity. But we should be fastidious to the extreme of Sanity. All wisdom is the reward of a discipline conscious or unconscious.[10]

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10. This thought would be put into Henry Thoreau's early lecture "WHAT SHALL IT PROFIT" as:

> [Paragraph 93] As we grow old, we live more coarsely—we relax a little in our disciplines, and to some extent cease to obey our finest instincts. We are more careless about our diet and our chastity. But we should be fastidious to the extreme of sanity. All wisdom is the reward of a discipline conscious or unconscious.

Kalm visited Albany, New York, and discovered the water supply there to be inferior. He would remain, however, in the area, into the next year. Until the year 1751, Kalm would be collecting plant specimens in northeastern North America. His botanical collections would be extensively cited by Professor Carolus Linnaeus in 1753 in *SPECIES PLANTARUM*, and would constitute nomenclatural types for many of our northeastern US and southeastern Canadian species.

William Forsyth, a Scotsman, succeeded Philip Miller at the Chelsea Physic Garden. He would create the first rock garden in England. In 1784 he would be appointed gardener to George III at Kensington and St. James's palaces.

BOTANIZING

1749

The 1st of the 36 volumes of Georges-Louis Leclerc, *comte de* Buffon's *HISTOIRE NATURELLE* was printed in this year. This seriously short naturalist was Director of the Jardin du Roi in Paris.

> Natural history embraces all the objects the universe presents to us. This prodigious multitude of quadrupeds, birds, fish, insects, plants, minerals, etc., offers to the curiosity of the human mind a vast spectacle, of which the whole is so great that the details are inexhaustible.

PALEONTOLOGY
BOTANIZING

He made the mistake of hypothecating that the planets had been formed when a comet had crashed into the sun. Under pressure from the Faculty of Theology of Paris (that understood God doesn't pull stunts like that!), in the next volume he would include a retraction.

THE SCIENCE OF 1749

Carolus Linnaeus's *MATERIA MEDICA*. He was made rector of the University of Uppsala.

BOTANIZING

May: Peter Kalm was supposed to have returned to Sweden but set off instead on a long-hoped visit to Canada.

BOTANIZING

"A YANKEE IN CANADA": I went on deck at daybreak, when we were thirty or forty miles above Quebec. The banks were now higher and more interesting. There was an "uninterrupted succession of white-washed cottages" on each side of the river. This is what every traveller tells. But it is not to be taken as an evidence of the populousness of the country in general, hardly even of the river banks. They have presented a similar appearance for a hundred years. The Swedish traveller and naturalist Kalm, who descended this river in 1749, says, "It could really be called a village, beginning at Montreal and ending at Quebec, which is a distance of more than one hundred and eighty miles; for the farm-houses are never above five arpens,[1] and sometimes but three asunder, a few places excepted." Even in 1684 Hontan said that the houses were not more than a gunshot apart at most. Ere long we passed *Cap Rouge*, eight miles above Quebec, the mouth of the *Chaudière* on the opposite or south side, New Liverpool Cove with its lumber rafts and some shipping; then Sillery and Wolfe's Cove and the Heights of Abraham on the north, with now a view of Cape Diamond and the citadel in front. The approach to Quebec was very imposing. It was about six o'clock in the morning when we arrived. There is but a single street under the cliff on the south side of the cape, which was made by blasting the rock and filling up the river. Three story houses did not rise more than one fifth or one sixth the way up the nearly perpendicular rock, whose summit is three hundred and forty-five feet above the water. We saw, as we glided past, the sign on the side of the precipice, part way up, pointing to the spot where Montgomery was killed in 1775. Formerly it was the custom for those who went to Quebec for the first time, to be ducked, or else pay a fine. Not even the Governor General escaped. But we were too many to be ducked, even if the custom had not been abolished.[2]

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1. The Canadian arpen or arpent was 84/100ths of an acre.
2. Hierosme Lalemant says in 1648, in his relation, he being Superior: "All those who come to New France know well enough the mountain of Notre Dame, because the pilots and sailors, being arrived at that part of the Great River which is opposite to those high mountains, baptize ordinarily for sport the new passengers, if they do not turn aside by some present the inundation of this baptism which one makes flow plentifully on their heads."

PETER KALM

"A YANKEE IN CANADA": At mid-afternoon we made haste down *Sault au Matelot* Street towards the Falls of Montmorenci, about eight miles down the St. Lawrence on the north side, leaving the further examination of Quebec till our return. On our way we saw men in the streets sawing logs pit-fashion, and afterward with a common wood-saw and horse cutting the planks into squares for paving the streets. This looked very shiftless, especially in a country abounding in Water-power, and reminded me that I was no longer in Yankee land. I found on inquiry that the excuse for this was, that labor was so cheap, and I thought with some pain, — how cheap men are here! I have since learned that the English traveller Warburton, remarked soon after landing at Quebec, that every thing was cheap there but men. That must be the difference between going thither from New and from Old England. I had already observed the dogs harnessed to their little milk-carts, which contain a single large can, lying asleep in the gutters, regardless of the horses, while they rested from their labors, at different stages of the ascent in the Upper Town. I was surprised at the regular and extensive use made of these animals for drawing, not only milk, but groceries, wood, &c. It reminded me that the dog commonly is not put to any use. Cats catch mice; but dogs only worry the cats. Kalm, a hundred years ago, saw sledges here for ladies to ride in drawn by a pair of dogs. He says, "A middle-sized dog is sufficient to draw a single person when the roads are good," and he was told by old people that horses were very scarce in their youth, and almost all the land carriage was then effected by dogs. They made me think of the Esquimaux, who, in fact, are the next people on the north. Charlevoix says that the first horses were introduced in 1665.

PIERRE-FRANÇOIS-XAVIER DE CHARLEVOIX

PETER KALM

"A YANKEE IN CANADA": After breakfast we proceeded to the fall, which was within half a mile, and at this distance its rustling sound, like the wind among the leaves, filled all the air.... We looked directly down on it from the point of a projecting rock, and saw far below us, on a low promontory, the grass kept fresh and green by the perpetual drizzle, looking like moss. The rock is a kind of slate, in the crevices of which grew ferns and golden-rods. The prevailing trees on the shores were spruce and arbor-vitæ, the latter very large and now full of fruit; also aspens, alders, and the mountain ash with its berries. Every immigrant who arrives in this country by way of the St. Lawrence, as he opens a point of the Isle of Orleans sees the Montmorenci tumbling into the Great River thus magnificently in a vast white sheet, making its contribution with emphasis. Roberval's Pilot, Jean Alphonse, saw this fall thus and described it in 1542. It is a splendid introduction to the scenery of Quebec. Instead of an artificial fountain in its squares, Quebec has this magnificent natural waterfall to adorn one side of its harbor. Within the mouth of the chasm below, which can be entered only at ebb tide, we had a grand view at once of Quebec and of the fall. Kalm says that the noise of the fall is sometimes heard at Quebec about eight miles distant, and is a sign of a north-east wind. The side of this chasm, of soft and crumbling slate too steep to climb, was among the memorable features of the scene. In the winter of 1829 the frozen spray of the fall descending on the ice of the St. Lawrence made a hill one hundred and twenty-six feet high. It is an annual phenomenon which some think may help explain the formation of glaciers.

PETER KALM

1750

Carolus Linnaeus sent out the Reverend Peter Osbeck.

Peter Kalm made another northern trip, following the Mohawk River to the country of the Iroquois and visiting Lake Ontario and the Niagara Falls.

BOTANIZING

1751

In Nürnberg, Volume I of Conrad Gesner's botanical manuscripts.

BOTANIZING

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: Although David Hume might have been found guilty of “heresy,” as an avowed “atheist” was “outside the Church of Scotland’s jurisdiction.” During this month the atheist would fail to acquire the Chair in Logic vacated by Professor Adam Smith at the University of Glasgow as Professor Smith moved to the Chair in Moral Philosophy vacated during November 1751 by the death of Professor Thomas Craigie.

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

John Bartram and William Bartram went to Connecticut.

BOTANIZING

The sensitive fern was found, in Virginia, and given its name.

BOTANIZING

The Sandy Spring Monthly Meeting of the Religious Society of Friends was “settled” (formally organized). Friends held their initial recorded meeting in a frame Meeting House that perhaps had been a tobacco barn, near the spring.

The cinnamon fern was found, in Maryland.

BOTANIZING

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

January 11, Thursday: Hans Sloane died. He had donated to the Apothecaries' Company the botanical or physic garden of the Chelsea estate, which they had for some time been renting, and had bequeathed his books, manuscripts, prints, drawings, flora, fauna, medals, coins, seals, cameos, and other curiosities to the British nation on condition that parliament should pay to his executors the rather minor (by comparison) sum of £20,000. An act was soon past to provide this sum and the collection, along with King George II's royal library, etc., would be opened to the public at Bloomsbury as the British Museum in 1759.

BOTANIZING

Joahann Joachim Quantz wrote from Berlin to Georg Philipp Telemann in Hamburg, thanking him for his kind words about *VERSUCH EINTER ANWEISUNG DIE FLÖTE TRAVERSIERE ZU SPIELEN*.

Pope Benedict XIV surrendered to the King of Spain the authority to appoint bishops and other church positions in the portion of that nation that lay on Iberian peninsula.

BOTANY

BOTANY

September: John Bartram took his 14-year-old son William Bartram along on a botanizing trip in the Catskills, and again visited Dr. Cadwallader Colden.

BOTANIZING

1754

Disappointed, after nine years of trying, with the career prospects of chaplaining, Adam Ferguson left the Black Watch Regiment to devote himself to literary pursuits in Leipzig.

At the age of 23 the Scotsman William Aiton emigrated to England and was given a job by Philip Miller, in the Chelsea Physic Garden.

BOTANIZING

Carolus Linnaeus's *MUSEUM ADOLPHI FRIDERICI* (THE MUSEUM OF ADOLPHUS FREDERICK).

BOTANIZING

Late Summer: John Bartram and William Bartram botanized in the Catskill Mountains and met Dr. Alexander Garden at the home of Cadwallader Colden.

BOTANIZING

1755

John Bartram created a botanical garden on a plot of ground along the Schuylkill River outside Philadelphia, which is now a part of the city's park system.

Late Summer-Fall: John Bartram and William Bartram botanized in New York and Connecticut.

BOTANIZING

1758

The Eastern Screech Owl ***Otus asio*** and the Long-Eared Owl ***Asio otus*** were 1st described and classified, in a vastly enlarged 10th edition of Carolus Linnaeus's *SYSTEMA NATURAE* (SYSTEM OF NATURE) which

THE SCIENCE OF 1758

included a classification of over 4,000 species of such *Animalia*.

WALDEN: Even the sailor on the Atlantic and Pacific is awakened by his voice; but its shrill sound never roused me from my slumbers. I kept neither dog, cat, cow, pig, nor hens, so that you would have said there was a deficiency of domestic sounds; neither the churn, nor the spinning wheel, nor even the singing of the kettle, nor the hissing of the urn, nor children crying, to comfort one. An old-fashioned man would have lost his senses or died of ennui before this. Not even rats in the wall, for they were starved out, or rather were never baited in, –only squirrels on the roof and under the floor, a whippoorwill on the ridge pole, a blue-jay screaming beneath the window, a hare or woodchuck under the house, a screech-owl or a cat-owl behind it, a flock of wild geese or a laughing loon on the pond, and a fox to bark in the night. Not even a lark or an oriole, those mild plantation birds, ever visited my clearing. No cockerels to crow nor hens to cackle in the yard. No yard! but unfenced Nature reaching up to your very sills. A young forest growing up under your windows, and wild sumachs and blackberry vines breaking through into your cellar; sturdy pitch-pines rubbing and creaking against the shingles for want of room, their roots reaching quite under the house. Instead of a scuttle or a blind blown off in the gale, –a pine tree snapped off or torn up by the roots behind your house for fuel. Instead of no path to the front-yard gate in the Great Snow, –no gate, –no front-yard, –and no path to the civilized world!

BLUE JAY
WHIPPOORWILL
CANADA GOOSE
THE GREAT SNOW

PEOPLE OF WALDEN

WALDEN: For sounds in winter nights, and often in winter days, I heard the forlorn but melodious note of a hooting owl indefinitely far; such a sound as the frozen earth would yield if struck with a suitable plectrum, the very *lingua vernacula* of Walden Wood, and quite familiar to me at last, though I never saw the bird while it was making it. I seldom opened my door in a winter evening without hearing it; *Hoo hoo hoo, hoorer hoo*, sounded sonorously, and the first three syllables accented somewhat like *how der do*; or sometimes *hoo hoo* only. One night in the beginning of winter, before the pond froze over, about nine o'clock, I was startled by the loud honking of a goose, and, stepping to the door, heard the sound of their wings like a tempest in the woods as they flew low over my house. They passed over the pond toward Fair Haven, seemingly deterred from settling by my light, their commodore honking all the while with a regular beat. Suddenly an unmistakable cat-owl from very near me, with the most harsh and tremendous voice I ever heard from any inhabitant of the woods responded at regular intervals to the goose, as if determined to expose and disgrace this intruder from Hudson's Bay by exhibiting a greater compass and volume of voice in a native, and *boo-hoo* him out of Concord horizon. What do you mean by alarming the citadel at this time of night consecrated to me? Do you think I am ever caught napping at such an hour, and that I have not got lungs and a larynx as well as yourself? *Boo-hoo, boo-hoo, boo-hoo*! It was one of the most thrilling discords I ever heard. And yet, if you had a discriminating ear, there were in it the elements of a concord such as these plains never saw nor heard.

OVID?
CANADA GOOSE

This 10th edition included human beings — which Carolus Linnaeus was the 1st to designate as *Homo sapiens*. Clearly obvious from some of his depictions is the fact that he was uncertain how to differentiate apes from humans. Since he hadn't been able to discover such a differentia, he employed obviously empty conventions such as "day man" versus "night man." He opinioned the following as to the races of his human species:

- **a. Wild** shaggy hair, mute, four-footed.
- **b. American** red, choleric, erect; thick, straight, black hair; distended nostrils; freckled face; beardless chin; obstinate, gay, free. He paints himself with variegated, red lines. He is ruled by custom.
- **c. European** white, sanguine, muscular; long, blond hair; blue eyes; gentle, most intelligent; a discoverer. He covers himself with clothing suitable to the northern climate. He is ruled by religious custom.
- **d. Asiatic** yellow, melancholy, rigid; dark hair; dark eyes; austere, arrogant, greedy. He covers himself with loose clothing. He is ruled by opinion.
- **e. African** black, phlegmatic, lax; black, curly hair; silky skin, apelike nose; swollen lips; the bosoms of the women are distended; their breasts give milk copiously; crafty, slothful, careless. He smears himself with fat. He is ruled by authority.
- **f. Monster** divided into two groups: those so by nature as dwarfs and giants; and those so by custom as eunuchs, and peoples with compressed or elongated heads.

1759

Professor Carl von Linné became rector of the University of Uppsala. The *Vegetabilia* portion of the 10th edition of Carolus Linnaeus's *SYSTEMA NATURAE* (SYSTEM OF NATURE) came through the presses.

BOTANIZING

Franz Aepinus's *TESTAMEN THEORIAE ELECTRICITAS ET MAGNETESMI.*

Royal Botanic Gardens were established at Kew on property belonging to the Dowager Princess of Wales. William Aiton would become the Superintendent, but at first had under his charge only the relatively small botanic garden of the Princess Augusta. This Kew institution would remain a private activity of the British royal family for 82 years.

BOTANIZING

October 31, Wednesday: A detachment of Rogers' Rangers led by Major Rogers himself reached the safety of Fort Number 4, New Hampshire after their raid on St. Francis, Quebec, and sent provisions north to others of their number.

During this late October period, John Bartram and John Bartram, Jr. were botanizing in the Shenandoah Valley and the blue Ridge Mountains of Virginia.

BOTANIZING

1760

Joseph Banks 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

John Bartram botanized in Virginia and South Carolina.

BOTANIZING

In Charleston he stayed with Dr. Alexander Garden, whose acquaintance he had made when Garden was passing through Philadelphia five and a half years before. He met the celebrated horticulturist Martha Logan who afterwards would be sending him many seeds and plants. Earlier in life, kicked in the back by a horse, he had been able to make a full recovery, but at this point he had reached the age of 62, and when he fell heavily out of the top of a tree, one arm would remain “so weak that I can hardly pull off my clothes.” Then later this year he strained his hip while lifting a large box packed with soil and 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.

1762

September: John Bartram and his sons Billie and Moses left Philadelphia for North Carolina. At the Yadkin river the sons went back to the coast while the father remained inland.

BOTANIZING

1763

J.G. Kolreuter of Germany studied the fertilization of plants by animal pollen carriers.

BOTANIZING

Michel Adanson's *FAMILLES DES PLANTES* became the first general attempt to group plants based on their relatedness, a "natural system." The entry for each of his natural families presents a variety of characters common to the group.

BOTANIZING

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

1764

Carolus Linnaeus's *MUSEUM LUDOVICAE ULRICAE REGINAE* (MUSEUM OF QUEEN LOUISA ULRICA).

BOTANIZING

Fall: John Bartram formed the idea of again making use of his son William Bartram's ability to draw.

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, South Carolina (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

BOTANIZING

trip, in 1773, would the son collect seed in the only known population of Franklin tree, near Fort Barrington, Georgia. 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

Spring: J. Hector St. John de Crèvecoeur visited the home of Friend John Bartram near Philadelphia.

RESIDENCE OF JOHN BARTRAM,

He found his host alongside the Schuylkill River, directing a work party of neighboring farmers that was creating "a new-made bank, which seemed greatly to confine its stream." He recorded that "Bertram" seemed eager enough to discontinue toiling at an alteration of nature's course in order to display hospitality by offering a meal, and engage in discourse. His biographer, Friend Thomas P. Slaughter, has commented, that this account by Crèvecoeur sounds "more like John Bartram than the portrait he drew of himself." Crèvecoeur remarked upon the eating arrangements, which were utterly novel for that epoch:

BOTANIZING

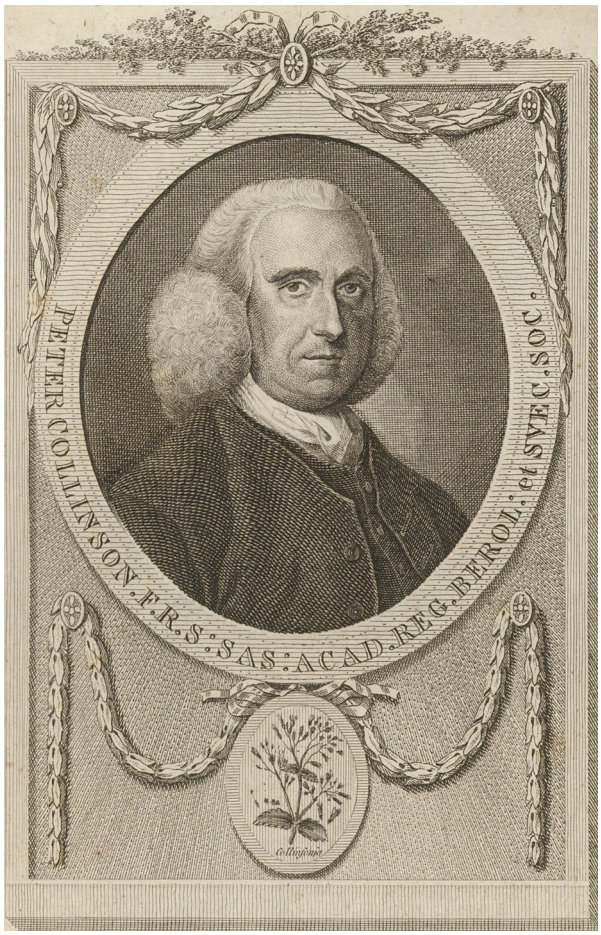
> We entered into a large hall, where there was a long table full of victuals; at the lower part sat his Negroes; his hired men were next, then the family and myself; and at the head, the venerable father and his wife presided. Each reclined his head and said his prayers, divested of the tedious cant of some and of the ostentatious style of others. — LETTERS, Penguin Classics 1986, pages 188-9

Actually, only one of the black Americans whom Crèvecoeur observed had been purchased outright by the Bartrams: his name was Harvey. Also, one of the things we know about John Bartram, out of his own mouth, was that he was utterly opposed to any educating or encouraging of blacks "to think themselves as good or better than their masters and too good for servants." Friend Thomas P. Slaughter, himself a Quaker, observes in this connection that Friend John simply cannot be considered to have been an exemplar of true "Quaker liberalism."

When Crèvecoeur marveled at the coat of arms mounted in a gilt frame in John Bartram's library, it would appear that Friend John dissembled. He represented that the object was his father's, when clearly he had obtained it for himself or had his Billey draw it for him, and also he seems to have represented falsely that his father had come over from France rather than from England. In the writeup that Crèvecoeur would make of his visit, he is clearly saying to us that "this American original may not be everything he represented himself to me as being." However, since Crèvecoeur clearly was fabricating a larger-than-life image of his "Bertram" for his own purposes, perhaps the author was merely protecting his authorial self from accusations of puffery!

April 9, Tuesday: Friend John Bartram received a letter from Peter Collinson informing him that he had gotten an "appointment" for him as a King's Botanist with a salary of 50 pounds a year. (Actually, King George III of England took no interest whatever in botany and the Queen's patronage of botanists was fully committed to John Hill and to his protégé William Young.)

BOTANIZING



Bartram would, out of his personal insecurity and need for the recognition of others, expand this very modest thingie into a published claim that he was the only such person, that his charter was wider than his North American seaboard — that indeed he had been appointed "King's Botanist to the World." He would need to be warned that if he persisted in such exaggeration, the King might not be trifled with, indeed, might withdraw this trifling annuity of which in all likelihood he was entirely unaware.

June 7, Friday: John Bartram wrote Billie informing him that he had been appointed by the King and would be traveling south. He asked his son to "sell of all thy goods at a public vendue" so as to be prepared to travel with his father.

BOTANIZING

July: When John Bartram received the 1st payment of his £50 annual stipend from the King, he and his son Billie sailed from Philadelphia to the port of Charleston, South Carolina, and traveled northeast along the coastline through Georgetown to the Ashwood Plantation up the Cape Fear River.

BOTANIZING

July 7, Sunday: John Bartram arrived in Charleston, South Carolina.

August: John Bartram and Billie traveled from the Ashwood Plantation on up the Cape Fear River of North Carolina, and then back through the plantation and southwest along the coastline through Brunswick and Georgetown to Charleston, South Carolina.

BOTANIZING

August 6, Tuesday: John Bartram and Billie returned to Charleston, South Carolina.

September: John Bartram and Billie traveled southwest through South Carolina to Savannah, Georgia, and then up the Savannah River past Galphins Store to Augusta. They then during the month returned to the coast at Savannah by way of Brier Creek as well as the river.

BOTANIZING

September 4, Wednesday: John Bartram and Billie arrived in Savannah. They lodged with James Habersham and met with Governor Wright. They left Savannah the next day and traveled north along the Augusta Road. On the way they visited Silver Bluff and Shell Bluff. They explored the Savannah River with George Galphin.

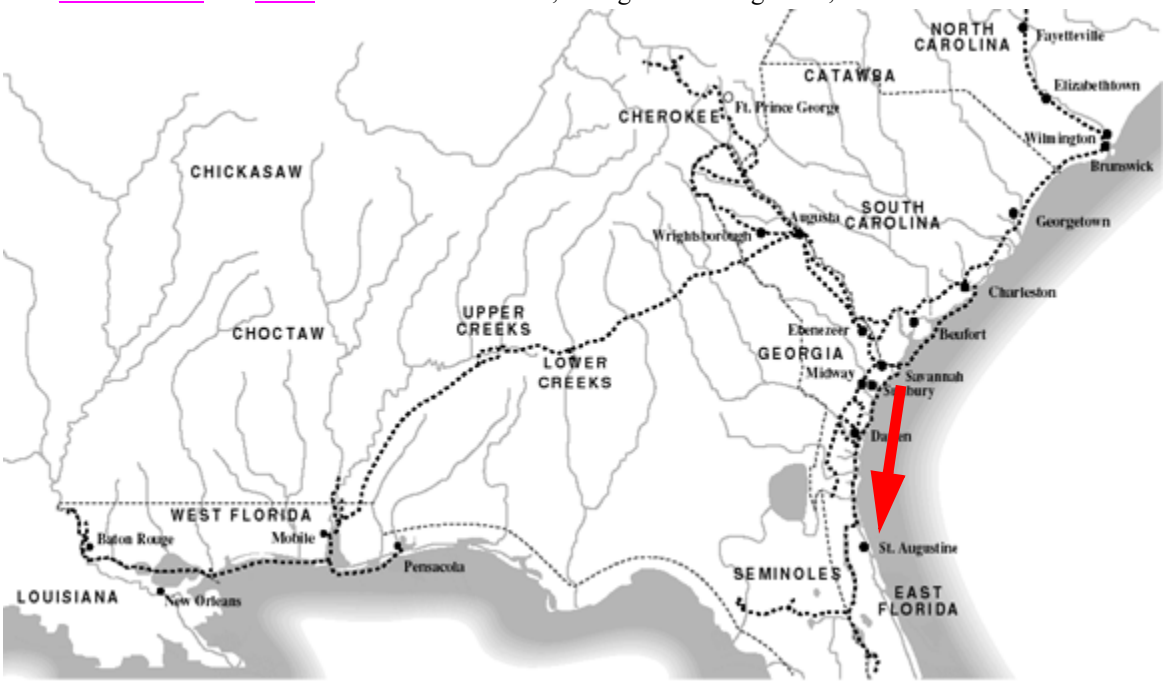
BOTANIZING

September 12: John Bartram and Billie arrived in Augusta.

BOTANY

BOTANY

October: John Bartram and Billie sailed from Savannah, Georgia to St. Augustine, Florida.



October 1, Tuesday: John Bartram and Billie reached Fort Barrington where they discovered Franklinia, fevertree, and Ogeechee lime.

BOTANIZING

October 5, Saturday: John Bartram and Billie left the Altamaha River and traveled south on the Old Post Road, then known as the Savannah to Saint Augustine Road.

November: John Bartram and Billie spent the month in St. Augustine.

BOTANIZING

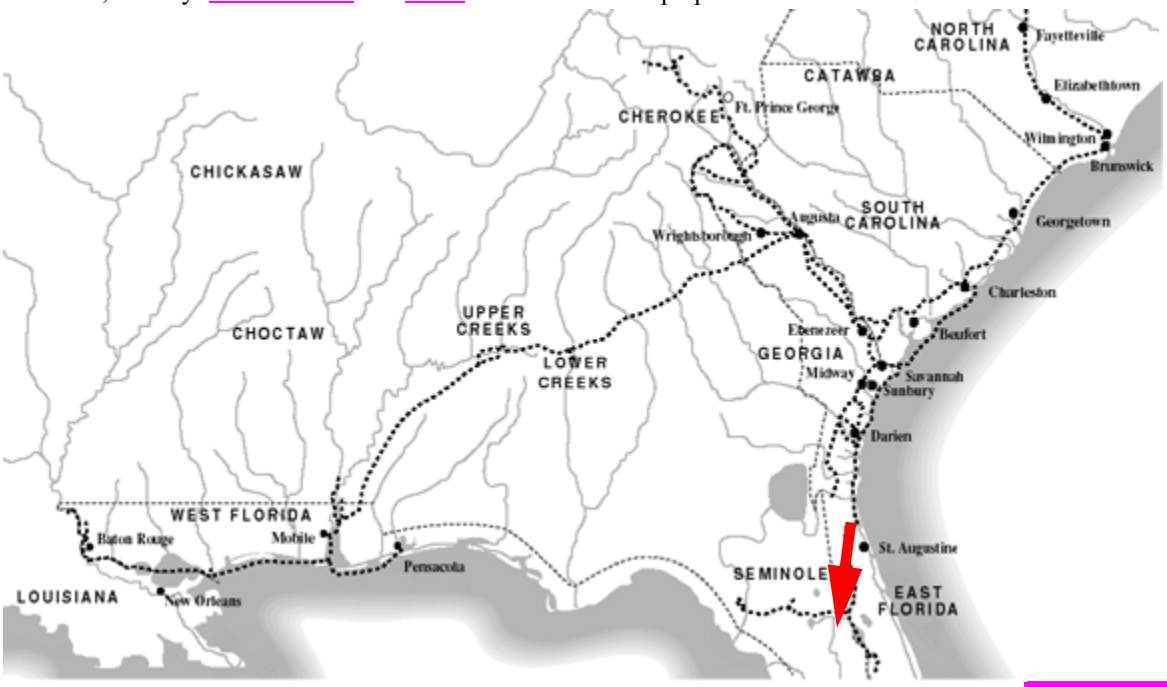
December: John Bartram and Billie traveled through Florida from St. Augustine north to Fort George (returning to St. Augustine the following February).

BOTANIZING

BOTANY

BOTANY

December 22, Sunday: John Bartram and Billie set out on their trip up the St. Johns River.



BOTANIZING

December 26: John Bartram and Billie visited Charlotia and Murphy Island.

BOTANIZING

December 31: John Bartram and Billie reached Spalding's Lower Store near Palatka.

BOTANIZING

1766

A Journal Kept by John Bartram of Philadelphia, Botanist to His Majesty for the Floridas.

BOTANIZING

Carolus Linnaeus's *CLAVIS MEDICINAE* (KEY TO MEDICINE) and Part I of the 12th edition of his *SYSTEMA NATURAE* (SYSTEM OF NATURE).

Cadwalader Colden died.

Joseph Banks explored Newfoundland and Labrador, charting waters and making collections.

BOTANIZING

William Young was back in Philadelphia, with the gossip suggesting that he had left the European scene under a cloud. Some of his reputation rested on his introduction of the Venus Fly-trap (originally John Bartram's discovery), which had not previously been seen alive in Europe.

BOTANIZING

January 12, Sunday: John Bartram and Billie reached their farthest point near the headwaters of the St. Johns River, near Titusville.

BOTANIZING

January 13, Monday: John Bartram and Billie began to make their way back down the St. Johns River.

January 19, Sunday: John Bartram and Billie arrived at Spalding's Upper Store.

January 23, Thursday: An earthquake table lists the quake on this day as "`1766JAN23 1000 43.70 70.30 5 ME PORTLAND`."

John Bartram and Billie botanized around Silver Glen Springs.

BOTANIZING

January 24: An earthquake EARTHQUAKE table lists the quake on this day as "`1766JAN24 X 43.70 70.30 2 ME PORTLAND`."

William Bartram discovered *Illicium floridanum*, star anise.

BOTANIZING

1767

Part II of the 12th edition of Carolus Linnaeus's *SYSTEMA NATURAE* (SYSTEM OF NATURE).

BOTANIZING

1768

Dr. Erasmus Darwin constructed a small carriage, which he intended to use both to optimize the power of the horse, and the ease of turning. It consisted of a sort of platform with a seat, upon a very high pair of wheels, which was supported in front by an arch reaching over the hind quarters of the horse. A saddle on the horse had a socket on top, and the arch was attached to this socket by a ring. Although an arrangement similar to this would be given, in America, the name "Equibus," Dr. Darwin's version apparently did not work very well, as he upset in it and broke a knee-cap. Evidently then he ended his experiment with the apparatus. Ever after, he would limp a little.

Completion of publication in this year, with Part III, of the 12th edition of Carolus Linnaeus's *SYSTEMA NATURAE* (SYSTEM OF NATURE), an enormous tome. Dr. Adam Kuhn of Philadelphia, who had studied under Linnaeus, was probably the 1st professor of botany in America — he was chair of botany at the University of Pennsylvania.

BOTANIZING

The Reverend Joseph Priestley's book on politics, AN ESSAY ON THE FIRST PRINCIPLES OF GOVERNMENT AND THE NATURE OF POLITICAL, CIVIL AND RELIGIOUS LIBERTY, argued for the development of a political system that maximized civil liberty. In a statement that was to have an influence on the work of Jeremy Bentham and his ideas on Unitarianism, Priestley wrote: "The good and happiness of the members, that is the majority of the members of the state, is the great standard by which every thing relating to that state must finally be determined."

> In the largest states, if the abuses of government should, at any time be great and manifest; if the servants of the people, forgetting their masters, and their masters' interest, should pursue a separate one of their own; if, instead of considering that they are made for the people, they should consider the people as made for them; if the oppressions and violations of right should be great, flagrant, and universally resented; if the tyrannical governors should have no friends but a few sycophants, who had long preyed upon the vitals of their fellow citizens, and who might be expected to desert a government, whenever their interests should be detached from it: if, in consequence of these circumstances, it should become manifest, that the risk, which would be run in attempting a revolution would be trifling, and the evils which might be apprehended from it, were far less than these which were actually suffered, and which were daily increasing; in the name of God, I ask, what principles are those, which ought to restrain an injured and insulted people from asserting their natural rights, and from changing, or even punishing their governors that is their servants, who had abused their trust; or from altering the whole form of their government, if it appeared to be of a structure so liable to abuse? To say that these forms of government have been long established, and that these oppressions have been long suffered, without any complaint, is to supply the strongest argument for their abolition. Nothing can more justly excite the indignation of an honest and oppressed citizen, than to hear a prelate, who enjoys a considerable benefice, under a corrupt government, pleading for its support by those abominable

> perversions of scripture, which have been too common on this occasion; as by urging in its favour that passage of St. Paul, "The powers which be are ordained of God", and others of a similar import. It is a sufficient answer to such an absurd quotation as this, that, for the same reason, the powers which will be will be ordained of God also. It will be said, that it is opening a door to rebellion, to assert that magistrates, abusing their power, may be set aside by the people, who are of course their own judges when that power is abused. May not the people, it is said, abuse their power, as well as their governors? I answer, it is very possible they may abuse their power: it is possible they may imagine themselves oppressed when they are not: it is possible that their animosity may be artfully and unreasonably inflamed, by ambitious and enterprising men, whose views are often best answered by popular tumults and insurrections; and the people may suffer in consequence of their folly and precipitancy. But what man is there, or what body of men (whose right to direct their own conduct was never called in question) but are liable to be imposed upon, and to suffer in consequence of their mistaken apprehensions and precipitate conduct? English history will inform us, that the people of this country have always borne extreme oppression, for a long time before there has appeared any danger of a general insurrection against the government.

Summer: Friend John Fothergill, a London physician and a fellow of the Royal Society, visited Friend Peter Collinson and saw some of the nature sketches that had been prepared by William Bartram. Soon he would commission a series of drawings of the American land tortoises.

BOTANIZING

> This was exactly what William needed, yet another new start.
> — Slaughter, Thomas P. THE NATURES OF JOHN AND WILLIAM BARTRAM. NY: Vintage Books, 1996, page 169.

August 11, Thursday: William Bartram's patron in England, Peter Collinson, died of a kidney problem at the age of 74. Bartram would need a new patron and, luckily, one would immediately show up: Friend John Fothergill, a well-connected Quaker physician in London.

BOTANIZING

1769

April 26, Wednesday: John Bartram was elected to the Royal Academy of Science of Stockholm.

BOTANIZING

October 10, Tuesday: Captain Gaspar de Portola's exploration of the California coast reached low hills forested by very tall trees that were red in color. This is the 1st recorded sighting (did I mention that Captain Portola was a white man?) of the coast redwoods.

BOTANIZING

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

April 19, Thursday: Austrian Archduchess Maria Antonia Josepha Johanna got married by proxy with Louis, le Dauphin before the Papal Nuncio in Vienna. Louis was proxied by one of Maria's brothers. Maria would henceforward be known as Marie Antoinette, Dauphine of France.

Leopold and Wolfgang Amadeus Mozart were guests of Prince San Angelo of Naples, in Rome. They met the Scottish Pretender, Charles Edward Stuart.

Australia was "discovered" by the British (though the Dutch had already named the area New Holland and had experienced at least 15 landings since 1606). Captain James Cook had in 1768 set out on the *Endeavor* on a scientific mission, with the young naturalists Joseph Banks and Daniel Charles Solander (a pupil of Carl von Linné), as well as artists. On April 29, 1770, his ship stood into Botany Bay, which Cook originally called Sting Ray Harbor — but the great collection of new botanical materials by Banks and Solander provoked him to change the name.

BOTANIZING

JOURNAL: THURSDAY, 19th. In the P.M. had fresh Gales at South-South-West and Cloudy Squally weather, with a large Southerly Sea; at 6 took in the Topsails, and at 1 A.M. brought too and Sounded, but had no ground with 130 fathoms of line. At 5, set the Topsails close reef'd, and 6, saw land[11] extending from North-East to West, distance 5 or 6 Leagues, having 80 fathoms, fine sandy bottom. We continued standing to the Westward with the Wind at South-South-West until 8, at which time we got

11. The south-east coast of Australia. See chart.

Topgallant Yards a Cross, made all sail, and bore away along shore North-East for the Eastermost land we had in sight, being at this time in the Latitude of 37 degrees 58 minutes South, and Longitude of 210 degrees 39 minutes West. The Southermost point of land we had in sight, which bore from us West 1/4 South, I judged to lay in the Latitude of 38 degrees 0 minutes South and in the Longitude of 211 degrees 7 minutes West from the Meridian of Greenwich. I have named it Point Hicks, because Lieutenant Hicks was the first who discover'd this Land. To the Southward of this point we could see no land, and yet it was clear in that Quarter, and by our Longitude compared with that of Tasman's, the body of Van Diemen's land ought to have bore due South from us, and from the soon falling of the Sea after the wind abated I had reason to think it did; but as we did not see it, and finding the Coast to trend North-East and South-West, or rather more to the Westward, makes me Doubtfull whether they are one land or no.[12] However, every one who compares this Journal with that of Tasman's will be as good a judge as I am; but it is necessary to observe that I do not take the Situation of Vandiemen's from the Printed Charts, but from the extract of Tasman's Journal, published by Dirk Rembrantse. At Noon we were in the Latitude of 37 degrees 50 minutes and Longitude of 210 degrees 29 minutes West. The extreams of the Land extending from North-West to East-North-East, a remarkable point, bore North 20 degrees East, distant 4 Leagues. This point rises to a round hillock very much like the Ramhead going into Plymouth sound, on which account I called it by the same name; Latitude 37 degrees 39 minutes, Longitude 210 degrees 22 minutes West. The Variation by an Azimuth taken this morning was 8 degrees 7 minutes East. What we have as yet seen of this land appears rather low, and not very hilly, the face of the Country green and Woody, but the Sea shore is all a white Sand.

HIS 3 VOYAGES, VOL. I

HIS 3 VOYAGES, VOL. II

THE FUTURE CAN BE EASILY PREDICTED IN RETROSPECT

12. Had not the gale on the day before forced Cook to run to the northward, he would have made the north end of the Furneaux Group, and probably have discovered Bass Strait, which would have cleared up the doubt, which he evidently felt, as to whether Tasmania was an island or not. The fact was not positively known until Dr. Bass sailed through the Strait in a whale-boat in 1797. Point Hicks was merely a rise in the coast-line, where it dipped below the horizon to the westward, and the name of Point Hicks Hill is now borne by an elevation that seems to agree with the position.

1771

John Bartram released control of his home and garden to his firstborn son John Bartram, Jr. The family business in plant and seeds would continue — and improvident brother William Bartram would always have a place to lay his ignoble head.

BOTANIZING

The Reverend Gilbert White of Selborne discontinued the GARDEN KALENDAR which he had maintained since 1751, in favor of the format of Daines Barrington's THE NATURALIST'S JOURNAL.[13]

In Nürnberg, Volume II of Conrad Gesner's botanical manuscripts.

BOTANIZING

Luigi Galvani of Bologna recorded "animal" electricity.

THE SCIENCE OF 1771

The Reverend Joseph Priestley discovered that a plant could produce enough breathable air to sustain a mouse plus keep a candle burning. Though he described this in different terms, he had discovered oxygen.

In Gailenreuth Cave in Germany, Father Johann Esper found human bones beneath those of extinct animals. He concluded that the bones had gotten underneath by some sort of happenstance, the alternative being unthinkable — and this was an opinion with which Cuvier would concur.

PALEONTOLOGY

13. See the extracts edited by Walter Johnson, published in 1931 and reprinted in 1970.

1772

Joseph Banks was appointed scientific advisor for the royal botanical gardens by King George III.

Carl Pieter Thunberg and Francis Masson arrived in South Africa independently (though they often collected together). Masson would send over 500 plant species to Kew. Thunberg's study was mainly scientific, but he sent such specialties to Sweden as the strelitzia.

BOTANIZING

It has been alleged that at some point John Bartram manumitted his slaves, who ate at table with his 11 children, and put them on salary. We have no indication that if this happened, the action had been ideology-driven, that is, that it was due to any growing distaste for human slavery, or commitment to an ideal of freedom, or religious sentiment on the part of the elder Bartram, or pressure from other Quakers — this may indeed have been the case but there's an entire absence of evidence. It is within the bounds of possibility that the manumission described was entirely practical. It is also within the bounds of possibility that this account that has grown up represents a considerable exaggeration. What William Bartram would write about his father was simply that "he gave liberty to a most valuable male slave, then in the prime of his life, who had been bred up in the family almost from his infancy." One event, one person. Various members of the Bartram family in fact bought and sold slaves up to within three years of the point at which the Philadelphia Yearly Meeting of the Religious Society of Friends began to censure members who continued to own slaves.

What Friend John Fothergill had in mind, in his patronage of William Bartram, was a two-or-three-year expedition for the collection of rare plant specimens and their seeds, more or less a replay of what William's father John Bartram had accomplished on behalf of Friend Peter Collinson, deceased, before advancing age had deprived him of his eyesight. He wanted "plants remarkable for their beauty, fragrance, singularity of appearance or known usefulness." He really wouldn't get this from the son at all. He wouldn't get one cutting, he wouldn't receive as much as one seed. All he would get was drawings, and travel accounts not remarkable for their accuracy, and over a greater period of years than he had bargained for. Well, but his patronage wouldn't cost him very much, either. In one of the years of Bartram's TRAVELS, for instance, his position as patron would cost him a mere £12.

BOTANIZING

The following account of a couple of stories that Peter Cook of Germantown ("Mr. Peter Cock, a merchant") had passed along in 1748 to travelling naturalist Peter Kalm is from Volume 14 of THE ANNUAL REGISTER, OR A VIEW OF THE HISTORY, POLITICS, AND LITERATURE FOR THE YEAR 1771, edited by Edmund Burke and printed in London for J. Dodsley, in Pall-Mall (one of these stories would wind up in Henry Thoreau's CAPE COD):

An Account of ſome Veſtiges of Cultivation and Antiquity, which

the French met with, in their Attempt to trace out the Paſſage by land from Canada to the South Sea; from Profeſſor Kalm.... *Remarkable Prognoſtic of a Hurricane in the Weſt Indies; from the ſame.*

Mr. Cock told me one day, and on ſome other occaſions afterward, an accident which happened to him, and which ſeemed greatly to confirm a peculiar ſign of an imminent hurricane. He ſailed to the Weſt Indies in a ſmall yacht, and had an old man on board, who had for a conſiderable time ſailed in this ſea. The old man ſounding the depth, called to the mate to tell Mr. Cock to launch the boats immediately, and to put a ſufficient number of men into them, in order to tow the yacht during the calm, that they might reach the iſland before them, as ſoon as poſſible, as within twenty-four hours there would be a ſtrong hurricane. Mr. Cock aſked him what reaſons he had to think ſo? the old man replied, that on ſounding, he ſaw the lead in the water at a diſtance of many fathoms more than he had ſeen it before; that therefore the water was become clear all of a ſudden, which he looked upon as a certain ſign of an impending hurricane in the ſea. Mr. Cock likewiſe ſaw the exceſſive clearness of the water. He therefore gave immediate orders for launching the boat, and towing the yacht, ſo that they arrived before night in a ſafe harbour. But before they had quite reached it the waves began to riſe more and more, and the water was as it were boiling, though no wind we perceptible. In the enſuing night the hurricane came on, and raged with ſuch violence, that not only many ſhips were loſt, and the roofs were torn off from the houſes, but even Mr. Cock's yacht and other ſhips, though they were in ſafe harbours, were by the wind, and the violence of the ſea, waſhed ſo far on ſhore, that ſeveral weeks elapſed, before they could be got off....

The following curious Particulars in Natural Hiſtory, are taken from Profeſſor Kalm's Travels in North America....

Mr. Peter Cock, a merchant of this town, aſſured me that he lately had himſelf been a ſpectator of a [black] ſnake's ſwallowing a little bird [Catbird *Muſcicapa Carolinenſis*)....

PEOPLE OF CAPE COD

CAPE COD: It is generally supposed that they who have long been conversant with the Ocean can foretell, by certain indications, such as its roar and the notes of sea-fowl, when it will change from calm to storm; but probably no such ancient mariner as we dream of exists; they know no more, at least, than the older sailors do about this voyage of life on which we are all embarked. Nevertheless, we love to hear the sayings of old sailors, and their accounts of natural phenomena, which totally ignore, and are ignored by, science; and possibly they have not always looked over the gunwale so long in vain. Kalm repeats a story which was told him in Philadelphia by a Mr. Cock, who was one day sailing to the West Indies in a small yacht, with an old man on board who was well acquainted with those seas. "The old man sounding the depth, called to the mate to tell Mr. Cock to launch the boats immediately, and to put a sufficient number of men into them, in order to tow the yacht during the calm, that they might reach the island before them as soon as possible, as within twenty-four hours there would be a strong hurricane. Mr. Cock asked him what reasons he had to think so; the old man replied, that on sounding, he saw the lead in the water at a distance of many fathoms more than he had seen it before; that therefore the water was become clear all of a sudden, which he looked upon as a certain sign of an impending hurricane in the sea." The sequel of the story is, that by good fortune, and by dint of rowing, they managed to gain a safe harbor before the hurricane had reached its height; but it finally raged with so much violence, that not only many ships were lost and houses unroofed, but even their own vessel in harbor was washed so far on shore that several weeks elapsed before it could be got off.

PETER KALM "A MR. COCK"

Summer: William Bartram proposed that Dr. Fothergill fund a trip to Florida.

BOTANIZING

Fall: Dr. Fothergill authorized Dr. Lionel Chalmers of Charleston to allow William Bartram a stipend of £50 and additional payments for each drawing. In return for this money he would be shipping seeds and plants to Dr. Fothergill.

BOTANIZING

1773

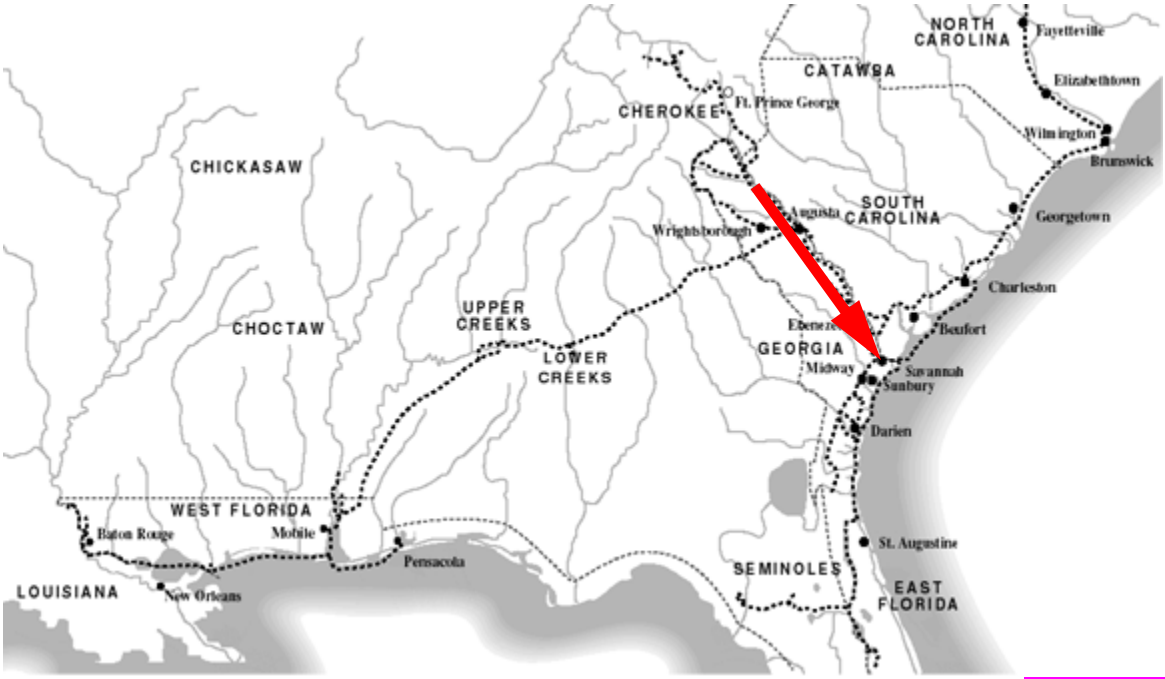
March-April: William Bartram sailed from Philadelphia to the port of Savannah, went up the Savannah River to Augusta, and then came back down the river through Savannah and ventured south to beyond Fort Barrington.

BOTANIZING

May: William Bartram returned north from Fort Barrington to Savannah and then went on upriver to Augusta.

BOTANIZING

June-July: William Bartram went a ways farther up the Savannah River valley above Augusta, and then came down the river through Augusta to the port of Savannah.



BOTANIZING

Mid-July to March: William Bartram made excursions around Savannah and the Georgia coast.

BOTANIZING

(He was ill for several weeks during Summer 1773 and recuperated at the home of Lachlan McIntosh in Darien.)

September to April: William Bartram ventured from Savannah to Spalding Lower Store on the St. Johns River of Florida.

1774

Late April: William Bartram traveled to Alachua Savannah (Gainesville) and Cuscowilla (Micanopy).

BOTANIZING

May: William Bartram ventured from Spalding Lower Store on the St. Johns River inland to Alachua Savannah, and returned.

BOTANIZING

Mid-May through early June: William Bartram traveled to Lake George, Spalding's Upper Store, his encounter with the menacing alligators, and visited Blue Springs.

BOTANIZING

June: William Bartram ventured from Spalding Lower Store on the St. Johns River south to Blue Springs, and returned.

BOTANIZING

Mid-June to Mid-July: William Bartram returned to Alachua Savannah, traveled to the Suwanee River, and explored Manatee Springs.

BOTANIZING

July: William Bartram ventured from Spalding Lower Store on the St. Johns River to Manatee Springs, and returned.

BOTANIZING

August-October: William Bartram made an excursion up the St. John's River, and from Spalding Lower Store south to the Great East Lake, and returned.

BOTANIZING

1775

During his travel, William Bartram experienced a temporary blinding affliction. His eyes would be giving him problems for the remainder of his life. We do not know the precise medical cause: some hints have been that this may have been caused by poison ivy, or it may have been a complication of a bout with the scarlet fever he had in this year.

BOTANIZING

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

May 22, Monday: William Bartram arrived at Cowee and explored the Cowee Mountains.

BOTANIZING

May 24, Wednesday: William Bartram departed Cowee and crossed the Nantahala Mountains at Burningtown Gap.

BOTANIZING

Early in June: The Reverend Asa Dunbar recorded in his journal: "*The two-year-olds* [cows] *came home from* [their pasturage in] *Princetown*."

William Bartram returned to Fort James and explored the Broad River.

BOTANIZING

June 27, Tuesday: William Bartram camped at Flat Rock.

BOTANIZING

July 1, Saturday: William Bartram camped at Rock Landing on the Oconee River.

BOTANIZING

July 13, Thursday: William Bartram departed the Lower Creek towns and traveled along the south side of Uchee Creek, passed through Tuskegee, and crossed Uphapee Creek to Talasi.

BOTANIZING

July 16, Sunday: On about this day William Bartram traveled from Talassee to Kolomi.

BOTANIZING

July 19, Wednesday: On about this day William Bartram traveled through the Alabama prairies (Montgomery County).

BOTANIZING

July 21, Friday: On about this day William Bartram passed through Fort Deposit and followed the trading path that coincides with the present-day Conecuh-Monroe county boundary.

BOTANIZING

July 26, Wednesday: On about this day William Bartram arrived at Major Farmar's plantation on the Tensaw River.

BOTANIZING

August 5, Saturday: William Bartram returned to the Farmar plantation where he spent several days exploring the Tensaw River and made a trip upriver to the lower part of the Tombigee River.

BOTANIZING

The 1st Spanish ship, *San Carlos*, entered San Francisco bay.

There is in existence a 42 inch by 30 inch Chart of Boston Harbor bearing this date, prepared from surveys taken by Samuel Holland, Esq. and his assistants, who had been employed on that service as early as 1764.

MAPS OF BOSTON

Mid-August: William Bartram explored Baldwin County to the north of Stockton.

BOTANIZING

October 27, Friday: William Bartr GO TO MASTER INDEX OF WARFARE d on the 28th they visited Pointe Coupee.

BOTANIZING

The Reverend Asa Dunbar recorded in his journal: "*Battle at Chelsea*."

December 4, Monday: Friend Moses Brown wrote Governor Stephen Hopkins of Rhode Island in an attempt to dissuade him from “present measures,” those of the hostilities against England.

On about this day, William Bartram arrived on the Tallapoosa River. He would visit Fort Toulouse, Alabama Town, Muklasa, Tuckabatchee, Kolomi, and Atasi.

BOTANIZING

1776

Dr. Erasmus Darwin began the creation of a botanic garden at Abnalls, Lichfield.
He began the keeping of a Commonplace Book, which would become massive. His eldest son, Charles, entered the Edinburgh Medical School.

Spring and Summer: William Bartram explored the Georgia coast and traveled to the St. Mary's River where he had an encounter with the "intrepid Siminole." He joined the Georgia militia during a military campaign to dislodge loyalists from the St. Marys River.

BOTANIZING

July 31, Wednesday: William Bartram sailed up the Altamaha River.

BOTANIZING

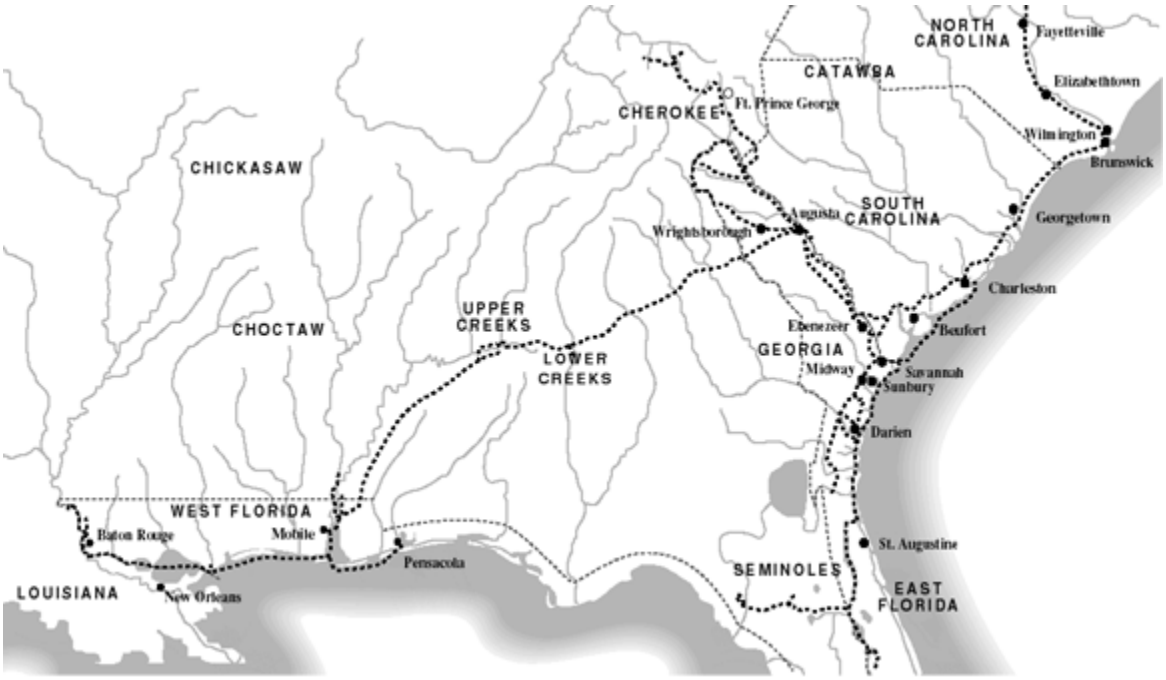
Early December: William Bartram arrived at Ashwood, on the Cape Fear River.

BOTANIZING

1777

January 2, Thursday: It was on about this day that William Bartram, his travels in the southern colonies complete, arrived back home in Philadelphia:

BOTANIZING


NORTH CAROLINA
Fayetteville
CATAWBA
Elizabethtown
CHEROKEE
Ft. Prince George
Wilmington
Brunswick
CHICKASAW
SOUTH CAROLINA
Augusta
Georgetown
Wrightsborough
Charleston
UPPER CREEKS
CHOCTAW
Ebenezer
Beufort
GEORGIA
LOWER CREEKS
Midway
Savannah
Sunbury
Darien
WEST FLORIDA
Baton Rouge
Mobile
Pensacola
St. Augustine
SEMINOLES
LOUISIANA
New Orleans
EAST FLORIDA

1779

Dr. Erasmus Darwin constructed a machine that caused what was being written with one pen to be replicated by a second, linked pen (despite what you may have hears about Thomas Jefferson's copy machine at Monticello, the two such devices created by Dr. Darwin remain the only ones ever constructed that were capable of producing a copy entirely indistinguishable from the original!), and an effective horizontal windmill for the grinding of flints — and sketched a multi-mirror telescope.

THE LUNAR SOCIETY OF BIRMINGHAM

He completed his botanical garden at Abnalls, Lichfield.

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.

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

1781

The Reverend Manasseh Cutler was elected a fellow of the American Academy of Arts and Sciences.

BOTANIZING

1784

Eventually, in 1986, there would be published A SELBORNE YEAR: THE "NATURALIST'S JOURNAL" FOR 1784 / GILBERT WHITE; edited by Edward Dadswell; illustrated by Nichola Armstrong. Exeter, Devon: Webb & Bower; London: M. Joseph.

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

Antoine-Auguste Parmentier embarked on a campaign to persuade the French to rely upon the potato. King Louis XVI allowed him to plant potatoes on a hundred abandoned acres outside Paris, and he kept the field under heavy guard. Then, one night, this cunning fellow allowed this guard to go off duty — and so of course as expected the local peasants sneaked over and stole his entire crop, to plant on their own farms. He persuaded the king to throw a banquet at which only potatoes were served, and persuaded Marie Antoinette to put potato blossoms in her hair. What an operator! Benjamin Franklin attended that banquet.

Humphry Marshall, cousin of William Bartram and the younger John Bartram, who had a large arboretum at Marshallton in Chester County, Pennsylvania, in this year published a catalog *ARBUSTRUM AMERICANUM* in which he accounted for many of the species in his collection.

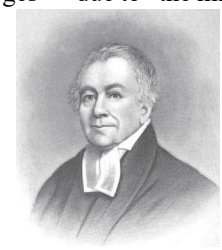
BOTANIZING

Beginning in this year André Michaux and his son François André Michaux were making their initial tour of the US, not only introducing plants from France and her colonies but also setting up nurseries from which they might export American plants to France. In southeastern North America they encountered wild populations of Cherokee rose, which were believed to be native. (The plant appears to have come to North America with early Spanish explorers or settlers, as it is native to China, and had been cultivated in Moslem countries. Similarly, when William Penn acquired Penn's Woods from the Indians, he found they were already cultivating the peach, native to Persia, in their gardens.) This visit would continue into the year 1796.

Publication of Dr. Erasmus Darwin's translation of Linnaeus's *SYSTEMA VEGETABILIUM*, the system of plant classification that forms the basis of modern Botany, from Latin into English as SYSTEM OF VEGETABLES. His paper "An artificial spring of water" appeared in the Philosophical Transactions of the Royal Society.

THE SCIENCE OF 1785

The Reverend Manasseh Cutler, LL.D. was aspiring to write a natural history of New England. In this year he presented a paper on "Vegetable Productions" which is credited with being the 1st treatise on New England Botany. Lamenting that Canada and the southern states have been visited by "eminent botanists from Europe," while the part in between "seems still to remain unexplored," He blamed this sorry condition on the fact that botany was not being taught in our colleges — due to "the mistaken opinion of its unutility in common life."[14]



"HUCKLEBERRIES": Yet Dr. Manassah Cutler, one of the earliest New England botanists, speaks of the huckleberry lightly as being merely a fruit which children love to eat with their milk. What ingratitude thus to shield himself behind the children! I should not wonder if it turned out that Dr. Manassah Cutler ate his huckleberry pudding or pie regularly through the season, as many his equals do. I should have pardoned him had he frankly put in his thumb and pulled out a plum, and cried 'What a Great Doctor am I?' But probably he was lead astray by reading English books or it may be that the Whites did not make so much use of them in his time.

REVEREND MANASSEH CUTLER

14. Reverend Manasseh Cutler, "An Account of Some of the Vegetable Productions, Naturally Growing in this Part of America, Botanically Arranged." MEMOIRS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, 1st series, Volume I (Boston 1785): 396-493.

REV. MANASSEH CUTLER

A Bartram cousin named Humphrey Marshall founded his own botanical garden in the village of Marshallton in Chester County, Pennsylvania and issued *ARBUSTUM AMERICANUM*: THE AMERICAN GROVE, the 1st American book to deal exclusively with trees and shrubs.

Luigi Castiglioni would be spending two years in America to "investigate the nature of the most useful plants, the manner of cultivating and propagating them, and the uses that are made or can be made of them." The journal of his trip would be published in 1790 as *VIAGGIO*: TRAVELS IN THE UNITED STATES OF NORTH AMERICA, 1785-1787, and details travels north into Charlottesville, west over the Blue Ridge into Staunton, and north through the Shenandoah Valley toward Winchester.

July 6, Wednesday: William Jackson Hooker was born in Norwich, a son of Joseph Hooker of Exeter. After being educated at the high school of Norwich his status as an independent educated gentleman of means would enable him to travel and to take up as a recreation the study of ornithology and entomology. On the recommendation of Sir James Edward Smith (whom he consulted respecting a rare moss), he would soon come to specialize in botany.

1786

The Reverend Manasseh Cutler drove to Ohio in a sulky, and there helped form the Ohio Company. He studied Mark Catesby's NATURAL HISTORY.

BOTANIZING

Upon being urged by Professor John Law to expand his lectures, the Reverend William Paley published THE PRINCIPLES OF MORAL AND POLITICAL PHILOSOPHY (London). [15]

> "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":

15. 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.

WILLIAM PALEY

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

PEOPLE OF WALDEN

> 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

GEOLOGY

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.)

CHANGE IS ETERNITY, STASIS A FIGMENT

September: William Bartram was visited by André Michaux and François André Michaux, who were setting up a plant nursery in New Jersey.

BOTANIZING

Fall: William Bartram finally had a draft prepared, of his travel book. However, his plan to secure a list of subscribers, in order to justify a printing by the firm of Enoch Story, Jr., became stranded upon the mudflats of the realities of printing. Then, there may or may not have been a plot by William's supposed friend Benjamin Smith Barton, to abscond with the MS and get it published in Scotland as his own creation. Also, at this point, he fell heavily from a cypress while collecting seeds, badly shattering the bones of his right leg. (He would limp along by reliance upon a walking-stick for the remaining 37 years of his life.)

BOTANIZING


TRAVELS

THROUGH

NORTH & SOUTH CAROLINA,

GEORGIA,

EAST & WEST FLORIDA,

1787

André Michaux found many new species in the montane forests of the Carolinas. Later he would venture to Hudson Bay in search of new species.

BOTANIZING

In this year Friend Luke Howard reached his 15th year of age, and was apprenticed to Ollive Sims, chemist and druggist of Stockport. The study of Botany was young Luke's "principal relaxation." He kept a botanical collection.

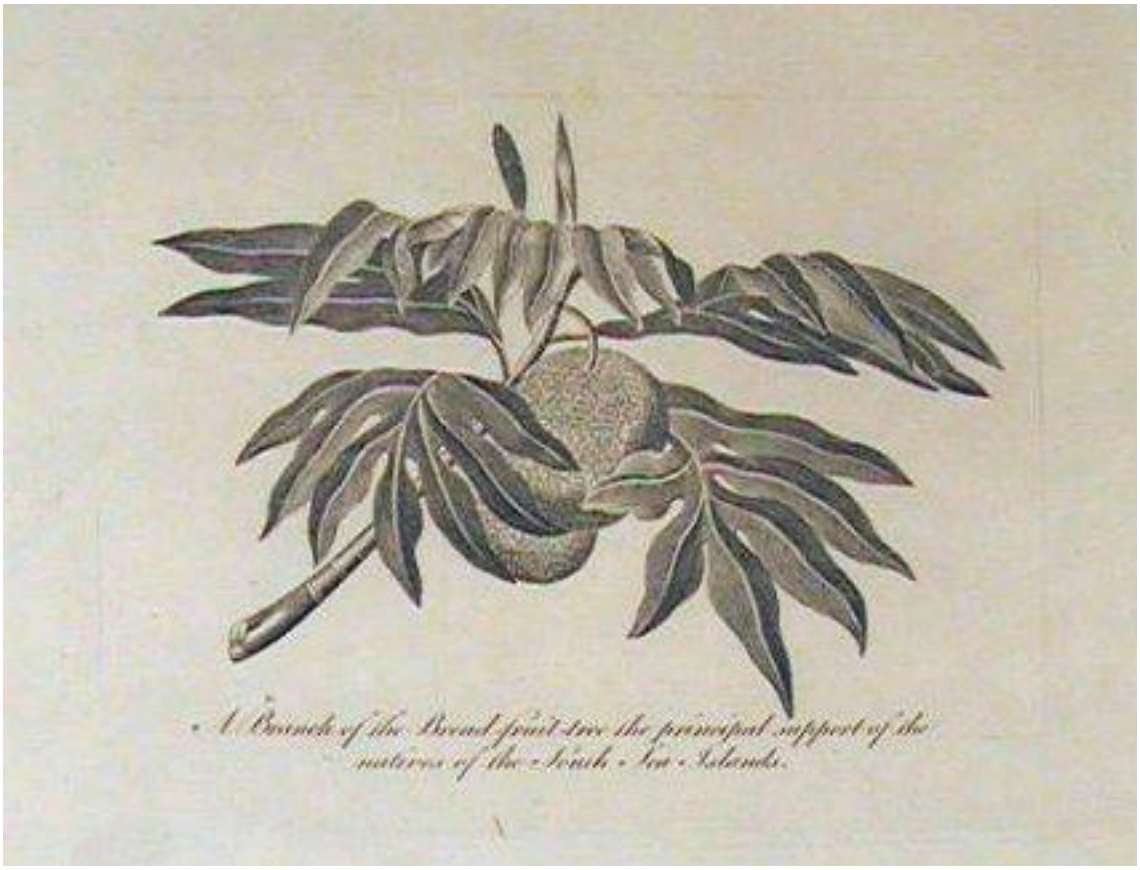
BOTANIZING

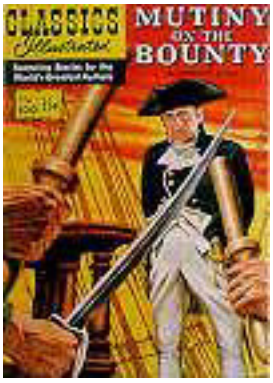
Publication began for Botanical Magazine by William Curtis, the world's longest-running journal, dedicated to introducing exotic plants to an avid audience. To produce this series, Curtis quit his job as Demonstrator in Botany for the Chelsea Physic Garden.

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.)





June 10, Sunday: George Washington took a break from governmental proceedings and rode out "to see the Botanical Garden of Mr. Bartram, which though stored with many curious plants, shrubs and trees, many of which are exotics, was not laid off with much taste nor was it large."

BOTANIZING

1788

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

Thomas Walter's *FLORA CAROLINIANA* was published.

THE SCIENCE OF 1788

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

William Bartram's OBSERVATIONS ON THE CREEK AND CHEROKEE INDIANS.

CREEKS/CHEROKEES

William Aiton's *HORTUS KEWENSIS* recorded 15 exotic species of orchid at Kew. They were: *Bletia verecunda*, *Epidendrum fragrans*, *Epidendrum cochleatum*, *Phaius grandifolius* (syn *P. tankervilliae*), *Cypripedium spectabilis*, *Cypripedium acaule*, *Liparis liliifolia*, *Calopogon pulchellus*, *Habenaria fimbriata*, *Arethusa bulbosa*, *Satyrium carneum*, *Satyrium coriifolium*, *Bartholina pectinata*, *Serapias lingua*, and *Nigritella angustifolia*. *Epidendrum cochleatum* was the first epiphytic orchid known to have bloomed at Kew, in 1789.

This initial official *HORTUS KEWENSIS* in three volumes described a total of 5,500 plant species, arranging them according to the Linnaean system with a description of each plant's habitat, in which year it had been introduced, and the name of the introducer.[16]

BOTANIZING

Antoine Laurent de Jussieu achieved a workable system of naming and grouping plants in his *GENERA PLANTARUM*, by combining Linnaeus's nomenclature with Adanson's natural system of classification. His treatment provided the basis for the system of classifying plants we use today. The book was published in Paris — during the same year as the French Revolution.

October: George Washington, on his tour, visited the plant nursery of William Prince at Flushing on Long Island and was disappointed: "these gardens, except in the number of young fruit trees, did not answer my expectations. The shrubs were trifling, and the flowers not numerous."

BOTANIZING

16. This volume attributed 21 plant discoveries to William Bartram.

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 Captain 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*.[17] 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."

The overview was that all plant organs, flowers included, began as leaves — an overview that would enjoy some support from 21st-Century genetic research.

THE SCIENCE OF 1790

PALEONTOLOGY

17. 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:

CONCORD FREE PUBLIC LIBRARY

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

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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.

"HISTORICAL PERSPECTIVE" BEING A VIEW FROM A PARTICULAR POINT IN TIME (JUST AS THE PERSPECTIVE IN A PAINTING IS A VIEW FROM A PARTICULAR POINT IN SPACE), TO "LOOK AT THE COURSE OF HISTORY MORE GENERALLY" WOULD BE TO SACRIFICE PERSPECTIVE ALTOGETHER. THIS IS FANTASY-LAND, YOU'RE FOOLING YOURSELF. THERE CANNOT BE ANY SUCH THINGIE, AS SUCH A PERSPECTIVE.

1791

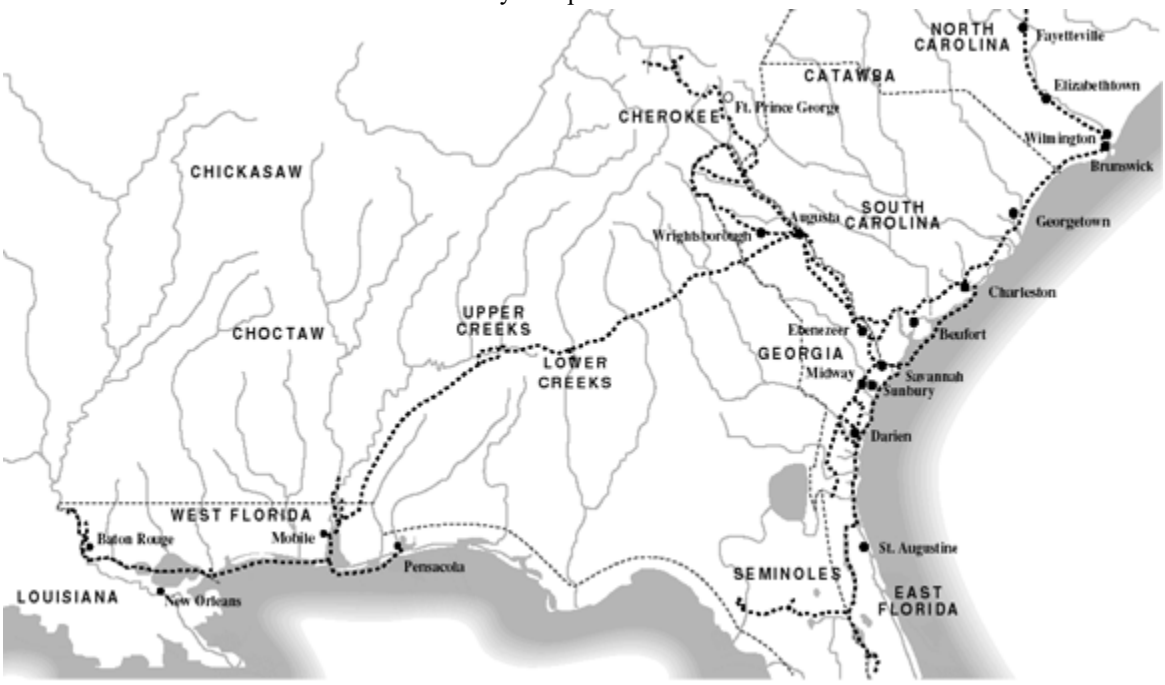
Gotthilf Heinrich Muhlenberg, son of Heinrich Melchior Muhlenberg (champion of Lutheranism) published a paper entitled "*Index flora lancastriensis*" in which he accounted for 454 genera and more than a thousand native and cultivated species that grew in the vicinity of his home in Lancaster, Pennsylvania.

Carl Ludwig Willdenow revised Carolus Linnaeus's *SPECIES PLANTARUM* and described several new American species from specimens sent by Muhlenberg.

BOTANIZING

August 26, Friday: John Fitch was granted a US patent for his working steamboat.

William Bartram's TRAVELS THROUGH NORTH AND SOUTH CAROLINA, GEORGIA, EAST AND WEST FLORIDA, THE CHEROKEE COUNTRY, THE EXTENSIVE TERRITORIES OF THE MUSCOGULGES, OR CREEK CONFEDERACY, AND THE COUNTRY OF THE CHACTAWS; CONTAINING AN ACCOUNT OF THE SOIL AND NATURAL PRODUCTIONS OF THOSE REGIONS, TOGETHER WITH OBSERVATIONS ON THE MANNERS OF THE INDIANS. EMBELLISHED WITH COPPER-PLATES finally was published.[18]



The author had his personal copy specially bound with his extra drawings and his errata sheets in the back.

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18. William Bartram. TRAVELS THROUGH NORTH AND SOUTH CAROLINA, GEORGIA, EAST AND WEST FLORIDA, THE CHEROKEE COUNTRY, THE EXTENSIVE TERRITORIES OF THE MUSCOGULGES, OR CREEK CONFEDERACY, AND THE COUNTRY OF THE CHACTAWS; CONTAINING AN ACCOUNT OF THE SOIL AND NATURAL PRODUCTIONS OF THOSE REGIONS, TOGETHER WITH OBSERVATIONS ON THE MANNERS OF THE INDIANS. EMBELLISHED WITH COPPER-PLATES (Philadelphia: Printed by James & Johnson. M, DCC, XCI).

FLORIDA

CAMBRIDGE HISTORY OF ENGLISH AND AMERICAN LITERATURE

The reception at home would be cool but they would be fascinated by it in Europe, where America was regarded as a far-away mysterious and exotic land. The French botanist Andre Michaux and his son Francois would come to visit. So would Thomas Nuttall, the English botanist, and Benjamin Smith Barton, and Henry Muhlenberg, and Alexander Wilson. Bartram would be elected Professor of Botany at the University of Pennsylvania although due to his health he would need to decline this honor. TRAVELS would impress Samuel Taylor Coleridge and his friend William Wordsworth. Henry David Thoreau would make notes on this book in his Indian Notebook #4 and refer to this book in WALDEN.

WM. BARTRAM'S BOOK

PEOPLE OF WALDEN

WALDEN: The customs of some savage nations might, perchance be profitably imitated by us, for they at least go through the semblance of casting their slough annually; they have the idea of the thing, whether they have the reality or not. Would it not be well if we were to celebrate such a "busk," or "feast of first fruits," as Bartram describes to have been the custom of the Mucclasse Indians? "When a town celebrates the busk," says he, "having previously provided themselves with new clothes, new pots, pans, and other household utensils and furniture, they collect all their worn out clothes and other despicable things, sweep and cleanse their houses, squares, and the whole town, of their filth, which with all the remaining grain and other old provisions they cast together into one common heap, and consume it with fire. After having taken medicine, and fasted for three days, all the fire in town is extinguished. During this fast they abstain from the gratification of every appetite and passion whatever. A general amnesty is proclaimed; all malefactors may return to their town.–"

"On the fourth morning, the high priest, by rubbing dry wood together, produces new fire in the public square, from whence every habitation in the town is supplied with the new and pure flame."

They then feast on the new corn and fruits and dance and sing for three days, "and the four following days they receive visits and rejoice with their friends from neighboring towns who have in like manner purified and prepared themselves."

The Mexicans also practised a similar purification at the end of every fifty-two years, in the belief that it was time for the world to come to an end.

I have scarcely heard of a truer sacrament, that is, as the dictionary defines it, "outward and visible sign of an inward and spiritual grace," than this, and I have no doubt that they were originally inspired directly from Heaven to do thus, though they have no biblical record of the revelation.

AUGUSTINE
WILLIAM BARTRAM
NOAH WEBSTER

District of PENNSYLVANIA, to wit:

BE it remembered, that on the twenty-sixth day of August, in the sixteenth year of the Independence of the United States of America, WILLIAM BARTRAM, of the said District, hath deposited in this office the title of a book, the right whereof he claims as Author in the words following, to wit:

"Travels through North & South Carolina, Georgia, "East & West Florida, the Cherokee country, the extensive territories of the Muscogulges, or Creek Confederacy, and the country of the Chactaws; containing an account of the Soil and Natural Productions of those regions, together with observations on the Manners of the Indians.——Embellished with copper-plates.

"BY WILLIAM BARTRAM."

In conformity to the Act of the Congress of the United States, entitled, "An Act for the encouragement of Learning, by securing the Copies of Maps, Charts and Books, to the authors and proprietors of such Copies, during the times therein mentioned."

SAMUEL CALDWELL,
Clerk of the District of
PENNSYLVANIA.

1792

George Washington put in two substantial orders to the nursery of John Bartram, son of the 1st John Bartram.

A new edition of Friend William Bartram's report of his TRAVELS through North and South Carolina, Georgia, East and West Florida FLORIDA, the Cherokee country, the extensive territories of the Muscogulges (Creek Confederacy), and the country of the Chactaws was printed in London, with much tinkering by an editor.[19]

PEOPLE OF WALDEN

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AUGUSTINE
WILLIAM BARTRAM
NOAH WEBSTER

August 6, Wednesday, 1851: … So worthy a traveller as Wm Bartram heads his first chapter with the words “The author sets sail from Philadelphia, and arrives at Charleston, from whence he begins his travels.”

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19. William Bartram. TRAVELS THROUGH NORTH AND SOUTH CAROLINA, GEORGIA, EAST AND WEST FLORIDA, THE CHEROKEE COUNTRY, THE EXTENSIVE TERRITORIES OF THE MUSCOGULGES, OR CREEK CONFEDERACY, AND THE COUNTRY OF THE CHACTAWS; CONTAINING AN ACCOUNT OF THE SOIL AND NATURAL PRODUCTIONS OF THOSE REGIONS, TOGETHER WITH OBSERVATIONS ON THE MANNERS OF THE INDIANS. EMBELLISHED WITH COPPER-PLATES (Philadelphia: Printed by James & Johnson. M, DCC, XCI).

FLORIDA

CAMBRIDGE HISTORY OF ENGLISH AND AMERICAN LITERATURE

1794

From this year until 1796, Augustin Pyramus de Candolle would be studying at the Collège de Calvin in Geneva while collecting botanical specimens in the surrounding countryside.

BOTANIZING

1795

André Michaux set off on his final American journey. He traveled up the Catawba River, passing through the territory now occupied by Knoxville, Nashville, and Danville, Kentucky. He was injured in a fall from his horse.

BOTANIZING
TIMELINE OF ACCIDENTS

A NATURALIST'S CALENDAR, WITH OBSERVATIONS IN VARIOUS BRANCHES OF NATURAL HISTORY; EXTRACTED FROM THE PAPERS OF THE LATE REV. GILBERT WHITE … NEVER BEFORE PUBLISHED. London, Printed for B. & J. White.

1796

André Michaux was shipwrecked during his return from his American journeys to France and lost all his personal property. Nearly all his collections, however, were salvaged. He would be received with honor and distinction but no considerable sum of money, although they did pay him a small proportion of his 7 years' arrears of salary. He found that many of his American trees had been sent by Marie Antoinette to her father's gardens at Schonbrunn.

BOTANIZING

TIMELINE OF ACCIDENTS

1797

Friedrich von Schelling's *IDEEN ZU EINER PHILOSOPHIE DER NATUR*.

Nicholas de Saussure's *RECHERCHES CHIMIQUES SUR LA VÉGÉTATION*.

Between this year and 1804, this sort of work by Nicklaus Joseph Jacqin would be being published:

1799

From this year into 1803, Augustin Pyramus de Candolle's *PLANTARUM HISTORIA SUCCULENTARUM*, in 28 sections.

BOTANIZING

Faujas described as a crocodile the Maastricht animal, a spectacular mosasaur found in chalk quarries in the Netherlands.

PALEONTOLOGY

Charles White's AN ACCOUNT OF THE REGULAR GRADATION IN MAN, AND IN DIFFERENT ANIMALS AND VEGETABLES, a treatise on the great chain of being, indicated that people of color were at the bottom of the human chain.

Thomas Jefferson described Megalonyx, a North American fossil ground sloth similar to the one found in South America.

Alexander von Humboldt named the Jurassic System after the Jura Mountains. This time period will later be identified as the "middle period" of the dinosaurs — hence "Jurassic Park."

George Shaw described a platypus even though he suspected his specimen might be a hoax.

The British government purchased the collection of Scottish anatomist John Hunter, forming the Hunterian Museum.

William Smith mapped rock formations in the vicinity of Bath, England, making perhaps the world's first geologic map. The same year, Smith, Joseph Townsend, and Benjamin Richardson recognized rocks containing the Permian and Triassic, though not necessarily by those names. (These periods will later be identified as spanning the earth's most catastrophic mass extinction.)

The Adams mammoth was discovered in the Russian tundra — this fossil would sit in a St. Petersburg museum for two centuries before geneticists would piece together its DNA from small samples of its hair.

THE SCIENCE OF 1799

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.

June: After being frustrated in his plans several times by wartime blockades of Europe, Friedrich Wilhelm Karl Heinrich Alexander von Humboldt was exploring what to him and to other Europeans such as his lover and traveling companion Aimé Bonpland was an entire New World.

The task would continue into 1804. This is the voyage he would describe in the 1820s in his *RELATION HISTORIQUE* or PERSONAL NARRATIVE, the three published volumes of which would appear in French in 1814, 1819, and 1825 (he would destroy the fourth volume of his manuscript), and the first PERSONAL NARRATIVE OF TRAVELS TO THE EQUINOCTIAL REGIONS OF THE NEW CONTINENT DURING THE YEARS 1799-1804 (London: Longman et al., 1822). First he traced the waterway of the Orinoco in Venezuela, and he was the first of the explorers who have penetrated deep inland in that area, mapping and collecting.

> I shall collect plants and fossils, and with the best of instruments make astronomic observations. Yet this is not the main purpose of my journey. I shall endeavor to find out how nature's forces act upon one another, and in what manner the geographic environment exerts its influence on animals and plants. **In short, I must find out about the harmony of nature.** (Kellner 233)

1800

During this year and the following one William Bartram would be drawing 24 plates for Professor Benjamin Smith Barton's ELEMENTS OF BOTANY, OR OUTLINES OF THE NATURAL HISTORY OF VEGETABLES, until "exceeding painfulness and weakness in my eyes" would force him to discontinue this occupation.

1801

The Elgin Botanical Garden was under development at the northern edge of New-York, largely through efforts of David Hosack, a professor at the medical school of Columbia College. Today Rockefeller Center stands on a portion of the 20-acre site once occupied by this garden.

The first Harvard Botanical Garden was established.

John Wedgwood (son of Josiah Wedgwood, uncle to Charles Darwin) wrote William Forsyth (George III's gardener) and Joseph Banks about starting the Royal Horticultural Society — which quickly came into being.

The cast iron process was invented, playing eventually into systems for constructing large conservatories.

The later-day owner of Alexander Pope's renowned estate was driven to removing the garden's famous willow tree in an effort to discourage tourists and lookyloos.

Upon the publication in Paris of André Michaux's *HISTOIRE DES CHÊNES DE L'AMÉRIQUE*, the son François André Michaux again toured the US, this time alone since his father had just died in an attempt to create a botanical garden on the island of Madagascar. This book by the father had handsome engravings after originals by the Redoutés and was the 1st work devoted entirely to the American oak tree.

The son would remain in the USA, botanizing, until 1803.

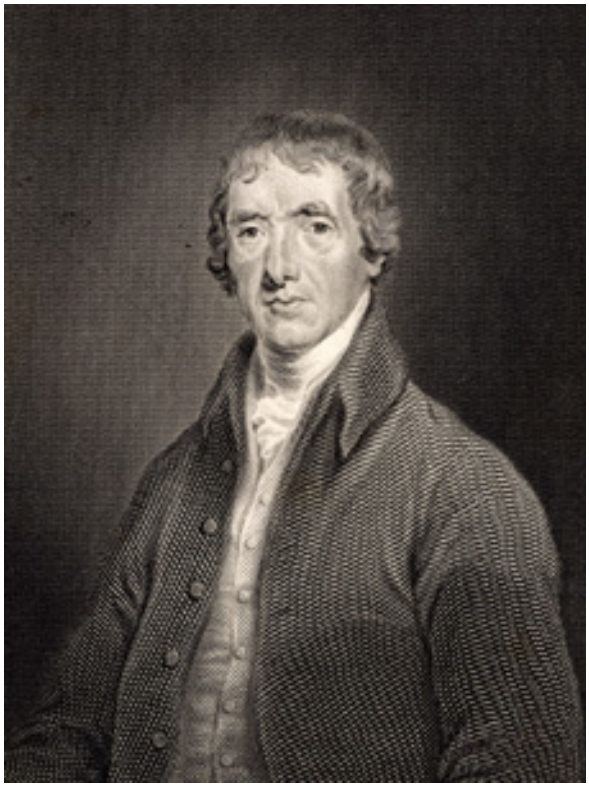
The predecessor to the New York Botanical Garden was started by David Hosack, on the ground that is now occupied by the Rockefeller Center.

Publication in Philadelphia of a greatly expanded version of Benjamin Smith Barton's 1798 COLLECTIONS FOR AN ESSAY TOWARDS A *MATERIA MEDICA* OF THE UNITED STATES.

BOTANIZING

1802

John Aikin's THE WOODLAND COMPANION OR A BRIEF DESCRIPTION OF BRITISH TREES, WITH SOME ACCOUNT OF THEIR USES.



2d edition of THE WORKS, IN NATURAL HISTORY, OF THE LATE GILBERT WHITE. COMPRISING THE NATURAL HISTORY OF SELBORNE; THE NATURALIST'S CALENDAR; AND MISCELLANEOUS OBSERVATIONS, EXTRACTED FROM HIS PAPERS. TO WHICH ARE ADDED, A CALENDAR… (London: Printed for J. White by T. Bensley).[20]

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

The 1st volume of Gottfried Reinhold Treviranus's 6-volume work, *BIOLOGIE ODER PHILOSOPHIE DE LEBENDEN NATUR*. (This was, however, not the very 1st use of the word "biology," as Jean-Baptiste de Monet de Lamarck actually had already in the course of this year coined this term.)[21]

THE SCIENCE OF 1802

PALEONTOLOGY

Bernard M'Mahon established his nursery in Philadelphia and began his own limited publication series (Curtis would establish a similar series in 1806).

Robert Brown arrived at Sydney (Australia) on the *Investigator*, along with botanical artist Ferdinand Bauer. George Caley, who had already been sent to collect plants in New South Wales by Banks, was furious. (In 1803 Banks received seed of 170 species from Caley.)

There would be no more ship production in Holland:

> A country without a history began to live in the past.
> — J.H. Plumb

August: Napoléon Bonaparte's title of First Consul (granted in 1799) was extended for life.

George Annesley, Viscount Valentia and Henry Salt visited St. Helena, where they joined up with the botanist Henry Porteous (Porteous would be noted for having as guests in his boarding house both the Duke of Wellington and Napoléon Bonaparte, albeit at different times).

ST. HELENA THE HISTORIC

21. Notice, please, that by choice of this term to describe the science, an inherent pro-life bias was built into the foundation of a supposedly "objective" science. Ever after this, the science would have incredible difficulties accounting for the utter naturalness and, indeed, inevitability of the process of species extinction.

1803

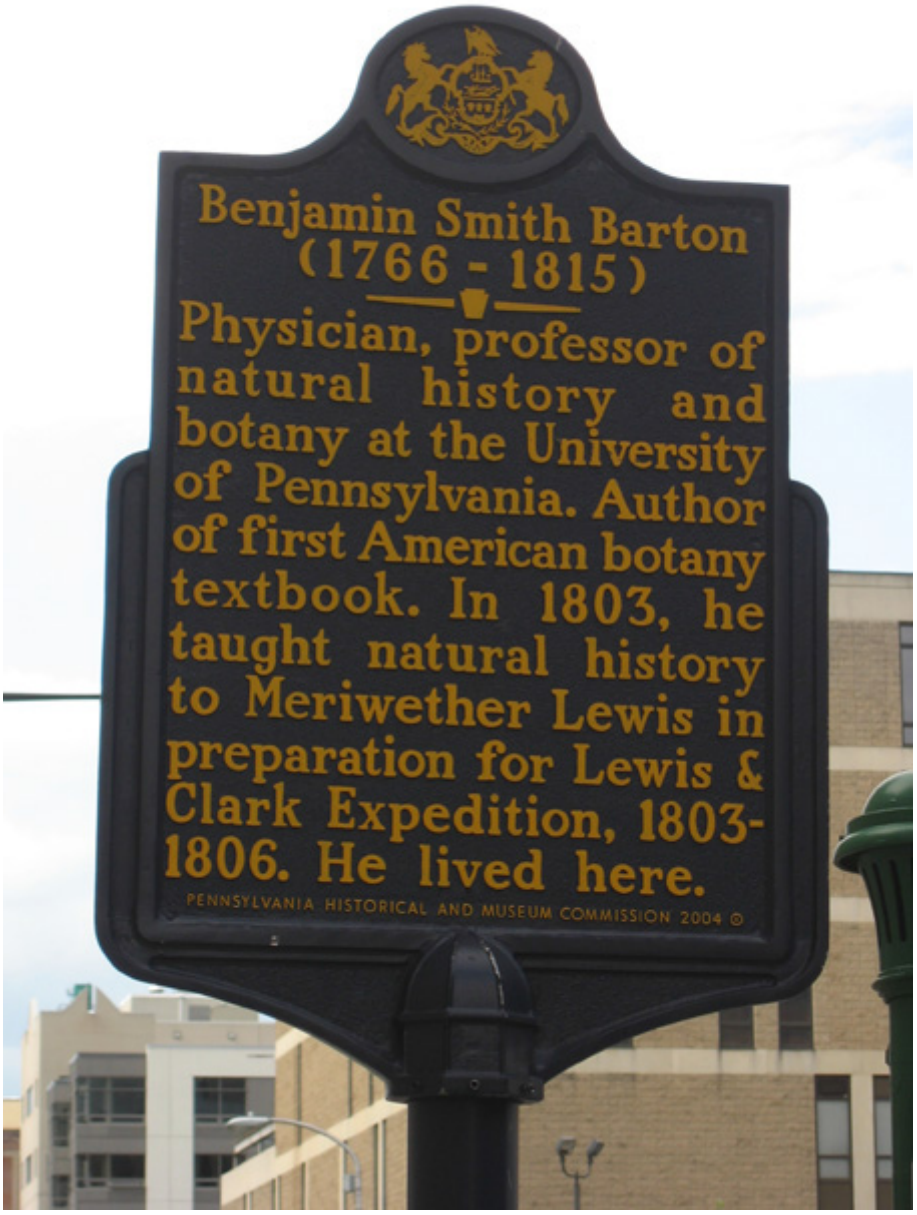
In Philadelphia, America's first handbook of botany, Professor Benjamin Smith Barton's ELEMENTS OF BOTANY, OR OUTLINES OF THE NATURAL HISTORY OF VEGETABLES, illustrated profusely by his friend William Bartram. It was perhaps not in this specific year, but it was at about this point, in his mid-60s, that Bartram was sitting for his portrait by Charles Willson Peale.

(The flower which the artist depicted Bartram as holding is perhaps one entirely out of the artistic imagination, as no such creation is identifiable by species.)

Erasmus Darwin's THE TEMPLE OF NATURE; OR, THE ORIGIN OF SOCIETY.[22]

'Ere Time began, from flaming chaos hurled
Rose the bright spheres, which from the circling world;
Earths from each sun with quick explosions burst,
And second planets issued from the first.
Then whilst the sea at their coeval birth
Surge over surge involved the shoreless earth;
Nursed by warm sun-beams in primeval caves
Organic life began beneath the waves.....
Hence without parent by spontaneous birth

22. The frontispiece from Erasmus Darwin's THE TEMPLE OF NATURE (depicted on a following screen) was drawn by Henry Fuseli to indicate the goddess of poetry pulling aside the veil of the Artemis of Ephesus, goddess of wild nature whose statues were being presumed incorrectly at that time to have been many-breasted. According to Frazer's THE GOLDEN BOUGH –one of those magisterial works out of the dark ages of scholarship upon which we rely far to much– "I am the Mother without spouse, the Original Mother; all are my children, and therefore none has ever dared to approach me."


Benjamin Smith Barton
(1766 - 1815)
Physician, professor of natural history and botany at the University of Pennsylvania. Author of first American botany textbook. In 1803, he taught natural history to Meriwether Lewis in preparation for Lewis & Clark Expedition, 1803-1806. He lived here.
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION 2004 ©

Rise the first specks of animated earth;
From nature's womb the plant or insect swims,
And buds or breathes with microscopic limbs.

Organic life beneath the shoreless waves
Was born and nurs'd in ocean's pearly caves
First forms minute unseen by sphearic glass
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire and larger limbs assume;
whence countless groups of vegetation spring
And breathing realms of fin and feet and wing.

André Michaux's *FLORA BOREALI-AMERICANA*, in Latin, was the first synthesis of information on North American plants. Benjamin Smith Barton wrote the first botanical textbook in the United States and launched a "Flora of North America" project. He would support Pursh and Nuttall for field excursions west to the Great Lakes, and beyond.

Dr. B.S. Barton's ELEMENTS OF BOTANY, the first elementary textbook of botany, was published in Philadelphia. (Early in the 19th century, Philadelphia was recognized as the chief American locale for scientific advances. Dr. Barton presided there over a wide and active circle of researchers, some of whose members, such as Dr. Schoepf and Dr. Muhlenberg, were busy writing their own *materia medica* of this country.)


FRONTISPIECE.
THE TEMPLE OF NATURE.

Spring: As the United States was in the process of purchased the Louisiana Territory from France, President Thomas Jefferson in the White House in Washington DC was preparing a plan to explore this newly acquired, uncharted western territory, territory that was expected to contain erupting volcanoes, mountains of salt, and in accordance with the biology of the time, unicorns, living mastodons and 7-foot-tall beavers (there would not be such, but there would indeed be abundant fossils of such).

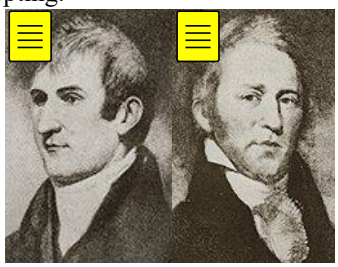
THE SCIENCE OF 1803

PALEONTOLOGY

He appointed Meriwether Lewis to explore the purchase lands. Lewis went to the United States Armory and Arsenal that George Washington had caused to be established at Harpers Ferry to select weapons and hardware for his transcontinental expedition. He obtained 15 rifles hopefully adequate to stop a mastodon, a unicorn, or a 7-foot beaver in its tracks, 15 powder horns, 30 bullet molds, 30 ball screws, extra rifle and musket locks, gunsmith's repair tools, several dozen tomahawks, 24 knives large enough and sharp enough to butcher a mastodon, a unicorn, or a 7-foot beaver, and a collapsible iron-framed canoe.

The rifles he obtained may well have looked like this standard Baker, then in use in the British Army:

He also went to Philadelphia to obtain the best available instruction in botany, zoology, celestial navigation, and medicine. He wrote to a former army comrade, William Clark, inviting him to share command of expedition. Clark wrote back, accepting.



The President wanted William Bartram to go along with the explorers, as Official Naturalist. His eyes, unfortunately, not to mention his legs, would not be up to this.

BOTANIZING

For the 1st time, in this crop year, the US would find itself exporting more cotton, a slave-labor-intensive commodity, than tobacco, a slave-labor-intensive commodity. In fact, as cotton became more profitable, and as the renewal of hostilities in Europe increased demand for US commodities, and the demand for field hands to tend and pick this cotton increased — South Carolina would be resuming importation of slaves!

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.

John Leonard Knapp, Esq. F.L.S. & A.S.'s THE GRAMINA BRITANNICA; OR REPRESENTATIONS OF THE BRITISH GRASSES. WITH REMARKS AND OCCASIONAL DESCRIPTIONS, issued in this year, displayed many of the specimens from his botanical tour of Scotland. The book contained 119 colored plates of grasses as drawn by Knapp. Unfortunately, a fire at the printing works of Mr. T. Bensley at Bolt-Court in London destroyed all of the impression of this volume with the exception of 100 copies that were with the binder. It would be reprinted by Mr. Strong of Bristol in 1842 with little alteration of the original text and no addition of species.

THE GRAMINA BRITANNICA

May 14, Monday: The setting off of the Lewis & Clark Expedition from Camp Dubois "under a jentle brease" (Meriwether Lewis was still in St. Louis and would be joining the expedition a few days later; over a period of years he and William Clark would be venturing from St. Louis across the Stony Mountains to the Columbia River, reaching the Pacific on November 7, 1805, and back).[23]

Benjamin Robert Haydon left home in Plymouth for London, to enter the Royal Academy as a student.

1806

François André Michaux began his 3d tour on the North American continent (until 1808).

Barton employed Frederick Pursh, a Saxon-born botanist, to help examine specimens from the Michaux flora. The two of them would soon start fighting and so Pursh would need to move on, to Hosack's employ — and then he would also have a falling-out with Hosack.

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23. We don't have a complete list of the nearly four dozen participants, who were from every corner of our young nation. Reuben and Joseph Field were brothers. George Drouillard, Pierre Cruzatte, and François Labiche were sons of French-Canadian fathers and Indian mothers. Besides the two captains, other diarists were John Ordway, a young soldier from New Hampshire, Patrick Gass, a carpenter of Irish stock from Pennsylvania, Joseph Whitehouse, a tailor from Virginia, and Charles Floyd of Kentucky, a "young man of much merit." Their keelboat was 55 long, 8 feet wide, and capable of carrying 10 tons of supplies, and they also had two smaller boats termed pirogues. On a good day they would be able to journey some 14 miles, let along the way of course by native informants, from American village to American village. To prepare for the journey, Lewis had spent nine months in Philadelphia studying botany under Benjamin Smith Barton. The seed they were to collect would be shared by Hamilton at The Woodlands, and by M'Mahon (by 1825 Oregon grape holly would be widely known and would be available commercially from Prince Nursery of Flushing, New York for $25).

1807

New Jersey women were deprived of their right to vote, with this repeal being sponsored by a male politician who, a decade earlier, had been voted against by a female voting block.

FEMINISM

A most interesting illustration appeared in this year as the frontispiece of the 1st volume of Alexander von Humboldt's *AL. VON HUMBOLDT UND AIMÉ BONPLAND'S REISE*.[24] According to Alexander Gode-von Aesch's NATURAL SCIENCE IN GERMAN ROMANTICISM (NY: Columbia UP, 1941; reprint NY: AMS Press, 1966, pages 97-108), this naked male carrying a lyre is a period illustration of the spirit of poetry, and we notice that Mr. Naked Guy is raising a cloth covering which had been draped over a statue representing the feminine mystery of nature. The figure used in this period illustration in order to represent the spirit of poetry happens to be

Bertel Thorwaldsen's (1770-1844) "Genius of Poetry" statue. The figure used in this illustration for the goddess of nature is the famous statue of the cult of Diana of Ephesus, in which the female figure's upper torso is completely covered with lumps very suggestive of female breasts (actually, to the ancient Greek worshipers at this shrine, the lumps on the upper torso of the statue represented not the breasts of a human female but the testicles of sacrificed bulls, ostensibly hung around the goddess's neck as an offering, but this may well have been being misunderstood in the early 19th Century). A cloth drape is carefully positioned over Mr. Naked Guy's genitals so that we don't have to preoccupy ourselves with whether he is being adequately sexually

24. This 1st volume was Humboldt's *IDEEN ZU EINER GEOGRAPHIE DER PFLANZEN NEBST EINEM NATURGEMÄLDE DER TROPENLÄNDER,...* (Tübingen, bey F.G. Cotta; Paris, bey F. Schœll, 1807), offered in homage to Göthe's 1790 *METAMORPHOSIS DER PFLANZEN* (which, as you can see, figures in the illustration — I have artificially heightened the contrast of the lettering so that you can make it out).

BOTANIZING

aroused at that upon which he is gazing.

WALDEN: With a little more deliberation in the choice of their pursuits, all men would perhaps become students and observers, for certainly their nature and destiny are interesting to all alike. In accumulating property for ourselves or our posterity, in founding a family or a state, or acquiring fame even, we are mortal; but in dealing with truth we are immortal, and need fear no change nor accident. The oldest Egyptian or Hindoo philosopher raised a corner of the veil from the statue of the divinity; and still the trembling robe remains raised, and I gaze upon as fresh a glory as he did, since it was I in him that was then so bold, and it is he in me that now reviews the vision. No dust has settled on that robe; no time has elapsed since that divinity was revealed. That time which we really improve, or which is improvable, is neither past, present, nor future.

PEOPLE O
WALDEN

ISIS
EGYPT

THE SCIENCE OF 1807

1808

Dr. Augustin Pyramus de Candolle was made professor of botany at the École de Médécine at the University of Montpellier.

BOTANIZING

The English naturalist Thomas Nuttall arrived in Philadelphia.

BOTANIZING

The claim to fame of the "Quaker Bridge" area of the New Jersey pine barrens area about 30 miles from Philadelphia is that the curly grass fern *Schizaea pusilla* was first seen here, in this year if it had not already been seen in 1805. A label accompanying a specimen in the collection of the Torrey Botanical Society indicates: "First discovered by Dr. C.W. Eddy, near Quaker Bridge." (Although Dr. Eddy was in company with J. LeConte, Pursh, and C. Whitlow, and although he and Mr. LeConte found all the specimens, Pursh has alleged that he alone made this discovery.)

1809

Nuttall sent Barton 43 specimens gathered during a trip to the salt marshes of Delaware Bay. He also toured the Nanticoke River on the Chesapeake Bay, and afterward went to Niagara Falls.

BOTANIZING

Bernard M'Mahon founded a botanic garden (named Upsal) near Huntingdon Station, Philadelphia.

Summer: William Jackson Hooker initial botanical expedition, at the suggestion of Sir Joseph Banks, was to Iceland (the specimens he collected, and all notes and drawings, were destroyed by fire during a homeward voyage in which he came close in addition to losing his life).

1810

Professor Augustin Pyramus de Candolle became chair of botany in the faculty of sciences, University of Montpellier.

THE SCIENCE OF 1810

In upstate New York, Amos Eaton began lecturing in botany at the Catskill Botanical School, publishing a small textbook on the subject.

Between this year and 1813, three volumes of *HISTOIRE DES ARBRES FORESTIERS DE L'AMERIQUE SEPTENTRIONALE* would be being published by the younger François André Michaux.

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.

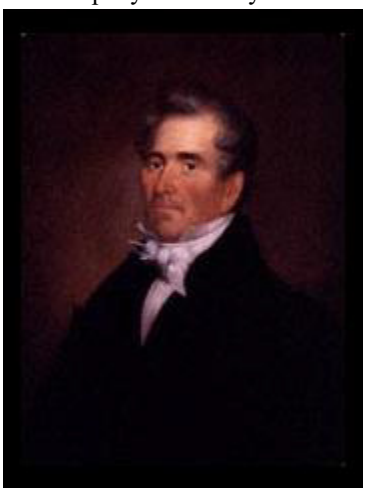
PLANTS

1811

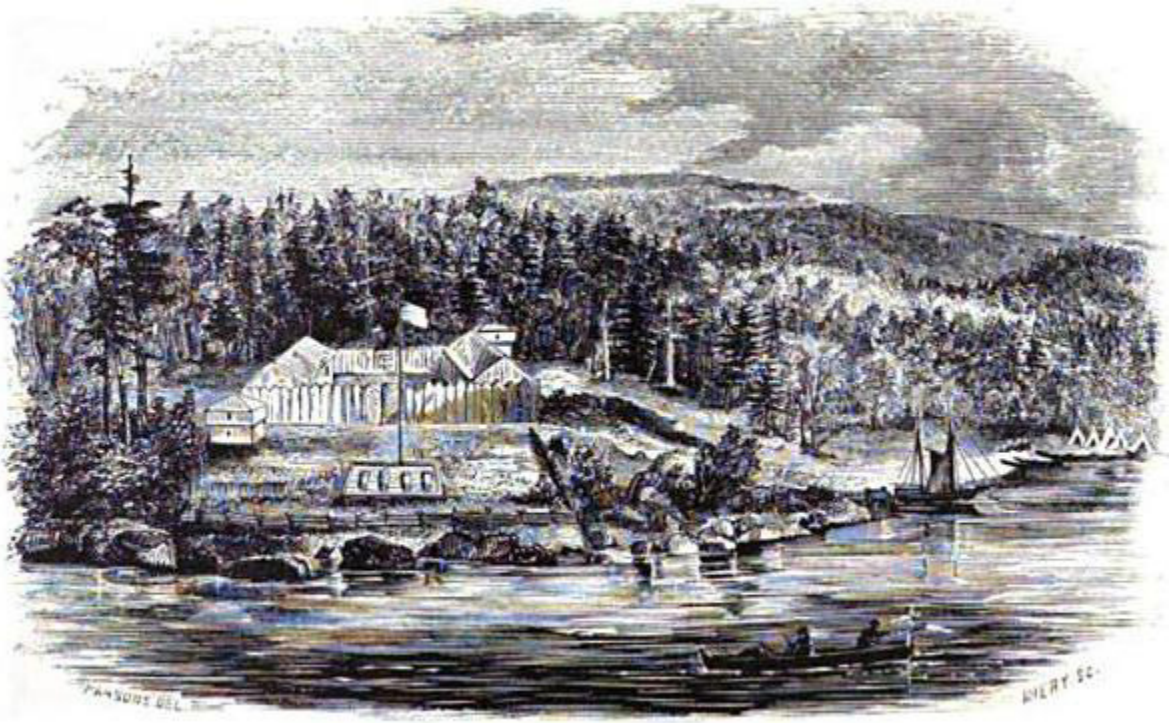
Friedrich Traugott Pursch (Frederick Pursh) journeyed to England, where under the patronage of Aylmer Bourke Lambert he analyzed material he had collected during his stay in the United States and compared it with material from 41 herbaria and plant collections, to create his *FLORA AMERICAE SEPTENTRIONALIS* which would be published in 1814.

BOTANIZING

Henry Marie Brackenridge was a member of an overland expedition to Astoria at the mouth of the Columbia River organized by the Missouri Fur Company and led by Manuel Lisa.[25]



While Brackenridge was accompanying Lisa, the English botanists John Bradbury and Thomas Nuttall were staying at his trading post in the Mandan country.



Astoria, as it was in 1813

The voyagers of the Astor Expedition were amazed when they discovered dirt in the barrel of botanist Nuttall's gun. He had been digging plants with it — what manner of man was this, who was so oblivious to his own personal safety? (Richard Henry Dana, Jr. would refer to this botanist as "Old Curious.")

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25. *La Compagny des fourures du Missoury dans une adventure conduit par Manuel Lisa dans deux barge partits l'une le 2 May et l'autre le 6, 1812*, Kansas State Historical Society, Topeka, Kansas.

The company's barges, heading up the Missouri River, would overtake and travel for some distance in the company of a rival expedition organized by John Jacob Astor of the Southwest Fur Company and led by Wilson P. Hunt, that had set out three weeks earlier with 70 men aboard three barges.

August 26, Monday: British forces took Batavia (Djakarta) while the Dutch defenders retreated to Semarang.

A Catskill jury convicted Amos Eaton of forgery in connection with a foreclosed property and packed him off to a life sentence at New York's Newgate Prison, in Greenwich Village. The prisoner would continually maintain his utter innocence and, during the following four years, would be teaching botany to the prison agent's son John Torrey (who would afterward become a botanist). This prisoner would also, from prison, be publishing a manuscript on mineralogy.

BOTANIZING

Upon his release, Eaton would be spending a year at Yale College, studying botany, chemistry, and mineralogy under Professor Benjamin Silliman, Sr. and Eli Ives.

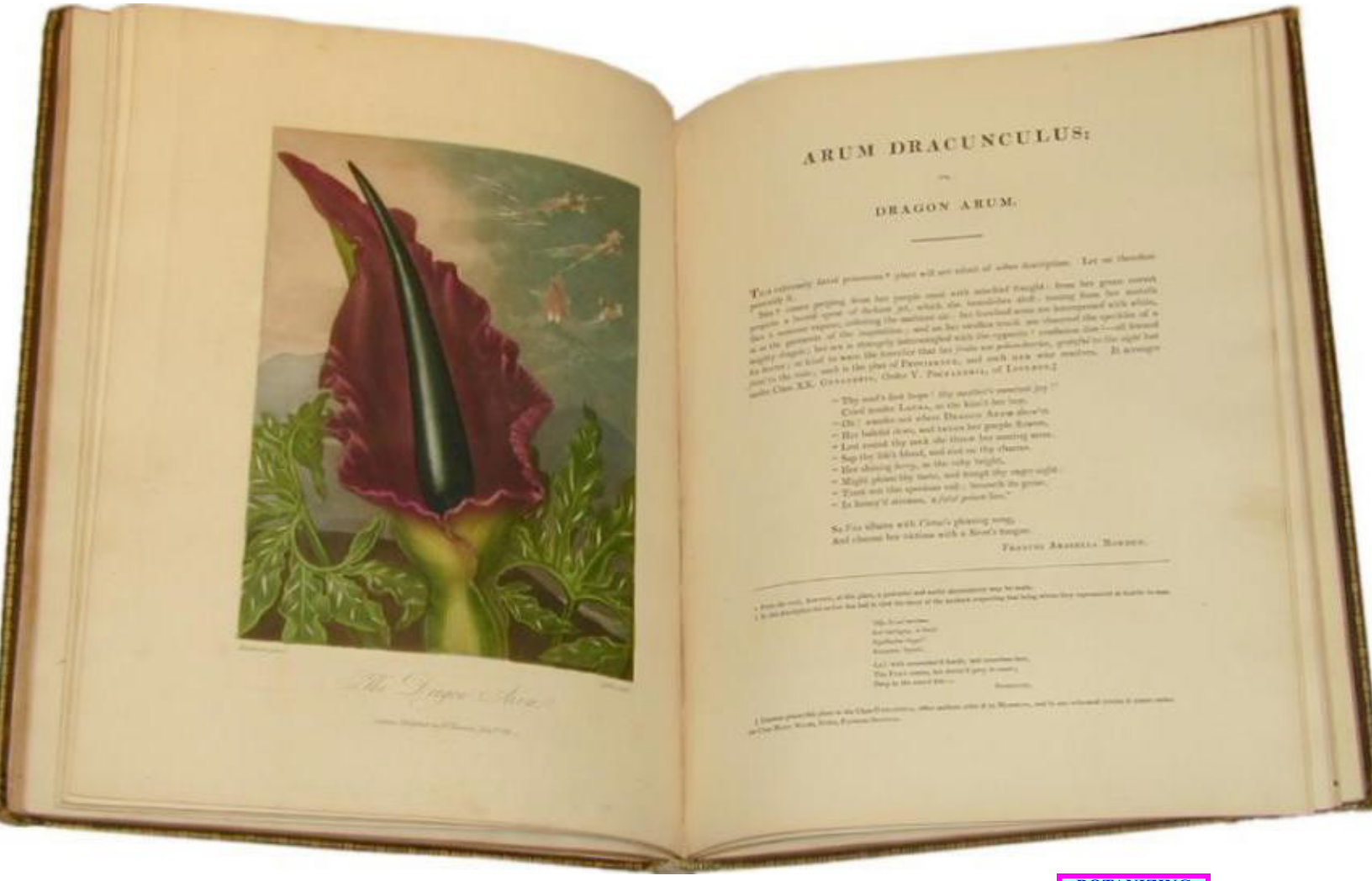
Friend Stephen Wanton Gould wrote in his journal:

> *2 day 26 of 8 Mo// The day has passed much as usual. In the evening we called to see Elizabeth Coggeshall a little while*

RELIGIOUS SOCIETY OF FRIENDS

1812

In London, Dr. Robert John Thornton published his TEMPLE OF FLORA, OR GARDEN OF THE BOTANIST, POET, PAINTER, AND PHILOSOPHER:



ARUM DRACUNCULUS:

OR

DRAGON ARUM.

BOTANIZING

1813

Professor Augustin Pyramus de Candolle's *THÉORIE ÉLÉMENTAIRE DE LA BOTANIQUE*, in which he coins the term "taxonomy."

BOTANIZING

Michel Eugène Chevreul discovered margaric acid (the "g" was hard as in "glycemic index" for this was after the Greek μαργαρίτης or μάργαρον on account of the material's pearly appearance).

Prepared by Gilbert White of Selborne's nephew John White, the 3rd edition of the Reverend's THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE.[26]

> All nature is so full, that the district produces the greatest variety which is the most examined.
>
> — Gilbert White's THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE, as quoted on page 4 of William Least Heat-Moon's PRAIRYERTH (A DEEP MAP) [Boston MA: Houghton Mifflin, 1991].

Speaking of nature being full, the 5-acre pond north of the city of New-York, that used to be called "The Collect," that had been rimmed by slaughterhouses and had then become a cesspool, was at this point packed solid. There wasn't any water, even foul water, anymore. The area was finally ready to do service as our nation's worst slum.

---

26. 1813; 1993: THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE, 1813 edition: facsimile with an introduction by P.G.M. Foster. London: The Ray Society. Series title: Ray Society (Series); no. 160.

Frederick Pursh's *Flora Americae Septentrionalis Kalmia Lataforia.*

BOTANIZING

Summer: Sarah Alden Bradford (Sarah Alden Bradford Ripley) and Abba [Alcott?] attended a series of lectures by Professor William Dandridge Peck of the Harvard College botanical garden.

1814

Dr. Jacob Bigelow along with William Dandridge Peck delivered the initial lectures on botany offered at Harvard College. In this year he produced *FLORULA BOSTONIENSIS*, A COLLECTION OF PLANTS OF BOSTON AND ITS ENVIRONS, WITH THEIR GENERIC AND SPECIFIC CHARACTERS, SYNONYMS, DESCRIPTIONS, PLACES OF GROWTH, AND TIME OF FLOWERING AND OCCASIONAL REMARKS, a text dealing with plants growing within a 10-mile radius of Boston (published by Cummings & Hilliard of Boston, printed by Hilliard & Metcalf of Cambridge). Gradually this would be extended, 1840 edition upon 1824 edition, to cover all of the plant life of New England. It would became the standard flora for the region up to the appearance in 1848 of Professor Asa Gray's MANUAL. (In this year the good doctor, busy as a bumblebee in clover, also prepared an edition, with notes, of Sir J.E. Smith's work on botany.)

FLORULA BOSTONIENSIS

1st edition of Friedrich Traugott Pursch[27] 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

William Jackson Hooker went on a 9-month botanizing excursion to France, Switzerland, and northern Italy.

BOTANIZING

John Lyon died of typhoid fever in America. He collected 3,600 plants of *Magnolia macrophylla* at one time. "His attitude was commercial; in all his journals he never expresses pleasure in a plant, but he almost invariably notes the mileage covered and the cost of the journey. Many of his so-called first introductions are due to others." Fraser and Lyon overlapped with *Pieris floribunda*, *Jeffersonia diphylla*, *Oenothera tetragona fraseri,* and several other plants. Lyon's new ones included *Chelone lyoni*, *Dicentra eximia*, and *Iris fulva*.

BOTANIZING

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

1815

William Jackson Hooker got married with Maria Dawson Turner, eldest daughter of Dawson Turner, banker, of Great Yarmouth, and sister-in-law of Francis Palgrave. Settling at Halesworth, Suffolk, he would devote himself to the formation of his excellent herbarium. He became a corresponding member of the Royal Swedish Academy of Sciences.

THE SCIENCE OF 1815

Samuel Constantine Rafinesque returned to the USA despite loss in a shipwreck of numerous of his botanical manuscripts and collections.

BOTANIZING

Dr. Jacob Bigelow became Professor of *Materia Medica* for the Medical School of Harvard College. He would serve in that capacity until 1855.

BOTANIZING

1816

William Jackson Hooker's BRITISH *JUNGERMANNIAE*, his initial scientific monograph.

The 2d edition of Friedrich Traugott Pursch (Frederick Pursh)'s *FLORA AMERICAE SEPTENTRIONALIS*.

BOTANIZING

1817

William Jackson Hooker's description of the *PLANTAE CRYPTOGAMICAE* of Alexander von Humboldt and Aimé Bonpland. From this year into 1828, his new edition of William Curtis's *FLORA LONDINENSIS* for which he provided the plant descriptions.

John Bradbury returned to England to prepare to publish at his own expense his TRAVELS IN THE INTERIOR OF AMERICA, 1809, 1810, & 1811; INCLUDING A DESCRIPTION OF UPPER LOUISIANA..., after which he would bring his family with him to America and become Director of the Botanic Garden at St. Louis. Thomas Nuttall received credit for the introduction of a number of species which, almost certainly, were also introduced by the neglected Bradbury: *Oenothera missouriensis*, *Ribes aureumand*, *Shepherdia argentea*. Nuttall's plants included *Camassia fraseri*, *Lepachys* (*Rudbeckia*) *columnaris*, *Mentzelia decapetala*, *Oenothera caepitosa*, *Oenothera nuttalli,* and *Penstemon glaber*.

BOTANIZING

Professor Augustin Pyramus de Candolle's "*MÉMOIRE SUR LA GÉOGRAPHIE DES PLANTES DE FRANCE, CONSIDERÉE DANS SES RAPPORTS AVEC LA HAUTEUR ABSOLUE*" in the Mémoires de Physique et de Chimie de la Société d'Arcueil.

BOTANIZING

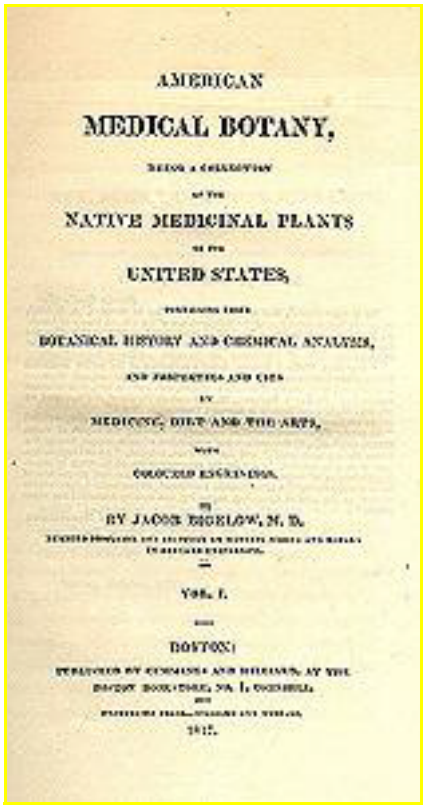
Professor Augustin Pyramus de Candolle became the director of the botanical garden of Geneva, a position he would occupy until 1834. He became professor of natural history at the Academy of Geneva, a position he would occupy until 1835. From this year into 1821, the two volumes of Professor de Candolle's *REGNI VEGETABILIS SYSTEMA NATURALE*.

BOTANIZING

Amos Eaton's A MANUAL OF BOTANY FOR THE NORTHERN STATES (this work would appear, over time, in 8 editions, and it would be the 5th edition, published in 1829, that would be available to Henry Thoreau in the library of Waldo Emerson). The author began lecturing through New England and the Hudson Valley.

AMOS EATON'S BOTANY

From this year into 1820, the three volumes of Dr. Jacob Bigelow's AMERICAN MEDICAL BOTANY, 1817-1821, BEING A COLLECTION OF THE NATIVE MEDICINAL PLANTS OF THE UNITED STATES, CONTAINING THEIR BOTANICAL HISTORY AND CHEMICAL ANALYSIS, PROPERTIES AND USES... would be being published in Boston by Cummings & Hilliard, at the Boston bookstore, no. 1 Cornhill. University press.... Hilliard and Metcalf, 1817-1820:


AMERICAN

MEDICAL BOTANY,

NATIVE MEDICINAL PLANTS

UNITED STATES,

BOTANICAL HISTORY AND CHEMICAL ANALYSIS,

MEDICINE, DIET AND THE ARTS,

BY JACOB BIGELOW, M. D.

VOL. I.

BOSTON:

1817.

BOTANIZING

AM. MED. BOTANY, I

AM. MED. BOTANY, II

AM. MED. BOTANY, IIIA

AM. MED. BOTANY, IIIB

Thoreau would check these volumes out of the Harvard Library on April 30, 1851 and copy materials into his Indian Notebook #4.[28] He would refer to this work in his journal on May 29, 1851, June 6, 1851, and June 14, 1851.

[ALERT: This is obsolete science. Nobody should self-medicate on the basis of such 1817 plant knowledge. If you poison yourself do me the favor of leaving a note: "It's not Austin's fault."]

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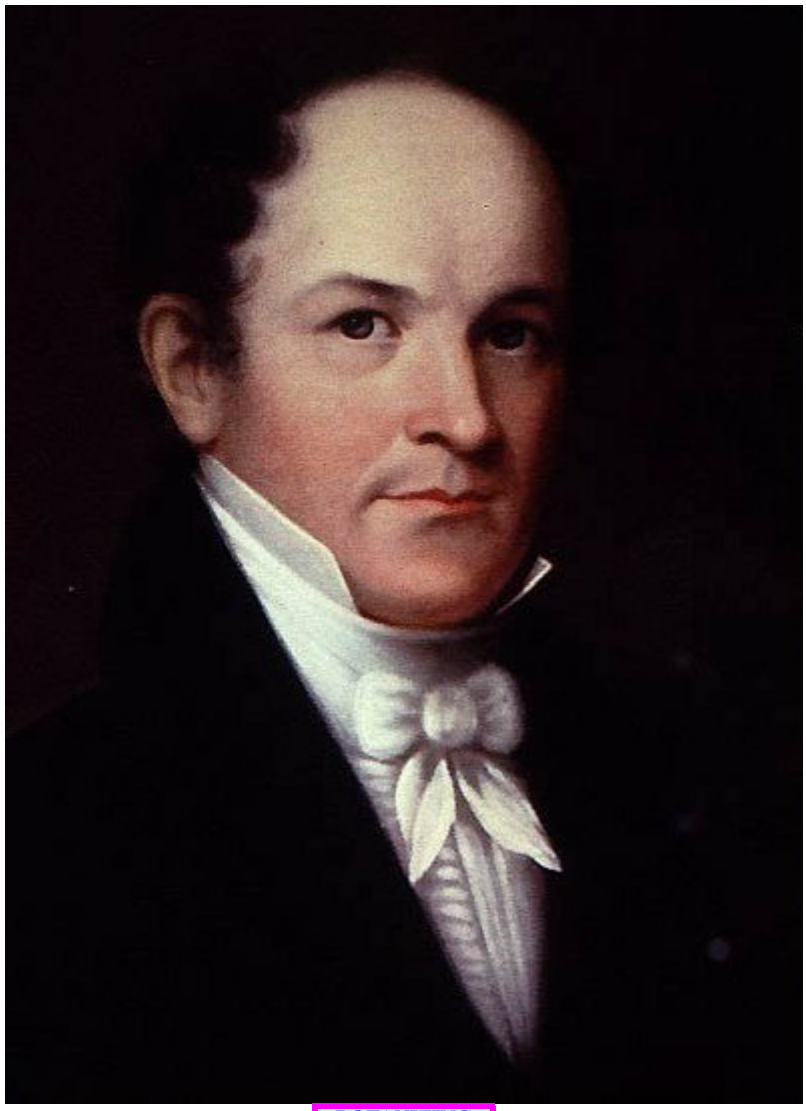
28. The original notebooks are held by the Pierpont Morgan Library in New York, as manuscripts #596 through #606. There are photocopies, made by Robert F. Sayre in the 1930s, in four boxes at the University of Iowa Libraries, accession number MsC 795. More recently, Bradley P. Dean, PhD and Paul Maher, Jr. have attempted to work over these materials.

1818

Thomas Nuttall's GENERA OF NORTH AMERICAN PLANTS, the first generic plant list for North America, was published in Philadelphia (American and English books on plant hunting were naturally emphasizing the United States and China/Japan because these are partly temperate lands with plants that can also be grown in the eastern United States and England).



BOTANIZING

Lewis Caleb Beck was licensed as a physician. During his travels through the countryside, he would be botanizing.

William Jackson Hooker's *MUSCOLOGIA*, a very complete account of the mosses of Britain and Ireland prepared in conjunction with Professor Thomas Taylor. The initial of the two volumes of his *MUSCI EXOTICI*, devoted to new foreign mosses and other cryptogamic plants.

Dr. William P.C. Barton, nephew of Benjamin Smith Barton, published a compendium of Philadelphia plants.

BOTANIZING

Fall: The farmhouse on Virginia Road in which Henry Thoreau had been born, and the some 30 acres still associated with it, was sold at auction. Eventually this unfortunate parcel would fall to the ownership of Colburn Hadlock, who would feed pigs there on the garbage from his Middlesex House in Concord. Consequently the pigfield near the house would acquire so many pieces of shattered hotel refuse that Thoreau would christen it "Crockery Field."

THOREAU RESIDENCES

At age 13 William Lloyd Garrison contracted for a 7-year apprenticeship as a printer at the Newburyport, Massachusetts Herald, a Federalist paper. He soon learned to typeset at the rate of a thousand "emms" an hour and became foreman in the shop.

Thomas Nuttall set out from Philadelphia to botanize on the southern plains all the way to the Rocky Mountains.

1819

By this point Major John Adlum was growing Catawba grapes. It is unclear where the vine had come from.

Toward the end of the year, Dr. Lewis Caleb Beck set up a medical practice in St. Louis, Missouri (he would make himself the first white botanist in Missouri).

April: Having descended the Ohio River and then the Mississippi River, and ascended the Arkansas River botanizing, Thomas Nuttall arrived at Fort Smith.

May: As an opportunity to botanize, Thomas Nuttall joined a military expedition to the Red River.

June: The engineer Major Stephen Long departed from Pittsburgh with an expedition authorized by US Secretary of War John Caldwell Calhoun into the territory south of the Missouri River. (Suppose we decide to kill some people there — how are we going to find our way around?)

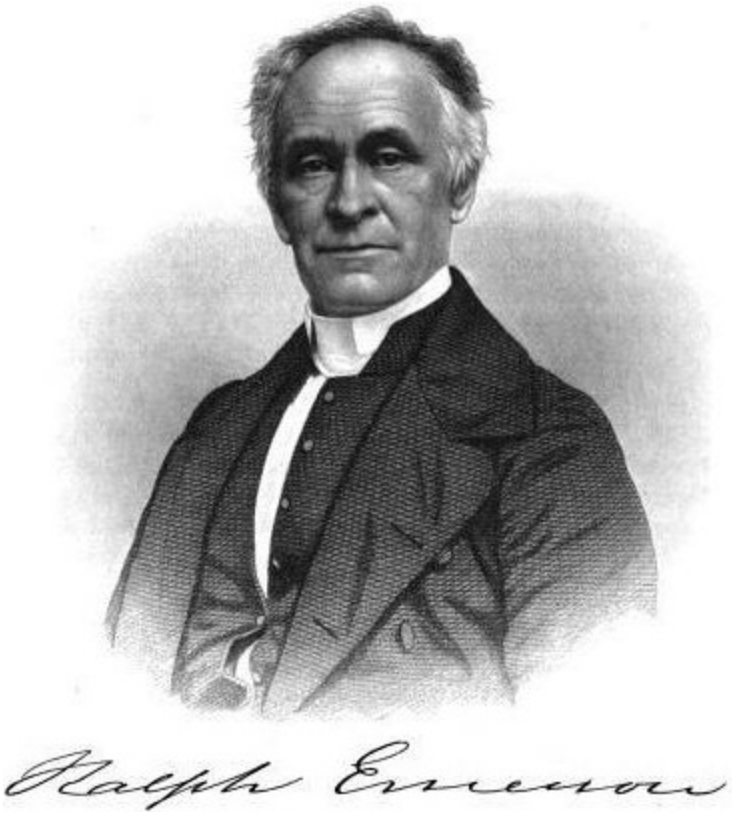
Having become separated as he botanized from the military expedition at the Red River, Thomas Nuttall returned to Fort Smith in the company of a band of adventurers.

This was the year of François André Michaux's *SYLVA* trip.

July: Thomas Nuttall set out from Fort Smith by pirogue to botanize up the Arkansas River. Reaching the Three Forks (present site of Fort Gibson), he explored the Verdigris River and made extensive observations of the local Osage natives — not because he wanted to kill anyone, just because he was curious.

September: Upon returning to Harvard College for his Junior year, Ralph Waldo Emerson dropped his Ralph, becoming plain Waldo Emerson.

(Do you suppose that Ralph Waldo Emerson may have chosen to be known as Waldo Emerson at least in part in order to avoid confusion with his more advanced cousin the Reverend Ralph Emerson of Norfolk, Connecticut?)



About the middle of this month, Thomas Nuttall arrived back at the Three Forks settlement only barely alive. He had drunk some water from a spring that had made him terribly ill (exacerbating his ongoing struggle with malaria). As he and the trapper “Mr. Lee” had crossed central Oklahoma, he had been delirious. When the voyagers had come upon the Cimarron River, therefore, they had descended to the Arkansas River to get back to their starting point, Three Forks.

(A couple of years later the botanist would publish A JOURNAL OF TRAVELS INTO THE ARKANSAS TERRITORY, DURING THE YEAR 1819. WITH OCCASIONAL OBSERVATIONS ON THE MANNERS OF THE ABORIGINES. ILLUSTRATED BY A MAP AND OTHER ENGRAVINGS.)

TRAVELING IN ARKANSAS

1820

Professor Augustin Pyramus de Candolle's *Essai Élémentaire de Géographie Botanique.*

BOTANIZING

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.

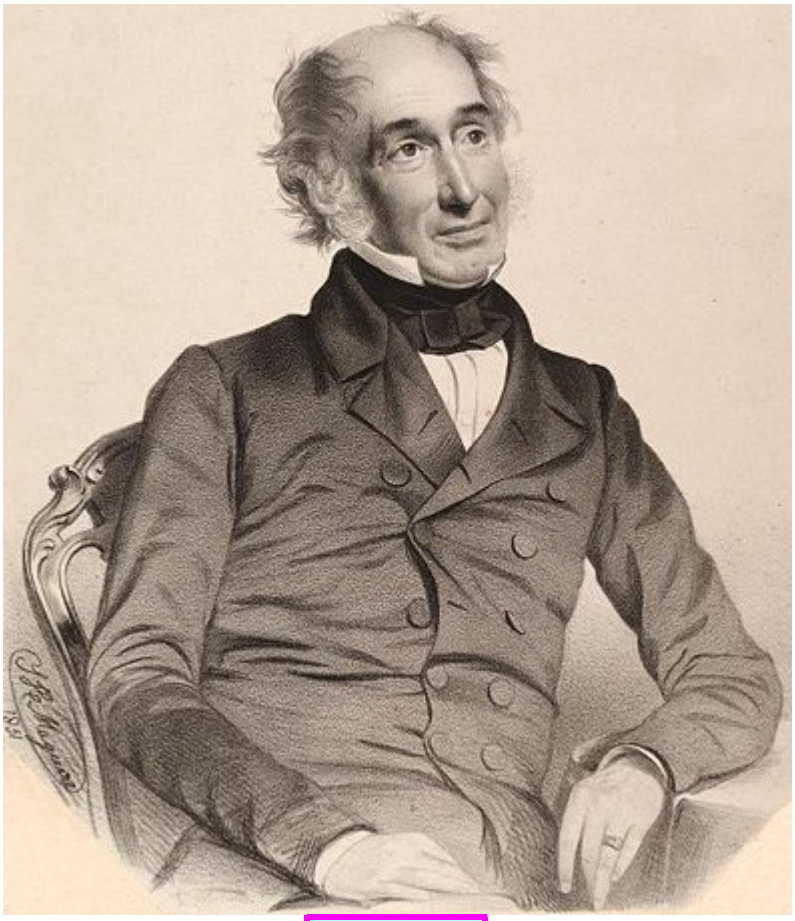
PLANTS

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

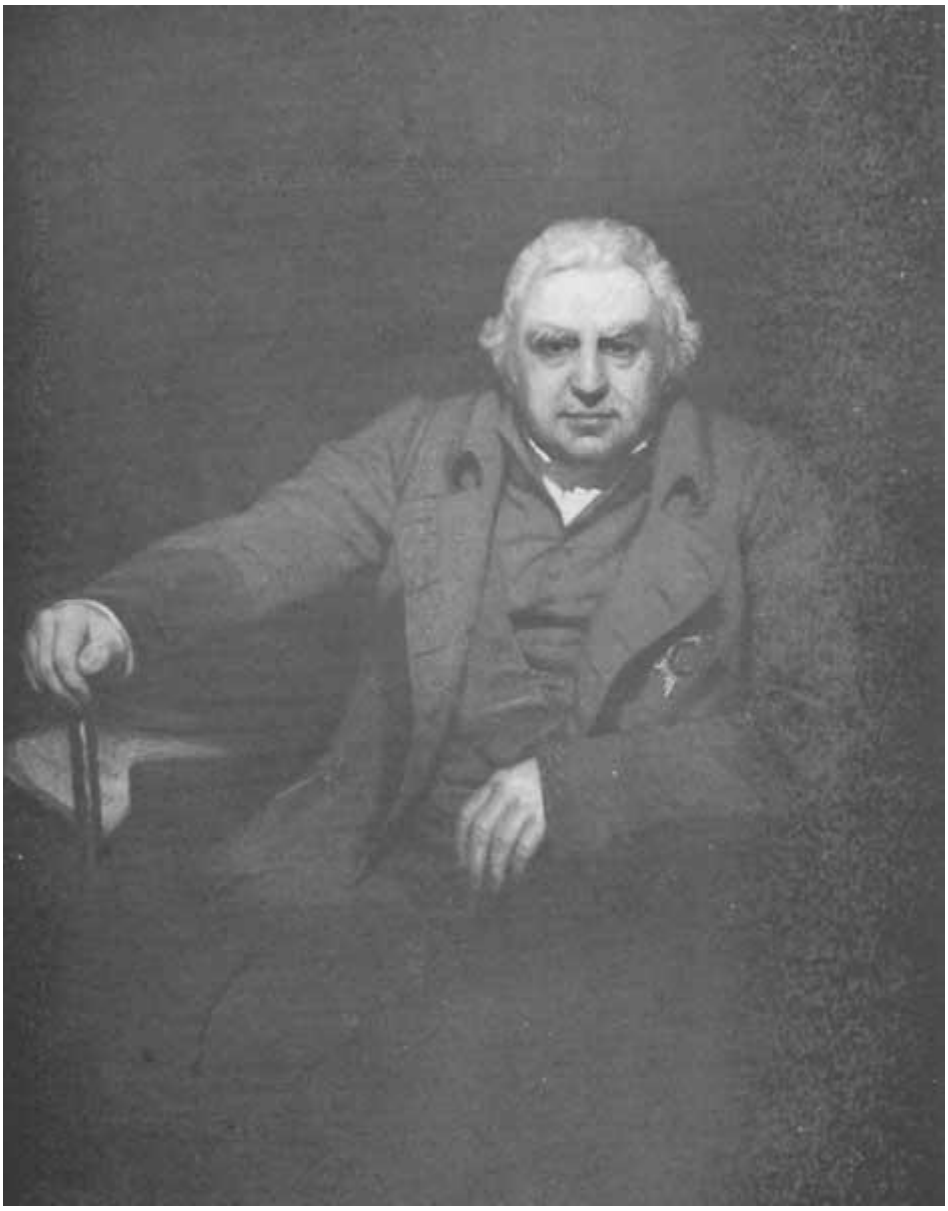
The botanist Frederick Pursh died at the age of 46.

The final of the two volumes of William Jackson Hooker's *MUSCI EXOTICI*, devoted to new foreign mosses and other cryptogamic plants. With the help of Banks, he became Regius Professor of Botany at the University of Glasgow.



BOTANIZING

With the death of Joseph Banks, there was a real possibility that the rare plants at Kew would be dispersed among other private gardens. Professor Hooker led a campaign to transform Kew into a national treasure.



Dr. Jacob Bigelow was one of a committee of five selected to form the “American Pharmacopoeia.” It was he who came up with the nomenclature scheme for *materia medica* of substituting a single for a double word whenever practicable, a scheme which afterward would be accepted by the British Colleges.

BOTANIZING

During this decade, John Leonard Knapp would be authoring a series of anonymous articles for Time's Telescope under the byline "The Naturalist's Diary." This series of articles would in 1829 form the germ of his most successful work, also anonymous, THE JOURNAL OF A NATURALIST, a work which would see publication in four editions, of which Thoreau would make extensive use. The book is an account of the natural history, country life and agriculture along the escarpment from Alveston to Thornbury in Gloucestershire, inspired by the Rev. Gilbert White's THE NATURAL HISTORY OF SELBORNE. J.W. White described him as "a charming botanist and traveller through the inexhaustible regions of nature." His last years would be spent at Alveston where he was a churchwarden. His time was now spent almost entirely in the pursuit of Natural History and the cultivation of his garden.

BOTANIZING

1821

Professor William Jackson Hooker brought out *FLORA SCOTICA*, in which the natural method of arrangement of British plants was given with the artificial. He worked in Scotland with the Glasgow botanist and lithographer Thomas Hopkirk to establish the Royal Botanic Institution of Glasgow and to lay out and develop the Glasgow Botanic Gardens.

Mary Macpherson [Mairi “Mairi Mhor nan Oran” nic-a-Phearsain] was born in Skye.

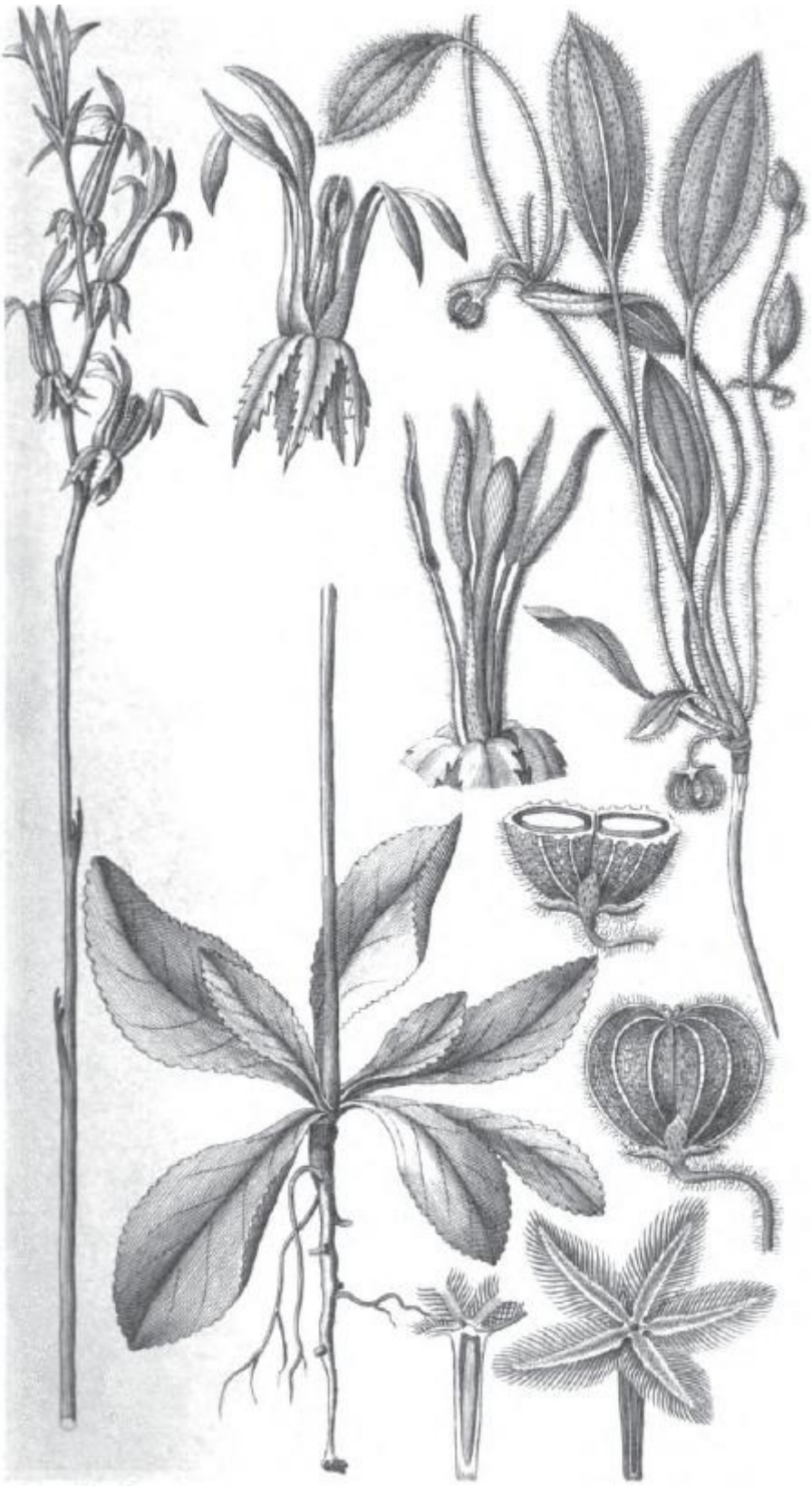
George John Whyte-Melville was born in Strathkinness.

The Annals of the Parish, Galt.

The Ayrshire Legatees, Galt.

Professor Augustin Pyramus de Candolle’s and Kurt Polycarp Joachim Sprengel’s ELEMENTS OF THE PHILOSOPHY OF PLANTS.... TR. FROM THE GERMAN (Edinburgh: W. Blackwood).

CONSULT THIS RESOURCE



1822

Amos Eaton's A GEOLOGICAL PROFILE OF THE ROCKS FROM ONONDAGA SALT SPRINGS, N.Y. TO WILLIAMS COLLEGE, MASS.

While on one of his excursions in New England, Eaton took note of a wild-growing "Purple Pitcher" plant that was refusing to be at all purple but was all over a solid apple-green. The plant had no red pigment at all — in the spring its flowers were yellowish green with no hint of ruddiness and, in the fall, its leaves failed to darken. This discovery would be designated *Sarracenia purpurea f. heterophylla*:

BOTANIZING

4th edition: THE NATURAL HISTORY OF SELBORNE / BY GILBERT WHITE; TO WHICH ARE ADDED THE NATURALIST'S CALENDAR, MISCELLANEOUS OBSERVATIONS, AND POEMS. A NEW ED., WITH ENGRAVINGS. London: Printed for J. and A. Arch: Longman, Hurst, Rees, Orme and Brown: Lackington: J. Mawman: Baldwin, Cradock and Joy: J. Hatchard and Son: S. Bagster: Ogle, Duncan, and Co.: W. Mason J. Sheldon: R. Saunders: Hurst and Robinson.[29]

From this year into 1827, the 3 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.[30]

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29. The Reverend White's NATURAL HISTORY OF SELBORNE is only the 4th most reprinted book in the English language.
30. 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.

The government of Sweden decided that it would permit citizens to consume coffee.

Lydia Howard Huntley Sigourney's anonymous TRAITS OF THE ABORIGINES OF AMERICA A POEM. (Cambridge: From the University Press. Hilliard and Metcalf Printers. Sold by Cummings & Hilliard, No. 1 Cornhill, Boston. 1822)

READ SIGOURNEY TEXT

Note 29.-Lines 361-6 of Canto III

"The firm Cassine, endures the wrecking storm,
"And changeful season, by Tradition styl'd
"The boon of Heaven, and round Hygeia's fane
"Wreaths a bright garland, when her priestesses
"Clad in their meek and unpretending skill
"Its aid demand...."

CAFFEINE

The Ilex Vomitoria, or Evergreen Cassine, is a native of West Florida. An infusion of it is the standard medicine of the Southern Indians. It has been supposed that this is the same plant which is found in Paraguay, the sale of whose leaves is to the Jesuits such an important branch of revenue. It is found also in Carolina, and among some of our tribes was held in such high esteem, that the decoction of its toasted leaves called "black drink," their women were not permitted to taste. Lawson, in recording a tradition of this plant, says "The savages of

Carolina have it in veneration above all the plants they are aquainted withal, and tell you the discovery thereof was by an infirm Indian, who laboured under the burden of many rugged distempers, and could not be cured by all their Doctors ; so, one day he fell asleep, and dreamt that if he took a decoction of the tree that grew at his head, he would certainly be cured : upon which he awoke, and saw the Yaupon, or Cassine-tree, which was not there when he fell a sleep. He followed the direction of his dream, and he came perfectly well in a short time. Now I suppose, no man has so little sense as to believe this fable; yet it lets us see what they intend thereby, and that it has doubtless worked feats enough, to gain it such an esteem among these savages, who are too well versed in vegetables, to be brought to a continual use of any one of them, upon a mere conceit or fancy, without some apparent benefit they found thereby; especially when we are sensible, that they drink the juices of plants, to free nature of her burthens, and not out of foppery and fashion, as other nations are oftentimes found to do." In closing these botanical notes, which probably comprize but a small number of the medicinal plants known to our natives, the words of the late Professor Barton, whose attention to this subject marked at once his perseverence and benevolence, are particularly appropriate.

> Judging from the discoveries which have been made in the term of three hundred years, it may be safely conjectured, that there are no countries of the globe from which there is reason to expect greater or more valuable accessions to the Materia-Medica, than those of America. In conducting our inquiries into the properties of the medicinal vegetables of our country, much useful information may, I am persuaded, be obtained through the medium of our intercourse with the Indians. Some of the rudest tribes of our continent are acquainted with the general medical properties of many of their vegetables. We shall find that the Materia Medica of these people contains but few substances as inert as many of those which have a place in our books on this science. What treasures of medicine may not be expected from a people, who, although destitute of the lights of science, have discovered the properties of some of the most inestimable medicines with which we are acquainted? Without mentioning the productions of South-America, let it be recollected, that it is to the rude tribes of the United States that we are indebted for our knowledge of Polygala Senega, Aristolochia Serpentaria, and Spigelia Marilandica.

BLACK DRINK, WHITE DRINK, ...

1823

Dr. Thaddeus William Harris's 1st economic/entomological paper, "Upon the Natural History of the Salt Marsh Caterpillar." (At Harvard College in 1837, Harris would be teaching Entomology and Botany to David Henry Thoreau during his final year of formal schooling.)

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.

July 22, Tuesday: William Bartram had been feeling so poorly that he had for some six months given up his daily writing in his garden diary. On this day he was out in his botanical garden in Kingsessing, when an artery burst in his lungs and he died:

> The end came suddenly, as he walked from the house to his garden, or he died slowly, breathing his last while reposing under a weeping ash tree. He died alone or in the arms of his niece's husband. It's not even certain where relatives and friends buried him — in his beloved garden or in the cemetery of the Quaker Meeting, where Friends registered his birth and that of his twin sister more than eighty-four years earlier.
>
> — Slaughter, Thomas P. THE NATURES OF JOHN AND WILLIAM BARTRAM. NY: Vintage Books, 1996, page 3.

His biographer Thomas P. Slaughter has discussed at length the manner in which William Bartram the 18th-Century American natural historian might relate to Henry Thoreau the 19th-Century American natural historian:

> I would call him an eighteenth-century Thoreau who had found his Walden Pond on the banks of the Schuylkill. However, it makes more sense to see Thoreau as a nineteenth-century heir to

William Bartram's naturalistic legacy. The parallels between the lives of our first two great natural historians are instructive. Neither was a scientist. Both were Romantics. Each considered himself a failure in the eyes of the world. They both experienced a prolonged adolescence plagued by identity struggles; neither ever did secure a living, settle into a career, or marry. Each had just one, unconsummated romance. Both kept journals and revised their lives through their writings. Popular appreciation of their work came after death. Although there may be some coincidence in the parallels –both their fathers were named John– the leisured isolation that is the core of their artful engagement with nature was a product rejection, flight, and a prolonged return to the environs of their youths. Neither could make it in the urban world of commerce or, for that matter, in the wilderness open to men of enterprise in each of their times. Bartram and Thoreau fled to rural settings from which they celebrated the wilds and denounced the civilized life. The meaning of William's life was in the days, as was true for Thoreau's sojourn at Walden, and not in accomplishments and events. As William himself said, in a passage of his commonplace book immediately following the account of his nap, with words that sound Thoreauvian to those who haven't heard Bartram before,

> *The works of a person that builds begin immediately to decay; while those of him who plants begin directly to improve. In this planting promises a more lasting pleasure than building.*

here would be no peripatetic construction for William, no quest to define himself by building a mansion on a hill, like Jefferson, or on a cliff, like Washington, with a superintending view that asserts human dominance over nature. William was no nation builder, either, as were the delegates to the Constitutional Convention and officials of the new federal government that they created, those who toured the garden and sought his advice about making plants grow. He would not try to capture nature's elements with a kite or in a bottle, like John's good friend Benjamin Franklin, who offered to make William a printer half a century before. He did not share the ambitions of Charles Willson Peale to confine nature in a cabinet, of Alexander Wilson to capture an entire species in a book, of Benjamin Rush to alter nature's biological course, of Benjamin Smith Barton to achieve fame through his writings about nature, or of Charles Brockden Brown to plumb the darker side of human nature in various settings.

— Slaughter, Thomas P. THE NATURES OF JOHN AND WILLIAM BARTRAM. NY: Vintage Books, 1996, pages 248-9.

This biographer continues speaking of William Bartram and Henry Thoreau in his penultimate paragraph:

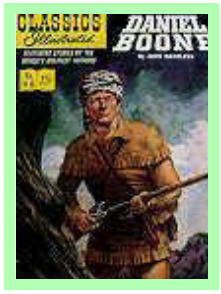
> Although knowledge of the Bartrams' existence has never been lost, there remains in the literature an overwhelming sense that American environmental history **really** begins with Thoreau and urban-industrial growth. Nods toward an eighteenth- and seventeenth-century past do not adequately integrate those experiences historically. Surely, a more complex history, which doesn't look like a straight line –either ascending or

descending– would represent gains more than compensating for sacrifices in simplicity. The modernization trajectory, a view of history as either strictly improvement or loss, which we find so emotionally attractive in stories about us isn't true. A historiography that splits optimists from pessimists, patriots from critics, will not serve us well in the times ahead. Environmentalists, at least, are showing signs of entertaining such changes in habits of thought.

— Slaughter, Thomas P. THE NATURES OF JOHN AND WILLIAM BARTRAM. NY: Vintage Books, 1996, pages 270-1.

1824

The peak year for US ginseng export, with 375 tons leaving our ports. Daniel Boone combined trapping and scouting with ginseng collecting, regularly forwarding his ginseng to a Philadelphia export agent — a 'sang digger of renown!



Professor William Jackson Hooker's ACCOUNT OF SABINE'S ARCTIC PLANTS.

Publication of an enlarged edition of Dr. Jacob Bigelow's 1814 *FLORULA BOSTONIENSIS*, A COLLECTION OF PLANTS OF BOSTON AND ITS VICINITY. (A further enlarged edition of this localized botanical sourcebook would appear in 1840. Henry Thoreau would make extensive use of it.)

FLORULA BOSTONIENSIS

BIGELOW

GINSENG

May 29: It is evident that the virtues of plants are almost completely unknown to us– And we esteem the few with which we are better acquainted unreasonably above the many which are comparatively unknown to us. Bigelow says –"It is a subject of some curiosity to consider, if the knowledge of the present Materia Medica were by any means to be lost, how many of the same articles would again rise into notice and use. Doubtless a variety of new substances would develop unexpected powers, while perhaps the poppy would be shunned as a deleterious plant, and the cinchona might grow unmolested upon the mountains of Quito." ... He says Ginseng, Spigelia, Snake-root, &c. form considerable articles of exportation.... At one time the Indians above Quebec & Montreal were so taken up with searching for Ginseng that they could not be hired for any other purpose. It is said that both the Chinese & the Indians named this plant from its resemblance to the figure of a man

David Douglas visited Bartram's Garden, and was back in England by January 1824.

BOTANIZING

John Torrey published FLORA OF THE NORTHERN AND MIDDLE SECTIONS OF THE UNITED STATES: OR A SYSTEMATIC ARRANGEMENT AND DESCRIPTION OF ALL THE PLANTS HITHER TO DISCOVERED IN THE UNITED STATES NORTH OF VIRGINIA (T. and J. Swords). He led American botanists in the adoption of the natural system of classification developed by Antoine-Laurent de Jussieu and promoted by Alphonse Louis Pierre Pyramus de Candolle.

BOTANIZING

Professor Augustin Pyramus de Candolle and his son Alphonse began the *PRODROMUS SYSTEMATIS NATURALIS REGNI VEGETABILIS* (this project would be completed in 1873 with the aid of Alphonse's son Casimir de Candolle).

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.)

1827

From this year until 1865, Professor William Jackson Hooker's Curtis's Botanical Magazine (38 volumes in all).

The expedition of John Franklin returned from its adventure to the mouth of the Mackenzie River (now Northwest Canada) to Point Beechley (now Alaska).

THE FROZEN NORTH

Thomas Drummond, a nurseryman of Forfarshire who had been part of this expedition, would find a new job as the curator of the Belfast Botanic Garden.

BOTANIZING

1828

The British government commissioned the 240-ton brig H.M.S. *Beagle* for a hydrographic survey of South America. The captain was to be Robert FitzRoy, R.N. (the British had quite a bit of understanding about how to deal with royal bastards, since there had been so very many of them). He asked for a naturalist to sail with him, a person qualified to examine the land. The task at hand would be to complete the survey of Patagonia and Tierra del Fuego, which had commenced under Captain King in 1826 to 1830 (this man had gotten despondent and shot himself in the head), and to survey the shores of Chile, Peru, and some islands in the Pacific.

BOTANIZING

1829

Amos Eaton's A MANUAL OF BOTANY FOR THE NORTHERN STATES ... 5TH ED., REV., COR., AND MUCH EXTENDED (Albany, New York: Websters and Skinners). This is the edition that would be available to Henry Thoreau in the library of Waldo Emerson.

AMOS EATON'S BOTANY

John Leonard Knapp had been during this decade contributing a series of anonymous articles to Time's Telescope under the heading "The Naturalist's Diary." At this point this series was the basis for publication at London of an anonymous volume entitled THE JOURNAL OF A NATURALIST. This work would see publication in four editions (it would be reprinted in Philadelphia in 1831), and would be made use of by Thoreau. It is an account of the natural history, country life and agriculture along the escarpment from Alveston to Thornbury in Gloucestershire, inspired by the Reverend Gilbert White's THE NATURAL HISTORY OF SELBORNE. J.W. White has described Knapp as "a charming botanist and traveller through the inexhaustible regions of nature." He would spend his last years at Alveston as a churchwarden, occupying himself with the pursuit of natural history and the cultivation of his garden. In honor of Knapp's THE GRAMINA BRITANNICA, the genus of grasses previously named *Milbora* by Adanson would be renamed *Knappia* by Smith.

BOTANIZING

From this year into 1831, Professor William Jackson Hooker and Dr R.K. Greville would be putting out the two volumes of *ICONES FILICUM* (ILLUSTRATIONS OF THE FERNS).

Professor Hooker began his *FLORA BOREALI-AMERICANA*, which would not be completed until 1840 (this work would treat primarily Canadian plants and would make itself the 1st flora of North American plants to follow a natural rather than the Linnaean sexual classification system).

CAROLUS LINNAEUS

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.

By about this point the writings of the naturalist Reverend Gilbert White had become so popular in England, that what has been termed "the cult of Gilbert White" was beginning to reach even into America. The steady stream of visitors to Selborne, England would eventually include both Charles Darwin and John Burroughs, and the money that was being made off the sale of such books would eventually draw even the American editor and critic wannabee James Russell Lowell.

> The rise of the natural history essay in the latter half of the nineteenth century was an essential legacy of the Selborne cult. It was more than a scientific-literary genre of writing, modeled after White's pioneering achievement. A constant theme of the nature essayists was the search for a lost pastoral haven, for a home in an inhospitable and threatening world.... [N]atural history was the vehicle that brought readers to the quiet peace of hay barns, orchards, and mountain valleys. These virtuosi of the nature essay were among the best selling writers of their age.

In this regard, here is a quote from Professor Lawrence Buell's analysis of the manner in which Henry Thoreau has entered the American canon:

> A generation after Henry Thoreau, John Burroughs, America's leading nature essayist at the turn of the twentieth century, wrote about Thoreau in somewhat the same way eighteenth-century and romantic poets tended to write about John Milton: as the imposing precursor figure whose shadow he must disown or destroy in order to establish his own legitimacy.

1831

Drummond became an independent plant collector sponsored by the Glasgow and Edinburgh Botanic Gardens.

BOTANIZING

Dr. Jacob Bigelow founded Mount Auburn Cemetery in Watertown MA,[31] as the first garden cemetery in the United States, and personally designed its stone tower, chapel, gates, and fences.

BOTANIZING

Among the corpses now installed there are those of (in alphabetical order by family name — of course so that the founder of the cemetery may be awarded the honor of being first on the list):

- Jacob Bigelow (1787-1879), MD and LLD
- Nathaniel Bowditch (1773-1838), navigator and mathematician
- Phillips Brooks (1835-1893), Episcopal Bishop
- Charles Bulfinch (1763-1844), architect
- Mary Baker Eddy (1821-1910), religious leader
- Buckminster Fuller (1895-1983), visionary
- Isabella Stewart Gardner (1840-1924), art patron
- Charles Dana Gibson (1867-1944), artist
- Asa Gray (1810-1888), botanist
- Oliver Wendell Holmes (1809-1894), author and poet
- Winslow Homer (1836-1910), artist
- Julia Ward Howe (1819-1910), reformer and author
- Harriet Jacobs (1813-1897), author and abolitionist
- Henry Cabot Lodge (1850-1924), statesman
- Henry Cabot Lodge, Jr. (1902-1985), U.S. Senator
- Henry Wadsworth Longfellow (1807-1882), poet
- Amy Lowell (1874-1925), poet
- James Russell Lowell (1819-1891), poet
- Bernard Malamud (1914-1986), novelist
- Josiah Quincy (1772-1864), politician
- Josephine St. Pierre Ruffin (1842-1924), civil rights leader, journalist

31. http://www.zwire.com/site/news.cfm?newsid=15156403&BRD=1709&PAG=461&dept_id=68844&rfi=6

- Charles Sumner (1811-1874), abolitionist and senator

According to the Oneida Daily Dispatch on September 3, 2005,[32] "The first rural cemetery in the United States was the Egyptian Revival-style Mount Auburn Cemetery in Cambridge, Massachusetts, established in 1831. Oliver Wendell Holmes, Henry David Thoreau and Julia Ward Howe are buried there. On November 3, 1997, an arrest was made stemming from the theft of seven of the cemetery's Victorian-era iron gates. Four of the gates were found in a Cape Cod antique shop."

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32. *Pigsgusset* was renamed Watertown MA because the first white people to arrive there arrived there with water on their brain — or because they already had uses for the word "pig" and the word "gusset." Something. Now this *Pigsgusset* is a good place to "go deading," for you find that the earth of their cemetery not only encompasses about twice as many stiffs as the present population of Watertown, but there seem to be at least 170 times as many famous names.

January: Asa Gray received the degree of doctor of medicine at the College of Physicians and Surgeons, Fairfield, New York. (He would soon abandon the practice of medicine in order to become a full collaborator with Professor John Torrey of Princeton University on A FLORA OF NORTH AMERICA (NY: Wiley & Putnam, 1838-1843).

BOTANIZING

August 24, Wednesday: The Reverend John Stevens Henslow, Professor of Botany at Cambridge University and founder of the Botanic Garden there, suggested that Charles Darwin travel with him aboard HMS *Beagle*, a 10-gun brig, for its 2d world voyage of exploration and charting, visiting, among other locations, the Galápagos Islands.

THE SCIENCE OF 1831

Friend Stephen Wanton Gould wrote in his journal:

4th day 24th of 8th M 1831 / Rode with my wife to Smithfield & attended Moy [Monthly] *Meeting - it was to me a remarkably solid & good meeting - in the first Meeting Wm Almy bore a short testimony In the last we did not have much buisness but affairs were conducted in a solid manner I believe this was the first meeting I ever attended with Moses Brown where he was wholly silent in a Meeting for buisness. — he was pretty smart in health, but he told me after meeting that he had nothing special to offer tho' he took an interest in the subject before us —*

RELIGIOUS SOCIETY OF FRIENDS

1832

5th edition: THE NATURAL HISTORY OF SELBORNE / BY THE LATE GILBERT WHITE; WITH ADDITIONS BY SIR WILLIAM JARDINE. New ed. London: Printed for Whittaker, Treacher & Co.
Series title: Constable's miscellany …; v. 45.[33]

John Veitch and his son James (1792-1863) moved the nursery business to Mount Radford, Exeter, England.

BOTANIZING

February 2, Thursday: In the year of the publication of the 5th edition,[34] Waldo Emerson began Gilbert White's THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE.

In Providence, Rhode Island, Friend Stephen Wanton Gould wrote in his journal:

> *2nd of 2nd M 1832 / Quarterly Meeting - which has been a favourd one. — The public appearances were in rotation first a few Words by Anna D Wing - then Thomas Anthony in a favoured Gospel testimony followed in one & the same tenor by Susan Howland - then after pretty good communications from Danl Clapp & Hannah Dennis The Meeting closed. — & proceeded to buisness. —very considebrable of Moment was before us - Rowland Greenes concern to pay a religious visit to the Yearly Meeting of Virginia & part of that of N Carolina was united with - several return certificates were granted to friends who had visited us in the Ministry some time past - And the appointment of Theophilus Shove by Swansey Moy* [Monthly] *Meeting to the Station of an Elder was concurred with — there were several acceptable religious communications in the last Meeting & some that probably might as well have been spared. — The Children all went to Meeting from the School. - The Girls were carried in Carraiges. —*

RELIGIOUS SOCIETY OF FRIENDS

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33. The Reverend White's NATURAL HISTORY OF SELBORNE is only the 4th most reprinted book in the English language.
34. THE NATURAL HISTORY OF SELBORNE / BY THE LATE GILBERT WHITE; WITH ADDITIONS BY SIR WILLIAM JARDINE. New ed. London: Printed for Whittaker, Treacher & Co. Series title: Constable's miscellany …; v. 45.
I do **not** know that this was the edition which Waldo Emerson was consulting.

1833

THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE / BY GILBERT WHITE. A NEW ED. / WITH NOTES BY SEVERAL EMINENT AUTHORS, AND AN ENLARGEMENT OF THE NATURALIST'S CALENDAR. London.

THE NATURAL HISTORY OF SELBORNE: OBSERVATIONS ON VARIOUS PARTS OF NATURE: AND THE NATURALIST'S CALENDAR / BY THE LATE GILBERT WHITE; WITH NOTES, BY THOMAS BROWN. Edinburgh: Published for the Proprietors by James Chambers.

THE NATURAL HISTORY OF SELBORNE: OBSERVATIONS ON VARIOUS PARTS OF NATURE AND THE NATURALIST'S CALENDAR / BY GILBERT WHITE; WITH ADDITIONS BY SIR WILLIAM JARDINE. New ed. / with eighteen engravings by Branston. London: Whittaker, Treacher.[35]

Colley was hired by Bateman to collect orchids in the Demerara region of British Guiana. Sixty species were returned alive from this expedition.

Drummond finally reached Texas after spending his first season collecting mainly in the Ohio Valley. He contracted cholera and barely recovered.

BOTANIZING

Summer: Dr. Asa Gray of Harvard College collected plant specimens for Professor John Torrey.

BOTANIZING

Fall: Dr. Asa Gray worked for the Botany professor John Torrey (1796-1873) at his home.

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

1834

The 2d volume, on water birds, of Professor Thomas Nuttall's A MANUAL OF THE ORNITHOLOGY OF THE UNITED STATES AND OF CANADA (Cambridge: Hilliard and Brown; Boston: Hilliard, Gray). He resigned as curator of the Botanical Garden of Harvard in order to accompany the Wyeth Expedition to the Pacific coast.

NUTTALL'S WATER BIRDS

Horatio Cook Meriam received his A.M. degree from Harvard College:

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Horatio Cook Meriam; LL.B. 1831; A.M. 1834  1872
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NEW "HARVARD MEN"

James Russell Lowell matriculated at Harvard.

The Reverend Professor Jared Sparks of Harvard began the long-term task of editing a 10-volume series (Boston: Hilliard, Gray; London: Kennett) –and then a 15-volume series– of THE LIBRARY OF AMERICAN BIOGRAPHY.

LIBRARY OF AM. BIOG. I

September: Dr. Asa Gray visited Philadelphia with Botany professor John Torrey (1796-1873) and collected plant specimens in New Jersey for him. He would then return to Torrey's home.

1835

During this year and the following one, the two volumes of Sir William Jackson Hooker's COMPANION TO THE BOTANICAL MAGAZINE.

Alphonse Louis Pierre Pyramus de Candolle became director of the botanical gardens and chair of botany at the University of Geneva.

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.

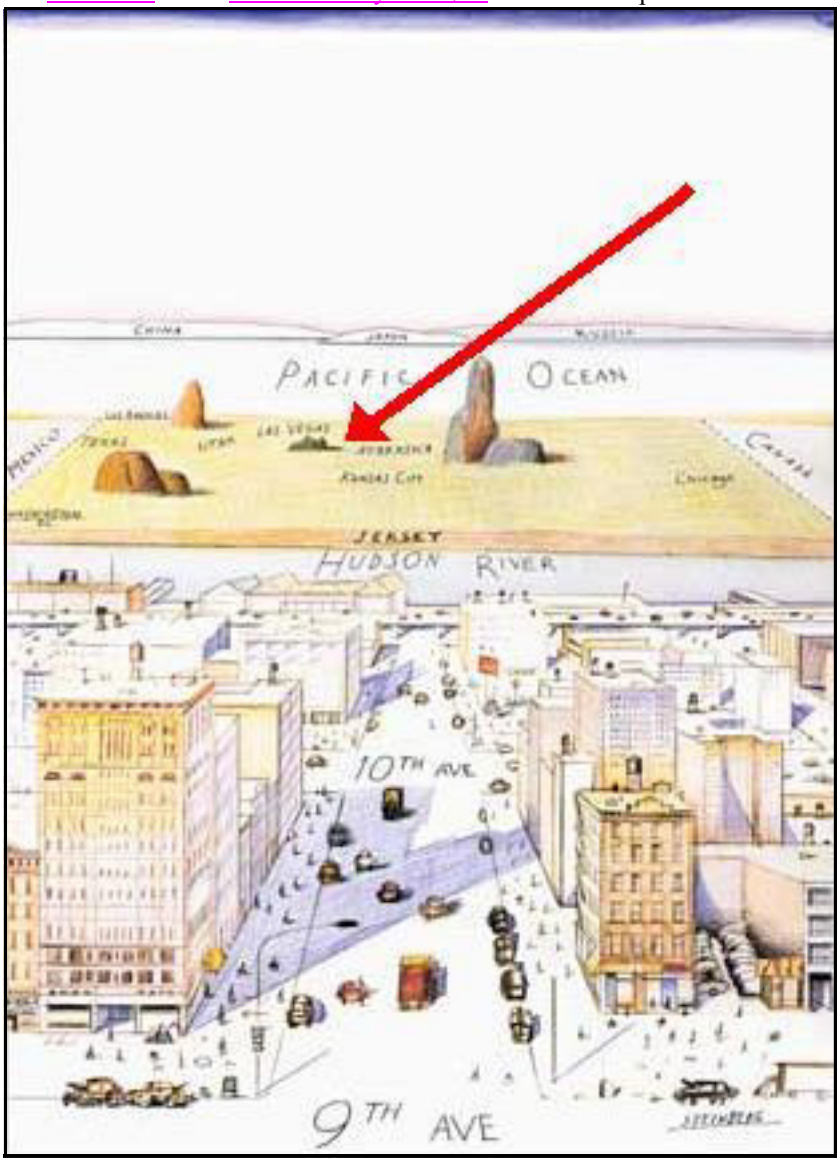
John Gibson accompanied Lord Auckland on his voyage toward India, via Madeira, Rio de Janeiro, and the Cape of Good Hope. They would arrive in Calcutta during March 1836 with plants from Auckland destined for Nathaniel Wallich, director of the Calcutta Botanical Garden. Gibson would also collect in the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

PLANTS

BOTANY

BOTANY

In this year and the next, Professor Thomas Nuttall, having taken leave from Harvard College, would explore the flora of the California coast. Richard Henry Dana, Jr. would meet up with him out there.



BOTANIZING

Spring: Dr. Reuben Crandall relocated to Georgetown, Virginia near Washington DC to practice medicine and collect botanical specimens.

August 10, Monday: At Niblo's Garden in New-York Phineas Taylor Barnum started to exhibit blind and paralyzed black slave Joyce Heth under the pretense that it had been she who had nursed our illustrious founding father George Washington.

BOTANIZING

Dr. Reuben Crandall was arrested after Harry King, a Georgetown, Virginia man, called on him in his office while he was unpacking some crates and boxes of stuff. The young man sighted "a pamphlet on anti-slavery lying on the table." There were several such papers lying around, which the botanist had been using to press his plant specimens. He asked if he might have one to read, and "Dr. Crandall told him he might." For this, Dr. Crandall would be held in the local lockup for almost 9 months awaiting trial for his life for the treason of incitement to servile insurrection (the same statute, written by Thomas Jefferson, under which Captain John Brown would be tried and hanged) — and while living under these conditions he would acquire the

"consumption," or pulmonary tuberculosis, that would destroy him.

Francis Scott Key, the District of Columbia's DA, would attempt to persuade the judge to impose the death penalty upon Prudence Crandall's younger brother.

Dr. Crandall had been charged with promulgating a false doctrine that the black American had equal rights with the white, with casting reflections on the chivalry of the south, and with intent to cause unrest among Negroes.[36] It was suggested that he had himself authored publications urging immediate emancipation of slaves. Clearly this Un-American agitator deserved to be dead. A crowd of white Navy Yard workers therefore went to the Washington County Jail where he was being held, to agitate for his lynching, and along the way a

free black tavernkeeper, Beverly Snow, made some sort of derogatory remark about their wives. The crowd began by thoroughly trashing Snow's tavern, and then over two days and three nights of rioting, it smashed the windows of Negro churches, the Negro school, and various homes.

Drastic legislation would follow this "Snow Riot" in the District of Columbia — legislation further restricting the rights of free Negroes to assemble.[37]

As part of the legal process, Dr. Crandall would be interrogated about his attitudes toward people of other races. There was a concern that he might share to some degree in the radical attitudes of his notorious elder sister Prudence. He assured his captors that "he would break up the school if he could, but his sister was a very obstinate girl." He informed them that he had another sister, younger, who was sharing in his older sister's attitudes, but that he had been hoping "that he could, in all events, get her away" from this bad influence.

September 17, Thursday morning: HMS *Beagle* dropped anchor off Chatham Island, the easternmost of the Galápagos group, and Charles Darwin went ashore to attempt to make discoveries.

BOTANIZING

That day David Henry Thoreau checked out, from Harvard Library, the 2d volume of Abraham Tucker (1705-1774)'s THE LIGHT OF NATURE PURSUED (1768-1778, 7 volumes, published in part under the pseudonym Edward Search).

36. THE TRIAL OF REUBEN CRANDALL, M.D., CHARGED WITH PUBLISHING AND CIRCULATING SEDITIOUS AND INCENDIARY PAPERS, &C. IN THE DISTRICT OF COLUMBIA, WITH THE INTENT OF EXCITING SERVILE INSURRECTION . . . BY A MEMBER OF THE BAR. Washington DC, Printed for the Proprietors, 1836. (This 48-page pamphlet alleged that "The Trial of Crandall presents the first case of a man charged with endeavoring to excite insurrection among slaves and the free colored population that was ever brought before a judicial tribunal.")

37. Provine, Dorothy Sproles. THE FREE NEGRO IN THE DISTRICT OF COLUMBIA 1800-1860. Thesis Louisiana State University Department of History, 1959, 1963

1836

THE NATURAL HISTORY OF SELBORNE, WITH ITS ANTIQUITIES; NATURALIST'S CALENDAR, & C. A NEW EDITION, WITH NOTES BY EDWARD BLYTH (London: Orr and Smith).[38]

GILBERT WHITE

"[John Claudius] Loudon and others [wrote in AN ENCYCLOPAEDIA OF PLANTS; COMPRISING THE DESCRIPTION, SPECIFIC CHARACTER, CULTURE, HISTORY, APPLICATION IN THE ARTS, AND EVERY OTHER DESIRABLE PARTICULAR RESPECTING ALL THE PLANTS INDIGENOUS, CULTIVATED IN, OR INTRODUCED TO BRITAIN.... London: Longman, Rees, Orme, Brown, Green, and Longman] that there are only two species growing in England, which are eaten raw, answering to our eight — to wit, the Bilberry (*V. myrtillus*) and the Blea-berry or Bog Whortleberry (*V. uliginosum*), both of which are found in North America, and the last is the common one on the summit of the White Mountains, but in Great Britain it is found only in the northern part of England and in Scotland. This leaves only one in England to our five which are abundant. Loudon says of the bog whortleberry (*V. uliginosum*), 'The berries are agreeable but inferior in flavor to those of Vaccinium myrtillus [the bilberry]; eaten in large quantities, they occasion giddiness, and a slight headache.' And of their common whortleberry (*V. myrtillus*) he says, 'It is found in every country in Britain, from Cornwall to Caithness, least frequently in the south-eastern countries, and increases in quantity as we advance northward.' It 'is an elegant and also a fruit-bearing plant.' The berries 'are eaten in tarts or with cream, or made into a jelly, in the northern and western counties of England; and, in other parts of the country they are made into pies and puddings.' They 'are very acceptable to children either eaten by themselves, or with milk' or otherwise. They 'have an astringent quality.'"

"HUCKLEBERRIES"

"HUCKLEBERRIES": Take the rubuses or what you might call bramble berries, for instance, to which genus our raspberries, blackberries and thimbleberries belong. According to Loudon there are five kinds indigenous in Britain to our eight. But of these five only two appear to be at all common, while we have four kinds both very common and very good. The Englishman Coleman says of their best, the English raspberry, which species we also cultivate, that 'the wilding is not sufficiently abundant to have much importance.'

JOHN CLAUDIUS LOUDON

The American edition of the Reverend William Kirby's ON THE POWER WISDOM AND GOODNESS OF GOD AS MANIFESTED IN THE CREATION OF ANIMALS AND IN THEIR HISTORY HABITS AND INSTINCTS (Philadelphia: Carey, Lea & Blanchard).

ON THE POWER, WISDOM, ...

ON THE POWER, WISDOM, ...

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

Franz Diebl (1770-1859) put out a two-volume textbook, *ABHANDLUNGEN AUS DER LANDWIRTSCHAFTSKUNDE FÜR LANDWIRTHE, BESONDERS ABER FÜR DIEJENIGEN, WELCHE SICH DER ERLERNUNG DIESER WISSENSCHAFT WIDMEN. II. VON DEM PFLANZENBAU*, in which he alleged that the primary method for the improvement of plants was artificial pollination. Gregor Mendel would in 1846 attend Diebl's lectures on pomiculture and viticulture at the Philosophical Institute in Brno.

BOTANIZING

Carl Friedrich von Gartner (1772-1850) won the prize offered by the Dutch Academy in 1830, for his investigations of hybridization and the species question. Von Gartner's collection of research reports would receive numerous revisions, and was first published in Dutch. The book would be further revised and eventually published in German, in 1849.

BOTANIZING

The 1st sugar mill in the Hawaiian Islands began operation.

Nuttall returned from his trip across America and to the Hawaiian Islands. He added a further 1,000 new species to the American flora. This was the end of his active career.

BOTANIZING

Chatsworth conservatory construction was begun, to be completed in 1840. Measuring 272 x 66 feet (83 x 20m), the conservatory was designed and built by Paxton with the help of Decimus Burton (architect).

BOTANIZING

Professor William Jackson Hooker was made a Knight of Hanover (henceforward he would be being addressed as "Sir William").

The Botanical Society of London was initiated, with its membership being about one in ten female. According to D.E. Allen's "The Woman Members of the Botanical Society of London, 1836-1856," the science of botany was an exception to the gender-specific science of the day. Women were allowed to participate as botanizing was considered to be an activity suited to the tastes and sensitivities of the "weaker sex":

> Botany could break the rules because it had the great good luck to be in keeping with both of the contemporary alternative ideas of femininity. On the one hand it was able to masquerade as an elegant accomplishment and so found favor with the inheritors of the essentially aristocratic "blue-stocking" creed, with its studied cultivation of an unintense intellectualism. On the other, it passed as acceptable in those far more numerous middle-class circles which subscribed to the new cant of sentimentalized womanhood: the "perfect lady" of a repressive Evangelicism.

THE SCIENCE OF 1836

Female members were allowed to vote, but only by the appointing of a gentleman as proxy, to register their vote before the attention of the group. During the 20-year life of this Botanical Society of London, only one woman member would ever contribute a paper to the meetings, and it would prove necessary for her to enlist a male member of the society as her surrogate to read out the paper upon that occasion. No woman would ever be elected to the council of the society, or serve as an officer. Female membership in this society which regarded itself as a radical departure would decline from this initial one in ten proportion to about one in twenty. Female work was simply not recognized. The presumption was that they would be merely collecting specimens for men to analyze, or illustrating publications ostensibly presented by males. For instance, the plates of John Gould's BIRDS OF EUROPE, a work valued primarily for such plates rather than for any text, had been prepared in actuality in large part by his wife.

January: Prudence Crandall's younger brother, Dr. Reuben Crandall the botanist, was after an hour of deliberation acquitted by his jury of having communicated antislavery literature. The very next morning, he would be discharged from the prison of Washington DC (he would, however, die of consumption or pulmonary tuberculosis which he had contracted during his lengthy pretrial incarceration).

BOTANIZING

April: In New York, Dr. Asa Gray completed work on his 1st botanical textbook, ELEMENTS OF BOTANY.

ELEMENTS OF BOTANY

May 8, Sunday: Friend Stephen Wanton Gould wrote in his journal:

> *1st day 8 of 5 M 1836 / Attended meetings & I must say they were seasons of much dryness to me but I have no doubt the fault was my own*
> *Father had short Service in both. —*

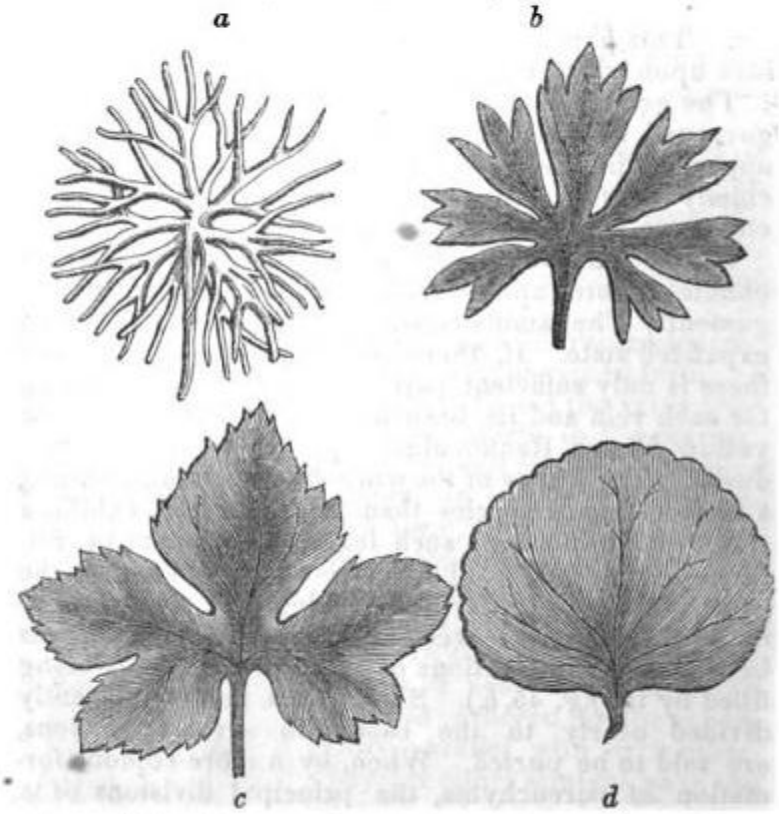
RELIGIOUS SOCIETY OF FRIENDS

Richard Henry Dana, Jr. and the *Alert* sailed out of San Diego harbor, headed south. Aboard the vessel was Professor Thomas Nuttall of Harvard College, returning to Boston from his botanical expedition to the California coast:

> This passenger ... was no one else than a gentleman whom I had known in my better days; and the last person I should have expected to have seen on the coast of California– Professor N_____, of Cambridge [Thomas Nuttall]. I had left him quietly seated in the chair of Botany and Ornithology, in Harvard University; and the next I saw of him, was strolling about San Diego beach, in a sailor's pea-jacket, with a wide straw hat, and barefooted, with his trowsers rolled up to his knees, picking up stones and shells. He had

parted or divided leaf grow together for a part of their length, a *lobed* leaf, like that of Ranunculus recurvatus results, (*fig.* 45, *c.*). If the whole space between the lobes be supplied with parenchyma, as in the lower leaves of R. abortivus (*fig.* 45, *d.*), a rounded leaf is produced; the *crenated* margin arising from the absence of parenchyma at the very extremities of the

Fig. 45.



veins. The Ranunculus or Crow-foot genus, from which the foregoing illustrations are taken, exhibits all the intermediate forms between an entire and a filiformly dissected leaf; indeed a large part of the series is often presented by a single plant. The difference is attributable

travelled overland to the North-west Coast, and come down in a small vessel to Monterey. There he learned that there was a ship at the leeward, about to sail for Boston; and, taking passage in the *Pilgrim*, which was then at Monterey, he came slowly down, visiting the intermediate ports, and examining the trees, plants, earths, birds, etc., and joined us at San Diego shortly before we sailed. The second mate of the *Pilgrim* told me that they had an old gentleman on board who knew me, and came from the college that I had been in. He could not recollect his name, but said he was a "sort of an oldish man," with white hair, and spent all his time in the bush, and along the beach, picking up flowers and shells, and such truck, and had a dozen boxes and barrels, full of them. I thought over everybody who would be likely to be there, but could fix upon no one; when, the next day, just as we were about to shove off from the beach, he came down to the boat, in the rig I have described, with his shoes in his hand, and his pockets full of specimens. I knew him at once, though I should not have been more surprised to have seen the Old South steeple shoot up from the hide-house. He probably had no less difficulty in recognizing me. As we left home about the same time, we had nothing to tell one another; and, owing to our different situations on board, I saw but little of him on the passage home. Sometimes, when I was at the wheel of a calm night, and the steering required no attention, and the officer of the watch was forward, he would come aft and hold a short yarn with me; but this was against the rules of the ship, as is, in fact, all intercourse between passengers and the crew.… The *Pilgrim*'s crew christened Mr. N. "Old Curious," from his zeal for curiosities, and some of them said that he was crazy, and that his friends let him go about and amuse himself in this way. Why else a rich man (sailors call every man rich who does not work with his hands, and wears a long coat and cravat) should leave a Christian country, and come to such a place as California, to pick up shells and stones, they could not understand. One of them, however, an old salt, who had seen something more of the world ashore, set all to rights, as he thoughts– "Oh, 'vast there!– You don't know anything about them craft. I've seen them colleges, and know the ropes. They keep all such things for curiosities, and study 'em, and have men a' purpose to go and get 'em. This old chap knows what he's about. He a'n't the child you take him for. He'll carry all these things to the college, and if they are better than any that they have had before, he'll be head of the college. Then, by-and-by, somebody else will go after some more, and if they beat him, he'll have to go again, or else give up his berth. That's the way they do it. This old covey knows the ropes. He has worked a traverse over 'em, and come 'way out here, where nobody's ever been afore, and where they'll never think of coming." This explanation satisfied Jack; and as it raised Mr. N.'s credit for capacity, and was near enough to the truth for common purposes, I did not disturb it.

The *Alert*, for its homeward journey, was carrying in addition to the hides and its passenger a small quantity of gold dust which had been brought down to the ports from the interior by various persons, something not at all unusual which at that time was attracting little attention.[39]

39. Not until 1841 would the first notable gold discovery be made in California, in San Feliciano Canyon near the Mission San Fernando.

AND NOW, FOR SOMETHING ENTIRELY DIFFERENT, A REPORT FROM OUR SAILOR:

Sunday, May 8th. This promised to be our last day in California. Our forty thousand hides, thirty thousand horns, besides several barrels of otter and beaver skins, were all stowed below, and the hatches calked down. All our spare spars were taken on board and lashed; our water-casks secured; and our live stock, consisting of four bullocks, a dozen sheep, a dozen or more pigs, and three or four dozen of poultry, were all stowed away in their different quarters: the bullocks in the long-boat, the sheep in a pen on the fore-hatch, and the pigs in a sty under the bows of the long-boat, and the poultry in their proper coop; and the jolly-boat was full of hay for the sheep and bullocks. Our unusually large cargo, together with the stores for a five months' voyage, brought the ship channels down into the water. In addition to this, she had been steeved so thoroughly, and was so bound by the compression of her cargo, forced into her by so powerful machinery, that she was like a man in a straight-jacket, and would be but a dull sailer, until she had worked herself loose.

The *California* had finished discharging her cargo, and was to get under weigh at the same time with us. Having washed down decks and got our breakfast, the two vessels lay side by side, in complete readiness for sea, our ensigns hanging from the peaks, and our tall spars reflected from the glassy surface of the river, which, since sunrise, had been unbroken by a ripple. At length, a few whiffs came across the water, and, by eleven o'clock, the regular north-west wind set steadily in. There was no need of calling all hands, for we had all been hanging about the forecastle the whole forenoon, and were ready for a start upon the first sign of a breeze. All eyes were aft upon the captain, who was walking the deck, with, every now and then, a look to windward. He made a sign to the mate, who came forward, took his station, deliberately between the knight-heads, cast a glance aloft, and called out, "All hands, lay aloft and loose the sails!" We were half in the rigging before the order came, and never since we left Boston were the gaskets off the yards, and the rigging overhauled, in a shorter time. "All ready forward, sir!"– "All ready the main!"– "Cross-jack yards all ready, sir!"– "Lay down, all hands but one on each yard!" The yard-arm and bunt gaskets were cast off; and each sail hung by the jigger, with one man standing by the tie to let it go. At the same moment that we sprang aloft, a dozen hands sprang into the rigging of the *California*, and in an instant were all over her yards; and her sails, too, were ready to be dropped at the word. In the mean time our bow gun had been loaded and run out, and its discharge was to be the signal for dropping sails. A cloud of smoke came out of our bows; the echoes of the gun rattled our farewell among the hills of California; and the two ships were covered, from head to foot, with their white canvas. For a few minutes, all was uproar and apparent confusion: men flying about like monkeys in the rigging; ropes and blocks flying; orders given and answered, and the confused noises of men singing out at the ropes. The top-sails came to the mast-heads with "Cheerily, men!" and, in a few minutes, every sail was set; for the wind was light. The head sails were backed, the windlass came round "slip– slap" to the cry of the sailors;– "Hove short, sir," said the mate;– "Up with him!"– "Aye, aye, sir."– A few hearty and long heaves, and the anchor showed its head. "Hook cat!"– The fall was stretched along the decks; all hands laid hold;– "Hurrah, for the last time," said the mate; and the anchor came to the cat-head to the tune of "Time for us to go," with a loud chorus. Everything was done quick, as though it were for the last time. The head yards were filled away, and our ship began to move through the water on her homeward-bound course.

The *California* had got under weigh at the same moment; and we sailed down the narrow bay abreast and were just off the mouth, and finding ourselves gradually shooting ahead of her, were on the point of giving her three parting cheers, when, suddenly, we found ourselves stopped short, and the *California* ranging fast ahead of us. A bar stretches across the mouth of the harbor, with water enough to float common vessels, but, being low in the water, and having kept well to leeward, as we were bound to the southward, we had stuck fast, while the *California*, being light, had floated over.

October 2, Sunday: The survey ship HMS *Beagle* returned to its home port in England after a 4½-year voyage around the earth of zoological, botanical, and geological discovery that included the Cape Verde islands, both coasts of South America, island groups such as the Galápagos, and the coastal waters of Australia.[40]

For many years Charles Darwin (who was not the ship's naturalist but supercargo, a gentleman companion for the ship's captain FitzRoy, sent along for the explicit purpose of keeping this captain sane despite his long enforced isolation from human contact as the man in command) would have nightmares about the cruel abuse of black slaves which he had witnessed along the east coast of the South American continent.

Salmon Brown was born in Hudson, Ohio to John Brown and Mary Ann Day Brown.

Friend Stephen Wanton Gould in his journal:

> *1st day 2nd of 10th M 1836 / Our Morning Meeting was silent & the weather being rainy was small, but to me a good solid meeting. — In the Afternoon it was larger than usual & a pretty good meeting but to me not equal to the Morning - which confirmed me that numbers does no always make weight not even with preaching added to it. —*

RELIGIOUS SOCIETY OF FRIENDS

40. What would eventually become of HMS *Beagle*? It would be used as a training ship in Japan until 1889, and would then be broken up. For a time, part of its rib cage would be used as a stand for stones piled up near the temple of Suitengu, near the Okai shipyards.

THE REPORT FROM OUR SAILOR DANA, CONTINUED:

We kept all sail on, in the hope of forcing over, but failing in this, we hove aback, and lay waiting for the tide, which was on the flood, to take us back into the channel. This was somewhat of a damper to us, and the captain looked not a little mortified and vexed. “This is the same place where the *Rosa* got ashore,” observed the redheaded second mate, most mal-a-propos. A malediction on the *Rosa*, and him too, was all the answer he got, and he slunk off to leeward. In a few minutes, the force of the wind and the rising of the tide backed us into the stream, and we were on our way to our old anchoring-place, the tide setting swiftly up, and the ship barely manageable, in the light breeze. We came-to, in our old berth, opposite the hide-house, whose inmates were not a little surprised to see us return. We felt as though we were tied to California; and some of the crew swore that they never should get clear of the bloody coast.

In about half an hour, which was near high water, the order was given to man the windlass, and again the anchor was catted; but not a word was said about the last time. The *California* had come back on finding that we had returned, and was hove-to, waiting for us, off the point. This time we passed the bar safely, and were soon up with the *California*, who filled away, and kept us company. She seemed desirous of a trial of speed, and our captain accepted the challenge, although we were loaded down to the bolts of our chain plates, as deep as a sand-barge, and bound so taught with our cargo that we were no more fit for a race than a man in fetters;– while our antagonist was in her best trim. Being clear of the point, the breeze became stiff, and the royal masts bent under our sails, but we would not take them in until we saw three boys spring aloft into the rigging of the *California*; when they were all furled at once, but with orders to stay aloft at the top-gallant mastheads, and loose them again at the word. It was my duty to furl the fore royal; and while standing by to loose it again, I had a fine view of the scene. From where I stood, the two vessels seemed nothing but spars and sails, while their narrow decks, far below, slanting over by the force of the wind aloft, appeared hardly capable of supporting the great fabrics raised upon them. The *California* was to windward of us, and had every advantage; yet, while the breeze was stiff, we held our own. As soon as it began to slacken, she ranged a little ahead, and the order was given to loose the royals. In an instant the gaskets were off and the bunt dropped. “Sheet home the fore royal!– Weather sheet’s home!”– “Hoist away, sir!” is bawled from aloft. “Overhaul your clew-lines!” shouts the mate. “Aye, aye, sir, all clear!”– “Taught leech! belay! Well the lee brace; haul taught to windward”– and the royals are set. These brought us up again; but the wind continuing light, the *California* set hers, and it was soon evident that she was walking away from us. Our captain then hailed, and said that he should keep off to his course; adding– “She isn’t the *Alert* now. If I had her in your trim, she would have been out of sight by this time.” This was good-naturedly answered from the *California*, and she braced sharp up, and stood close upon the wind up the coast; while we squared away our yards, and stood before the wind to the south-southwest. The *California*’s crew manned her weather rigging, waved their hats in the air, and gave up three hearty cheers, which we answered as heartily, and the customary single cheer came back to us from over the water. She stood on her way, doomed to eighteen months’ or two years’ hard service upon that hated coast, while we were making our way to our home, to which every hour and every mile was bringing us nearer.

As soon as we parted company with the *California*, all hands were sent aloft to set the studding-sails. Booms were rigged out, tacks and halyards rove, sail after sail packed upon her, until every available inch of canvas was spread, that we might not lose a breath of the fair wind. We could now see how much she was cramped and deadened by her cargo; for with a good breeze on her quarter, and every stitch of canvas spread, we could not get more than six knots out of her. She had no more life in her than if she were water-logged. The log was hove several times; but she was doing her best. We had hardly patience with her, but the older sailors said– “Stand by! you’ll see her work herself loose in a week or two, and then she’ll walk up to Cape Horn like a race-horse.”

When all sail had been set, and the decks cleared up, the *California* was a speck in the horizon, and the coast lay like a low cloud along the north-east. At sunset they were both out of sight, and we were once more upon the ocean where sky and water meet.

At eight o’clock all hands were called aft, and the watches set for the voyage. Some changes were made; but I was glad to find myself still in the larboard watch. Our crew was somewhat diminished; for a man and a boy had gone in the *Pilgrim*; another was second mate of the *Ayacucho*; and a third, the oldest man of the crew, had broken down under the hard work and constant exposure on the coast, and, having had a stroke of the palsy, was left behind at the hide-house under the charge of Captain Arthur.

THE REPORT FROM OUR SAILOR DANA, CONCLUDED:

The poor fellow wished very much to come home in the ship; and he ought to have been brought home in her. But a live dog is better than a dead lion, and a sick sailor belongs to nobody's mess; so he was sent ashore with the rest of the lumber, which was only in the way. By these diminutions, we were shorthanded for a voyage round Cape Horn in the dead of winter. Besides S_____ and myself, there were only five in the forecastle; who, together with four boys in the steerage, the sailmaker, carpenter, etc., composed the whole crew. In addition to this, we were only three or four days out, when the sailmaker, who was the oldest and best seaman on board, was taken with the palsy, and was useless for the rest of the voyage. The constant wading in the water, in all weathers, to take off hides, together with the other labors, is too much for old men, and for any who have not good constitutions. Beside these two men of ours, the second officer of the *California* and the carpenter of the *Pilgrim* broke down under the work, and the latter died at Santa Barbara. The young man, too, who came out with us from Boston in the *Pilgrim*, had to be taken from his berth before the mast and made clerk, on account of a fit of rheumatism which attacked him soon after he came upon the coast. By the loss of the sailmaker, our watch was reduced to five, of whom two were boys, who never steered but in fine weather, so that the other two and myself had to stand at the wheel four hours apiece out of every twenty-four; and the other watch had only four helmsmen. "Never mind– we're homeward bound!" was the answer to everything; and we should not have minded this, were it not for the thought that we should be off Cape Horn in the very dead of winter. It was now the first part of May; and two months would bring us off the cape in July, which is the worst month in the year there; when the sun rises at nine and sets at three, giving eighteen hours night, and there is snow and rain, gales and high seas, in abundance.

The prospect of meeting this in a ship half manned, and loaded so deep that every heavy sea must wash her fore and aft, was by no means pleasant. The *Alert*, in her passage out, doubled the Cape in the month of February, which is midsummer; and we came round in the *Pilgrim* in the latter part of October, which we thought was bad enough. There was only one of our crew who had been off there in the winter, and that was in a whaleship, much lighter and higher than our ship; yet he said they had man-killing weather for twenty days without intermission, and their decks were swept twice, and they were all glad enough to see the last of it. The *Brandywine* frigate, also, in her passage round, had sixty days off the Cape, and lost several boats by the heavy sea. All this was for our comfort; yet pass it we must; and all hands agreed to make the best of it.

During our watches below we overhauled our clothes, and made and mended everything for bad weather. Each of us had made for himself a suit of oil-cloth or tarpaulin, and these we got out, and gave thorough coatings of oil or tar, and hung upon the stays to dry. Our stout boots, too, we covered over with a thick mixture of melted grease and tar, and hung out to dry. Thus we took advantage of the warm sun and fine weather of the Pacific to prepare for its other face. In the forenoon watches below, our forecastle looked like the workshop of what a sailor is– a Jack at all trades. Thick stockings and drawers were darned and patched; mittens dragged from the bottom of the chest and mended; comforters made for the neck and ears; old flannel shirts cut up to line monkey jackets; southwesters lined with flannel, and a pot of paint smuggled forward to give them a coat on the outside; and everything turned to hand; so that, although two years had left us but a scanty wardrobe, yet the economy and invention which necessity teaches a sailor, soon put each of us in pretty good trim for bad weather, even before we had seen the last of the fine. Even the cobbler's art was not out of place. Several old shoes were very decently repaired, and with waxed ends, an awl, and the top of an old boot, I made me quite a respectable sheath for my knife.

There was one difficulty, however, which nothing that we could do would remedy; and that was the leaking of the forecastle, which made it very uncomfortable in bad weather, rendered half of the berths tenantless. The tightest ships, in long voyage, from the constant strain which is upon the bowsprit, will leak, more or less, round the heel of the bowsprit, and the bitts, which come down into the forecastle; but, in addition to this, we this, we had an unaccountable leak on the starboard bow, near the cat-head, which drove us from the forward berths on that side, and, indeed, when she was on the starboard tack, from all the forward berths. One of the after berths, too, leaked in very bad weather; so that in a ship which was in other respects as tight as a bottle, and brought her cargo to Boston perfectly dry, we had, after every effort made to prevent it, in the way of caulking and leading, a forecastle with only three dry berths for seven of us. However, as there is never but one watch below at a time, by 'turning in and out,' we did pretty well. And there being, in our watch, but three of us who lived forward, we generally had a dry berth apiece in bad weather.[1]

All this, however, was but anticipation. We were still in fine weather in the North Pacific, running down the north-east trades, which we took on the second day after leaving San Diego.

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1. On removing the cat-head, after the ship arrived at Boston, it was found that there were two holes under it which had been bored for the purpose driving treenails, and which, accidentally, had not been plugged up when the cat-head was placed over them. This was sufficient to account for the l and for our not having been able to discover and stop it.

1837

From this year into 1854, the 10 volumes of Sir William Jackson Hooker's *ICONES PLANTARUM* (ILLUSTRATIONS OF PLANTS).

In reference to tropical orchids, and particularly concerning *Cattleya labiata*, Gardner wrote that the progress of cultivations (for coffee plantations, and wood for charcoal) was "proceeding so rapidly for twenty miles around Rio, that many of the species which still exist will, in the course of a few years, be completely annihilated, and the botanists of future years who visit the country will look in vain for the plants collected by their predecessors."

Robert Schomburgk discovered *Victoria regia* in British Guiana (name later changed to *Victoria amazonica*). Early shipments of seed would be unsuccessful, until in 1849 Paxton would grow the plant and bring it into flower in a heated tank of the tropical house at Chatsworth. The entire January 1847 issue of Botanical Magazine would be dedicated to this waterlily.

THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE. BY THE REV. GILBERT WHITE, M.A. WITH THE NATURALIST'S CALENDAR; AND MISCELLANEOUS OBSERVATIONS, EXTRACTED FROM HIS PAPERS. A NEW ED.; WITH NOTES, BY EDWARD TURNER BENNETT … AND OTHERS. London, Printed for J. and A. Arch [etc].[41]

BOTANIZING

John Gould, a taxidermist and leading ornithologist, reported that Charles Darwin had brought back from the Galapagos three species of mockingbird (the very possibility of which, he had already admitted, would undermine the stability of species) and thirteen distinct species of finch. "If ever there was one moment when Darwin was pushed across the border dividing creationism from evolution, this may well have been that moment," Ronald Clark would mistakenly opinion in THE SURVIVAL OF CHARLES DARWIN: A BIOGRAPHY OF A MAN AND AN IDEA (NY: Random House, 1984, page 47) — mistakenly because Darwin had in fact already arrived at the concept of development with modification prior to being informed that all those apparently different bird specimens on the islands had developed from mainland finches. Later he would read the famous essay by Thomas Malthus and this would further push him in his understanding of the mechanism of evolution.

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

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

Charles Pickering had been raised in Wenham, Massachusetts and after attending Harvard College and Harvard Medical School had set up practice in Philadelphia. He had become the librarian and curator of the Academy of Natural Sciences, and at this point was selected to be one of the scientists (functioning primarily as a botanist, but also as a herpetologist and an ichthyologist) with the US South Seas Exploring Expedition (until 1842).

Dr. Asa Gray had planned to participate in the US South Seas Exploring Expedition but delays would lead him to withdraw.

WALDEN: What was the meaning of that South-Sea Exploring Expedition, with all its parade and expense, but an indirect recognition of the fact, that there are continents and seas in the moral world, to which every man is an isthmus or an inlet, yet unexplored by him, but that it is easier to sail many thousand miles through cold and storm and cannibals, in a government ship, with five hundred men and boys to assist one, than it is to explore the private sea, the Atlantic and Pacific Ocean of one's being alone.-

"Erret, et extremos alter scrutetur Iberos.
Plus habet hic vitæ, plus habet ille viæ."

Let them wander and scrutinize the outlandish Australians.
I have more of God, they more of the road.

PEOPLE O WALDEN

CHARLES WILKES

He was appointed professor of botany at the newly formed University of Michigan. Publication of the 1st volume of Professor John Torrey's A FLORA OF NORTH AMERICA (NY: Wiley & Putnam, 1838-1843), with Professor Gray as a full collaborator.

BOTANIZING

November: From this month until November 1839, Professor Asa Gray would be traveling in Europe for the purpose of purchasing books for the University of Michigan while visiting various herbaria.

BOTANIZING

1839

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

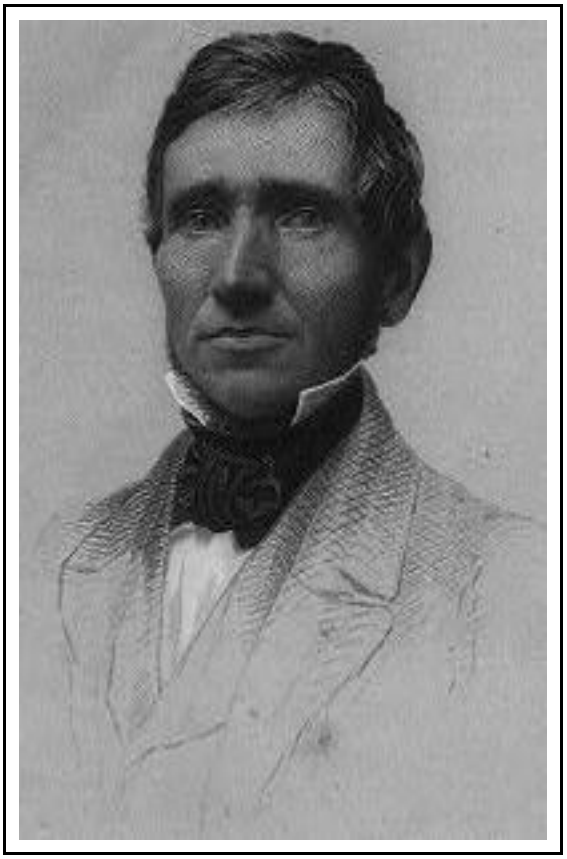
BOTANIZING

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

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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 the hardest ivory. He could make it as flexible as whalebone 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

Professor Jacob Bigelow's lectures at Harvard College on the application of science to the useful arts had been previously published as ELEMENTS OF TECHNOLOGY, and in this year they were published again as USEFUL ARTS CONSIDERED IN CONNECTION WITH THE APPLICATIONS OF SCIENCE" (New-York).

USEFUL ARTS, VOL. I

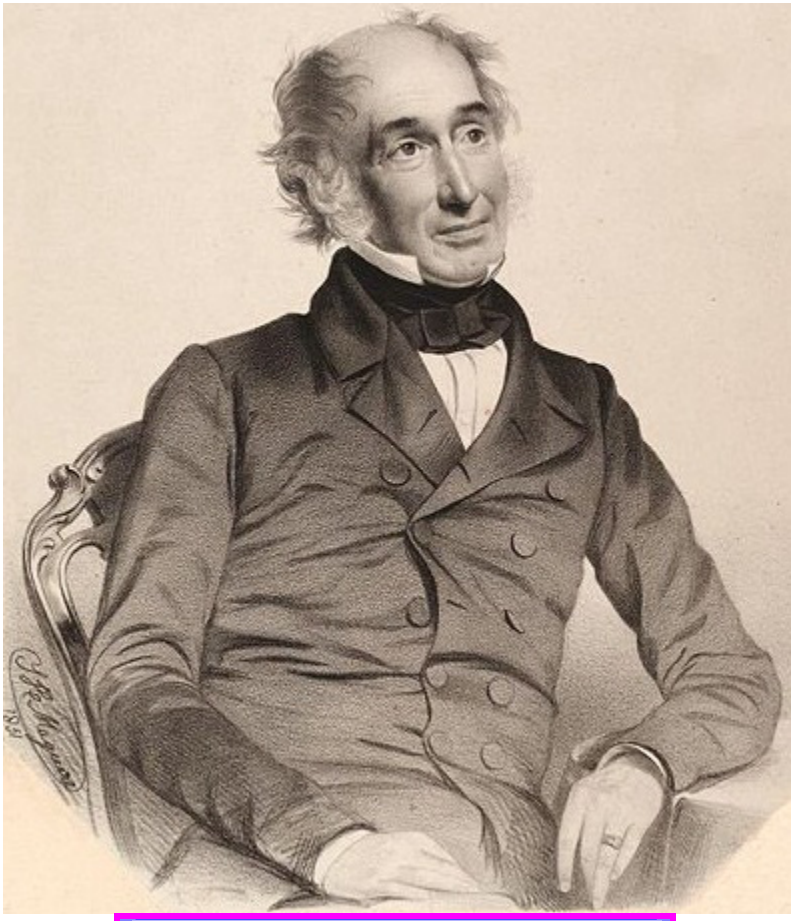
USEFUL ARTS, VOL. II

Publication of an even more enlarged edition of Dr. Bigelow's 1814 and 1824 *FLORULA BOSTONIENSIS*.

BOTANIZING

FLORULA BOSTONIENSIS

Republication as two volumes of Professor Sir William Jackson Hooker's *FLORA BOREALI-AMERICANA*; OR, THE BOTANY OF THE NORTHERN PARTS OF BRITISH AMERICA: COMPILED PRINCIPALLY FROM THE PLANTS COLLECTED BY DR RICHARDSON & MR DRUMMOND ON THE LATE NORTHERN EXPEDITIONS, UNDER COMMAND OF CAPTAIN SIR JOHN FRANKLIN, R.N. TO WHICH ARE ADDED (BY PERMISSION OF THE HORTICULTURAL SOCIETY OF LONDON,) THOSE OF MR DOUGLAS, FROM NORTH-WEST AMERICA, AND OF OTHER NATURALISTS... ILLUSTRATED BY NUMEROUS PLATES... (London: Henry G. Bohn, No. 4, York Street, Covent Garden — this had beginning in 1833 been being issued in 4 volumes). Through the efforts of Sir William, Kew would become established as a British national botanic garden.



FLORA BOREALI AMERICANA

FLORA BOREALI AMERICANA

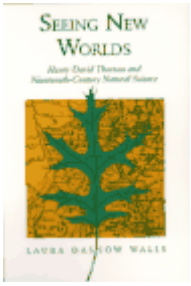
(On October 25, 1856 Henry Thoreau would inspect the 1850 reprinting of these two volumes, at the Astor Library in New-York.)

Professor Asa Gray began a correspondence with the botanist George Engelmann (1809-1884).

The 8th and final edition of Amos Eaton's A MANUAL OF BOTANY FOR THE NORTHERN STATES.[43]

1840s, 1850s: In this timeframe several scientists were glimpsing chromosomes under the microscope, but not having the slightest clue what it was that they were looking at.

Laura Dassow Walls has pointed out in SEEING NEW WORLDS: THOREAU AND HUMBOLDTIAN SCIENCE that to enact the agenda of exploration and investigation being recommended by Alexander von Humboldt would require an army of workers — which on the continent of North America was indeed created, in the form of the tax-funded Corps of Topographical Engineers established by the federal government of the United States of America.



There were in the first half of the 19th Century a multitude of Congress-sponsored scientific expeditions and the control of our new federal government was extended in this manner over much of North America. Geological or natural history surveys funded by state governments had begun in North Carolina in 1823, and by the end of the 1830s such surveys had been initiated by 13 states. In addition the federal government had been funding or assisting with exploration since the expedition of Lewis and Clark, but throughout the 1840s and 1850s the great reconnaissance of the American West was being conducted by Army officers. Lieutenant John Charles Frémont led only three of these numerous expeditions across the western regions of the North

American continent. Between 1840 and 1860, the US government published 60 enormously expensive multi-volume double-folio or oversize treatises on the American West, in addition to 15 treatises on global naval expeditions and uncounted reports of the Coast and Geodetic Survey. Very little of our incessant contemporary dialog about the "free enterprise system" dates back to that era, and the cost of all this seems to have amounted to from $^1/_4$th to $^1/_3$d of the annual federal budget without having in any way set off alarm bells in the minds of the ideologues of the right of the political spectrum![44] Since Humboldt was very much in touch with these activities, a number of the explorers, scientists, and artists of the period may safely be characterized as

43. The 5th edition, published in 1829, was what was available to Henry Thoreau in the library of Waldo Emerson.

44. NASA, eat your heart out.

"Humboldt's Children":[45] personages such as Karl Bodmer, George Catlin, Frederic Edwin Church, John

Charles Frémont, and Professor Thomas Nuttall. However, Louis Agassiz would also need to be characterized as having been a protégé of Humboldt, and Charles Darwin, Professor Asa Gray, and Arnold Henri Guyot. Humboldt corresponded with and was visited by American scientists such as vice-president of the Boston Society of Natural History Charles T. Jackson, academic scholars such as Harvard professor George Ticknor, and popular writers such as Washington Irving (to whom in this year we were offering the position of Secretary of the Navy).

Dr. Augustus Addison Gould of Massachusetts General Hospital became a corresponding member of the Academy of Natural Sciences at Philadelphia, of the Literary and Historical Society of Quebec, of the National Institute in Washington DC, and of the American Statistical Association. He published a pioneering work in the United States on the geographical distribution of species, "Results of an Examination of the Shells of Massachusetts and their Geographical Distribution," in the Boston Journal of Natural History (Volume 3, Art. xviii, pp. 483-494).

James Ellsworth De Kay became First Vice-President of the Lyceum of Natural History of New York. His CATALOGUE OF THE ANIMALS BELONGING TO THE STATE OF N.Y. AS FAR AS THEY HAVE BEEN FIGURED AND DESCRIBED (made May 7, 1839) appeared on pages 7-14 of the FOURTH ANNUAL REPORT OF THE GEOLOGICAL SURVEY OF THE STATE MADE JANUARY 24, 1840 (484 pages, New York Assembly Document #50) and was reviewed in the American Journal of Science (Volume 40:73-85). (His "Report of the zoological dept" appeared on pages 15-36 of that same document.)

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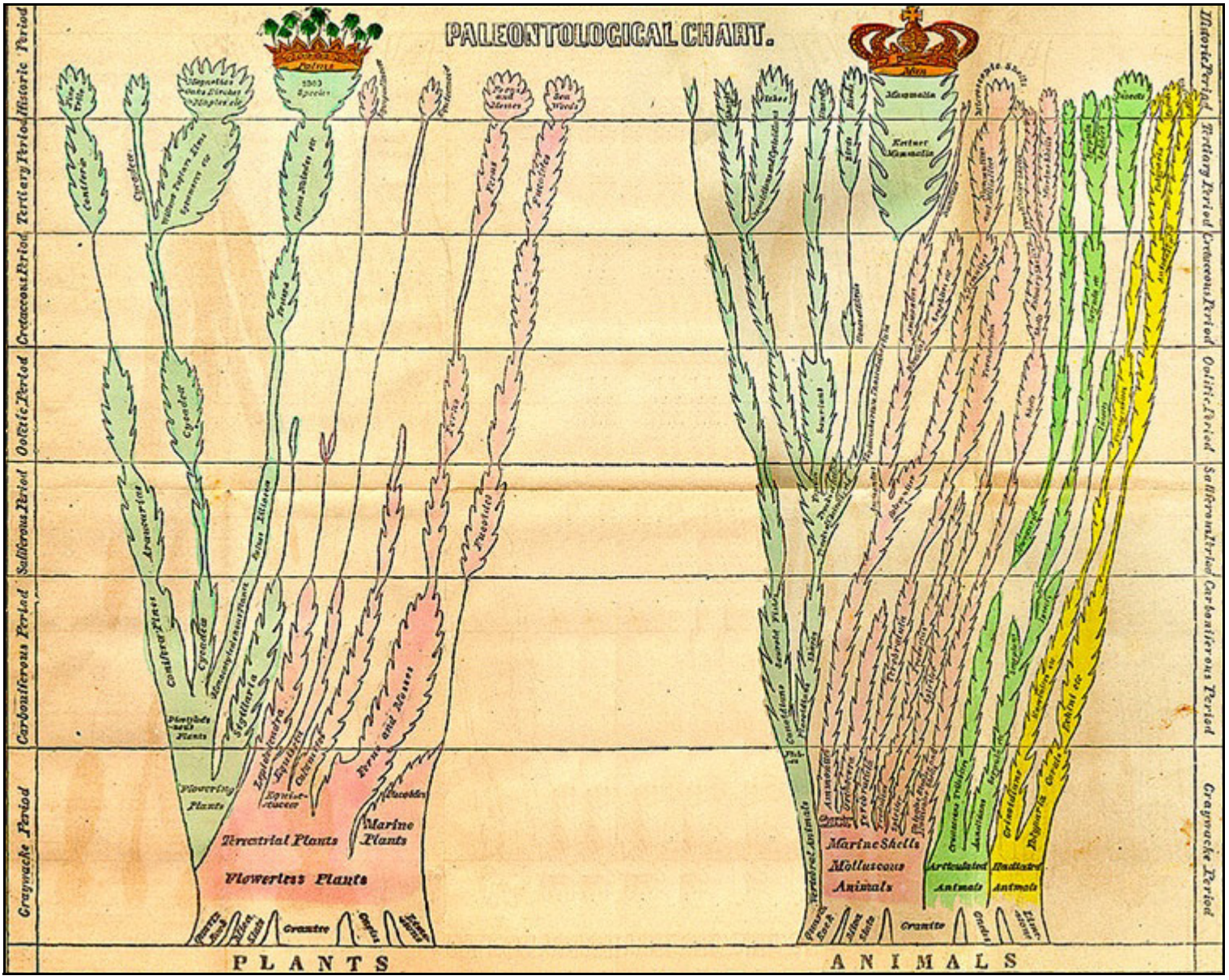
45. Goetzmann, William H. NEW LANDS, NEW MEN, AMERICA AND THE SECOND GREAT AGE OF DISCOVERY. NY: Viking, 1986

The Reverend Professor Edward Hitchcock was awarded the degree of LL.D. by Harvard University. His DYSPEPSY FORESTALLED AND RESISTED, OR, LECTURES ON DIET, REGIMEN, AND EMPLOYMENT. Also, his textbook ELEMENTARY GEOLOGY (of which there would be 31 editions):



ELEMENTARY GEOLOGY

(You may be forgiven, I suppose, as modern types, for initially presuming that the colorized paleontological chart on the previous screen, revealing as it does the branchings of genera and species over immense eras of time, had something or other to do with "evolution of species" — in fact, however, it did not have anything at all to do with anything of that sort! Looking backward to the 1840s through our eyes, it is easy for us to be guilty of "presentism" — of, that is to say, supposing that the sorts of scientific understanding we now take for granted were being somehow prefigured or anticipated in the minds of yesteryear when they most definitely were not.)

PALEONTOLOGY

1841

In America, Professor Asa Gray began a new textbook of Botany.

The US government sponsored expeditions to survey boundaries and to explore for a railroad route across the continent. The "Pacific Railroad Reports" would include botanical papers by Torrey, Gray, and Engelmann and would introduce to the botanical public C.C. Parry, J.M. Bigelow, and others.

Such joint military-civilian enterprises were important for Botany in the United States. Collections made on many of these expeditions were sent directly to Torrey and Gray or to them through George Engelmann in St. Louis. Additionally, botanists working on plants in the southeastern United States sent their plants to Torrey and Gray. This was a time of great excitement about the plants of North America, both here and abroad. Torrey and Gray were in frequent contact with collectors and other specialists. Gray would be the accepted leader of North American Botany for nearly 50 years, and upon his death no individual would replace him in botanical importance.

Professor Sir William Jackson Hooker's BOTANY OF BEECHEY'S VOYAGE TO THE PACIFIC AND BEHRING'S STRAITS (with Dr Arnott).

The Kew Botanical Gardens were transferred to the government, and on the resignation of William Townsend Aiton Sir William became the initial director. Under his leadership the gardens would increase from 10 to 75 acres, add an arboretum of 270 acres, create many new greenhouses, and institute a museum of economic botany.

Gardener's Chronicle began publication, with J. Lindley as horticultural editor.

THE NATURAL HISTORY OF SELBORNE, by the Reverend Gilbert White … NY: Harper and brothers. Series title: Harper & Brothers family library, No. 147.

1842

Professor Sir William Jackson Hooker's *GENERA FILICUM* (THE GENERA OF FERNS), from the original colored drawings of F. Bauer, with additions and descriptive letterpress. From this year until 1848, the 7 volumes of his The London Journal of Botany.

John Leonard Knapp's THE GRAMINA BRITANNICA, which had been issued in 1804 but in only 100 surviving copies, was at this point reprinted by Mr. Strong of Bristol in 1842 with little alteration of the original text and no addition of species. This volume's book contained 119 colored plates of grasses as drawn by Knapp including many of the specimens from Knapp's botanical tour of Scotland.

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.[46]

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

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

Harvard College hired Professor Asa Gray away from Princeton University to become its professor of natural history, frustrating the desire of Dr. Thaddeus William Harris, Harvard Library's Librarian, to himself achieve that appointment.

Dr. Harris, with frustrated look

By this point six of the seven parts of John Torrey's and Asa Gray's A FLORA OF NORTH AMERICA: CONTAINING ABRIDGED DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS AND NATURALIZED PLANTS GROWING NORTH OF MEXICO; ARRANGED ACCORDING TO THE NATURAL SYSTEM had been distributed.

FLORA OF NORTH AMERICA

FLORA OF NORTH AMERICA

This work covered the vascular plants of North America north of Mexico except Greenland and was based on all readily accessible collections. It was organized according to a natural rather than a Linnaean system. Although Torrey and Gray's work was not completed, Gray would take it up again years later. He would issue subsequent fascicles as part of a new work, the SYNOPTICAL FLORA OF NORTH AMERICA.

SYNOPTICAL FLORA

Only the gamopetalous families were actually completed by Gray. Torrey and Gray's studies were based largely on collections from the many expeditions being made at that time. Relying upon information gathered in the great western expeditions of the preceding decades, Watson and Robinson would publish additional parts of Gray's SYNOPTICAL FLORA OF NORTH AMERICA in 1895.

SYNOPTICAL FLORA

1843

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.

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).

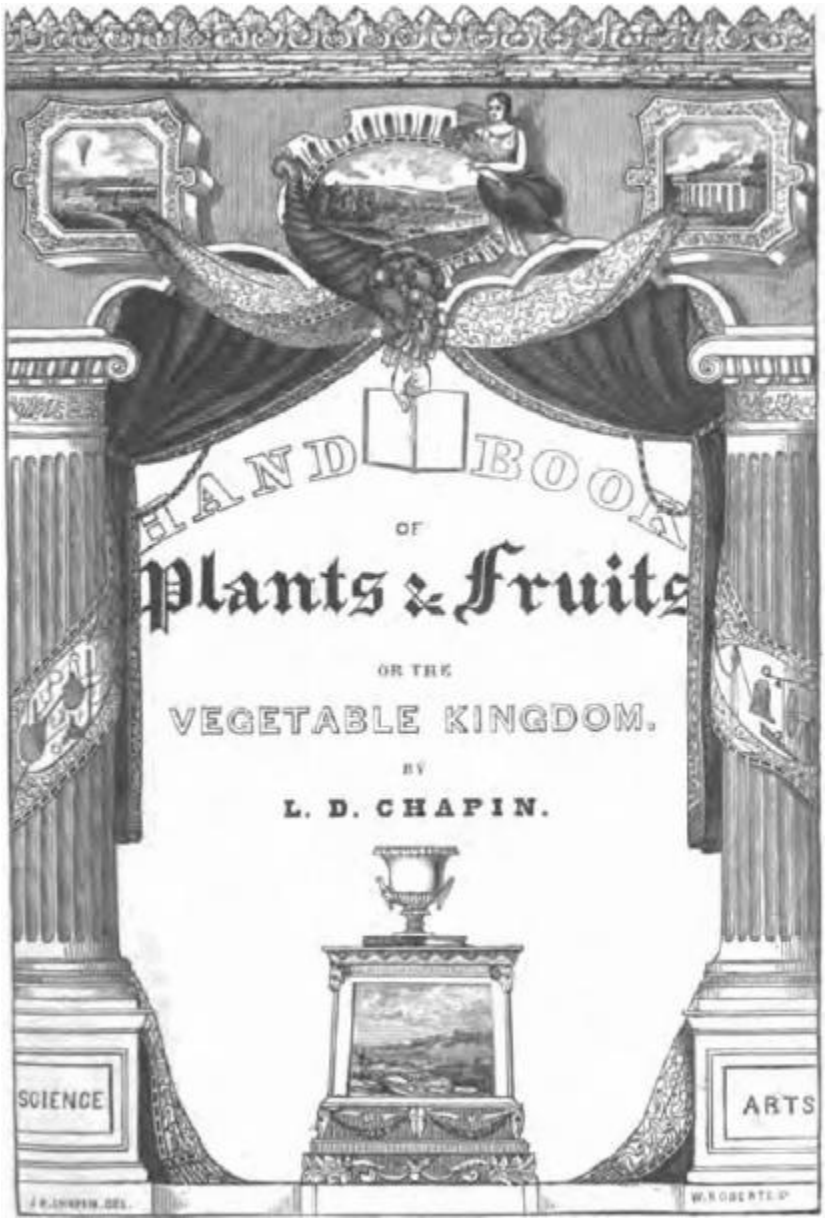
Robert Fortune made the first of four journeys to China (until 1860), initially for the Royal Horticultural Society, then for the East India Company (he would send 23,892 young tea plants and 17,000 germinated seedlings to northern India), and then for the US government. The tea plants Fortune would 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

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.)

1845

August 5, Tuesday: Henry Thoreau wrote to Benjamin Marston Watson, presumably from Concord, conveying a sample of a pale-fruited form (*leucocarpa*) of Black Huckleberry *Gaylussacia baccata*, a sample of Sand Cherry *Prunus susquehanae*, a sample of what we now identify as American Hornbeam (or Ironwood) *Carpinus caroliniana*, the fruit of which looks somewhat like hops, and a sample of American Hackberry (or False Elm) *Celtis occidentalis* (this was the period in which, in Plymouth, Massachusetts, Watson was initiating his "Old Colony Nurseries").

The box is full of red huckleberries, warranted not to change their hue, or lose their virtues in any climate, though I will not speak for the condition of this box when opened.
The other contains half a dozen cherries (Sand Cherries, Bigelow?)
The last grew within a rod of my lodge. I plucked them all today
The third box — which should contain the seeds of the Carpinus Americana — hop-wood — False Elm &c waits for their seeds to ripen

Yrs
Henry D Thoreau
Aug 5th 1845

BIGELOW

FLORULA BOSTONIENSIS

BOTANIZING

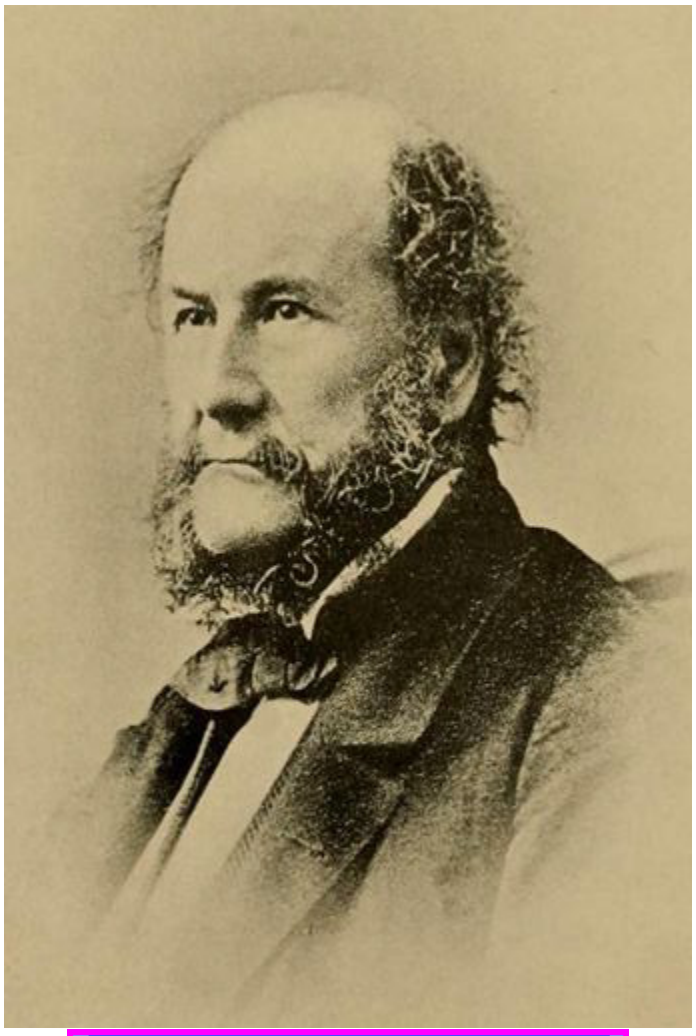
1846

In addition to his studies at the Theological College, with the approval and encouragement of the abbot of the monastery at Brünn, Franz Cyrill Napp (1792-1867), Gregor Mendel attended lectures on fruit-growing and viticulture. Napp, who had written a manual on plant breeding, was also chairman of the Pomological Association, and served on the committee of the local Agricultural Society. The lectures were delivered at the Brünn Philosophical Institute by Professor Franz Diebl (1770-1859), who was well-known for his articles and books about plant breeding.

From this year until 1864, the 5 volumes of Professor Sir William Jackson Hooker's *SPECIES FILICUM* (THE SPECIES OF FERNS).

Some of the conservationist insights which would be presented in the following year by George Perkins Marsh before the Agricultural Society of Rutland County, Vermont were elaborated in George B. Emerson's A REPORT ON THE TREES AND SHRUBS GROWING NATURALLY IN THE FORESTS OF MASSACHUSETTS. PUBLISHED AGREEABLY TO AN ORDER OF THE LEGISLATURE, BY THE COMMISSIONERS ON THE ZOOLOGICAL AND BOTANICAL SURVEY OF THE STATE was published in Boston

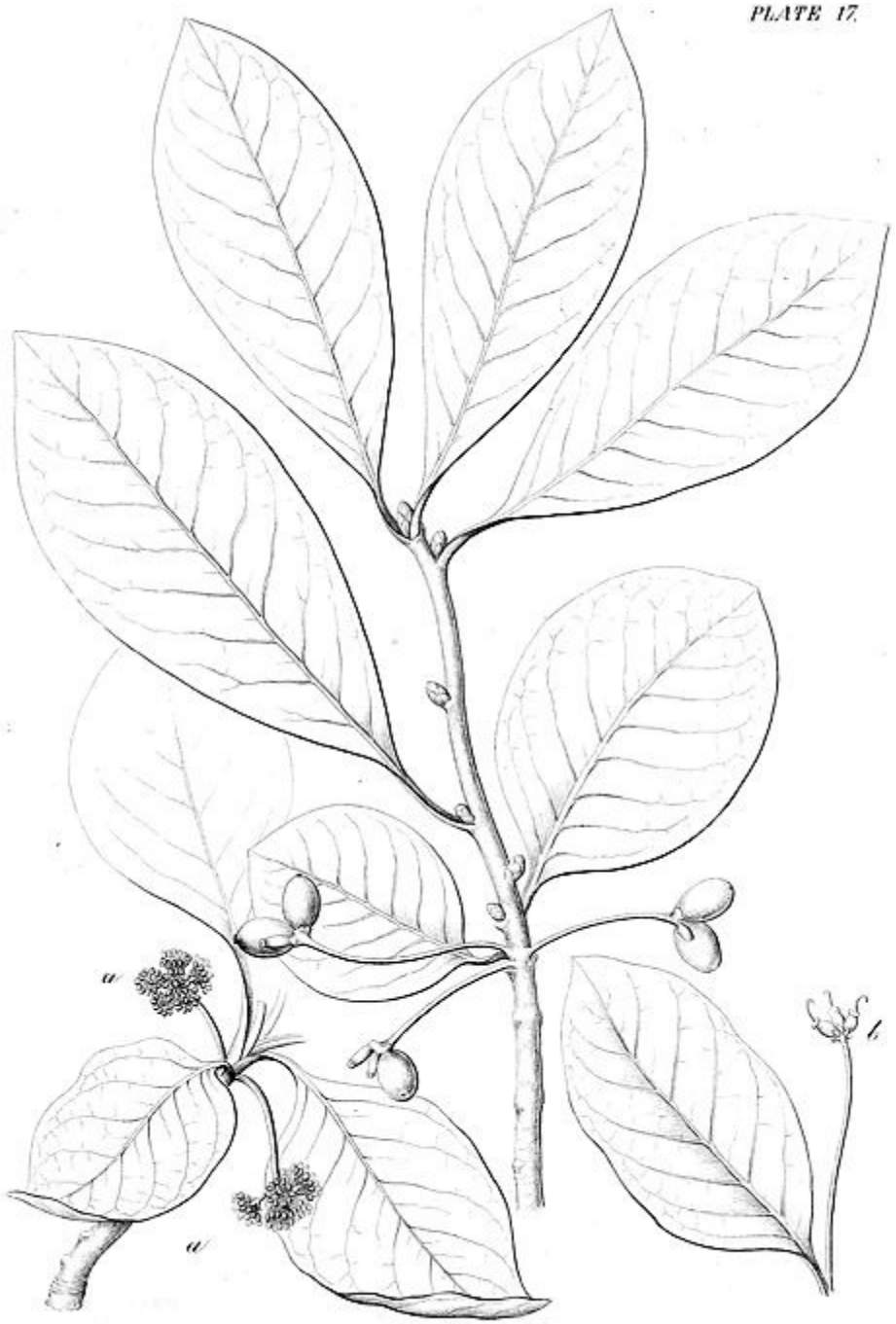
(Dutton and Wentworth, State Printers, No. 37, Congress Street) with illustrations by Isaac Sprague.



EMERSON'S TREES/SHRUBS

A copy of this would be in Henry Thoreau's personal library and a snippet from page 511 about the "flexibility, lightness, and resiliency" of the wood of the *Tilia Americana*, also called the basswood, or lime, or linden tree, would find its way into A WEEK.

PLATE 17.



TUPELO TREE (*Nyssa multiflora.*)

A WEEK: (September 2, Monday, 1839) The bass, *Tilia Americana*, also called the lime or linden, which was a new tree to us, overhung the water with its broad and rounded leaf, interspersed with clusters of small hard berries now nearly ripe, and made an agreeable shade for us sailors. The inner bark of this genus is the bast, the material of the fisherman's matting, and the ropes and peasant's shoes of which the Russians make so much use, and also of nets and a coarse cloth in some places. According to poets, this was once Philyra, one of the Oceanides. The ancients are said to have used its bark for the roofs of cottages, for baskets, and for a kind of paper called Philyra. They also made bucklers of its wood, "on account of its flexibility, lightness, and resiliency." It was once much used for carving, and is still in demand for sounding-boards of piano-fortes and panels of carriages, and for various uses for which toughness and flexibility are required. Baskets and cradles are made of the twigs. Its sap affords sugar, and the honey made from its flowers is said to be preferred to any other. Its leaves are in some countries given to cattle, a kind of chocolate has been made of its fruit, a medicine has been prepared from an infusion of its flowers, and finally, the charcoal made of its wood is greatly valued for gunpowder.

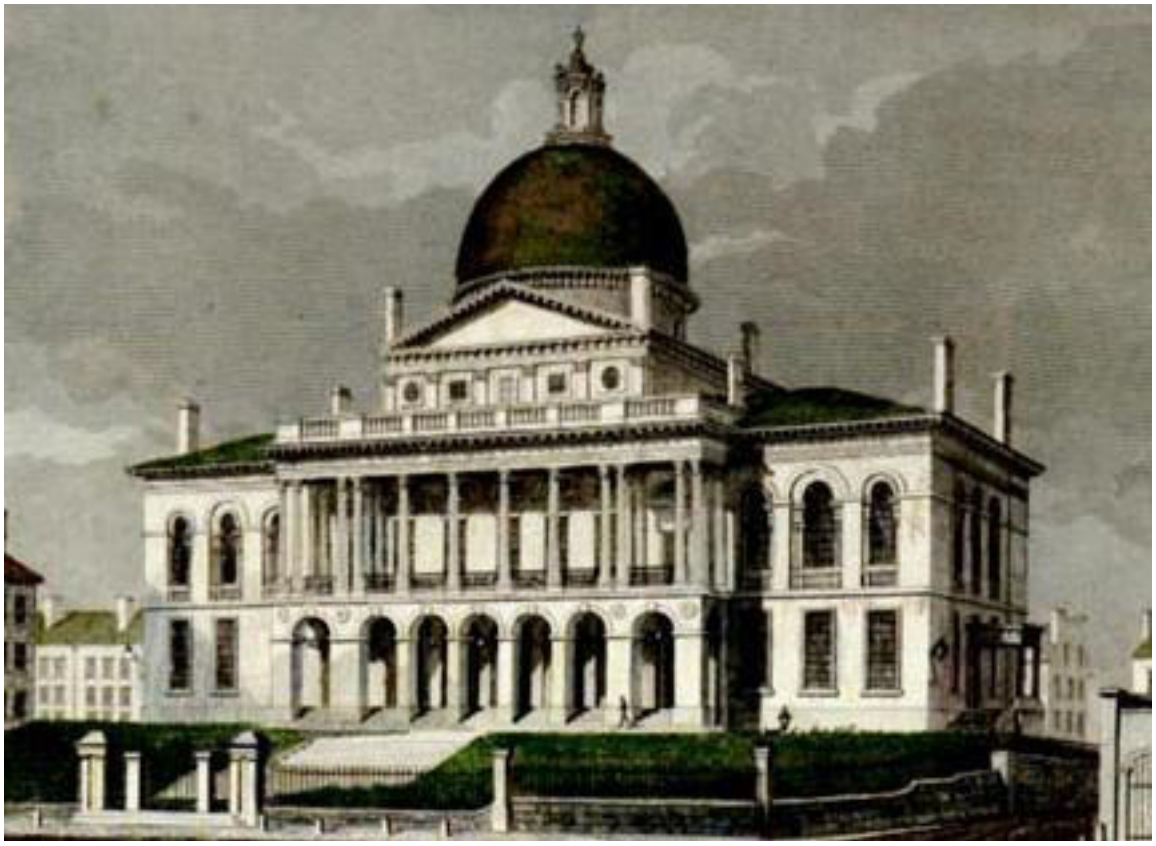
CHOCOLATE
LINDEN TREE

The Agricultural Gazette reported that members of the Newcastle Farmers' Club had inspected an ear of wheat grown from a seed found in an Egyptian mummy case. "It is much more bulky than an English ear, being, in fact, seven English ears rolled into one!" We may well note similarities between this news report and the biblical story of Pharaoh's dream: "And Pharaoh slept and dreamed the second time, and behold seven ears of corn came up upon one stalk...."

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

At about this point Dr. Edward Jarvis of Concord, according to his TRADITIONS AND REMINISCENCES OF CONCORD, MASSACHUSETTS 1779-1878, donated his botanical collection so the state could create an exhibit in the State House:



When I was in college in the years 1824-1826, and when I taught the town school in Concord, 1826-1827, and while I was a medical student with Dr. Josiah Bartlett, and also when I was a practicing physician in Concord in 1832-1836, I devoted some of my time to the study of the botany of the town. I went into all parts of the town –the fields, the meadows and the forests– and gathered such of the plants as I could find. I kept these with others gathered in other places into a herbarium which I preserved with great care until about the year 1846, when I gave it to the State at the request of the Board of Agriculture, who wished to have a complete collection of the plants of Massachusetts in the cabinet at the state house.

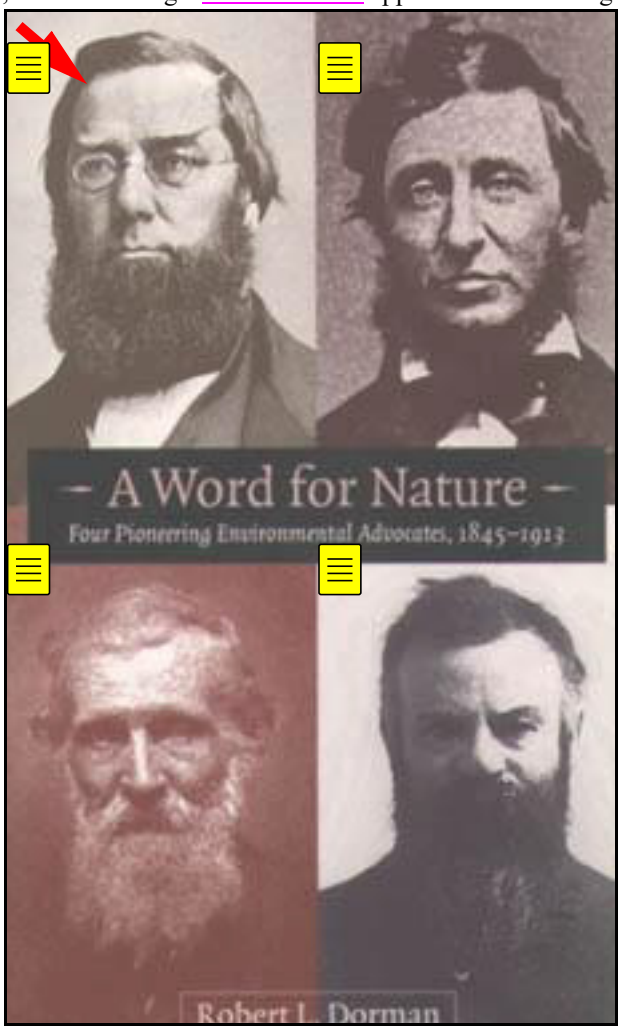
DR. JOSIAH BARTLETT

Edgar Wellington Howe was born in Concord in about this year. He would enroll as a cadet at West Point in 1874, and graduate in 1878. He would serve as a 2nd Lieutenant in the 17th Infantry on frontier duty at Fort Sisseton, Dakota from 1878 to 1880, and at Fort Yates, Dakota until 1882. He would teach Military Science and Tactics at Bowdoin College, Maine in 1882 and at Maine State College of Agriculture and the Mechanic Arts until 1885. He would return to frontier duty in 1885, serving at Fort Custer, Montana, at Fort D.A. Russell, Wyoming; and at Fort Steele, Wyoming. After a leave of absence in 1887 he would return to Fort D.A. Russell. In 1889 he would leave for instruction at the Engineer Torpedo School at Willet's Point NY. He would serve in the Spanish American War, during the Philippine Insurrection, and in the Cuban Army of Pacification.

He would marry Julia Rosenberger and they would have four children. Col. Howe would die in New York on June 15, 1923.

1847

Late September: George Perkins Marsh, a US Congressman from Vermont, spoke before the Agricultural Society of Rutland County, Vermont, calling attention to the destructive impact of human activity on the land, especially through deforestation, and advocating a conservationist approach to the management of forested lands.



(Some of the insights which Marsh was elaborating had been presented in the previous year in George Emerson's A REPORT ON THE TREES AND SHRUBS GROWING NATURALLY IN THE FORESTS OF MASSACHUSETTS.)[47]

ECOLOGY
BOTANIZING

December: Professor Asa Gray completed the manuscript for his MANUAL OF BOTANY.

1848

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

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47. The conservation movement was little more than a shabby fraud. From the historical record, these early environmental technocrats were intent not on solving our ecological crisis but on destroying the earth as quickly as possible. Their net impact has been negative: we would have been better off had we never had a conservation movement, to teach us how to manage our looting so that we looted with greater and greater effectiveness and economy. According to Samuel P. Hays's EXPLORATIONS IN ENVIRONMENTAL HISTORY: ESSAYS BY SAMUEL P. HAYS (Pittsburgh PA: U of Pittsburgh P, 1998), these men were mere pawns of the powers that be, careerists bought by their careers:

> Conservation, above all, was a scientific movement, and its role in history arose from the implications of science and technology in modern society. Conservation leaders sprang from such fields as hydrology, forestry, agrostology, geology, and anthropology. Vigorously active in professional circles in the national capital, these leaders brought the ideals and practices of their crafts into federal resource policy. Loyalty to these professional ideals, not close association with the grass-roots public, set the tone of the Theodore Roosevelt conservation movement. Its essence was rational planning to promote efficient development and use of all natural resources. The idea of efficiency drew these federal scientists from one resource task to another, from specific programs to comprehensive concepts. It molded the policies which they proposed, their administrative techniques, and their relations with Congress and the public. It is from the vantage point of applied science, rather than of democratic protest, that one must understand the historic role of the conservation movement. The new realms of science and technology, appearing to open up unlimited opportunities for human achievement, filled conservation leaders with intense optimism. They emphasized expansion, not retrenchment; possibilities, not limitations.... They displayed that deep sense of hope which pervaded all those at the turn of the century for whom science and technology were revealing visions of an abundant future.... Conflicts between competing resource users, especially, should not be dealt with through the normal processes of politics. Pressure group action, logrolling in Congress, or partisan debate could not guarantee rational and scientific decisions. Amid such jockeying for advantage with the resulting compromise, concern for efficiency would disappear. Conservationists envisaged, even though they did not realize their aims, a political system guided by the ideal of efficiency and dominated by the technicians who could best determine how to achieve it.

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.,

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BOSTON & CAMBRIDGE:

JAMES MUNROE AND COMPANY.

LONDON: JOHN CHAPMAN.

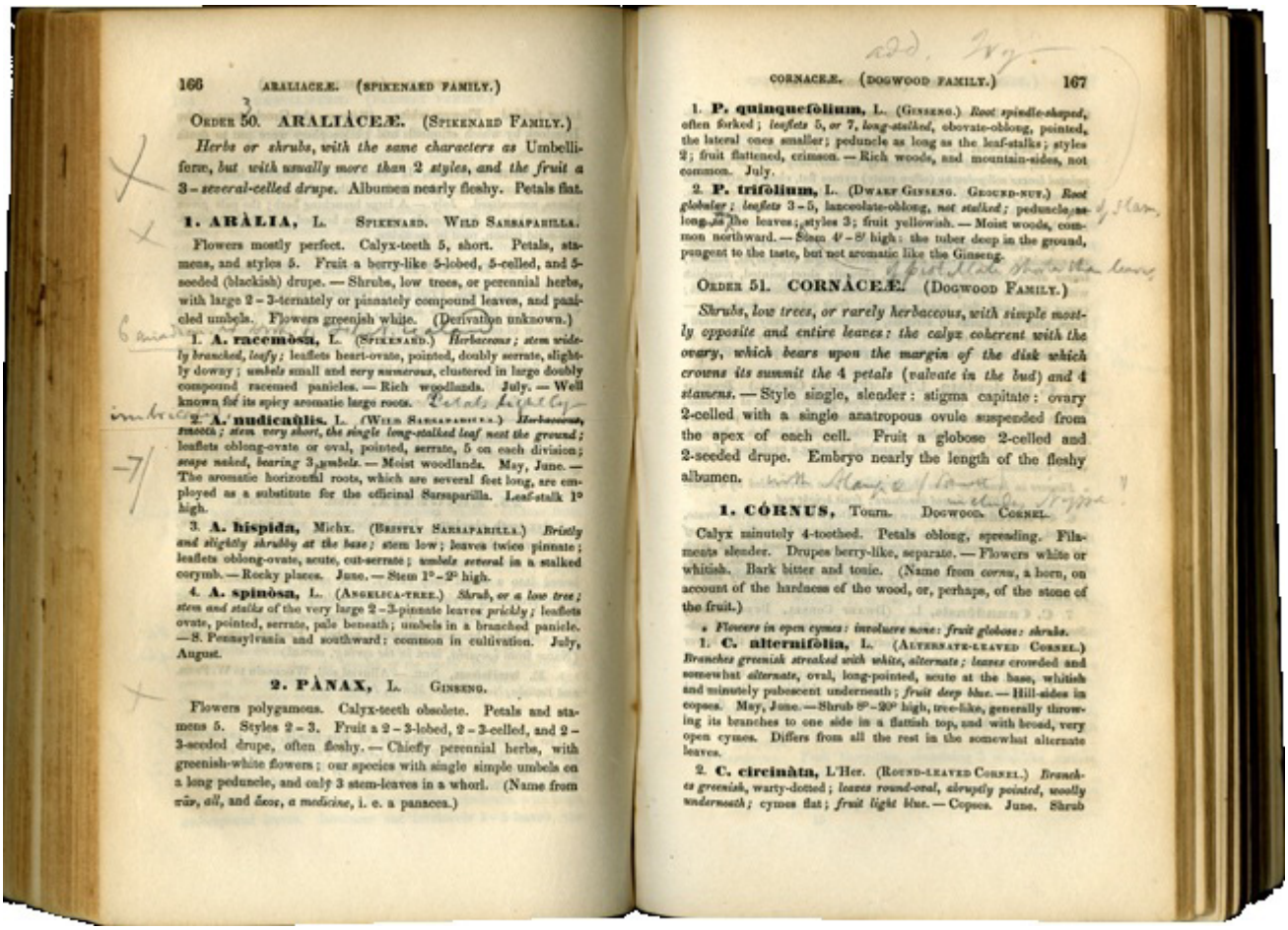
1848.

building known as the Massachusetts Medical College.

PROCEEDINGS, FOR 1848

Dr. Henry Jacob Bigelow got married with Susan Sturgis (1825-1853), a daughter of William Sturgis and Elizabeth Davis Sturgis of Boston.

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: James Munroe and Company, London: John Chapman),[48] Professor Bigelow's contribution had been made obsolete.



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, mossy; 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

48. 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.

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).

1849

Professor Sir William Jackson Hooker's A CENTURY OF ORCHIDACEOUS PLANTS, and his NIGER *FLORA*. From this year until 1857, the 9 volumes of his Journal of Botany and Kew Garden Miscellany.

William Lobb was sent to the Pacific coast of America by Veitch & Sons to collect plants for their horticultural trade.

William Darlington's and Peter Collinson's MEMORIALS OF JOHN BARTRAM AND HUMPHRY MARSHALL; (Philadelphia, Lindsay & Blakiston).

BARTRAM AND MARSHALL

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1848.

1850

The Philadelphia industrialist Andrew M. Eastwick, as a poor child, had whiled away some Sunday afternoons in the Bartram Garden, which he appropriately termed a "paradise." By this year he had become wealthy enough to purchase this botanical garden in order to preserve it.

Professor Asa Gray revised his BOTANICAL TEXTBOOK.

After a successful year of teaching at the Gymnasium in Znaim (Znojmo), Gregor Mendel took a teaching examination that would allow him to secure a permanent appointment. The exam consisted of two essays, one on the physical and chemical properties of air and the other on geology. Flunking, Mendel was told that he might retake the exam after a period of not less than a year. When C.F. Napp inquired of one of the examiners, the Baron von Baumgartner, as to Mendel's performance on the exam, the examiner suggested that Mendel be sent to the University of Vienna to study the natural sciences.

During the 1850s, Governor Stevens of the Washington Territory would be clashing with the US Army because while his objective was to displace the local Indians in order to possess their land, the army was determinedly opposing such land grabs. When settlers in the Rogue River area of Oregon would stage an attack on a native village, Captain Smith, commandant of Fort Lane, would interpose his soldiers between the natives and the whites.

John Jeffrey was sent to Oregon by a consortium called the Oregon Association of Edinburgh, to collect what he could find there. His plant introductions to England would include incense cedar and Jeffrey pine.

BOTANIZING

The Reverend Professor Edward Hitchcock's HISTORY OF A ZOOLOGICAL TEMPERANCE CONVENTION, HELD IN CENTRAL AFRICA IN 1847 (Northampton).

E. Du Bois-Reymond invented a galvanometer that could measure the electric impulses in nerves. H. von Helmholtz measured the speed of nervous impulses in frogs.

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

Professor Sir William Jackson Hooker's VICTORIA *REGIA*.

Gregor Mendel began a 2-year program of study at the University of Vienna. He would take a variety of courses and study with, or attend the lectures of, among others, Professor of Plant Physiology Franz Unger whose *BOTANISCHE BRIEFE* would in 1852 argue for the evolution of (i.e. non-fixity) of species, Andreas von Ettinghausen, whose course on experimental method and physical apparatus likely drew on his 1826 writings on combinatorial analysis and 1842 writings on the organization of experiments, and Christian Johann Doppler, a well-regarded lecturer on experimental physics.

Hofmeister described alternation of generations in higher plants.

Over the following four years Charles Darwin would be issuing 4 volumes of monographs on cirripedes (marine invertebrates including barnacles). His thorough research would be recognized with the Royal Medal.

Henry Thoreau read in Zoölogy and in Botany:

- William Bartram and John Bartram

JOHN BARTRAM'S BOOK

WM. BARTRAM'S BOOK

- Peter Kalm, a disciple of Carolus Linnaeus
- the Baron Cuvier, teacher of Louis Agassiz

ANIMAL KINGDOM, I

ANIMAL KINGDOM, II

ANIMAL KINGDOM, III

ANIMAL KINGDOM, IV

- Loudon, apostle of the Linnaean "artificial" system of botanical classification
- Stoever, the biographer of Carolus Linnaeus
- Pultenay, a Linnaean
- Carolus Linnaeus (in February 1852)
- Alphonse Louis Pierre Pyramus de Candolle, apostle of the Linnaean "artificial" system of botanical classification (later)
- Louis Agassiz and Augustus A. Gould's revised edition of their 1848 PRINCIPLES OF ZOÖLOGY: TOUCHING THE STRUCTURE, DEVELOPMENT, DISTRIBUTION AND NATURAL ARRANGEMENT OF THE RACES OF ANIMALS, LIVING AND EXTINCT; WITH NUMEROUS ILLUSTRATIONS. FOR THE USE OF SCHOOLS AND COLLEGES. PT. I. COMPARATIVE PHYSIOLOGY

AGASSIZ & GOULD 1851

> CAPE COD: The Greeks would not have called the ocean ἀτρύγετος, or unfruitful, though it does not produce wheat, if they had viewed it by the light of modern science, for naturalists now assert that "the sea, and not the land, is the principal seat of life,"–though not of vegetable life. Darwin affirms that "our most thickly inhabited forests appear almost as deserts when we come to compare them with the corresponding regions of the ocean." Agassiz and Gould tell us that "the sea teems with animals of all classes, far beyond the extreme limit of flowering plants"; but they add, that "experiments of dredging in very deep water have also taught us that the abyss of the ocean is nearly a desert"; –"so that modern investigations," to quote the words of Desor, "merely go to confirm the great idea which was vaguely anticipated by the ancient poets and philosophers, that the Ocean is the origin of all things." Yet marine animals and plants hold a lower rank in the scale of being than land animals and plants. "There is no instance known," says Desor, "of an animal becoming aquatic in its perfect state, after having lived in its lower stage on dry land," but as in the case of the tadpole, "the progress invariably points towards the dry land." In short, the dry land itself came through and out of the water on its way to the heavens, for, "in going back through the geological ages, we come to an epoch when, according to all appearances, the dry land did not exist, and when the surface of our globe was entirely covered with water." We looked on the sea, then, once more, not as ἀτρύγετος, or unfruitful, but as it has been more truly called, the "laboratory of continents."
>
> PIERRE JEAN EDOUARD DESOR
> AGASSIZ & GOULD
> CHARLES DARWIN

PEOPLE C
CAPE CC

THE NATURAL HISTORY OF SELBORNE; WITH OBSERVATIONS ON VARIOUS PARTS OF NATURE; AND THE NATURALIST'S CALENDAR. BY THE LATE REV. GILBERT WHITE … WITH ADDITIONS AND SUPPLEMENTARY NOTES BY SIR WILLIAM JARDIN … ED.,… London, H.G. Bohn.[49]

The initial volume of what would become a 5-volume set published at London by Van Voorst, ILLUSTRATIONS OF NEW SPECIES OF EXOTIC BUTTERFLIES, SELECTED CHIEFLY FROM THE COLLECTIONS OF W. WILSON SAUNDERS AND WILLIAM C. HEWITSON (3 more volumes would appear between 1862 and 1871, and a final volume in 1878).

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

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.

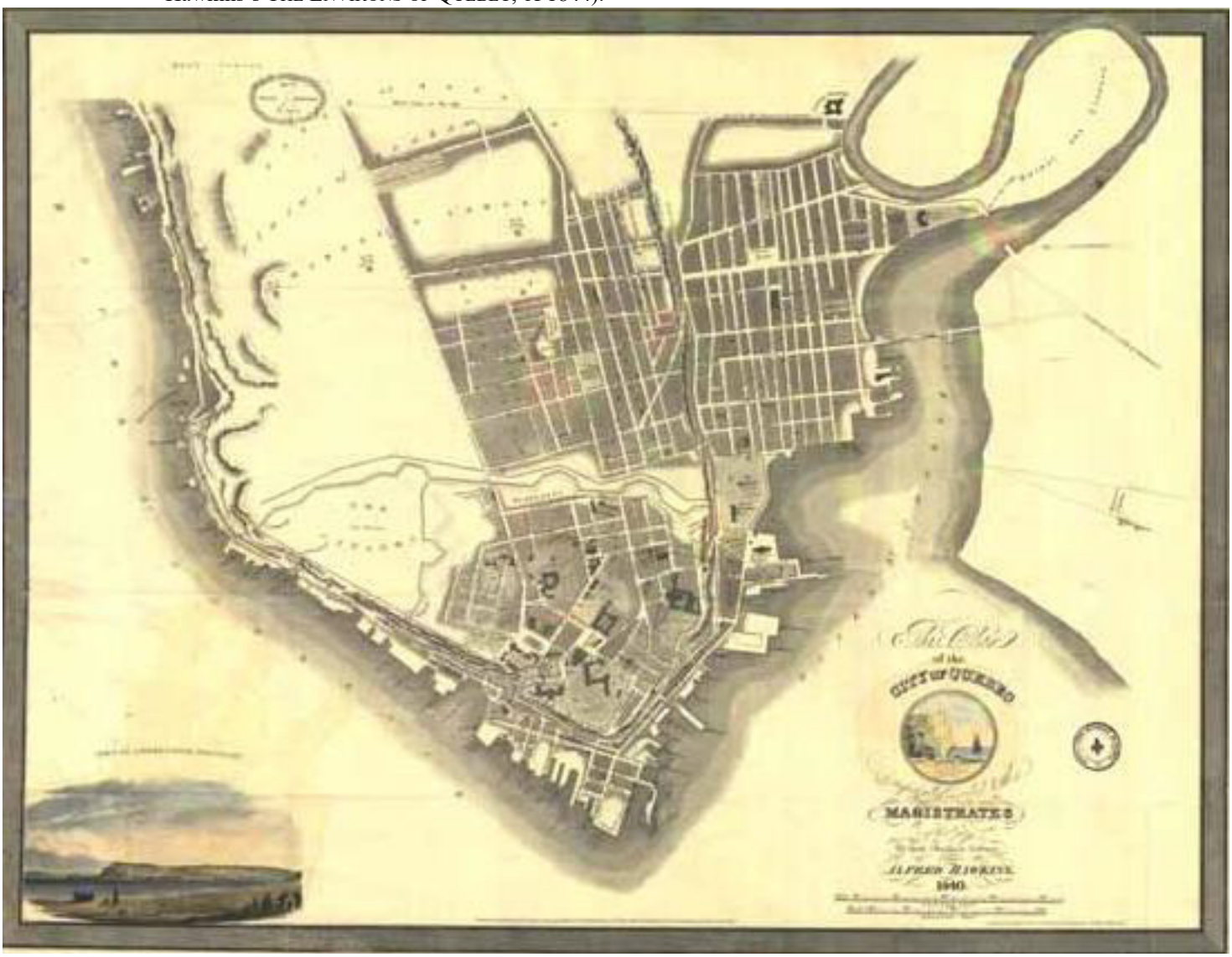
BOTANIZING

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

February 10, Monday: Giuseppe Garibaldi wrote to Specchi in Havana, complaining of the cold and of hunting restrictions that were in effect on Staten Island.

Henry Thoreau wrote to the university librarian, Dr. Thaddeus William Harris, who had taught him Entomology and Botany during his senior year at Harvard College, at Harvard Library, to check out "Alfred 'Hawkins' PICTURE OF QUEBEC' and 'Silliman's TOUR TO QUEBEC'" (contrary to what had been thought by some Thoreau scholars, he requested neither Hawkins's THIS PLAN OF THE CITY OF QUEBEC, of 1835, nor Hawkins's THE ENVIRONS OF QUEBEC, of 1844).



This would have amounted to, specifically, Alfred Hawkins's HAWKINS'S PICTURE OF QUÉBEC, WITH HISTORICAL RECOLLECTIONS (1834), and Benjamin Silliman, Sr.'s REMARKS MADE, ON A SHORT TOUR, BETWEEN HARTFORD AND QUEBEC IN THE AUTUMN OF 1819 (1824, 2d edition).

QUÉBEC

Concord Feb 10th 1851
Dear Sir,

I return by the bearer De Laet's "Norvus Orbis" &c Will you please send me Alfred "Hawkins' Picture of Quebec" and "Silliman's Tour to Quebec"? If these are not in — then Wytfliet's "Descriptionis Ptolemaicae Argumentum &c" and Lescarbot's "Les Muses de la Nouvelle France."

Yrs respec^{ty}
Henry D. Thoreau

CORNELIUS WYTFLIET

(It may well be that on this day he also returned to Harvard Library the checked out Volume 1 of François André Michaux's THE NORTH AMERICAN *SYLVA*, OR A DESCRIPTION OF THE FOREST TREES, OF THE UNITED STATES, CANADA, AND NOVA SCOTIA..., 1817-18-19.

April 30, Wednesday: Henry Thoreau checked out, from Harvard Library, the multiple volumes of Professor Jacob Bigelow's AMERICAN MEDICAL BOTANY (Boston, 1817-1820).[50]

BOTANIZING

AM. MED. BOTANY, I

AM. MED. BOTANY, II

AM. MED. BOTANY, IIIA

AM. MED. BOTANY, IIIB

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Having already checked out the 1st volume of François André Michaux's THE NORTH AMERICAN *SYLVA*, OR A DESCRIPTION OF THE FOREST TREES OF THE UNITED STATES, CANADA, AND NOVA SCOTIA ... TO WHICH IS ADDED A DESCRIPTION OF THE MOST USEFUL OF THE EUROPEAN FOREST TREES ... TR. FROM THE FRENCH BY F. ANDREW MICHAUX, Thoreau checked out the 2d and 3d volumes of this work.[51]

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50. Professor Bigelow had, from 1815 to 1827, been the 1st Rumford Professor of the Application of Science to the Useful Arts at Harvard College. He would be one of the founders of the Massachusetts Institute of Technology.

May 23, Friday: Henry Thoreau began his search for the wild American crabapple tree, which became important to him both horticulturally and as a real symbol of the aboriginal American wildness that would serve to contrast with his own imported and feral wildness. The "MX" and "Emerson" in the journal quotations which follow are the standard abbreviations for:

- François André Michaux's THE NORTH AMERICAN SYLVA, OR A DESCRIPTION OF THE FOREST TREES OF THE UNITED STATES, CANADA AND NOVA SCOTIA,… TO WHICH IS ADDED A DESCRIPTION OF THE MOST USEFUL OF THE EUROPEAN FOREST TREES.… TRANS FROM THE FRENCH OF F. ANDREW MICHAUX.… (Paris: C. D'Hautel, 1819).
- George B. Emerson's A REPORT ON THE TREES AND SHRUBS GROWING NATURALLY IN THE FORESTS OF MASSACHUSETTS. PUBLISHED AGREEABLY TO AN ORDER OF THE LEGISLATURE, BY THE COMMISSIONERS ON THE ZOOLOGICAL AND BOTANICAL SURVEY OF THE STATE (Boston: Dutton and Wentworth, 1846).

May 23: And wilder still there grows elsewhere I hear a native and aboriginal crab apple *Malus* as MX or as Emerson has it *Pyrus Coronaria* in southern states and also *Angustifolia* in the middle states.– Whose young leaves "have a a bitter & slightly aromatic taste" MX. –whose beautiful flowers perfume the air to a great distance. "The apples – – are small, green & intensely acid, and very odoriferous. Some farmers make cider of them, which is said to be excellent: they make very fine sweet-meats also, by the addition of a large quantity of sugar." MX Celebrated for "the beauty of its flowers, and for the sweetness of its perfume." MX
MX says that the wild apple of Europe has yielded to cultivation nearly 300 species in France alone. Emerson says referring to Loudon "in 1836, the catalogue & the gardens of the London Horticultural Society, contained upwards of 1400 distinct sorts, and new ones are every year added."
But here are species which they have not in their catalogue –not to mention the varieties which the crab might yield to cultivation.
This genus so kind to the human race the malus or pyrus –Rosaceae the family or others say Pomaceae. Its flowers are perhaps the most beautiful of any tree. I am frequently compelled to turn & linger by some more than usually beautiful $^{2}/_{3}$ expanded blossoms– If such were not so common –its fame would be loud as well as wide. Its most copious & delicious blossoms.
But our wild apple is wild perchance like myself who belong not to the aboriginal race here –but have strayed into the woods from the cultivated stock –where the birds where winged thoughts or agents have planted or are planting me. Even these at length furnish hardy stocks for the orchard.
You might call one M. oculata. another M. Iridis –M. cum parvuli daemonis oculis or imp-eyed. Blue-jay apple –or M. Corvi Cristati.
wood-dell apple –M. Silvestrivallis. Field-dell apple M. Campestri-vallis Meadow apple M. pratensis. Rock meadow apple saxopratensis Partridge or Grouse apple or bud– Apple of the Hesperides malum Hesperidum. Woodside ap. Wood apple M. silvatica The Truant's ap. m. cessatoris. Saunterer's ap. M. erronis vel Vagabundi The way side ap. M trivialis. Beauty of the air Decus Aeris –December eating–
Frozen thawed –gelato soluta or gelataregelata– The Concord Appl M. Concordiensis. The brindled apple Wine of New England. M. vinosa The Chickaree apple. The Green Apple M. viridis.– The dysentery or cholera morbus apple
Distantly related things are strangely near in fact Perchance this window seat in which we sit discoursing Transcendentalism –with only Germany & Greece –stretching behind our minds –was made so deep because this was a few years ago a garrison house –with thick log walls bullet proof –behind which men sat to escape the wild red man's bullet. & the arrow & the Tomahawk. & bullets fired by Indians are now buried in its walls. Pythagoras seems near compared with them.

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51. François André Michaux. THE NORTH AMERICAN *SYLVA*, OR A DESCRIPTION OF THE FOREST TREES, OF THE UNITED STATES, CANADA AND NOVA SCOTIA. CONSIDERED PARTICULARLY WITH RESPECT TO THEIR USE IN THE ARTS AND THEIR INTRODUCTION INTO COMMERCE; TO WHICH IS ADDED A DESCRIPTION OF THE MOST USEFUL OF THE EUROPEAN FOREST TREES ... TR. FROM THE FRENCH BY F. ANDREW MICHAUX. Philadelphia, 3 volumes, 1817

(This is an amended translation of his 1810-1813 *HISTOIRE DES ARBRES FORESTIERS DE L'AMERIQUE SEPTENTRIONALE*, and contains that work's illustrations.)

August 1, Friday: We learn from a couple of incidental mentions in the journal, that at this point Henry Thoreau was in the process of studying the 16 volumes of the Baron Cuvier's THE ANIMAL KINGDOM,[52]

ANIMAL KINGDOM, 1
ANIMAL KINGDOM, 2
ANIMAL KINGDOM, 3
ANIMAL KINGDOM, 4
ANIMAL KINGDOM, 5
ANIMAL KINGDOM, 6
ANIMAL KINGDOM, 7
ANIMAL KINGDOM, 8
ANIMAL KINGDOM, 9
ANIMAL KINGDOM, 10
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ANIMAL KINGDOM, 13
ANIMAL KINGDOM, 14
ANIMAL KINGDOM, 15
ANIMAL KINGDOM, 16

Louis Agassiz and Augustus A. Gould's PRINCIPLES OF ZOOLOGY, and Peter Kalm's TRAVELS INTO NORTH AMERICA. He stopped by the Boston Society of Natural History to return 2 books, one of them Volume I of the MEMOIRS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, new series, and check out the MEMOIRS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, Volume IV, Part 1, and Friend William Bartram's botanical TRAVELS THROUGH NORTH AND SOUTH CAROLINA, GEORGIA, EAST AND WEST FLORIDA, THE CHEROKEE COUNTRY, THE EXTENSIVE TERRITORIES OF THE MUSCOGULGES, OR CREEK CONFEDERACY, AND

52. In 1827 the initial five volumes were printed, the 1st four as THE CLASS MAMMALIA / ARRANGED BY THE BARON CUVIER, WITH SPECIFIC DESCRIPTIONS BY EDWARD GRIFFITH, CHARLES HAMILTON SMITH AND EDWARD PIDGEON and the 5th as SYNOPSIS OF THE SPECIES OF THE CLASS MAMMALIA, AS ARRANGED WITH REFERENCE TO THEIR ORGANIZATION BY CUVIER AND OTHER NATURALISTS: WITH SPECIFIC CHARACTERS, SYNONYMA, &C. &C. In 1829 volumes 6, 7, and 8 appeared as THE CLASS AVES / ARRANGED BY THE BARON CUVIER, WITH SPECIFIC DESCRIPTIONS BY EDWARD GRIFFITH AND EDWARD PIDGEON, THE ADDITIONAL SPECIES INSERTED IN THE TEXT OF CUVIER BY JOHN EDWARD GRAY. In 1830 the 11th volume appeared out of sequence, as THE FOSSIL REMAINS OF THE ANIMAL KINGDOM / BY EDWARD PIDGEON. In 1831 the 9th volume appeared as THE CLASS REPTILIA / ARRANGED BY THE BARON CUVIER, WITH SPECIFIC DESCRIPTIONS BY EDWARD GRIFFITH AND EDWARD PIDGEON. In 1832 the 14th and 15th volumes appeared out of sequence, as THE CLASS INSECTA / ARRANGED BY THE BARON CUVIER, WITH SUPPLEMENTARY ADDITIONS TO EACH ORDER BY EDWARD GRIFFITH AND EDWARD PIDGEON, AND NOTICES OF NEW GENERA AND SPECIES BY GEORGE GRAY. In 1833 the 13th volume appeared out of sequence, as THE CLASSES ANNELIDA, CRUSTACEA, AND ARACHNIDA / ARRANGED BY THE BARON CUVIER, WITH SUPPLEMENTARY ADDITIONS TO EACH ORDER BY EDWARD GRIFFITH AND EDWARD PIDGEON. In 1834 the 10th volume appeared as THE CLASS PISCES / ARRANGED BY THE BARON CUVIER, WITH SUPPLEMENTARY ADDITIONS BY EDWARD GRIFFITH AND CHARLES HAMILTON SMITH and the 12th volume appeared as THE MOLLUSCA AND RADIATA / ARRANGED BY THE BARON CUVIER, WITH SUPPLEMENTARY ADDITIONS TO EACH ORDER BY EDWARD GRIFFITH AND EDWARD PIDGEON. The final, 16th, volume of the set, of which I am unable at present to provide electronic copy, was unnumbered and undated and bore the title A CLASSIFIED INDEX AND SYNOPSIS OF THE ANIMAL KINGDOM ARRANGED IN CONFORMITY WITH ITS ORGANIZATION, BY THE BARON CUVIER ..., WITH SUPPLEMENTARY ADDITIONS TO EACH ORDER, BY EDWARD GRIFFITH ... AND OTHERS (this final volume included “A tabular view of the classification of animals adopted by the Baron Cuvier; with specific examples”).

THE COUNTRY OF THE CHACTAWS.

PEOPLE OF WALDEN

WALDEN: The customs of some savage nations might, perchance be profitably imitated by us, for they at least go through the semblance of casting their slough annually; they have the idea of the thing, whether they have the reality or not. Would it not be well if we were to celebrate such a "busk," or "feast of first fruits," as Bartram describes to have been the custom of the Mucclasse Indians? "When a town celebrates the busk," says he, "having previously provided themselves with new clothes, new pots, pans, and other household utensils and furniture, they collect all their worn out clothes and other despicable things, sweep and cleanse their houses, squares, and the whole town, of their filth, which with all the remaining grain and other old provisions they cast together into one common heap, and consume it with fire. After having taken medicine, and fasted for three days, all the fire in town is extinguished. During this fast they abstain from the gratification of every appetite and passion whatever. A general amnesty is proclaimed; all malefactors may return to their town.–"

"On the fourth morning, the high priest, by rubbing dry wood together, produces new fire in the public square, from whence every habitation in the town is supplied with the new and pure flame."

They then feast on the new corn and fruits and dance and sing for three days, "and the four following days they receive visits and rejoice with their friends from neighboring towns who have in like manner purified and prepared themselves."

The Mexicans also practised a similar purification at the end of every fifty-two years, in the belief that it was time for the world to come to an end.

I have scarcely heard of a truer sacrament, that is, as the dictionary defines it, "outward and visible sign of an inward and spiritual grace," than this, and I have no doubt that they were originally inspired directly from Heaven to do thus, though they have no biblical record of the revelation.

AUGUSTINE
WILLIAM BARTRAM
NOAH WEBSTER

WM. BARTRAM'S BOOK

left at 9 AM Aug. 1st
After Kingston –came Plympton Halifax & Hanson all level with frequent cedar swamps especially the last – also in Weymouth.
Desor & Cabot think the jelly-fish (oceania tubulosa are buds from a polyp of Genus Lyncoryne.) Desor accounting for suspended moisture or fogs over sand banks (or shoals) says the heat being abstracted by radiation the moisture is condensed in form of fog.
Lieut Walsh lost his lead & wire when 34,200 or more than 6 statute miles had run out perpendicularly.
I could make a list of things ill-managed– We Yankees do not deserve our fame. viz:
I went to a menagerie the other day. The proprietors had taken wonderful pains to collect rare and interesting animals from all parts of the world. And then placed by them –a few stupid and ignorant fellows who knew little or nothing about the animals & were unwilling even to communicate the little they knew. You catch a rare creature interesting to all mankind & then place the first biped that comes along with but a grain more reason in him to exhibit & describe the former– At the expense of Millions this rare quadruped from the sun is obtained, and then Jack Halyard or Tom Coach Whip is hired to explain it. Why all this pains taken to catch in Africa –and no pains taken to exhibit in America? Not a cage was labelled– There was nobody to tell us how or where the animals were caught –or what they were– Probably the proprietors themselves do not know –or what their habits are– But hardly had we been ushered into the presence of this choice this admirable collection –than a ring was formed for Master Jack & the poney. Were they **animals** then who had caught and exhibited these –& who had come to see these? Would it not be worth the while to learn something? to have some

information imparted?
The absurdity of importing the behemoth & then instead of somebody appearing tell which it is –to have to **while away the time** –though your curiosity is growing desperate –to learn one fact about the creature –to have Jack and the poney introduced!!!

GEORGES CUVIER

Why I expected to see some descendant of Cuviers there to improve this opportunity for a lecture on Nat. Hist. That is what they should do make this an –occasion for communicating some solid information –that would be fun alive that would be a sunny day –a sun day in one's existence not a secular day of shetland ponies –not jack and his poney & a tintimmara of musical instruments –and a man with his head in the lions mouth. I go not there to see a man hug a lion –or fondle a tiger –but to learn how he is related to the wild beast– There'll be All-fool days enough without our creating any intentionally. The presumption is that men wish to behave like reasonable creatures –that they do not need and are not seeking relaxation –that they are not dissipated. Let it be a travelling zoological garden –with a travelling professor to accompany it– At present foolishly the professor goes alone with his poor painted illustrations of animated– While the menagerie takes another road without its professor only its keepers.
I see June & co or Van Amberg & Co –are engaged in a pecuniary speculation in which certain wild beasts are used as the counters
Cuvier & co are engaged in giving a course of lectures on Nat. History. Now why could they not put head & means together for the benefit of mankind –and still get their living. The present institution is imperfect precisely because its object is to enrich Van amburg & co –& their low aim unfits them for rendering any more valuable service –but no doubt the most valuable course would also be the most valuable in a pecuniary sense– No doubt a low self interest is a better motive force to these enterprises than no interest at all but a high self interest –which consists with the greatest advantage of all would be a better still.
Item 2nd Why have we not a decent pocket map of the State of Mass? There is the large map why is it not cut into half a dozen sheets & folded into a small cover for the pocket? Are there no travellers to use it? Well to tell the truth there are but few, & that's the reason why. Men go by rail road –& state maps hanging in bar rooms are small enough– The state has been admirably surveyed at a great cost –and yet Dearborne's Pocket map is the best one –we have!

PIERRE JEAN EDOUARD DESOR

PEOPLE OF CAPE COD

CAPE COD: The Greeks would not have called the ocean ἀτρύγετος, or unfruitful, though it does not produce wheat, if they had viewed it by the light of modern science, for naturalists now assert that "the sea, and not the land, is the principal seat of life,"–though not of vegetable life. Darwin affirms that "our most thickly inhabited forests appear almost as deserts when we come to compare them with the corresponding regions of the ocean." Agassiz and Gould tell us that "the sea teems with animals of all classes, far beyond the extreme limit of flowering plants"; but they add, that "experiments of dredging in very deep water have also taught us that the abyss of the ocean is nearly a desert"; –"so that modern investigations," to quote the words of Desor, "merely go to confirm the great idea which was vaguely anticipated by the ancient poets and philosophers, that the Ocean is the origin of all things." Yet marine animals and plants hold a lower rank in the scale of being than land animals and plants. "There is no instance known," says Desor, "of an animal becoming aquatic in its perfect state, after having lived in its lower stage on dry land," but as in the case of the tadpole, "the progress invariably points towards the dry land." In short, the dry land itself came through and out of the water on its way to the heavens, for, "in going back through the geological ages, we come to an epoch when, according to all appearances, the dry land did not exist, and when the surface of our globe was entirely covered with water." We looked on the sea, then, once more, not as ἀτρύγετος,, or unfruitful, but as it has been more truly called, the "laboratory of continents."

PIERRE JEAN EDOUARD DESOR
AGASSIZ & GOULD
CHARLES DARWIN

August 6, Wednesday: J.C.A. Smith, the white-guy escort whom the anti-slavery society had sent along with Henry "Box" Brown during his lecture tour in England, reported back to William Lloyd Garrison that Brown had quarreled with him, and that he had picked up bad habits, and that he was denying to him his "fair share" of the moneys "they" were collecting from the British crowds. (Uh, dude, why don't you crawl back into your box — this ain't about you.)

Richard Wagner and Theodor Uhlig completed a walking tour from Brunnen, Switzerland that included the Surenen Pass. With this experience, he added *Das Rheingold* and *Die Walküre* to his *Nibelung* concept.

August 6, Wednesday: The motions of circus horses are not so expressive of music –do not harmonize so well with a strain of music as those of animals of the cat kind– An Italian has just carried a hand-organ through the village– I hear it even at walden wood –it is as if a cheeta had skulked howling through the streets of the village with knotted tail.
Neglected gardens are full of Flea-bane? now not yet in blossom. Thoroughwort has opened –& golden-rod is gradually opening the smooth sumac shows its red fruit The berries of the bristly aralia are turning dark– The wild holly's scarlet fruit is seen & the red dwarf chock cherry Cerasus is (Prunus Obovata– After how

few steps –how little exertion –the student stands in pine woods above the solomon's seal & the cow wheat – in a place still unaccountably strange & wild to him –& to all civilization. This so easy & so common –though our literature implies that it is rare –we in the country make no report of the seals & sharks in our neighborhood to those in the city We send them only our huckle berries not free wild thoughts.

Why does not man sleep all day as well as all night –it seems so very natural & easy –for what is he awake.

A man must generally get away some hundreds or thousands of miles from home before he can be said to begin his travels– Why not begin his travels at home –! Would he have to go far or look very closely to discover novelties. The traveller who in this sense pursues his travels at home, has the advantage at any rate of a long residence in the country to make his observations correct & profitable. Now the American goes to England while the Englishman comes to America in order to describe the country– No doubt there some advantages in this kind of mutual criticism– But might there not be invented a better way of coming at the truth than this scratch-my back & I'll scratch your's method? Would not the American for instance who had himself perchance travelled in England & elsewhere –make the most profitable & accurate traveller in his own country. How often it happens that the travellers principal distinction is that he is one who knows less about a country than a native. Now if he should begin with all the knowledge of a native –& add thereto the knowledge of a traveller– Both natives & foreigners would be obliged to read his book. & the world would be absolutely benefitted It takes a man of genius to travel in his own country –in his native village –to make any progress between his door & his gate. But such a traveller will make the distances which Hanno & Marco Polo –& Cook & Ledyard went over ridiculous.

BOTANIZING

WM BARTRAM

So worthy a traveller as Wm Bartram heads his first chapter with the words "The author sets sail from Philadelphia, and arrives at Charleston, from whence he begins his travels."

I am perchance most & most profitably interested in the things which I already know a little about –a mere & utter novelty is a mere monstrosity to me. I am interested to see the yellow pine which we have not in Concord though Michaux says it grows in Mass –. or the English Oak having heard of the royal oak –& having oaks ourselves Or the oriental Plane having often heard of it –& being well acquainted with its sister the occidental plane –but the new Chinese flower whose cousin I do not happen to know I pass by with indifference. I do not know that I am very fond of novelty. I wish to get a clearer notion of what I have already some inkling.

These Italian boys with their hand-organs remind me of the keepers of wild beasts in menageries –whose whole art consists in stirring up their beasts from time to time with a pole. I am reminded of bright flowers & glancing birds & striped pards of the jungle– these delicious harmonies tear me to pieces while they charm me – the tigir's musical smile.

How some inventions have spread –some brought to perfection by the most enlightened nations have been surely & rapidly communicated to the most savage– The gun for instance How soon after the settlement of America were comparitively remote Indian tribes –most of whose members had never seen a white man supplied with guns– The gun is invented by the civilized man & the savage in remote wildernesses on the other side of the globe throws away his bow & arrows & takes up this arm. Bartram travelling in the S states bet 70 & 80 describes the warriors as so many gun-men.

ADMETUS

Ah, yes even here in concord horizon Apollo is at work for King Admetus– Who is King Admetus? It is Business with his four prime ministers Trade & Commerce –& Manufactures & Agriculture. And this is what makes Mythology true & interesting to us

December 31, Wednesday: In North Africa, Heinrich Barth viewed Ngaljam Demmo.

The Austrian constitution was abolished by order of the Emperor. All political reforms, except the end of serfdom, were rescinded. A patent was issued declaring Emperor Franz Joseph II an absolute monarch.

Henry Thoreau observed the thawing sand/clay bank in the "Deep Cut" of the railroad leading to Walden Pond and for the first time linked it to his botanical studies. He saw "perfect leopard paws," the springing forth of the earth, in the bank. "There is nothing inorganic."

Douglas R. Anderson, on page 309 of his A HOUSE UNDIVIDED, has pointed out in regard to Thoreau's experience of the thawing railroad embankment "Deep Cut" on this day, that Thoreau here is not to be conceptualized as being in Nature's *cloaca*, watching the formation of excrement, but **in her womb**, watching the formation of the forms of leaves, the forms of fingers, of the "great central life" to which "all animal and vegetable life is merely parasitic." If Thoreau the artist here is anything, Anderson points out, he is midwife, he is stationed at the deeply cleft portal through which new life emerges.[53]

53. Douglas R. Anderson. A HOUSE UNDIVIDED: DOMESTICITY AND COMMUNITY IN AMERICAN LITERATURE. Cambridge: Cambridge UP, 1990

WALDEN: Few phenomena gave me more delight than to observe the forms which thawing sand and clay assume in flowing down the sides of a deep cut on the railroad through which I passed on my way to the village, a phenomenon not very common on so large a scale, though the number of freshly exposed banks of the right material must have been greatly multiplied since railroads were invented. The material was sand of every degree of fineness and of various rich colors, commonly mixed with a little clay. When the frost comes out in the spring, and even in a thawing day in the winter the sand begins to flow down the slopes like lava, sometimes bursting out through the snow and overflowing it where no sand was to be seen before. Innumerable little streams overlap and interlace one with another, exhibiting a sort of hybrid product, which obeys half way the law of currents, and half way that of vegetation. As it flows it takes the forms of sappy leaves or vines, making heaps of pulpy sprays a foot or more in depth, and resembling, as you look down on them, the laciniated lobed and imbricated thalluses of some lichens; or you are reminded of coral, of leopards' paws or birds' feet, of brains or lungs or bowels, and excrements of all kinds. It is a truly *grotesque* vegetation, whose forms and color we see imitated in bronze, a sort of architectural foliage more ancient and typical than acanthus, chiccory, ivy, vine, or any vegetable leaves; destined perhaps, under some circumstances, to become a puzzle to future geologists. The whole cut impressed me as if it were a cave with its stalactites laid open to the light. The various shades of the sand are singularly rich and agreeable, embracing the different iron colors, brown, gray, yellowish, and reddish. When the flowing mass reaches the drain at the foot of the bank its spreads out flatter into *strands*, the separate streams losing their semi-cylindrical form and gradually becoming more flat and broad, running together as they are more moist, till they form an almost flat *sand*, still variously and beautifully shaded, but in which you can trace the original forms of vegetation; till at length, in the water itself, they are converted into *banks*, like those formed off the mouths of rivers, and the forms of vegetation are lost in the ripple marks on the bottom.

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

PEOPLE O
WALDEN

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.

When the sun withdraws the sand ceases to flow, but in the morning the streams will start once more and branch and branch again into a myriad of others. You here see perchance how blood vessels are formed. If you look closely you observe that first there pushes forward from the thawing mass a stream of softened sand with a drop-like point, like the ball of the finger, feeling its way slowly and blindly downward, until at last with more heat and moisture, as the sun gets higher, the most fluid portion, in its effort to obey the law to which the most inert also yields, separates from the latter and forms for itself a meandering channel or artery within that, in which is seen a little silvery stream glancing like lightning from one stage of pulpy leaves or branches to another, and every and anon swallowed up in the sand. It is wonderful how rapidly yet perfectly the sand organizes itself as it flows, using the best material its mass affords to form the sharp edges of its channel. Such are the sources of rivers. In the silicious matter which the water deposits is perhaps the bony system, and in the still finer soil and organic matter the fleshy fibre or cellular tissue. What is man but a mass of thawing clay? The ball of the human finger is but a drop congealed. The fingers and toes flow to their extent from the thawing mass of the body. Who knows what the human body would expand and flow out to under a more genial heaven? Is not the hand a spreading *palm* leaf with its lobes and veins? The ear may be regarded, fancifully, as a lichen, *umbilicaria*, on the side of the head, with its lobe or drop. The lip (*labium* from *labor* (?)) laps or lapses from the sides of the cavernous mouth. The nose is a manifest congealed drop or stalactite. The chin is a still larger drop, the confluent drippings of the face.

The cheeks are a slide from the brows into the valley of the face, opposed and diffused by the cheek bones. Each rounded lobe of the vegetable leaf, too, is a thick and now loitering drop, larger or smaller; the lobes are the fingers of the leaf; and as many lobes as it has, in so many directions it tends to flow, and more heat or other genial influences would have caused it to flow yet farther.
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

A few days after what Eric Wilson[54] has referred to as this experience of an "aqueous epiphany" (marked by his conclusion "True as Thales said –The world was made out of water– that is the principle of all things") Thoreau would get out his WALDEN manuscript and begin what we regard as his 4th or "D" draft.
Since Thoreau was to lecture on AN EXCURSION TO CANADA on this evening in Lincoln, it is plausible to surmise –though we do not know– that his experience of the flowing forms of the Deep Cut may have occurred while he was walking up the railroad tracks from Concord toward Lincoln to deliver this lecture.

54. "Thoreau, Thales, and the Distribution of Water" in The Concord Saunterer, New Series, Volume 6, 1998: 27-44

Well, there seems to be confusion here. Did Thoreau lecture in Lincoln on December 30th or on December 31st? I have another note, that on the 31st he heard Elizabeth Oakes Smith lecture on “Womanhood” at the Concord lyceum, that she asked him to carry her lecture to the hall with the result that afterward his pocket smelled like cologne and he commented disapprovingly in his journal that “she was a woman in the too common sense after all.”

December 31, Wednesday: The 3d warm day. now overcast and beginning to drizzle. Still it is inspiriting as the brightest weather – though the sun surely is not agoing to shine, There is a latent light in the mist – as if there were more electricity than usual in the air. These are warm foggy days in winter which excite us.

It reminds me this thick spring like weather, that I have not enough valued and attended to the pure clarity & brilliancy of the winter skies– Consider in what respects the winter sunsets differ from the summer ones. Shall I ever in summer evenings see so celestial a reach of blue sky contrasting with amber as I have seen a few days since– The day sky in winter corresponds for clarity to the night sky in which the stars shine & twinkle so brightly in this latitude.

I am too late perhaps, to see the sand foliage in the deep cut – should have been there day before yesterday – it is now too wet & soft.

Yet in some places it is perfect. I see some perfect leopard’s paws

These things suggest – that there is motion in the earth as well as on the surface; it lives & grows. It is warmed & influenced by the sun – just as my blood by my thoughts. I seem to see some of the life that is in the spring bud & blossom more intimately nearer its fountain head – the fancy sketches & designs of the artist. It is more simple & primitive growth. As if for ages sand and clay might have thus flowed into the forms of foliage – before plants were produced to clothe the earth. The earth I tread on is not a dead inert mass. It is a body – has a spirit – is organic – and fluid to the influence of its spirit – and to whatever particle of that spirit is in me. She is not dead but sleepeth. It is more cheering than the fertility & luxuriance of vineyards – this fundamental fertility near to the principle of growth. To be sure it is somewhat foecal and stercoral–. So the poet’s creative moment is when the frost is coming out in the spring – but as in the case of some too easy poets – if the weather is too warm & rainy or long continued it becomes mere diarrhea – mud & clay relaxed. The poet must not have something pass his bowels merely – that is women’s poetry.– He must have something pass his brain & heart and bowels too, it may be, altogether.– so he gets delivered– There is no end to the fine bowels here exhibited – heaps of liver – lights & bowels. Have you no bowels? Nature has some bowels. and there again she is mother of humanity. Concord is a worthier place to live in – the globe is a worthier place for these creations This slumbering life – that may wake. Even the solid globe is permeated by the living law. It is the most living of creatures. No doubt all creatures that live on its surface are but parasites.

I observed this afternoon the old Irish woman at the shanty in the woods – sitting out on the hill side bare headed in the rain & on the icy though thawing ground – knitting. She comes out like the ground squirrel at the least intimation of warmer weather. She will not have to go far to be buried – so close she lives to the earth. – While I walk still in a great coat & under an umbrella– Such Irish as these are naturalizing themselves at a rapid rate – and threaten at last to displace the Yankees – as the latter have the Indians– The process of acclimation is rapid with them they draw long breaths in the sick room. What must be the philosophy of life to that woman – ready to flow down the slope with the running sand! Ah what would I not give for her point of view. She does not use any ths in her style– Yet I fear that even she may have learned to lie.

There is a low mist in the woods– It is a good day to study lichens. The view so confined – it compels your attention to near objects – & the white background reveals the disks of the lichens distinctly– They appear more loose – flowing – expanded – flattened out – the colors brighter – for the damp– The round greenish yellow lichens on the white pines loom through the mist (or are seen dimly) like shields – whose devices you would fain read. The trees appear all at once covered with this crop – of lichens & mosses of all kind – flat – & tearful

are some – distended by moisture– This is their solstice – and your eyes run swiftly through the mist to these things only. On every fallen twig even that has lain under the snows – as well as on the trees, they appear erect & now first to have attained their full expansion. Nature has a day for each of her creatures – her creations. To day it is an exhibition of lichens at forest Hall– The livid green of some – the fruit of others. They eclipse the trees they cover.– And the red – club pointed – (baobab tree like) on the stumps – the **erythrean** stumps.– ah beautiful is decay. True as Thales said – The world was made out of water – that is the principle of all things.
I do not lay myself open to my friends!? The owner of the casket locks it, and unlocks it.
Treat your friends for what you know them to be – regard no surfaces– Consider not what they did, but what they intended. Be sure as you know them, you are known of them again. Last night I treated my dearest friend ill. Though I could find some excuse for myselff, it is not such excuse as under the circumstances could be pleaded in so many words– Instantly I blamed myself – & sought an opportunity to make atonement–; but the friend avoided me, and with kinder feelings even than before I was obliged to depart– And now this morning I feel that it is too late to speak of the trifle – and besides I doubt now in the cool morning, if I have a right to suppose such intimate & serious relations as afford a basis for the apology I had conceived – for even magnanimity must ask this poor earth for a field. The virtues even wait for invitation. Yet I am resolved to know that one centrally – through thick & thin – and though we should be cold to one another – though we should never speak to one another – I will know that inward & essential love may exist even under a superficial cold – & that the law of attraction speaks louder than words. My true relation this instant shall be my apology for my false relation the last instant.
I made haste to cast off my injustice as scurf– I own it least of anybody for I have absolutely done with it. Let the idle & wavering & apologizing friend appropriate it. Methinks our estrangement is only like the divergence of the branches which unite in the stem.
Last night I heard Mrs Oakes Smith lecture on Womanhood. The most important fact about the lecture was that a woman said it – and in that respect it was suggestive.

Went to see her afterward. But the interview added nothing to the previous impression, rather subtracted. She was a woman in the too common sense after all. You had to fire small charges– I did not have a finger in once, for fear of blowing away all her works & so ending the game. You had to substitute courtesy for sense & argument It requires nothing less than a chivalric feeling to sustain a conversation with a lady. I carried her lecture for her in my pocket wrapped in her handkerchief – my pocket exhales cologne to this moment. The championness of womans rights still asks you to be a ladies' man– I can't fire a salute even for fear some of the guns may be shotted. I had to unshot all the guns in truth's battery and fire powder & wadding only. Certainly the heart is only for rare occasions – the intellect affords the most unfailing entertainment. It would only do to let her feel the wind of the ball. I fear that to the last woman's lectures will demand mainly courtesy from man.
How deceptive the size of a large pine– Still as you approach it – even within a rod or two it looks only like a reasonable stick – fit for a string piece perchance – the average size of trees one foot in diameter – big as a keg or a half barrel it may be. Fit for the sill or the beams of an old fashioned house.– This you think is a generous appreciation & allowance. Not till you stand close to its foot, upon one of its swelling insteps & compare its diameter with the diameter of your own eyeballs, do you begin to discover its width. Stand by its side & see how it shuts out a hemisphere from you. Why it is as wide as a front door. What a slender arrow – a light shaft now that you stand a rod or two off– What a ballista – a battering ram – a mighty vegetable monster – a cannon, near at hand! Now set a barrel aye a hogshead beside it. You apply your measures– The foot rule seems suddenly shrunk. Your umbrella is but half as long as it was–
The pine I saw fall yesterday measured today 105 feet – & was about 94 years old–
There was one still larger lying beside it. 115 feet long – 96 yrs old – 4 feet diam– the longest way. The tears were streaming from the sap wood – about 20 circles – of each. pure amber or pearly tears.
Through the drizzling fog now just before night-fall I see from the Cliffs the dark cones of pine trees that rise above the level of the tree tops – and can trace a few elm tree tops where a farm house hides beneath.

Denuded pines stand in the clearings with no old cloak to wrap about them. only the apexes of their cones entire – telling a pathetic story of the companions that clothed them. So stands a man. It is clearing around him. He has no companions on the hills– The lonely traveller looking up wonders why he was left when his companions were taken.

Thoreau's organicist poetics assumed that language has the capacity to convey the truths of nature in a form manifesting principles of growth and development homologous with those of nature itself. Thoreau believed that such isomorphism between the dynamics of nature and the dynamics of language could be accomplished by "writers whose language was based in nature's primal power." Philip F. Gura has shown that Thoreau's "profound interest in [the] contemporary philological theories" of Charles Kraitsir and Richard Trench was motivated by his dream "to return to the primitive analogical and derivative sense of words." The most celebrated example of Thoreau's attempt to translate nature's tawny grammar into human language is the "deep cut" passage in the "Spring" chapter of WALDEN, in which Thoreau discusses floral-shaped sand flows emerging from a thawing sand bank next to the railroad. This passage was largely composed in 1853, and so was informed by the considerations and accomplishments of Thoreau's later career, although as part of WALDEN it was integrated into a springtime context. The deep cut passage is the most striking instance of Thoreau's application of glossology in his writing (glossology being the language theory according to which the phonetic qualities of words replicate with semantic significance the qualities and principles of the natural objects of which they are signs).

WHAT I'M WRITING IS TRUE BUT NEVER MIND
YOU CAN ALWAYS LIE TO YOURSELF

1852

Harland Coultas's THE PRINCIPLES OF BOTANY, AS EXEMPLIFIED IN THE CRYPTOGAMIA; FOR THE USE OF SCHOOLS AND COLLEGES (Philadelphia).

Publication of the 2d volume of Henry Rowe Schoolcraft's and Captain Seth Eastman's HISTORICAL AND STATISTICAL INFORMATION RESPECTING … THE INDIAN TRIBES OF THE UNITED STATES:

THE INDIAN TRIBES, II, 1852

BIOLOGY

It was probably in this year that Henry Thoreau copied into his Indian Notebook #6 from the initial volume of a 1771 edition of Mark Catesby's THE NATURAL HISTORY OF CAROLINA, FLORIDA AND THE BAHAMA ISLANDS: CONTAINING THE FIGURES OF BIRDS, BEASTS, FISHES, SERPENTS, INSECTS AND PLANTS: PARTICULARLY THE FOREST-TREES, SHRUBS, AND OTHER PLANTS, NOT HITHERTO DESCRIBED, OR VERY INCORRECTLY FIGURED BY AUTHORS.

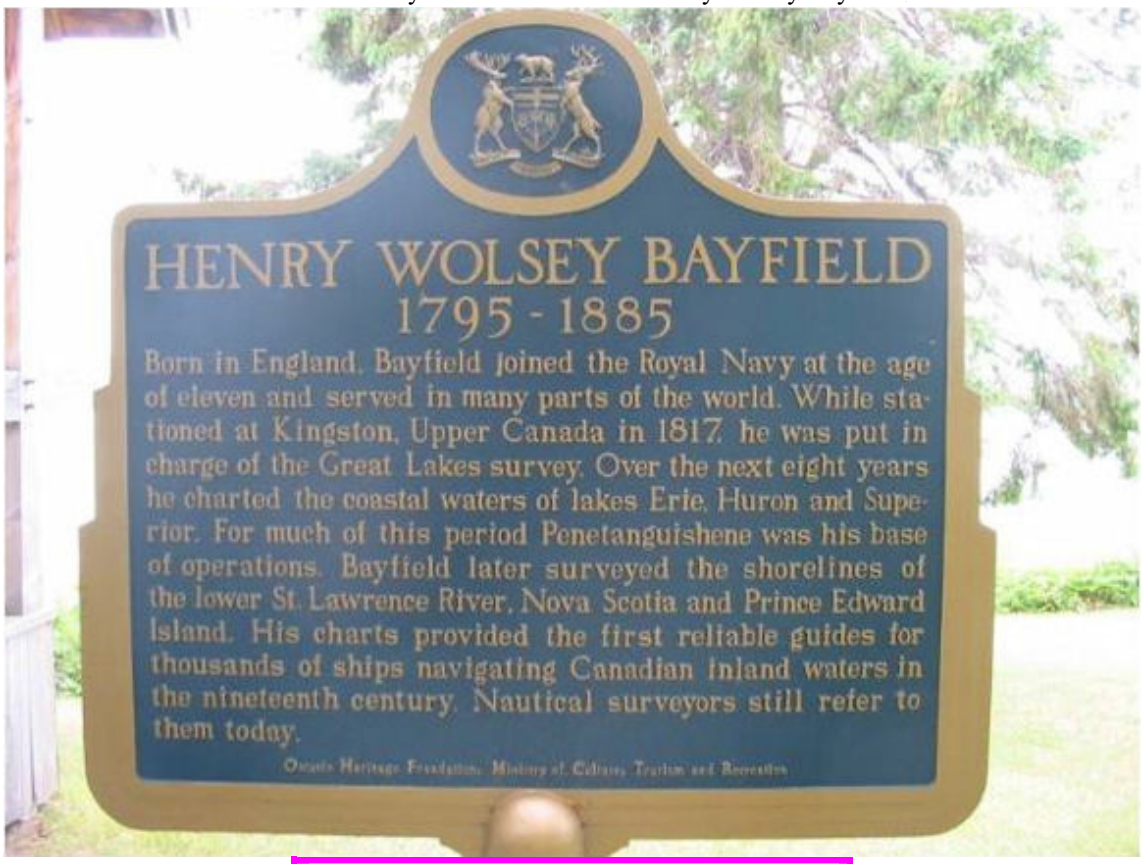
MARK CATESBY, VOL. I

Also, probably in this year, Thoreau copied into his Indian Notebook #6[55] from NARRATIVE OF AN EXPEDITION THROUGH THE UPPER MISSISSIPPI TO ITASCA LAKE, THE ACTUAL SOURCE OF THIS RIVER; EMBRACING AN EXPLORATORY TRIP THROUGH THE ST. CROIX AND BURNTWOOD (OR BROULE) RIVERS; IN 1832. UNDER THE DIRECTION OF HENRY R. SCHOOLCRAFT.

Also probably in this year, Thoreau copied into his Canadian Notebook[56] from a chart of the gulf and river of

55. The original notebooks are held by the Pierpont Morgan Library in New York, as manuscripts #596 through #606. There are photocopies, made by Robert F. Sayre in the 1930s, in four boxes at the University of Iowa Libraries, accession number MsC 795. More recently, Bradley P. Dean, PhD and Paul Maher, Jr. have attempted to work over these materials.
56. Henry Thoreau's Canadian Notebook is now at the Pierpont Morgan Library in New York.

St. Lawrence that had been made by British naval officer Henry Wolsey Bayfield.



CAPTAIN BAYFIELD

1853

THE NATURAL HISTORY OF SELBORNE: WITH OBSERVATIONS ON VARIOUS PARTS OF NATURE AND THE NATURALIST'S CALENDAR / BY THE LATE REV. GILBERT WHITE; WITH EXTENSIVE ADDITIONS BY THOMAS BROWN. 9th ed. London: J. J. Griffin; Glasgow: R. Griffin.[57]

THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE: WITH OBSERVATIONS ON VARIOUS PARTS OF NATURE AND THE NATURALISTS CALENDAR / BY THE LATE REV. GILBERT WHITE … EDITED, WITH NOTES BY SIR WILLIAM JARDINE. London: Nathaniel Cooke.

THE NATURAL HISTORY OF SELBORNE / BY THE LATE REV. GILBERT WHITE; WITH ADDITIONAL NOTES BY THE REV. J. G. WOOD; ILLUSTRATED WITH ENGRAVINGS ON WOOD. London: George Routledge & Co.

Henry Thoreau belatedly consulted this oft-published work.[58]

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57. The Reverend White's NATURAL HISTORY OF SELBORNE is only the 4th most reprinted book in the English language.
58. I do not know which of the many editions Henry perused, or even for sure that it was one of the completer editions. Also, although it has been alleged many times that this had great influence on Thoreau, quite frankly I have been unable myself to verify that Thoreau took this species of nature writing as Waldo Emerson had, with any seriousness.

The Reverend Professor Edward Hitchcock's OUTLINE OF THE GEOLOGY OF THE GLOBE AND OF THE UNITED STATES IN PARTICULAR WITH SKETCHES OF CHARACTERISTIC AMERICAN FOSSILS.

THE SCIENCE OF 1853

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

"HUCKLEBERRIES": Many public speakers are accustomed, as I think foolishly, to talk about what they call little things in a patronising way sometimes, advising, perhaps, that they be not wholly neglected; but in making this distinction they really use no juster measure than a ten-foot pole, and their own ignorance. According to this rule a small potatoe is a little thing, a big one a great thing. A hogshead-full of anything — the big cheese which it took so many oxen to draw — a national salute — a state-muster — a fat ox — the horse Columbus — or Mr. Blank — the Ossian Boy — there is no danger that any body will call these little things. A cartwheel is a great thing — a snow flake a little thing. The *Wellingtonia gigantea* — the famous California tree, is a great thing — the seed from which it sprang a little thing — scarcely one traveller has noticed the seed at all — and so with all the seeds or origins of things. But Pliny said — *In minimis Natura praestat* — Nature excels in the least things.

PLINY
WELLINGTONIA GIGANTEA

A new and revised edition of Edward Jesse's 1844 SCENES AND TALES OF COUNTRY LIFE, WITH RECOLLECTIONS OF NATURAL HISTORY, under the title SCENES AND OCCUPATIONS OF COUNTRY LIFE (London: John Murray, Albemarle Street).[59]

HERNE'S OAK.

SCENES AND OCCUPATIONS

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

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59. Many American publishers consider Henry Thoreau to fall within their category "nature writer" — some have considered him the creator of this category in America, others derogate him as one of it poorest exemplars because he fails to focus on the pleasantries they vend. It may be useful, therefore, to contrast Thoreau with a well-published "nature writer" of his own period such as this Edward Jesse, Esquire — why don't you struggle to detect some similarities with the life or writings of Thoreau?

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.

Alfred Russel Wallace's PALM TREES OF THE AMAZON (an ethnobotanical study based in part on drawings he had managed to save from fire and shipwreck) and A NARRATIVE OF TRAVELS ON THE AMAZON AND RIO NEGRO.

BOTANIZING

In this year and the following one, at Crystal Palace Park, under the supervision of Sir Richard Owen, the sculptor Benjamin Waterhouse Hawkins would be constructing full-scale concrete restorations of the prehistoric reptiles known to that time. —For the very biggest and newest, what but the very biggest and oldest? Three of the replicas would be of the dinosaurs: Iguanodon, Hylaeosaurus, and Megalosaurus.[60]

December 19, Monday: Sometime after the incident of the spading competition, Michael Flannery had quit working for Abiel H. Wheeler and become a field laborer instead for Elijah Wood. At this point he discussed this new job with Henry Thoreau and told of his continuing efforts to get his family from Ireland. That evening Thoreau wrote to H.G.O. Blake:

> An Irishman came to see me to-day, who is endeavoring to get his family out to this New World. He rises at half past four, milks twenty-eight cows (which has swollen the joints of his fingers), and eats his breakfast, without any milk in his tea or coffee, before six; and so on, day after day, for six and a half dollars a month; and thus he keeps his virtue in him, if he does not add to it; and he regards me as a gentleman able to assist him; but if I ever get to be a gentleman, it will be by working after my

fashion harder than he does.

THOREAU ON THE IRISH

From this day into December 21st, Thoreau would be surveying a Corner Spring woodlot that James P. Brown was selling to William Wheeler, which was cut in 1853-1854. (Brown lived near Nut Meadow Brook, and according to the Concord Town Report for 1851-1852, Thoreau had laid out a town road near his house and had been paid $4.00 for this by the town.)

View Henry Thoreau's personal working drafts of his surveys courtesy of AT&T and the Concord Free Public Library:

http://www.concordlibrary.org/scollect/Thoreau_Surveys/Thoreau_Surveys.htm

(The official copy of this survey of course had become the property of the person or persons who had hired this Concord town surveyor to do their surveying work during the 19th Century. Such materials have yet to be recovered.)

View this particular personal working draft of a survey in fine detail:

http://www.concordlibrary.org/scollect/Thoreau_Surveys/13.htm

Thoreau wrote to Spencer Fullerton Baird in regard to Louis Agassiz's American Association for the Advancement of Science, to withdraw his name, pleading that he would be unable to attend meetings and explaining that the kind of science he was attracted to was the science of the Reverend Gilbert White's

THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE

and Alexander von Humboldt's

ASPECTS OF NATURE

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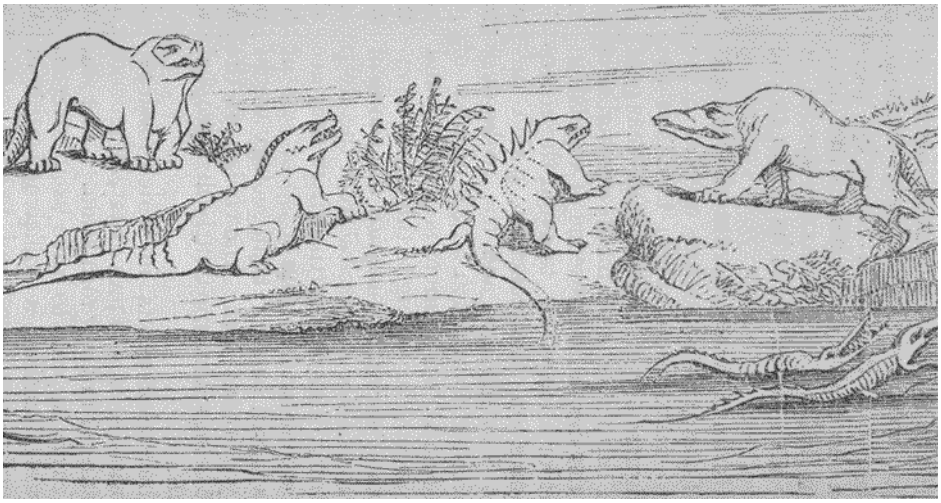
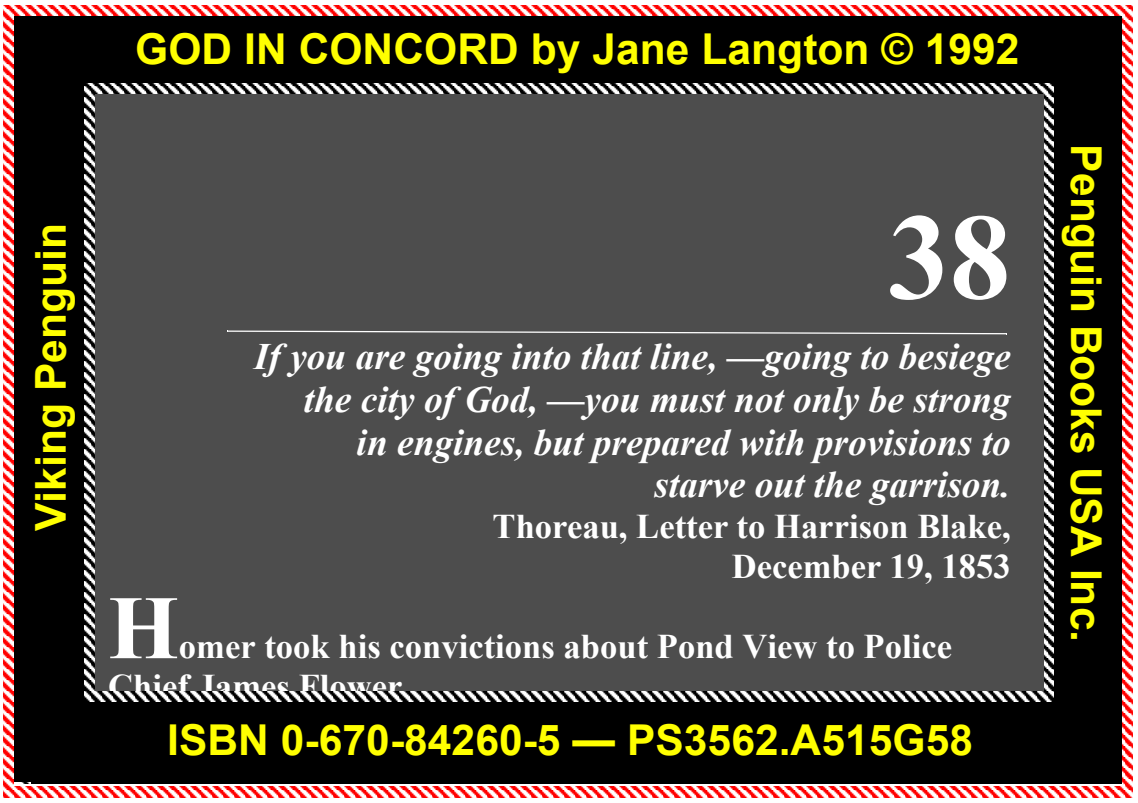
60. Although the Crystal Palace would burn down in 1936 these early models of dinosaur are still standing around in Sydenham Park south of London: to the left two Iguanodon, at the center the Hylaeosaurus, and to the right the Megalosaurus. Don't make a special trip.



— as he understood very well that this was bound suitably to render him unattractive to them.[61]

In this letter Thoreau made reference to a poem that had been published anonymously in Punch, or the London Charivari, by Thomas Hood, entitled "The Song of the Shirt."

In this letter, also, Thoreau made reference to pamphlet of 10 pages of blue paper just put out by the Smithsonian Institution that was going to become part of his personal library, Spencer Fullerton Baird's DIRECTIONS FOR MAKING COLLECTIONS IN NATURAL HISTORY, PREPARED FOR THE USE OF THE PARTIES ENGAGED IN THE EXPLORATION OF A ROUTE FOR THE PACIFIC RAILROAD ALONG THE 49TH PARALLEL.



Concord Dec 19th 53
Mr Blake,
My debt has accumulated so that I should have answered your last letter at once, if I had not been the subject of what is called a press of engagements, having a lecture to write for last Wednesday, and surveying more than usual besides. – It has been a kind of running fight with me – the enemy not always behind me, I trust.
True, a man cannot lift himself by his own waist-bands, because he cannot get out of himself, but he can expand himself, (which is bet-

61. Harding and Bode, CORRESPONDENCE, pages 309-10. He gave quite a different reason for not becoming a member in his JOURNAL: "*The fact is I am a mystic, a transcendentalist, and a natural philosopher to boot.*" Although it has been alleged many times that this reading had great influence on Henry Thoreau, quite frankly I have been unable myself to verify that Thoreau took this species of nature writing as Waldo Emerson had, with any seriousness.

ter, there being no up nor down in nature) and so split his waist-bands, being already within himself.
You speak of doing & being – & the vanity real or apparent of much doing – The suckers, I think it is they, make nests in our river in the spring of more than a cart-load of small stones, amid which to deposit their ova. The other day I opened a muskrats' house. It was made of weeds, five feet broad at base & 3 feet high, and far and low within it was a little cavity, only a foot in diameter where the rat dwelt. It may seem trivial – this piling up of weeds, but so the race of muskrats is preserved. We must heap up a great pile of doing for a small diameter of being. – Is it not imperative on us that we do something – if we only work in a tread-mill? and, indeed, some sort of revolving is necessary to produce a centre & nucleus of being. What exercise is to the body – employment is to the mind & morals. Consider what an amount of drudgery must be performed – how much hum-drum & prosaic labor goes to any work of the least value. There are so many layers of mere white lime in every shell to that thin inner one so beautifully tinted. Let not the shell fish think to build his house of that alone; and pray what are its tints to him? Is it not his smooth close-fitting shirt merely? whose tints are not to him, being in the dark, but only when he is gone or dead, and his shell is heaved up to light a wreck upon the beach, do they appear. With him too it is a song of the shirt – "work – work – work" – & this work is not merely a police in the gross sense, but in the higher sense, a discipline. If it is surely the means to the highest end we know, can any work be humble or disgusting? Will it not rather elevating as a ladder – the means by which we are translated?
How admirably the artist is made to accomplish his self culture by devotion to his art! The woodsawyer through his effort to do his work well, becomes not merely a better woodsawyer, but measureably a better man. Few are the men that can work on their navels – only some Brahmens that I have heard of. To the painter is given some paint & canvass instead. – to the Irishman a bog, – typical of himself. – In a thousand apparently humble ways men busy themselves to make some right take the place of some wrong, – if it is only to make a better paste-blacking – and they are themselves so much the better morally for it.
You say that you sit & aspire, but do not succeed much. Does it concern you enough that you do not? Do you work hard enough at it— Do you get the benefit of discipline out of it? If so, persevere. Is it a more serious thing than to walk a thousand miles in a thousand successive hours? Do you get any corns by it? Do you ever think of hanging yourself on account of failure?
If you are going into that line – going to besiege the city of God – you must not only be strong in engines – but prepared with provisions to starve out the garrison. An Irishman came to see me today who is endeavoring to get his family out to this New World. He rises

at half past 4 & milks 28 cows – (which has swolen the joints of his fingers) & eats his breakfast, without any milk in his tea or coffee, before 6 – & so on day after day for six & a half dollars a month – & thus he keeps his virtue in him – if he does not add to it – & he regards me as a gentleman able to assist him – but if I ever get to be a gentleman, it will be by working after my fashion harder than he does – If my joints are not swolen, it must be because I deal with the teats of celestial cows before break-fast, (and the milker in this case is always allowed some of the milk for his breakfast) to say nothing of the flocks & herds of Admetus afterward.
It is the art of mankind to polish the world, and every one who works is scrubbing in some part.
If the mark is high & far, you must not only aim aright, but draw the bow with all your might. You must qualify your self to use a bow which no humbler archer can bend.
Work – work – work!
Who shall know it for a bow? It is not of yew-tree. It is straighter than a ray of light – flexibility is not known for one of its qualities.

Dec 22nd
So far I had got when I was called off to survey. – Pray read the Life of Haydon the painter – if you have not. It is a small revelation for these latter days – a great satisfaction to know that he has lived – though he is now dead. Have you met with the letter of a Turkish cadi at the end of Layard's "Nineveh & Babylon" that also is refreshing & a capital comment on the whole book which preceeds it – the oriental genius speaking through him.
Those Brahmins put it through, they come off – or rather stand still, conquerors, with some withered arms or legs at least to show — & they are said to have cultivated the faculty of abstraction to a degree unknown to Europeans, – If we cannot sing of faith & triumph – we will sing our despair. We will be that kind of bird. There are day owls & there are night owls – and each is beautiful & even musical while about its business.
Might you not find some positive work to do with your back to Church & State – letting your back do all the rejection of them? Can you not go upon your pilgrimage, Peter, along the winding mountain path whither you face? A step more will make those funereal church bells over your shoulder sound far and sweet as a natural sound
Work – work – work!
Why not make a very large mud pie & bake it in the sun! Only put no church nor state into it, nor upset any other pepper -box that way. – Dig out a wood-chuck for that has nothing to do with rotting institutions – Go ahead.
Whether a man spends his day in an extacy or despondency – he must do some work to show for it – even as there are flesh & bones to show for him. We are superior to the joy we experience.

Your last 2 letters methinks have more nerve & will in them than usual – as if you had erected yourself more – Why are not they good work – if you only had a hundred correspondents to tax you?
Make your failure tragical – by the earnestness & steadfastness of your endeavor – & then it will not differ from success – Prove it to be the inevitable fate of mortals – of one mortal – if you can.
You said that you were writing on immortality – I wish you would communicate to me what you know about that – you are sure to live while that is your theme –
Thus I write on some text which a sentence of your letters may have furnished.
I think of coming to see you as soon as I get a new coat – if I have money enough left – I will write to you again about it.
Henry D. Thoreau

BENJAMIN ROBERT HAYDON

1854

Gregor Mendel received a teaching appointment at the *Oberrealschule* in Brno, where he would successfully teach natural history and physics for the following 16 years. He published his 2d paper, which concerns the beetle *Bruchus pisi*, on crop damage.

Professor Sir William Jackson Hooker's A CENTURY OF FERNS.

THE PRINCIPLES OF BOTANY, AS EXEMPLIFIED IN THE PHANEROGAMIA; BY HARLAND COULTAS, PROFESSOR OF GENERAL AND MEDICAL BOTANY IN THE PENN MEDICAL UNIVERSITY OF PHILADELPHIA (Philadelphia: King & Baird, Printers, No. 9 Sansom Street).

June 14, Wednesday: Henry Thoreau was visited by another amateur botanist, Austin Bacon of Natick, and they walked to Concord's limekiln.

> [George Partridge] Bradford [of Plymouth, a Brook Farmer], [the Reverend John Lewis] Russell [of Salem], and Austin Bacon of Natick are acknowledged in the preface to George B. Emerson's report on the trees and shrubs of Massachusetts. This preface approximates a directory of Massachusetts botanists in 1846. Austin Bacon (1813-88) was a surveyor-naturalist. Thoreau paid a visit to him on August 24, 1857, and was shown a number of Natick's botanical highlights. Thoreau's interest in Natick no doubt arose from his reading of Oliver N. Bacon's HISTORY OF NATICK, which included a list of unusual plants (January 19, 1856, JOURNAL).
>
> — Ray Angelo, "Thoreau as Botanist"

On page 2 of the New York Daily Times appeared an article about steamboating on the upper Mississippi River, identified only as by a "special correspondent," "W":

> Perhaps you have beheld such sublimity in dreams, but surely never in daylight walking elsewhere in this wonderful world. Over one hundred and fifty miles of unimaginable fairy-land, genii-land, and world of visions, have we passed during the last twenty-four hours.... Throw away your guide books; heed not the statements of travelers; deal not with seekers after and retailers of the picturesque; believe on man, but see for yourself the Mississippi River above Dubuque.[62]

June 14. Pm to Lime kiln with Mr Bacon of Natic
Sisymbrium amphibium (?) of Big. some days at foot of Loring's land. Common Mallows well out how long? What is that sisymbrium or Mustard-like plant at foot of Loring's? Erigeron strigosum?? out earliest say yesterday >>> Observed a ribwort near Simon Brown's barn by road with elongated spikes & only pistillate flowers— Hedge mustard how long? Pepper grass how long — sometime— Scirpus lactustris maybe some days. I see a black caterpillar on the black willows nowadays with red spots. Mr Bacon thinks that cherry birds

62. Notice, please, that this is precisely the steamboat adventure upon which Thoreau would embark during May 1861, in order to approach Minnesota.

are abundant where canker worms are — says that only female mosquitoes sting (not his observation alone) That there is one or two arbor vitae's native in Natic— He has found the lygodium palmatum there— Pearl I think he called her. He thought those the exuviae of mosquitoes on the river weeds under water— Makes his own microscopes & uses garnets— He called the huckleberry apple a parasitic plant — pterospora which grows on & changes the nature of the huckleberry.— Observed a diseased andromed paniculata twig prematurely in blossom— Caught a locust properly Harvest-fly — (cicada) drumming on a birch — which Bacon & Hill (of Waltham) think like the septemdecim except that ours has not red eyes, but black ones. Harris's other kind the Dog day Cicada (canicularis) or harvest fly — He says it begins to be heard invariably at the beginning of Dog days — he Harris heard it for many years in succession with few exceptions on the 25th of July. Bacon says he has seen pitch pine pollen in a cloud going over a hill a mile off is pretty sure—

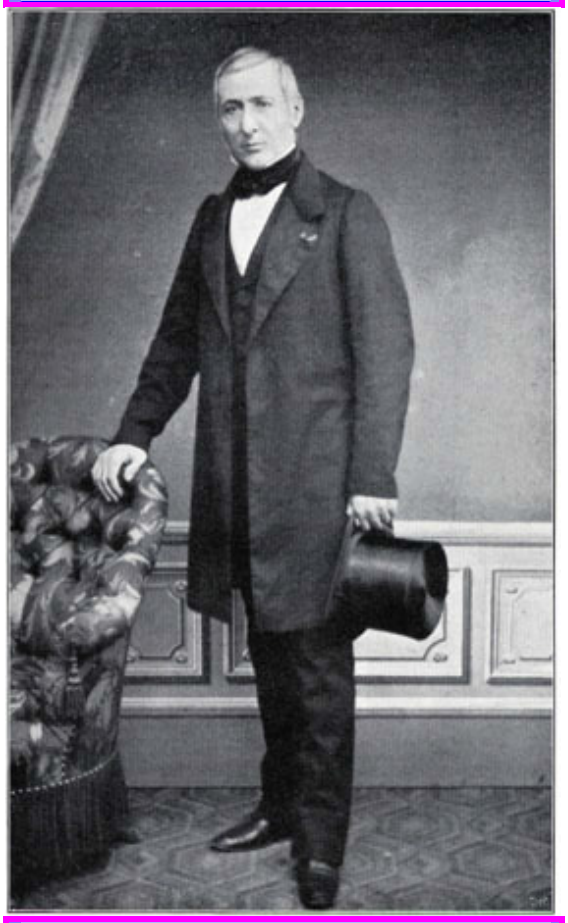
1855

Professor Sir William Jackson Hooker's MUSEUMS OF ECONOMIC BOTANY AT KEW.

Harland Coultas's THE PLANT: AN ILLUSTRATION OF THE ORGANIC LIFE OF THE ANIMAL (Philadelphia: Perry and Erety, Publishers, S.W. Corner Fourth and Race Sts.).

Alphonse Louis Pierre Pyramus de Candolle's *GÉOGRAPHIE BOTANIQUE RAISONNÉE; OU, EXPOSITION DES FAITS PRINCIPAUX ET DES LOIS CONCERNANT LA DISTRIBUTION GÉOGRAPHIQUE DES PLANTES DE L'ÉPOQUE ACTUELLE....* (Paris: V. Masson; [etc., etc].[63]

DE CANDOLLE, VOL. I



DE CANDOLLE, VOL. II

63. Henry Thoreau would make extracts from this into his Indian Book #12 in about 1861.

1856

The 2d edition, revised and enlarged, of Professor Lewis Caleb Beck's BOTANY OF THE UNITED STATES NORTH OF VIRGINIA: COMPRISING DESCRIPTIONS OF THE FLOWERING AND FERN-LIKE PLANTS HITHERTO FOUND IN THOSE STATES, ARRANGED ACCORDING TO THE NATURAL SYSTEM. WITH A SYNOPSIS OF THE GENERA ACCORDING TO THE LINNÆAN SYSTEM, A SKETCH OF THE RUDIMENTS OF BOTANY, AND A GLOSSARY OF TERMS. BY LEWIS C. BECK, M.D. PROFESSOR OF CHEMISTRY AND NATURAL HISTORY IN RUTGERS COLLEGE, NEW JERSEY, ETC., ETC. SECOND EDITION, REVISED AND ENLARGED (New York: Harper & Brothers, Publishers).

LEWIS CALEB BECK

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

January 19, Saturday: The great elm in from of postmaster Charles B. Davis's house in Concord was chopped down, as explained in Henry Thoreau's journal: "Davis and the neighbors were much alarmed by the creaking in the late storms, for fear it would fall on their roofs. It stands two or three feet into Davis's yard" "Four men, cutting at once, began to fell the big elm at 10 A.M., went to dinner at 12, and got through at 2:30 P.M. They used a block and tackle with five balls, fastened to the base of a buttonwood, and drawn by a horse ..." "The tree was so sound I think it might have lived fifty years longer; but Mrs. Davis said that she would not like to spend another such a week at the last before it was cut down." Afterwards, Thoreau would write: "I have attended the felling and, so to speak, the funeral of this old citizen of the town..." (we note that someone has planted another elm in place of that old tree, on the east side of the Concord Art Center).

OLD HOUSES

Thoreau for the 10th time (Dr. Bradley P. Dean has noticed) deployed in his journal a weather term that had been originated by Luke Howard: "There were eight or ten courses of clouds, so broad that with equal intervals of blue sky they occupied the whole width of the heavens, broad white **cirro-stratus** in perfectly regular curves from west to east across the whole sky."

Thoreau made a reference to Natick, Massachusetts and to Oliver N. Bacon's and Samuel Hunt's A HISTORY OF NATICK, FROM ITS FIRST SETTLEMENT IN 1651 TO THE PRESENT TIME: WITH NOTICES OF THE FIRST WHITE FAMILIES, AND ALSO AN ACCOUNT OF THE CENTENNIAL CELEBRATION, OCT. 16, 1851, REV. MR. HUNT'S ADDRESS AT THE CONSECRATION OF DELL PARK CEMETERY, &C....

A HISTORY OF NATICK

January 19: Another bright winter day.
P.M. — To river to get some water asclepias to see what birds' nests are made of.
The only open place in the river between Hunt's Bridge and the railroad bridge is a small space against Merrick's pasture just below the Rock.[64] As usual, just below a curve, in shallow water, with the added force

64. Hubbard's Bridge and, I have no doubt. Lee's Bridge, as I learned in my walk the next day.

of the Assabet.

The willow osiers of last year's growth on the pollards in Shattuck's row, Merrick's pasture, from four to seven feet long, are *perhaps* as bright as in the spring, the lower half yellow, the upper red, but they are a *little* shriveled in the bark.

Measured against the great elm in front of Charles Davis's on the Boston road, which he is having cut down. The chopper, White, has taken off most of the limbs and just begun, tried his axe, on the foot of the tree. He will probably fall it on Monday, or the 21st. At the smallest place between the ground and the limbs, seven feet from the ground, it is fifteen feet and two inches in circumference; at one foot from the ground on the lowest side, twenty-three feet and nine inches. White is to have ten dollars for taking off the necessary limbs and cutting it down merely, help being found him, He began on Wednesday. Davis and the neighbors were much alarmed by the creaking in the late storms, for fear it would fall on their roofs. It stands two or three feet into Davis's yard.

As I came home through the village at 8.15 P.M., by a bright moonlight, the moon nearly full and not more than 18° from the zenith, the wind northwest, but not strong, and the air pretty cold, I saw the melon-rind arrangement of the clouds on a larger scale and more distinct than ever before. There were eight or ten courses of clouds, so broad that with equal intervals of blue sky they occupied the whole width of the heavens, broad white cirro-stratus in perfectly regular curves from west to east across the whole sky. The four middle ones, occupying the greater part of the visible cope, were particularly distinct. They were all as regularly arranged as the lines on a melon, and with much straighter sides, as if cut with a knife. I hear that it attracted the attention of those who were abroad at 7 P.M., and now, at 9 P.M., it is scarcely less remarkable. On one side of the heavens, north or south, the intervals of blue look almost black by contrast. There is now, at nine, a strong wind from the northwest. Why do these bars extend cast and west? Is it the influence of the sun, which set so long ago? or of the rotation of the earth? The bars which I notice so often, morning and evening, are apparently connected with the sun at those periods,

BOTANIZING

In Oliver N. Bacon's History of Natick, page 235, it is said that, of phænogamous plants, "upwards of 800 species were collected from Natick soil in three years' time, by 11 single individual." I suspect it was Bacon the surveyor. There is given a list of those which are rare in that vicinity. Among them are the following which I do not know to grow here: *Actæa rubra* (W.),[65] *Asclepias tuberosa*,[66] *Alopecurus pratensis*,[67] *Corallorhiza odontorhiza* (?) (Nutt.), *Drosera filiformis* (Nutt.), *Ledum latifolium*,[68] *Malaxis lilifolia* (W.) (what in Gray?), *Sagina procumbens*.[69] Among these rare there but common here are *Calla Virginica*, *Glecoma hederacea*, *Iris prismatica*, *Lycopus Virginicus*, *Mikania scandens*, *Prunus borealis*, *Rhodora Canadensis*, *Xyris aquatica*, *Zizania aquatica*. They, as well as we, have *Equisetum hyemale*, *Kalmia glauca*, *Liatris scariosa*, *Ulmus fulva*, *Linnæa borealis*, *Pyrola maculata*, etc., etc.

Bacon quotes White, who quotes Old Colony Memorial account of manners and customs, etc., of our ancestors. Bacon says that the finest elm in Natick stands in front of Thomas F. Hammond's house, and was set out "about the year 1760." "The trunk, five feet from the ground, measures fifteen and a half feet." G. Emerson gives it different account, *q.v.*

Observed within the material of a robin's nest, this afternoon, a cherry-stone.

Gathered some dry water milkweed stems to compare with the materials of the bird's nest [**Yellow Warbler** ***Dendroica petechia***] of the 18th. The bird used, I am almost certain, the fibres of the bark of the stem, –not the pods,– just beneath the epidermis; only the bird's is older and more fuzzy and finer, like worn twine or string. The fibres and bark have otherwise the same appearance under the microscope. I stripped off some bark about one sixteenth of an inch wide and six inches long and, separating ten or twelve fibres from the epidermis, rolled it in my fingers, making a thread about the ordinary size. This I could not break by direct pulling, and no man could. I doubt if a thread of flax or hemp of the same size could be made so strong. What an admirable material for the Indian's fish-line! I can easily get much longer fibres. I hold a piece of the dead weed in my hands, strip off a narrow shred of the bark before my neighbor's eyes and separate ten or twelve fibres as fine as hair, roll them in my fingers, and offer him the thread to try its strength. He is surprised and mortified to find that he cannot break it. Probably both the Indian and the bird discovered for themselves this same (so to call it) wild hemp. The corresponding fibres of the mikania seem not so divisible, become not so fine and fuzzy; though somewhat similar, are not nearly so strong. I have a hang-bird's nest from the riverside, made almost entirely of this, in narrow shreds or strips with the epidermis on, wound round and round the twigs and woven into a basket. That is, this bird has used perhaps the strongest fibres which the fields afforded and which most civilized men have not detected.

Knocked down the bottom of that summer yellowbird's nest made on the oak at the Island last summer. It is

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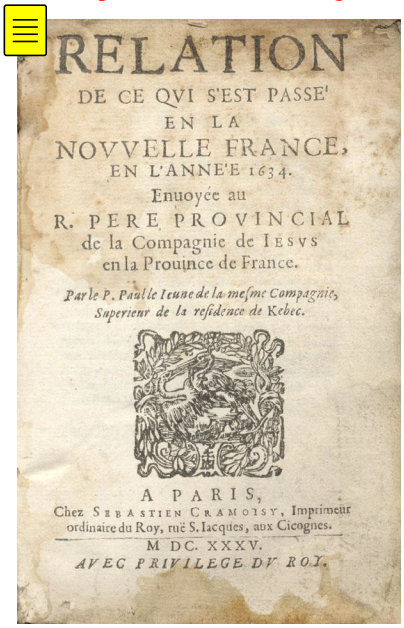
65. Found since.
66. Probably here.
67. Found since.
68. Found since.
69. Found since.

chiefly of fern wool and also, *apparently*, some sheep's wool(?), with a fine green moss (apparently that which grows on button-bushes) inmixed, and some milkweed fibre, and all very firmly agglutinated together. Some shreds of grape-vine bark about it. Do not know what portion of the whole nest it is.

March 26, Wednesday: Alice Reynolds was born, daughter of the Reverend Grindall Reynolds and Lucy Maria Dodge Reynolds.

Having already perused the volumes for the years 1633-1642, Henry Thoreau checked out, from Harvard Library, for the 2d time, the JESUIT RELATION volume for the years 1639, and the volume for 1642-1643.[70]

http://www.canadiana.org



RELATION
DE CE QVI S'EST PASSE'
EN LA
NOVVELLE FRANCE,
EN L'ANNE'E 1634.
Enuoyée au
R. PERE PROVINCIAL
de la Compagnie de IESVS
en la Prouince de France.
Par le P. Paul le Ieune de la mesme Compagnie,
Superieur de la residence de Kebec.

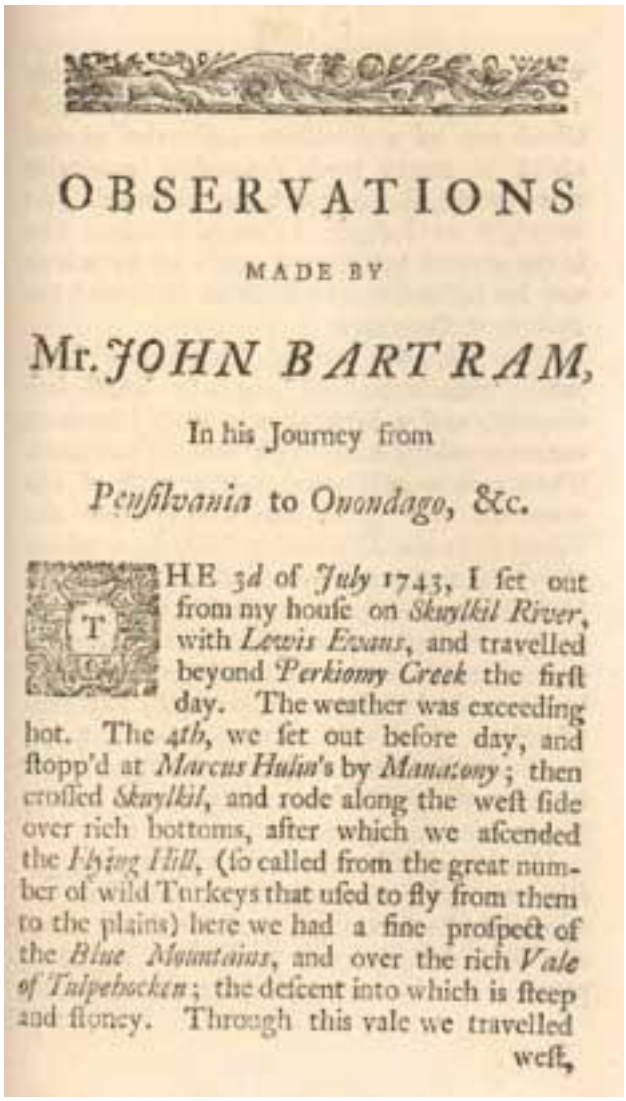
A PARIS,
Chez SEBASTIEN CRAMOISY, Imprimeur
ordinaire du Roy, ruë S. Iacques, aux Cicognes.
M DC. XXXV.
AVEC PRIVILEGE DV ROY.

He also checked out Friend John Bartram's botanical OBSERVATIONS ON THE INHABITANTS, CLIMATE, SOIL, RIVERS, PRODUCTIONS, ANIMALS, AND OTHER MATTERS WORTHY OF NOTICE. MADE BY MR. JOHN BARTRAM, IN HIS TRAVELS FROM *PENSILVANIA* TO *ONONDAGO*, OSWEGO AND THE LAKE ONTARIO, IN CANADA: TO WHICH IS ANNEX'D A CURIOUS ACCOUNT OF THE CATARACTS AT NIAGARA. BY MR. PETER KALM, A SWEDISH GENTLEMAN WHO TRAVELLED THERE (London: printed for J. Whiston & B. White, in Fleet-Street, 1751).

JOHN BARTRAM'S BOOK

70. Cramoisy, Sebastian (ed.). *RELATION DE CE QUI S'EST PASSÉ EN LA NOUVELLE FRANCE IN L'ANNÉE 1636: ENVOYÉE AU R. PERE PROVINCIAL DE LA COMPAGNIE DE JESUS EN LA PROVINCE DE FRANCE, PAR LE P. PAUL LE JEUNE DE LA MESME COMPAGNIE, SUPERIEUR DE LA RESIDENCE DE KÉBEC. A Paris: Chez Sebastian Cramoisy...*, 1637

He would make notes on this reading in his Indian Notebook #10,[71] and refer to it in CAPE COD.



OBSERVATIONS

MADE BY

Mr. JOHN BARTRAM,

In his Journey from

Penſilvania to *Onondago*, &c.

THE 3*d* of *July* 1743, I ſet out from my houſe on *Skuylkil River*, with *Lewis Evans*, and travelled beyond *Perkiomy Creek* the firſt day. The weather was exceeding hot. The 4*th*, we ſet out before day, and ſtopp'd at *Marcus Hulin's* by *Manatony*; then croſſed *Skuylkil*, and rode along the weſt ſide over rich bottoms, after which we aſcended the *Flying Hill*, (ſo called from the great number of wild Turkeys that uſed to fly from them to the plains) here we had a fine proſpect of the *Blue Mountains*, and over the rich *Vale of Tulpehocken*; the deſcent into which is ſteep and ſtoney. Through this vale we travelled weſt,

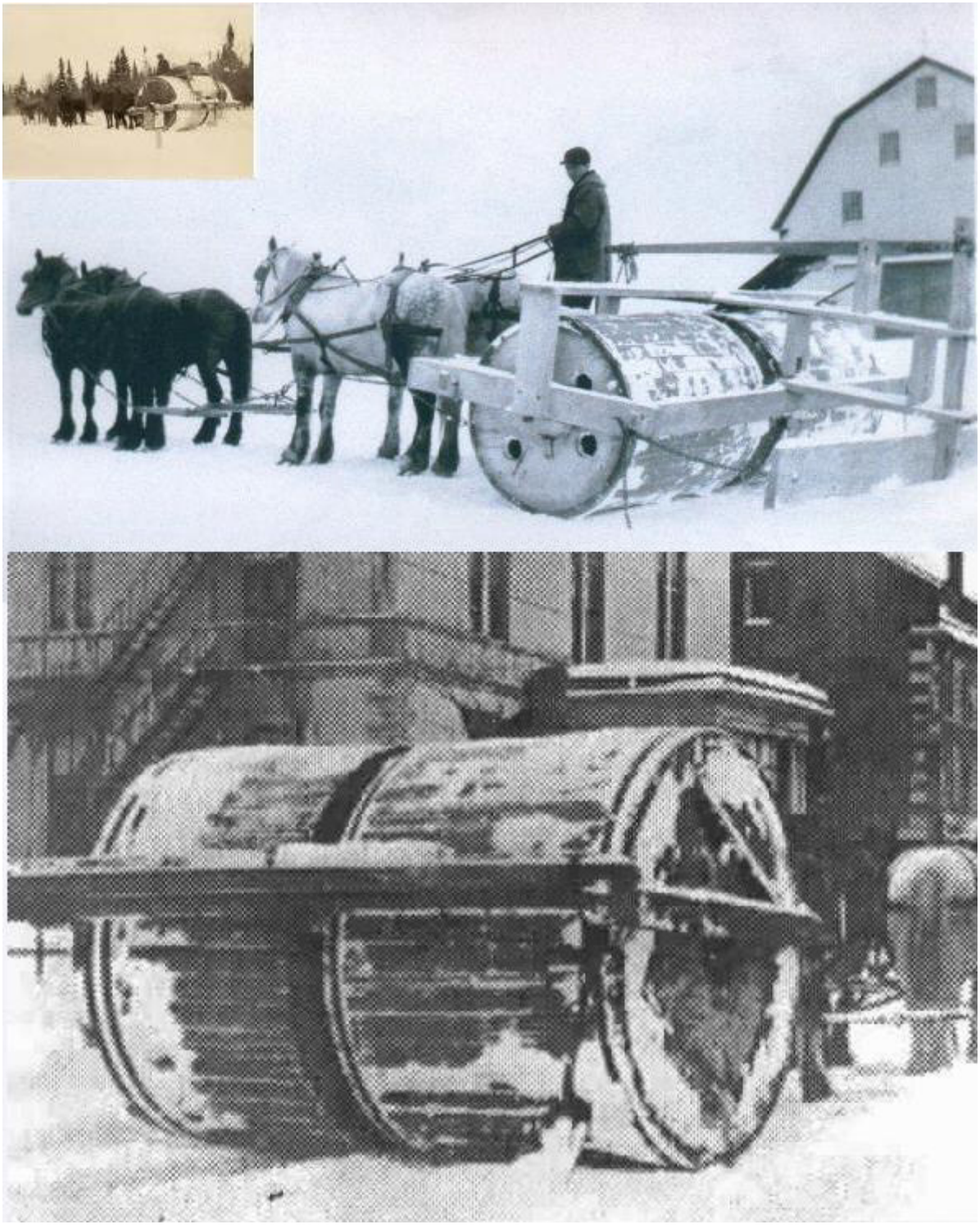
71. The original notebooks are held by the Pierpont Morgan Library in New York, as manuscripts #596 through #606. There are photocopies, made by Robert F. Sayre in the 1930s, in four boxes at the University of Iowa Libraries, accession number MsC 795. More recently, Bradley P. Dean, PhD and Paul Maher, Jr. have attempted to work over these materials.

CAPE COD: This spirit it was which so early carried the French to the Great Lakes and the Mississippi on the north, and the Spaniard to the same river on the south. It was long before our frontiers reached their settlements in the west, and a voyageur or coureur de bois is still our conductor there. Prairie is a French word, as Sierra is a Spanish one. Augustine in Florida, and Santa Fé in New Mexico [1582], both built by the Spaniards, are considered the oldest towns in the United States. Within the memory of the oldest man, the Anglo-Americans were confined between the Apalachian Mountains and the sea, "a space not two hundred miles broad," while the Mississippi was by treaty the eastern boundary of New France. (See the pamphlet on settling the Ohio, London, 1763, bound up with the travels of Sir John Bartram.) So far as inland discovery was concerned, the adventurous spirit of the English was that of sailors who land but for a day, and their enterprise the enterprise of traders. Cabot spoke like an Englishman, as he was, if he said, as one reports, in reference to the discovery of the American Continent, when he found it running toward the north, that it was a great disappointment to him, being in his way to India; but we would rather add to than detract from the fame of so great a discoverer.

PEOPLE OF CAPE COD

Bound up with this Bartram volume, as Thoreau indicated, was Anselm-Yates Bayly's THE ADVANTAGE OF A SETTLEMENT UPON THE OHIO IN NORTH AMERICA (London: J. Riddley, 1763).

Thoreau commented in his journal on the snow wheels of his era, which were used to tamp down the snow on the roads so they were passable by sleigh. Here are some photographs of typical snow wheels:




Mar. 26th '56 to Cambridge —

I hear that Humphrey Buttrick found a whole covey of quails dead under the snow — At (He tells me that his dog found 4 in the winter) as other coveys are missing thinks they have starved) Philadelphia a month or 2 since they offered a reward for live ones more than market price — to preserve them.

We have heard of an unusual quantity of ice in the course of the Liverpool packets this winter — Perhaps the Pacific has been {sunk} by one, as we hear that some other vessels have been — Yet the papers say it has been warmer about Lake Superior than in Kansas — & that the Lake will break up earlier than usual. They are just beginning to use snow wheels in Concord — but only in the middle of the town — where the snow is at length worn & melted down to bare ground in the middle of the road from 2 to 10 feet wide — Sleighs are far the most common even here In Cambridge there is no sleighing — for the most part the middle of bare & even the road from Porters to the College is dusty for 20 to 30 feet in width — the College Yard is one half bare — So if they have had more snow than we, as some say, it has melted much faster — There is also less in the towns between us & Cam. than in Concord. The snow lies longer on the low level plain surrounded by hills — in which Concord is situated. I am struck by the more wintry aspect — almost entirely uninterrupted snow fields — on coming into Concord in the cars.

The Romans introduced husbandry into England, where but little was practiced before — & the English have introduced it into America — so we may well read the Roman authors for a history of this art as practiced by us.

I am sometimes affected by the consideration that a man may spend the whole of his life after boyhood in accomplishing a particular design — as if he were put to a petty & special use — without taking time to look around him & appreciate the phenomenon of his existence — If so many purposes are thus necessarily left unaccomplished — perhaps unthought of — we are reminded of the transient interest we have in this life — Our interest in our country in the spread of liberty &c strong & as it were, innate as it is- -cannot (learn) (this learn gets omitted by the Dover editors) be as transient as our present existence here. It cannot be that all those patriots who die in the midst of their career have no further connexion with the career of the country.

August 8, Friday: Henry Thoreau and Waldo Emerson walked in the Conantum district of Concord. Back home, Emerson then commented on this day in his journal, recording with condescension and forbearance not only that his tour guide had exhibited "some of his botanical rarities" –by this manner of elocution signalling that these were plants of interest only by reason of novelty– but also that he had "expatiated on the omniscience of the Indians" — which would be a total absurdity of course, since as W. well understood, these American aboriginals are people of a low culture and a lower intellect, doomed to die out both as a culture and as a race due to their manifest inability to cope with the overwhelming superiority of us, the omniscient white people.

Thoreau recorded an incident involving Michael Flannery and his wife Ann and their young son Johnny. (One gathers that this must have been shortly after the wife and children arrived in Concord from Ireland, while they were still boarding at the Thoreau boardinghouse.) It was the pursuit of his father John Thoreau's 90-pound pig, which had escaped its pen and was wandering the streets of Concord. After several unsuccessful attempts to trap it, Thoreau writes, "an Irishman was engaged to assist":

> "I can catch him," says he, with Buonapartean confidence. He thinks him a family Irish pig. His wife is with him, bareheaded, and his little flibbertigibbet of a boy, seven years old. "Here, Johnny, do you run right off there" (at the broadest possible angle with his own course). "Oh, but he can't do anything." "Oh, but I only want him to tell me where he is,—to keep sight of him." Michael soon discovers that he is not an Irish pig, and his wife and Johnny's occupation are soon gone. Ten minutes afterward I am patiently tracking him step by step through a corn-field, a near-sighted man helping me, and then into garden after garden far eastward, and finally into the highway, at the graveyard; but hear and see nothing. One suggests a dog to track him. Father is meanwhile selling him to the blacksmith, who is also trying to get sight of him. After fifteen minutes since he disappeared eastward, I hear that he has been to the river twice far [to] the north, through the first neighbor's premises. I wend that way. He crosses the street far ahead, Michael behind; he dodges up an avenue. I stand in the

gap there, Michael at the other end, and now he tries to corner him. But it is a vain hope to corner him in a yard. I see a carriage manufactory door open. "Let him go in there, Flannery." For once the pig and I are of one mind; he bolts in, and the door is closed. Now for a rope. It is a large barn, crowded with carriages. The rope is at length obtained; the windows are barred with carriages lest he bolt through. He is resting quietly on his belly in the further corner, thinking unutterable things.

Now the course commences within narrower limits. Bump, bump, bump he goes, against wheels and shafts. We get no hold yet. He is all ear and eye. Small boys are sent under the carriages to drive him out. He froths at the mouth and deters them. At length he is stuck for an instant between the spokes of a wheel, and I am securely attached to his hind leg. He squeals deafeningly, and is silent. The rope is attached to a hind leg. The door is opened and the driving commences. Roll an egg as well. You may drag him, but you cannot drive him. But he is in the road, and now another thunder-shower greets us. I leave Michael with the rope in one hand and a switch in the other and go home. He seems to be gaining a little westward. But, after long delay, I look out and find that he makes but doubtful progress. A boy is made to face him with a stick, and it is only when the pig springs at him savagely that progress is made homeward. He will be killed before he is driven home. I get a wheelbarrow and go to the rescue. Michael is alarmed. The pig is rabid, snaps at him. We drag him across the barrow, hold him down, and so, at last, get him home.

Per Charles Flannery, presumably the grandson of Michael Flannery, as recorded in John E. Nickols's "Thoreau and the Pig" (Thoreau Society Bulletin LXXVII for Fall 1961, page 1): "*That Thoreau, he lived in a hut out there by the pond, he wasn't much, besides that he was insulting; he was an insulting man.... Why, do you know my grandfather and Henry Thoreau pounded lead together* [pencil making]*, yessir, they pounded lead together.... Do you know what he said to my grandfather, I'll tell you what he said. My grandfather used to take Thoreau home to eat dinner. Henry Thoreau ate dinner at my grandfather's house plenty of times, when they were poundin' lead together. One time my grandfather took Henry Thoreau home with him to eat dinner. When they got to the house the pigs were loose. My grandfather said, 'Henry, help me drive the pigs out of the yard; you stand in the barn door over there.... You stand there and don't let the pigs run into the barn,' grandfather asked Thoreau to guard the door. Henry stood in the door. Just then one of the pigs made a run for the barn. Henry started to head him off but the pig ran right between his legs. Knocked Henry right off his feet. He got up, dusted himself off and he said to my grandfather, 'Mr. Flannery, only an Irish pig would do a thing like that.'... Imagine that, imagine him saying a thing like that ... an Irish pig ... I tell you that man was insulting.*"

THOREAU ON THE IRISH

Early September: Bronson Alcott set Henry Thoreau up for a large surveying job with Friend Marcus Spring of a colony for Hicksite Quakers expelled by their meetings, near Perth Amboy, New Jersey across the water from Staten Island.

View Henry Thoreau's personal working drafts of his surveys courtesy of AT&T and the Concord Free Public Library:

http://www.concordlibrary.org/scollect/Thoreau_Surveys/Thoreau_Surveys.htm

(The official copy of this survey of course had become the property of the person or persons who had hired this Concord town surveyor to do their surveying work during the 19th Century. Such materials have yet to be recovered.)

View this particular personal working draft of a survey in fine detail:

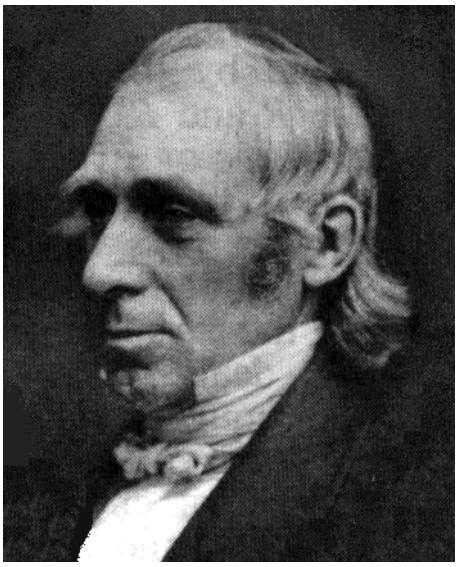
http://www.concordlibrary.org/scollect/Thoreau_Surveys/116.htm

This was the colony in which Theodore Dwight Weld and his wife Angelina Emily Grimké Weld and her sister

Sarah Moore Grimké had started their Eagleswood School, financed in part by the Mott family, and this was the school in which Ellen Wright, a niece of Friend Lucretia Mott who later married a son of William Lloyd Garrison, was educated, as well as other Wright children.

ANGELINA EMILY GRIMKÉ | SARAH MOORE GRIMKÉ

Thoreau took the train to Fitchburg and from there walked to Westminster; took the train to Brattleboro VT; explored the Connecticut River and Mount Wantastiquet and investigated plants and animals in Vermont; took the train to Bellows Falls; climbed Fall Mountain; took a wagon to Walpole, New Hampshire to visit the Alcott family.



Here is a recollection by Mary Brown Dunton as reported in Elizabeth B. Davenport's "Thoreau in Vermont in 1856," Vermont Botanical Club Bulletin III (April 1908), page 37:

> He struck me as being very odd, very wise and exceedingly observing. He roamed about the country at his own sweet will, and I was fortunate enough to be his companion on a walk up Wantastiquet Mt. I was well acquainted with the flora and could meet him understandingly there, but was somewhat abashed by the numerous questions he asked about all sorts of things, to which I could only reply "I do not know." It appealed to my sense of humor that a person with such a fund of knowledge should seek information from a young girl like myself, but I could not see that he had any fun in him. The only question I can now recall is this. As we stood on the summit of Wantastiquet, he fixed his earnest gaze on a distant point in the landscape, which he designated, asking "How far is it in a bee line to that spot?"

Before dawn on his 1st morning in Brattleboro VT, on his way to visit the Alcotts in New Hampshire, Thoreau reviewed a botanical catalog of Vermont plants. Then, as daylight appeared, he sauntered south along the railroad tracks and back along the banks of the Connecticut River, inspecting plants along the way. He climbed down the embankment to "the cold water path" of Whetstone Brook along neighboring Canal Street and Flat Street. Swamp maples along the Whetstone were beginning to turn color. Deep, dark columns of flowers rose like thick red ropes from the pale green leaves of sumac. He spent the afternoon inspecting plants, testing the murky water, and noting the wildlife. He made a note that Brattleboro appealed to him "for the nearness of primitive woods and mountain." He stopped to munch on raspberries and made a note of their "quite agreeable taste." Later that morning he tasted some grapes that were "pleasantly acidic."

On his 2nd morning in the town, Thoreau wandered far north along the Connecticut River, noting the level of the river, the shape of the gravel on its banks, and the explosion of late summer flowers that bloomed everywhere. "Will not the prime of the goldenrods and asters be just before the first severe frost?"

On his 3rd day in the town, Thoreau again went "a-botanizing" up Whetstone Brook. The witch-hazel was out, hemlock lined the stream and asters bloomed everywhere. That night he created a two-page list of each plant. He described the Indian rope plant, named for its use as twine: "How often in the woods and fields we want a string or a rope and cannot find one.... This is the plant which Nature made for that purpose." He noted that farmers in Vermont used the dried bark to tie up their fences, and wondered if it should be cultivated for that purpose.

While in Brattleboro a man who had recently killed a catamount showed Thoreau its skin and skull. By 1856, the mountain lion had become quite rare in southern Vermont. The skin measured nine feet, including its long tail, and the animal had weighed 108 pounds. Thoreau noted that the man had gotten a $20 bounty for his kill.

On the morning of his last day in the Vermont town, Thoreau climbed Wantastiquet Mountain, the hill that rises out of the Connecticut River, towering above the downtown buildings. From the top he could see as far as Mount Ascutney, but he was more attentive to the horses and people he could see below him. "Above all this everlasting mountain is forever lowering over the village, shortening the day and wearing a misty cap each morning." His considered opinion was that "this town will be convicted of folly if they ever permit this mountain to be laid bare."

THOREAU IN VERMONT:

WALKING WITH HENRY DAVID

BY ALAN BOYE

The glorious late-summer sunlight shone golden on the hills above downtown Brattleboro. Ignored by the people passing by, a man stood at the edge of Main Street and tightened the laces of his boots. He checked to see that his pencil and paper were in his backpack, and then climbed down the embankment to the babbling waters of Whetstone Brook.

The swamp maples that grew like weeds along the Whetstone were already showing the first hint of autumnal glory on their leaves. Deep, dark columns of flowers rose like thick red ropes from the pale green leaves of sumac. In the last of summer's brilliant air, insects flickered and then vanished like sparks of memory.

The man paused a moment and then set out on "the cold water path" of Whetstone Brook. He spent the beautiful afternoon inspecting its plants, testing the murky water, and noting the wildlife that scurried along its banks. All the while, the busy residents of the town hurried by on neighboring Canal and Flat streets, unaware of the strange creature below them.

The man was America's greatest naturalist, Henry David Thoreau. It was early September 1856. Thoreau was on his way to visit a friend in New Hampshire and stopped to spend four days walking around Brattleboro. It would be the only time in his life that he would explore Vermont on foot. He wrote in his journal that Brattleboro appealed to him "for the nearness of primitive woods and mountain."

A truck blasts past me and, in a low whine of gears, begins to climb Canal St. from downtown Brattleboro. Behind me, the Whetstone squeezes between a canyon of brick buildings. The water tumbles over massive rocks and then, just as suddenly, surrenders to the placid calm of the wide Connecticut. Cars clanging over the long bridge into New Hampshire nearly drown the sound of the rapids.

I head straight for the Whetstone past the somber, concrete-gray walls behind a bagel shop. A motion distracts me from the ordinary. Something mysterious watches me from the shadowed banks of the brook.

In the weedy edge of the stream stands a creature; the sharply angled body looks more like Egyptian hieroglyph than bird. A green heron walks away cautiously. The spear point of its stout head stabs at the sky with each of its jerking, upstream steps. I move to the bank and follow him, each of my unsure steps an attempt to catch a glimpse of the ghost of Thoreau.

In 1856, Thoreau was at the peak of his literary talents. Walden had been published only two years earlier. He was gaining a

reputation as a profound lecturer. On podiums across New England, he read aloud the essays that would make him famous for centuries to come.

In any era, Thoreau would not have fit well into polite society. First of all, an eagle-sized beak of a nose hung down over a bow-tie mouth; ever a practical man, he had grown a weird, neck-only beard in order to see if it might keep him from getting colds. His hair was almost always unkempt, and his active life gave him the broad, hard look of an athlete.

Thoreau had begun to turn away from the broad, philosophical contemplations that made Walden a masterpiece and towards writing focused on the natural world. Ever a keen observer of the world around him, he had turned more and more of his attention to a close study of the plants and animals. He believed that by paying strict attention to the details of the natural world, humankind would finally come to understand and appreciate the essence of life. "In wilderness," he wrote at about this time, "is the preservation of the world."

Before dawn on his first morning in Brattleboro, Thoreau was studying a catalog of Vermont plants. At daylight he sauntered south along the railroad tracks and then back along the banks of the Connecticut, inspecting every plant along his way. His journal describes with the exactness of a trained botanist each plant he encountered. He stopped to munch on raspberries; he scribbled a note about their "quite agreeable taste." Later that morning, he found some grapes that tasted "pleasantly acidic."

On his second morning in Brattleboro, Thoreau wandered far north along the Connecticut, noting the level of the river, the shape of the gravel on its banks, and the explosion of late summer flowers that bloomed everywhere.

"Will not the prime of the goldenrods and asters be just before the first severe frost?" he wrote.

Just twenty yards past the bagel shop, I seem to be in the deepest Vermont wilderness. I have been fighting my way through thick underbrush and stepping from one side of the brook to the other, trying to work my way along the steep banks that tower above me. I stop to inspect an unfamiliar leaf. I spend a good ten minutes with a tree-identification book, only to find the golden treasure I hold is simply the leaf of an ordinary yellow birch.

On the third day in Brattleboro, Thoreau was elated because he could "go a-botanizing" up the Whetstone. The witch-hazel was out, hemlock lined the stream and asters bloomed everywhere. Late that night in his sometimes-erratic handwriting, he meticulously scrawled a list of every plant he had found along the Whetstone. The journal entry fills nearly two pages, but he saves the most extensive entry for the Indian rope plant, named for its use as twine. "How often in the woods and fields we want a string or a rope and cannot find one," he wrote. "This is the plant which Nature made for that purpose."

He noted that farmers in Vermont used the dried bark to tie up their fences, and - ever practical - decided it would be a good idea if they were to cultivate it for just that purpose.

The stream is littered with good-sized, practical rocks. I lift a smaller one from the mud of the bank. It is cool in my hand. A thin sheen of moss hugs the rough surface of the stone. It's

easy to see why early settlers used these for grinding and sharpening tools. Where could a fella get a good sharpener? Why over to the Whetstone Brook, of course.

I set the stone back in its place in the mud. We don't have much need of whetstones anymore or, for that matter, of Indian rope plant. Neither do we have any pressing need for Thoreau's detailed record of Vermont's plants. The days of hook-nosed Transcendental philosophers carefully noting every one of nature's wonders have passed. Perhaps my search for some remnant of Thoreau is as quaint and as useless as sharpening a horse-drawn ploughshare on a pale white whetstone drawn from a mossy brook. Two cold and electronic chirps from my watch mark the passing of another hour. I turn around and start back down the stream.

While in Brattleboro Thoreau saw something that he would spend pages of his journal trying to describe. The man who had recently killed it showed Thoreau the skin and the skull of a catamount. Even in 1856, the mountain lion was a rare creature in southern Vermont. It would be the only catamount, living or dead, that Thoreau would ever see in his lifetime. The beast measured nine feet, including its long tail, and had weighed 108 pounds. Thoreau tried to capture every detail of the beast that he could in his journal. He noted without comment that the man had gotten a $20 bounty for the kill.

I spy a ragged and worn house cat, long since having known the comforts of a human home, slinking through the thin underbrush across the brook from where I walk. A series of rusted steel bars poke up through the thin water of the brook.

On the morning of his last day in Brattleboro Thoreau climbed Wantastiquet Mountain, the high hill that jumps straight out of the Connecticut River and towers above downtown Brattleboro. Although from the top he could see as far as Mount Ascutney, he was most fascinated by watching horses and people far below. He marveled at how close nature came to the bustling village. "Above all this everlasting mountain is forever lowering over the village, shortening the day and wearing a misty cap each morning." He cautioned that "this town will be convicted of folly if they ever permit this mountain to be laid bare."

I am nearly back to the bagel shop. Through the trees I see the dark massive shape of Wantastiquet Mountain. Near the top, still covered in thick forest, is the spot where nearly 150 years ago a great man stood and contemplated how the ways of humankind are made small by the glory and grandeur of the remarkable ways of nature.

I look away from the mountain, distracted by a sound. Something stirs near the base of a yellow birch tree. The green heron steps into a clearing and stands at the edge of the water. It stares at me through a black, wild eye. In the brook a few small fish weave threads of pure light through quick, silvery curtains of shadow and water.

October: The Reverend Richard Chenevix Trench became dean of Westminster.

Arriving back in Dublin, Ireland, Friend William Henry Harvey would receive an appointment as Professor of Botany at Trinity College.

October 25, Saturday: Henry Thoreau arrived at the Eagleswood community, about a mile west of Perth Amboy, New Jersey on the shore of Raritan Bay. He reported in his journal a visit to the Astor Library in New-York (while there he inspected the 1850 reprinting of the 2-volume 1840 edition of Professor Sir William Jackson Hooker's *FLORA BOREALI-AMERICANA*). He would write his sister Sophia that he was "constantly engaged in surveying" from Monday through Saturday.

BOTANY

Oct. 25. Saw, at Barnum's Museum, the stuffed skin of a cougar that was found floating dead in the Hudson many years ago. The stuffed jaguar there looks rather the largest. Had seen a clergyman in Worcester the previous afternoon (at Higginson's) who told me of one killed near the head of the Delaware, in New York State, by an acquaintance of his. His dog had treed it or found it on a tree on a mountainside, and the hunter first saw it as he came up from below, stretched out on a limb and looking intently at him, ready to spring. He fired and wounded it, but, as usual, it sprang as soon as struck, in the direction it was pointing. It struck seventy feet down the mountain from the tree, or a hundred feet distant, tearing off the sleeve of the hunter's very thick and stout coat, as it passed, and marking his arm from shoulder to hand. It took to a tree, and again, and this time approaching it from above, he shot it. The specimens I have seen were long-bodied. Looked into De Bay's Report at the Astor Library. He describes one, the largest "of which we have any account," killed in Lake Fourth, Herkimer County. "it had a total length of 11 feet 3 inches." He says that Vanderdonk speaks of lions and their skins, only the latter seen by Christians, meaning panthers. According to D., haunts ledges of rocks called "panther ledges." There is no well-authenticated account of their having attacked a man, and it is not well established that the northern and southern species are the same.[72]
De Kay describes the *Sorex Dekayi*, "nearly allied to *brevicaudus*, but is larger and more robust in its form." From Massachusetts to Virginia. "Cheek teeth 16/10," instead of 18/10 in *S. brevicaudus*. The color resembles the fur of the star-nosed mole. Length of head and body, 4.8 inches; tail, 8; to end of hairs, 9. He never met with *S. brevicaudus* in New York. Is not this my sorex of July 12th, 1856? Or is mine possibly the *Sorex Fosteri*, whose cheek teeth are 18/10; and total length, 4; tail, 1.5.

JAMES ELLSWORTH DE KAY

Arrived, at Eagleswood, Perth Amboy, Saturday, 5 P.M., October 25th.

72. Apparently a panther was killed after this, this fall in Rhode Island.

December 16, Tuesday: Richard Wagner described his friendship with Franz Liszt as the nicest thing that had ever happened to him.

The 1st concert by Sigismond Thalberg in Washington DC was attended by President Franklin Pierce (we can hope he wasn't drunk out of his mind).

Thomas Cholmondeley wrote Henry Thoreau from Rome, urging him to "try a history. How if you could write the sweet, beautiful history of Massachusetts? … Or take Concord … Take the spirit of Walton and a spice of White." The reference was of course to Izaak Walton's famously inoffensive fishing book THE COMPLEAT ANGLER OR THE CONTEMPLATIVE MAN'S RECREATION. BEING A DISCOURSE OF FISH AND FISHING, NOT UNWORTHY THE PERUSAL OF MOST *ANGLERS* and to the Reverend Gilbert White's THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE.

– ROME, December 16, 1856.
MY DEAR THOREAU,— I wish that I was an accomplished young American lady, for then I could write the most elegant and "recherché" letters without any trouble or thought. But now, being an Englishman, even my pleasures are fraught with toil and pain. Why, I have written several letters to you, but always, on reading them over to myself, I was obliged to burn them, because I felt they were bad letters, and insufficient for a passage of the ocean. To begin, then, a new and a good letter, I must acquaint you that I received [your] former communication, which gave me the sincerest pleasure, since it informed me that the books which I sent came to hand, and were approved of. I had indeed studied your character closely, and knew what you would like. Besides, I had, even from our first acquaintance, a previous memory of you, like the vision of a landscape a man has seen, he cannot tell where.
As for me, my life still continues (through the friendship of an unseen hand) a fountain of never-ending delight, a romance renewed every morning, and never smaller to-day than it was yesterday, but always enhancing itself with every breath I draw. I delight myself, I love to live, and if I have been "run down" I am not aware of it.
I often say to God, "What, O Lord, will you do with me in particular? Is

it politics, or philosophical leisure, or war, or hunting, or what?" He always seems to answer, "Enjoy yourself, and leave the rest to itself." Hence everything always happens at the right time and place, and rough and smooth ride together. There is an old Yorkshire gentleman — a great-grandfather of ninety — who promises to see his hundred yet, before he flits. This man was asked lately (he has had his troubles, too) "what of all things he should like best." The merry old squire laughed, and declared that "he should like of all things to begin and live his life over again, in any condition, almost, — he was not particular." Now, I am like the squire in my appreciation of life. It is so great a matter to exist pleasurably. The sensation of Being!

Thus much about myself. As for my Phenomena, I have seen and thought and done quite up to my highest mark; but I will not weary you with descriptions of the Crimea, Constantinople, or even Rome, whence I am now writing. But one thing I will attempt to tell you. I saw the great explosion when the Windmill Magazine blew up. I was out at sea, a good ten miles from the spot. The day was fine; suddenly the heaven was rent open by a pillar of fire, which seemed ready to tear the very firmament down. It was like the "idea" of the hottest oven. As it hung (for it lasted while you might count) on the horizon, the earth shook and the sea trembled, and we felt the ship quivering under us. It was felt far and wide like an earthquake. We held our breath and felt our beating hearts. Presently we recovered, and the first feeling in every heart was, "Better go home after that!" The roaring noise was, I am told, tremendous. Strange that I cannot at all recollect it! I only saw the apparition and felt the shock....

The English temper keeps very warlike. They want another turn with Russia. But since Europe is now pretty well closed up, it seems to be the general impression that Asia will be the field of the next Russian war: and who knows how long it may last when once it begins? They descending from their Riphean hills, hordes of poor and hardy Tartars, — Gog and Magog and their company; we ascending, with the immense resources of India behind us, towards the central regions, the scarce-explored backbone of Asia. The ruins of long-forgotten cities half buried in sand, the shattered temples of preadamite giants, the Promethean cliffs themselves, will ring with the clang of many a battle, with the wail of great defeats and the delirious transports of victory. There is a very old English prophecy now in circulation, "that the hardest day would come when we should have to fight against men having snow on their helmets." So that superstition swells the anti-Russian tide.

I have seen something of Turks, Greeks, Frenchmen, and Italians, and they impress me thus: the Turk, brave, honest, religious; the Greek, unclean, lying, a slave, and the son of a slave; the Frenchman, light-hearted, clever, and great in small things; the Italian, great, deep, ingenious. I would put him first. He is greater than the Frenchman. Having been in the Redan, the Malakoff, etc., I am truly astonished at the endurance of the Russians. The filth and misery of those horrid dens were beyond expression. Even the cleanest part of our own camp swarmed with vermin. I caught an aristicrat — a member of Parliament — one day stopped for a flea-hunt in his tent. Though too late for any regular engagement, I managed to experience the sensation of being under fire. It is only pleasurable for about

a quarter of an hour; in short, it soon fatigues, like a second-rate concert. The missiles make strange and laughable sounds sometimes, — whistling and crowing and boiling. Watching them moving through the air from the north side of the harbor, they seemed to come so slow!

The Crimea is a beautiful country, — the air clear, hilly, clothed with brushwood; the pine on the hill, and the vine in the valley. It is a fine country for horseback, and many a good ride I had through it. I see that I am falling into description, whether I will or no. The Bosphorus and the Sea of Marmora — indeed, all the neighborhood of Stamboul — are charming, in spite of rags, dirt, and disease. Nature has done her utmost here, and the view from the Seraskier's Tower is the finest in the world. The Turkish ladies (for I saw plenty of beauties in the bazaars) are, in figure, like our own; that is, "very fat." The Turk and the Briton seem to agree that a good breed cannot be got out of lean kine. In the face, however, they excel ours; the lines are more regular. In expression, babies; in gait, waddling; the teeth often rotten from too much sweetmeat.

There was an English lady at Stamboul who had traveled with a bashaw's favorite wife. They were put in one cabin on board a ship. She told us how the favorite behaved: how she was laughing and crying and praying in a breath; how she was continually falling fast asleep and snoring loudly, waking up again in a few minutes; she was the merest infant, and as fat as a little pig; lastly, how the bashaw was always popping into the cabin, to see what she was about, at all hours, and cared nothing for the English lady, though she was sometimes quite en déshabillé.

I met Abdel Kadir in the East. He is a very handsome man, with mild,

engaging manners, a face deadly pale, very fine eyes, beard, and hands. Very like one of your Southerners, some of whom are not to be surpassed. He is now residing at Damascus. I noted the Circassians to be a fine race, very tall and well made, with high features; grave and fierce, and yet sweet withal. They wear high caps, and carry an armful of daggers and pistols. The feet and hands long and small. They have, too, a fine, light, high-going step, full of spring and elasticity, like the gait of a high-mettled horse. "Incessu patuit." But every nation has a motion of its own. Among the boatmen on the Bosphorus I saw many faces and figures very like the same class at Hong-Kong and on the Canton River in China. Both have a Tartar look. Mongolians, I imagine. I think I should like, as I grow older and more stay-at-home, to pay attention to the subject of "breeding." Astonishing facts come out upon inquiry. Now, sheep, horses, dogs, and men should be more closely watched. I see already some things. I see that Nature is always flowing. She will not let you fix her, and she refuses to be caught out by any process of exhaustion. There is always somewhat unknown, and that somewhat is everything. You may think that you have exhausted the chances of vice and disease by putting the best always together. Now, if you merely put the best together, you will have either no breed or a very bad one. There is something in the "black sheep" which the better one loses. There is something divine, which is pity to lose, even in the most barbarous stock. Lord Byron said that the finest man and the best boxer he ever met told him that he was the offspring of positive deformity, and that he had brothers still finer than himself. On the other hand, I know a young gentleman who is an absolute baboon, but

the son of a good-looking father and a mother of a race famous for beauty. But the family crest is a baboon, and it came out after the lapse of centuries.

A student of family pictures will observe, in a good gallery, how the same face comes and goes. It will sometimes sleep for three hundred years. A certain expression of countenance is in a certain family; some change takes place, — perhaps they lose an estate or gain a peerage; it goes, and turns up again in another branch which never had it before. Is not Walker the best representative of old Rolf Ganger? I think that both gang the same gait.

This is enchanted ground, — St. Peter's, the Pantheon, the Coliseum, etc. But let me tell you what attracts me most in Rome and its neighborhood. It is the lake and woods of the ancient Alba Longa, the mother city of Rome, which you see clearly and well in the distance (about 14 miles off). The lake, which is very large, many miles round, is in the crater of an old volcano, and therefore high up. It is surrounded by woods, chiefly of holm oaks; but here are also the stone pine, the common deciduous oak, and other fine trees. These woods are pierced by numerous beautiful walks.

[Here follows a sketch of the neighborhood of the Alban lake.]

This little map will give you some inkling of these beautiful hills, of the lake of Alba and its sister Nemi. You will see that the colonists moved northwest to found Rome; you will imagine, when you stand on the bank of the lake, where is the long ridge or street whence the old city (all long ago gone) took its name, that you are at a height sufficient to see all the country round; yet you have got the Monte Calvo, with the old temple (now a convent) of Jupiter Latiaris at your back and many hundred

feet above you (perhaps a thousand). What a position for a city! What an eagle's nest! Here is every variety of scenery, with the sea quite plainly seen to the west. Hence you wind up through a modern town, called Rocca di Papa, and across a section of Hannibal's camp (you remember when he came so near Rome), which is another mountain basin, towards the temple aforesaid, where the thirty Latin cities used to sacrifice. The holy road to the top of the mountain still remains. It is very narrow, and flagged with great uneven stones. Algidus (not so high) lies behind. To the east, across the Campagna, are the Sabine hills, with Tibur in their bosom, and the old temple of Bona Dea on a great hill near it. The Etrurian hills are to the north, behind Rome, and Soracte, a little isolated shelf of rock, stands midway between them and the Sabine. Snow on Soracte marks a very hard winter. You remember the ode, "Vides ut alta, etc.,... Soracte."

And now to come to yourself. I have your two letters by me, and read them over with deep interest. You are not living altogether as I could wish. You ought to have society. A college, a conventual life is for you. You should be the member of some society not yet formed. You want it greatly, and without this you will be liable to moulder away as you get older. Forgive my English plainness of speech. Your love for, and intimate acquaintance with, Nature is ancillary to some affection which you have not yet discovered.

The great Kant never dined alone. Once, when there was a danger of the empty dinner table, he sent his valet out, bidding him catch the first man he could find and bring him in! So necessary was the tonic, the effervescing cup of conversation, to his deeper labors. Laughter, chatter, politics, and even the

prose of ordinary talk is better than nothing. Are there no clubs in Boston? The lonely man is a diseased man, I greatly fear. See how carefully Mr. Emerson avoids it; and yet, who dwells, in all essentials, more religiously free than he? Now, I would have you one of a well-knit society or guild, from which rays of thought and activity might emanate, and penetrate every corner of your country. By such a course you would not lose Nature. But supposing that reasons, of which I can know nothing, determine you to remain in “quasi” retirement; still, let not this retirement be too lonely. Take up every man as you take up a leaf, and look attentively at him. This would be easy for you, who have such powers of observation, and of attracting the juices of all you meet to yourself. Even I, who have no such power, somehow find acquaintances, and nobody knows what I get from those about me. They give me all they have and never suspect it. What treasures I gleaned at Concord! And I remember at Boston, at my lodgings, the worthy people only held out a week, after which I was the friend of the family, and chattered away like a magpie, and was included in their religious services. I positively loved them before I went away. I wish I lived near you, and that you could somehow originate some such society as I have in my head.

What you are engaged in I suspect to be Meditations on the Higher Laws as they show themselves in Common Things. This, if well weaved, may become a great work; but I fear that this kind of study may become too desultory. Try a history. How if you could write the sweet, beautiful history of Massachusetts? Positively, there is an immense field open. Or take Concord, — still better, perhaps. As for myself, so enamored an I of history that it is my

intention, if I live long enough, to write a history of Salop; and I will endeavor to strike out something entirely new, and to put county history where it ought to be. Take the spirit of Walton and a spice of White! It would be a great labor and a grand achievement, — one for which you are singularly qualified. By being "run down" I suppose you mean a little "hipped," — a disorder which no one escapes. I have had it so badly as to have meditated suicide more than once. But it goes away with the merest trifle, and leaves you stronger than ever. Ordinary men of the world defeat the enemy with a sop, such as getting drunk or having a woman; but this is a bad plan, and only successful for a time. He is better defeated by sobriety or a change of scene, such as your trip to the Connecticut River. "He is beginning to preach now," you will say. Well, then, let us have a turn at politics and literature. I was certain from the first that Buchanan would be President, because I felt sure that the Middle States are not with the North. Nor is the North itself in earnest. You are fond of humanity, but you like commerce, and a great heap, and a big name better. Of course you do. Besides, your principle and bond of union appears to be most negative, — you do not like slavery. Is there any positive root of strength in the North? Where and what? Your civilization is all in embryo, and what will come out no one can predict. At present, is there not a great thinness and poverty? Magnas inter opes inops! You have indeed in New England and the genius of liberty, and for construction and management; you have a wonderful aplomb, and are never off your feet. But when I think of your meagreness of Invention, and your absurd whims and degraded fancies of spirit-rapping, etc., and the unseemly low ebb

of your ordinary literature, I tremble. You have one Phoenix, — the greatest man since Shakespeare, I believe, — but where is the rest of the choir? Why, the men that promise best — such as Channing, some of whose poems are admirable — do not go down; and they never will as long as newspaper novels are in request. It is the same as in England, — all is fragmentary, poor, and draggletail. There is no continence. A perfectly beautiful conception, generously born and bred, such as Schiller's Cranes of Ibyeus or The Diver, is simply impossible in such a state of things. And observe, I would affirm the very same thing of England as it is at this hour. There is no poetry, and very little or no literature. We are drenched with mawkish lollipops, and clothed in tawdry rags. I am sorry to see even in Mr. Emerson's Traits of England that one or two chapters are far inferior to the rest of the book. He knows it, no doubt. He has sinned against his conception herein in order to accommodate the public with a few sugarplums. Those chapters will hurt the book, which would otherwise be, like his Essays, of perfect proportion and of historical beauty. I have seen some fragments by a certain W. Whitman, who appears to be a strong man. But why write fragments? It is not modest. Completeness of conception is the very first element of that sweet wonder which I know not how to call by its right name. There is a man we both of us respect and admire, — Carlyle; but has he not damaged his own hand beyond cure? He drives a cart, and strikes against every stone he sees. He has no "perception" of the highest kind. A good preacher, but after all a creaking, bumping, tortuous, involved, and visionary author. I wonder what Emerson will give us for his next book. The only new books

in England I have seen are Fronde's History, of which I cannot speak too highly, and a report on India by Lord Dalhousie, very able and businesslike. There are also the Russian accounts of the battle of Inkerman (which were printed in the Times), curious and able. Grey's Polynesian legend is getting old, but we have Sandwich on Kars and Russell's admirable account of the Crimean campaign, of which I need say nothing. His excellent letters from Moscow will also form a good book. I had forgot Maurice's and Kingsley's last, and Mansfield's Paraguay. (Read that.) Truly the list grows. Our poems, such as Arnold's, Sydney Dobell's, and Owen Meredith's, are the very dregs and sweepings of imitation. Alexander Smith's last I have not seen, but it is no great haul, I hear, — small potatoes! But they talk of a Catholic priest of the name of Stoddart, — that he has written well. Burton's African and Arabian travels, Arthur Stanley's Palestine, Cotton's Public Works of India, are all good and sound. We ought to have a book from Livingstone before long. He is now on his way home, after having succeeded in traversing Africa, — a feat never accomplished before. (He is at home, and going out again.) Newman on Universities ought to be good. The other day a man asked me, "Have you ever read the Chronicles of the Emperor Baber?" I had never even heard of them before. He said they outdid Cæsar's. Was he imposing upon my ignorance?
The books above mentioned I will endeavor to get when I visit England in the spring; some indeed I have already, and will send them to you. I want you to send me a copy of Emerson's Poems, which I cannot obtain, do what I will. Also please obtain for me a catalogue (you'll hear of it at the Boston Athenæum) of your local histories in the United States. There are hundreds of

them, I believe; a list has been made which I want to examine. I suppose you are well versed in the French works written by early travelers and missioners on America. Would you tell me one or two of the best authors of Canadian or Louisianian research? I am at present working at an essay on America, which gives me great pleasure and no little pain. I have a conception of America surveyed as “one thought;” but the members are not yet forthcoming. I have not yet written above a page or two. I have also been engaged upon Shakespeare’s Antony and Cleopatra, and indeed in other ways. For my daily reading I am taking Tasso’s Jerusalem, Chateaubriand’s Génie, and sometimes a little Tacitus; and I also read the Bible every day.

Farewell, dear Thoreau. Give my best love to your father, mother, and sister, and to old Channing; and convey my respect to Mr. Emerson and Mr. Alcott; and when next you go to Boston, call at my old lodgings, and give my regards to them there. If you write to Morton, don’t forget me there. He is a clever lad, is n’t he? Also my respect to Mr. Theodore Parker, whose sermons are rather to be heard than read.

Ever yours, and not in haste,
THOS. CHOLMONDELEY.
Posted in London February 22, 1857.

1857

Professor Asa Gray issued FIRST LESSONS IN BOTANY AND VEGETABLE PHYSIOLOGY.

Pasteur demonstrated that fermentation was biological.

Professor William Henry Harvey's *NEREIS BOREALI-AMERICANA*: OR CONTRIBUTIONS TO THE HISTORY OF THE MARINE ALGAE OF NORTH AMERICA. PART III.— *CHLOROSPERMEÆ* (Smithsonian Institution). Also, his "Short description of some new British algae, with two plates," in Natural History Review (4:201-204).

From this year into 1859, Professor Sir William Jackson Hooker's *FILICES EXOTICAE* (EXOTIC FERNS).

January 9, Friday: John Will Randall wrote to Francis Ellingwood Abbot about Henry Thoreau (this letter would appear in 1899 in POEMS OF NATURE AND LIFE (Boston MA: Ellis, page 109):

> *I hope you will find Mr. Thoreau a pleasant companion. I have met him at Mr. Hoar's, and was pleased with the accuracy of his botanical observations. He seemed to know what he knew — by no means, I think, the most common of characteristics.*

BOTANIZING

August 17, Monday: Henry Thoreau wrote to Benjamin Marston Watson about the glowworm.

CONCORD, August 17, 1857.
MR. WATSON, — I am much indebted to you for your glowing communication of July 20th. I had that very day left Concord for the wilds of Maine; but when I returned, August 8th, two out of the six worms remained nearly, if not quite, as bright as at first, I was assured. In their best estate they had excited the admiration of many of the inhabitants of Concord. It was a singular coincidence that I should find these worms awaiting me, for my mind was full of a phosphorescence which I had seen in the woods. I have waited to learn something more about them b[e]*fore acknowledging the receipt of them. I have frequently met with glow-worms in my night walks, but am not sure they were the same kind with these. Dr. Harris once described to me a larger kind than I had found, "nearly as big as your little finder;" but he does not name them in his report.*

The only authorities on Glow-worms which I chance to have (and I am pretty well provided), are Kirby and Spence (the fullest), Knapp ("Journal of a Naturalist"), "The Library of Entertaining Knowledge" (Rennie), a French work, etc., etc.; but there is no minute, scientific description in any of these. This is apparanetly a female of the genus Lampyris; but Kirby and Spence say that there are nearly two hundred species of this genus alone. The one commonly referred to by English writers is the Lampyris noctiluca; but judging from Kirby and Spence's description, and from the description and plate in the French work, this is not that one, for, besides other differences, both say that the light proceeds from the abdomen. Perhaps the worms exhibited by Durkee (whose statement to the Boston Society of Natural History, second July meeting, in the "Traveller" of August 12, 1857, I send you) were the same with these. I do not see how they could be the L. noctiluca, as he states.

I expect to go to Cambridge before long, and if I get any more light on this subject I will inform you. The two worms are still alive.

I shall be glad to receive the Drosera at any time, if you chance to come across it. I am looking over Loudon's "Arboretum," which we have added to our Library, and it occurs to me that it was written expressly for you, and that you cannot avoid placing it on your own shelves.

LOUDON

I should have been glad to see the whale, and might perhaps have done so, if I had not at that time been seeing "the elephant" (or moose) in the Maine woods. I have been associating for about a month with one Joseph Polis, the chief man of the Penobscot tribe of Indians, and have learned a great deal from him, which I should like to tell you sometime.

He reported that he was reading in John Claudius Loudon's *ARBORETUM ET FRUTICETUM BRITANNICUM* (either in the Concord town library set or in a personal set he had acquired):

PEOPLE OF CAPE COD

CAPE COD: Our way to the high sand-bank, which I have described as extending all along the coast, led, as usual, through patches of Bayberry bushes, which straggled into the sand. This, next to the Shrub-oak, was perhaps the most common shrub thereabouts. I was much attracted by its odoriferous leaves and small gray berries which are clustered about the short twigs, just below the last year's growth. I know of but two bushes in Concord, and they, being staminate plants, do not bear fruit. The berries gave it a venerable appearance, and they smelled quite spicy, like small confectionery. Robert Beverley, in his "History of Virginia," published in 1705, states that "at the mouth of their rivers, and all along upon the sea and bay, and near many of their creeks and swamps, grows the myrtle, bearing a berry, of which they make a hard brittle wax, of a curious green color, which by refining becomes almost transparent. Of this they make candles, which are never greasy to the touch nor melt with lying in the hottest weather; neither does the snuff of these ever offend the smell, like that of a tallow candle; but, instead of being disagreeable, if an accident puts a candle out, it yields a pleasant fragrancy to all that are in the room; insomuch that nice people often put them out on purpose to have the incense of the expiring snuff. The melting of these berries is said to have been first found out by a surgeon in New England, who performed wonderful things with a salve made of them." From the abundance of berries still hanging on the bushes, we judged that the inhabitants did not generally collect them for tallow, though we had seen a piece in the house we had just left. I have since made some tallow myself. Holding a basket beneath the bare twigs in April, I rubbed them together between my hands and thus gathered about a quart in twenty minutes, to which were added enough to make three pints, and I might have gathered them much faster with a suitable rake and a large shallow basket. They have little prominences like those of an orange all encased in tallow, which also fills the interstices down to the stone. The oily part rose to the top, making it look like a savory black broth, which smelled much like balm or other herb tea. You let it cool, then skim off the tallow from the surface, melt this again and strain it. I got about a quarter of a pound weight from my three pints, and more yet remained within the berries. A small portion cooled in the form of small flattish hemispheres, like crystallizations, the size of a kernel of corn (nuggets I called them as I picked them out from amid the berries). Loudon says, that "cultivated trees are said to yield more wax than those that are found wild." (See Duplessy, *Végétaux Résineux*, Vol. II. p. 60.) If you get any pitch on your hands in the pine-woods you have only to rub some of these berries between your hands to start it off. But the ocean was the grand fact there, which made us forget both bayberries and men.

BEVERLEY

J.C. LOUDON

DUPLESSY

CAPE COD: In the north part of the town there is no house from shore to shore for several miles, and it is as wild and solitary as the Western Prairies –used to be. Indeed, one who has seen every house in Truro will be surprised to hear of the number of the inhabitants, but perhaps five hundred of the men and boys of this small town were then abroad on their fishing-grounds. Only a few men stay at home to till the sand or watch for blackfish. The farmers are fishermen-farmers and understand better ploughing the sea than the land. They do not disturb their sands much, though there is a plenty of sea-weed in the creeks, to say nothing of blackfish occasionally rotting on the shore. Between the Pond and East Harbor Village there was an interesting plantation of pitch-pines, twenty or thirty acres in extent, like those which we had already seen from the stage. One who lived near said that the land was purchased by two men for a shilling or twenty-five cents an acre. Some is not considered worth writing a deed for. This soil or sand, which was partially covered with poverty and beach grass, sorrel, &c., was furrowed at intervals of about four feet and the seed dropped by a machine. The pines had come up admirably and grown the first year three or four inches, and the second six inches and more. Where the seed had been lately planted the white sand was freshly exposed in an endless furrow winding round and round the sides of the deep hollows, in a vortical spiral manner, which produced a very singular effect, as if you were looking into the reverse side of a vast banded shield. This experiment, so important to the Cape, appeared very successful, and perhaps the time will come when the greater part of this kind of land in Barnstable County will be thus covered with an artificial pine forest, as has been done in some parts of France. In that country 12,500 acres of downs had been thus covered in 1811 near Bayonne. They are called *pignadas*, and according to Loudon "constitute the principal riches of the inhabitants, where there was a drifting desert before." It seemed a nobler kind of grain to raise than corn even.

PEOPLE O
CAPE CO

J.C. LOUDON

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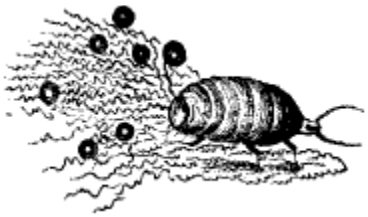
La Baleine d'Ostende

Visitée par l'Eléphant, la Girafe les Osages et les Chinois.

When he went "a-botanizing" (and that was often) Thoreau made careful and frequent use of:

- John Leonard Knapp's THE JOURNAL OF A NATURALIST, issued in London in 1829 and reprinted in Philadelphia in 1831



- James Rennie's THE FACULTIES OF BIRDS

THE FACULTIES OF BIRDS

- James Rennie's INSECT ARCHITECTURE, of which he owned a copy

INSECT ARCHITECTURE

- James Rennie's INSECT TRANSFORMATION, of which he owned a copy

INSECT TRANSFORMATIONS

- James Rennie's INSECT MISCELLANIES, of which he owned a copy

INSECT MISCELLANIES

- Various editions of Professor Jacob Bigelow's *FLORULA BOSTONIENSIS*. A COLLECTION OF PLANTS OF BOSTON AND ITS VICINITY, WITH THEIR GENERIC AND SPECIFIC CHARACTERS, PRINCIPAL SYNONYMS, DESCRIPTIONS, PLACES OF GROWTH, AND TIME OF FLOWERING, AND OCCASIONAL REMARKS

READ BIGELOW TEXT

- Loring Dudley Chapin's THE VEGETABLE KINGDOM; OR, HANDBOOK OF PLANTS AND FRUITS

READ LORING TEXT 1

READ LORING TEXT 2

READ LORING TEXT 3

READ LORING TEXT 4

- Professor Chester Dewey and Ebenezer Emmons, MD's REPORT ON THE HERBACEOUS FLOWERING PLANTS OF MASSACHUSETTS, ARRANGED ACCORDING TO THE NATURAL ORDERS OF LINDLEY, ILLUSTRATED CHIEFLY BY POPULAR DESCRIPTIONS OF THEIR CHARACTER, PROPERTIES, AND USES, of which he owned a copy

FLOWERING PLANTS

bound with REPORT ON THE QUADRUPEDS OF MASSACHUSETTS

QUADRUPEDS OF MASS.

- Various editions of Professor Amos Eaton's A MANUAL OF BOTANY FOR THE NORTHERN AND MIDDLE STATES

AMOS EATON'S BOTANY

- George B. Emerson's A REPORT ON THE TREES AND SHRUBS GROWING NATURALLY IN THE FORESTS OF MASSACHUSETTS. PUBLISHED AGREEABLY TO AN ORDER OF THE LEGISLATURE, BY THE COMMISSIONERS ON THE ZOOLOGICAL AND BOTANICAL SURVEY OF THE STATE

EMERSON'S TREES/SHRUBS

- AGRICULTURAL TRACT, NO. 1. CULTURE OF THE GRASSES. AN EXTRACT FROM THE FOURTH ANNUAL REPORT OF CHARLES L. FLINT, SECRETARY OF THE STATE BOARD OF AGRICULTURE. PUBLISHED, UNDER THE DIRECTION OF THE MASSACHUSETTS STATE BOARD OF AGRICULTURE, FOR GENERAL CIRCULATION, of which he owned a copy

FLINT ON THE GRASSES

- Both the 1st and the 2d editions of Professor Asa Gray'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.

MANUAL OF THE BOTANY

- Dr. William Lauder Lindsay's A POPULAR HISTORY OF BRITISH LICHENS, COMPRISING AN ACCOUNT OF THEIR STRUCTURE, REPRODUCTION, USES, DISTRIBUTION, AND CLASSIFICATION

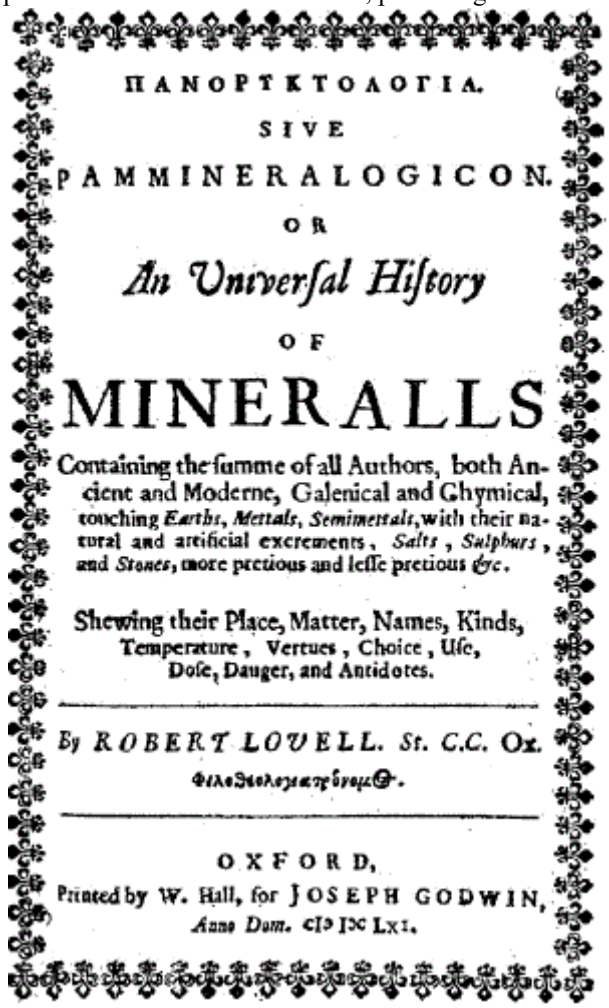
HIST. OF BRITISH LICHENS

- Robert Lovell's Π*AMBOTANOΛOΓIA. SIVE, ENCHIRIDION BOTANICUM*, OR, A COMPLEAT HERBALL, CONTAINING THE SUMME OF ANCIENT AND MODERNE AUTHORS, BOTH GALENICAL AND CHYMICAL, TOUCHING TREES, SHRUBS, PLANTS, FRUITS, FLOWERS, &C. IN AN ALPHABETICAL ORDER; WHEREIN ALL THAT ARE NOT IN THE PHYſICK GARDEN IN OXFORD, ARE NOTED WITH AſTERISKS. SHEWING THEIR PLACE, TIME, NAMES, KINDS, TEMPERATURE, VERTUES, UſE, DOſE, DANGER AND ANTIDOTES. TOGETHER WITH AN { INTRODUCTION TO HERBARIſME, &C. { APPENDIX OF EXOTICKS. { UNIVERſAL INDEX OF PLANTS: ſHEWING WHAT GROW WILD IN ENGLAND. (Oxford:

Printed by W.H. for Richard Davis, 1659, 1665)

LOVELL'S HERBALL

(This was usually printed with a Volume II bound in, pertaining to minerals:)



ΠΑΝΟΡΥΚΤΟΛΟΓΙΑ.

SIVE

PAMMINERALOGICON.

OR

An Universal History

OF

MINERALLS

Containing the summe of all Authors, both Ancient and Moderne, Galenical and Chymical, touching *Earths*, *Mettals*, *Semimettals*, with their natural and artificial excrements, *Salts*, *Sulphurs*, and *Stones*, more pretious and lesse pretious &c.

Shewing their Place, Matter, Names, Kinds, Temperature, Vertues, Choice, Use, Dose, Danger, and Antidotes.

By ROBERT LOVELL. St. C.C. Ox.

ΦιλοΘεολογωτατος.

OXFORD,

Printed by W. Hall, for JOSEPH GODWIN, *Anno Dom.* CIↃ IↃC LXI.

- John Edward Sowerby and Charles Johnson's THE FERNS OF GREAT BRITAIN (London: John E. Sowerby, 3 Mead Place, Lambeth, 1855)

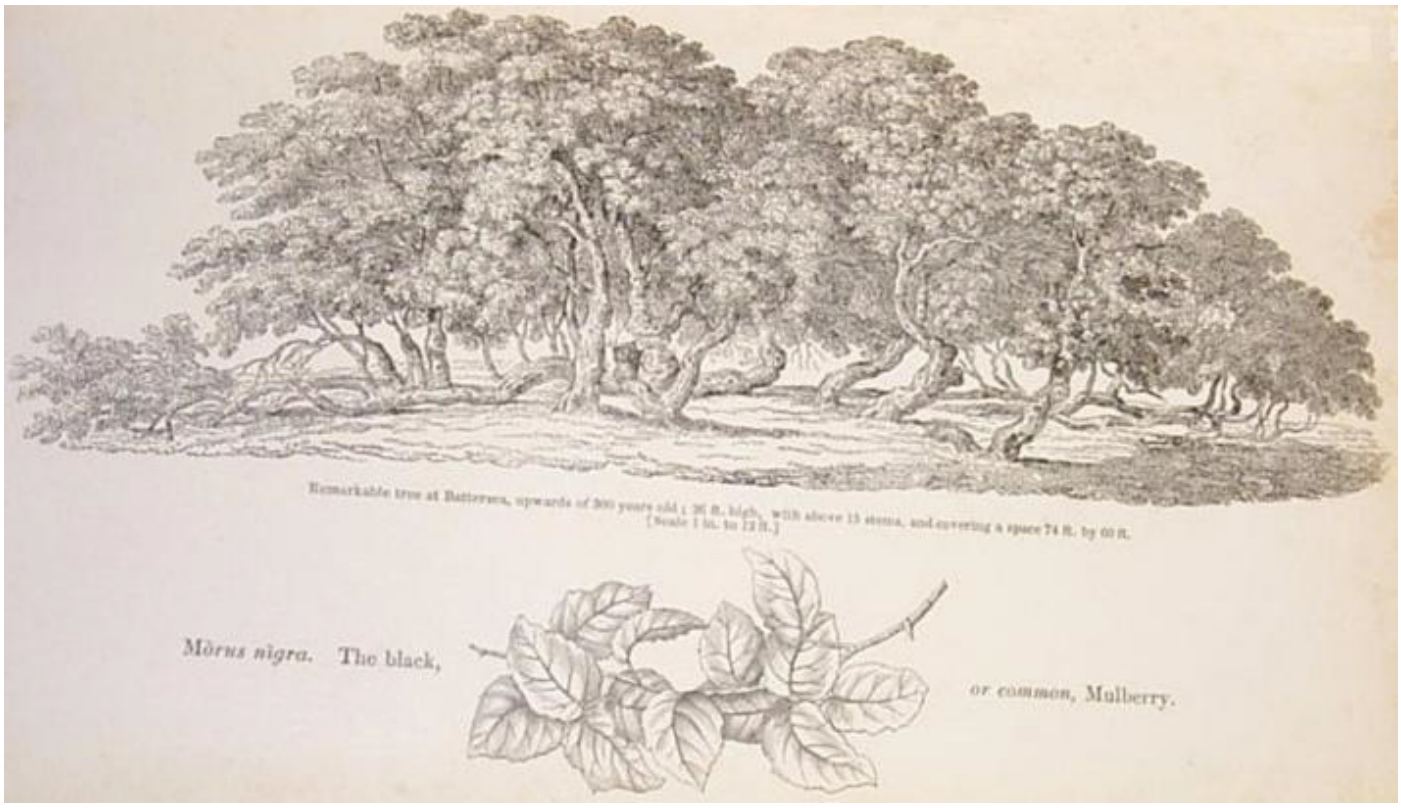
- Robert Mackenzie Stark's A POPULAR HISTORY OF BRITISH MOSSES: COMPRISING A GENERAL ACCOUNT OF THEIR STRUCTURE, FRUCTIFICATION, ARRANGEMENT, AND GENERAL DISTRIBUTION (London: Lovell Reeve, Henrietta Street, Covent Garden, 1854)

- Professor of Chemistry in the West-Point Military Academy John Torrey, M.D.'s A COMPENDIUM OF THE FLORA OF THE NORTHERN AND MIDDLE STATES: CONTAINING GENERIC AND SPECIFIC DESCRIPTIONS OF ALL THE PLANTS, EXCLUSIVE OF THE CRYPTOGAMIA, HITHERTO FOUND IN THE UNITED STATES NORTH OF THE POTOMAC (New-York: Stacy B. Collins, 65 Fulton-street; J. & J. Harper, Printers, 1826)

- The multivolume 1838-1843 edition of Professor John Torrey's and Professor Asa Gray's A FLORA OF NORTH AMERICA: CONTAINING ABRIDGED DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS

AND NATURALIZED PLANTS GROWING NORTH OF MEXICO; ARRANGED ACCORDING TO THE NATURAL SYSTEM (New-York: Wiley and Putnam; London: Wiley and Putnam, 35 Paternoster Row; Paris: Bossange & Co. 11 Quai Voltaire)

- John Claudius Loudon's ENCYCLOPEDIA OF PLANTS, and *ARBORETUM ET FRUTICUM BRITTANICUM*



1858

Charles Scammon discovered the breeding grounds of the gray whale, in Baja waters. Soon the Pacific population of these animals, the Atlantic population of which had already been wiped out, would also be seriously threatened.

Up to this point, findings of human remains and artifacts in conjunction with the remains of extinct species had been disputable, because there was always the possibility that modern human hoaxers had dug holes and buried modern artifacts and/or human bones with the remains of these extinct species. In this year the entrance to an entirely undisturbed cave was uncovered on Windmill Hill above Brixham harbor in England, and the new site was excavated under the attentive supervision of a committee of eminent geologists. A layer of cave stone that sealed the site was first fully exposed and it was painstakingly verified that this barrier contained no breaks or holes from modern excavations. Under this intact layer were discovered the bones of cave lion, cave bear, hyena, mammoth, woolly rhinoceros, and reindeer, along with numerous flint tools which could have been shaped only by humans. There could be no doubt of the stratigraphy or the association. The existence of prehistoric humans had finally been verified in such manner as to put to rest all dissension.

The prospect of human extinction as a consequence of climatic change was first hypothesized, by J. Spotswood Wilson, in a paper entitled “On the General and Gradual Deterioration of the Earth and Atmosphere.” From this point forward, the building levels of greenhouse gasses being created by human civilization would come to be identified more and more as a focus for concern.

Alfred Russel Wallace had already written, in 1855, an essay “On the Law Which Has Regulated the Introduction of New Species” which made clear his belief in what we now term evolution, which had been seen by Lyell and shown to Charles Darwin. In 1856 and 1857 he had followed this up by describing a provisional model of the relation of biogeography to organic change. In this year he wrote Darwin directly and much more specifically about new thoughts he had been having on the topic of descent with modification. Darwin and Wallace were hastily paired to jointly present their ideas “On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection” before the Linnaean Society. Darwin had been slow and cautious about publishing his concepts concerning evolution. When a letter describing many of the same, independently conceived ideas arrived from Wallace to be read before the Society, arrangements were made to establish Darwin’s priority — as he had been circulating drafts of future publications among friends in London.

In this year Wallace set up a residence in New Guinea. He came to be of the suspicion that the Papuans were not of Malay stock. He defended, and eventually would institutionalize, the faunal realms classification scheme that had been developed by Philip L. Sclater.

Professor Asa Gray issued HOW PLANTS GROW, and revised his BOTANICAL TEXTBOOK.

Professor William Henry Harvey’s “List of Arctic Algae, Chiefly Compiled from Collections Brought Home by Officers of the Recent Searching Expeditions,” in SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE (Part III, Supplement 2:132-134). Also, his and Otto Wilhelm Sonder’s three-volume 1859-1865 *FLORA CAPENSIS* (Cape Town and Dublin).

FLORA CAPENSIS

November 4, Thursday: George Bradburn wrote to Charles Wesley Slack to inquire whether Mr. Joshua Reed Giddings was to lecture.

 November 4: A rainy day.

Called to C. from the outside of his house the other afternoon in the rain. At length he put his head out the attic window, and I inquired if he did n't want to take a walk, but he excused himself, saying that he had a cold. "But," added he, "you can take so much the longer walk. Double it."

On the 1st, when I stood on Poplar Hill, I saw a man, far off by the edge of the river, splitting billets off a stump. Suspecting who it was, I took out my glass, and beheld Goodwin, the one-eyed Ajax, in his short blue frock, short and square-bodied, as broad as for his height he can afford to be, getting his winter's wood; for this is one of the phenomena of the season. As surely as the ants which he disturbs go into winter quarters in the stump when the weather becomes cool, so does G. revisit the stumpy shores with his axe. As usual, his powder-flask peeped out from a pocket on his breast, his gun was slanted over a stump near by, and his boat lay a little further along. He had been at work laying wall still further off, and now, near the end of the day, betook himself to those pursuits which he loved better still. It would be no amusement to me to see a gentleman buy his winter wood. It is to see G. get his. I helped him tip over a stump or two. He said that the owner of the land had given him leave to get them out, but it seemed to me a condescension for him to ask any man's leave to grub up these stumps. The stumps to those who can use them, I say,–to those who will split them. He might as well ask leave of the farmer to shoot the musquash and the meadow-hen, or I might as well ask leave to look at the landscape. Near by were large hollows in the ground, now grassed over, where he had got out white oak stumps in previous years. But, strange to say, the town does not like to have him get his fuel in this way. They would rather the stumps would rot in the ground, or be floated down-stream to the sea. They have almost without dissent agreed on a different mode of living, with their division of labor. They would have him stick to laying wall, and buy corded wood for his fuel, as they do. He has drawn up an old bridge sleeper and cut his name in it for security, and now he gets into his boat and pushes off in the twilight, saying he will go and see what Mr. Musquash is about.

When the Haverhill fishermen told me that they could distinguish the Concord River stuff (i. e. driftwood) I see they were right, for much of it is chestnut rails, and of these they have but few, and those in the southern part of New Hampshire.

If, about the last of October, you ascend any hill in the outskirts of the town and look over the forest, you will see, amid the brown of other oaks, which are now withered, and the green of the pines, the bright-red tops or crescents of the scarlet oaks, very equally and thickly distributed on all sides, even to the horizon. Complete trees standing exposed on the edges of the forest, where you have never suspected them, or their tops only in the recesses of the forest surface, or perhaps towering above the surrounding trees, or reflecting a warm rose red from the very edge of the horizon in favorable lights. All this you will see, and much more, if you are prepared to see it,–if you look for it. Otherwise, regular and universal as this phenomenon is, you will think for threescore years and ten that all the wood is at this season sere and brown. Objects are concealed from our view not so much because they are out of the course of our visual ray (continued) as because there is no intention of the mind and eye toward them. We do not reali7,e how far and widely, or how near and narrowly, we are to look. The greater part of the phenomena of nature are for this reason concealed to us all our lives. Here, too, as in political economy, the supply answers to the demand. Nature does not cast pearls before swine. There is just as much beauty visible to us in the landscape as we are prepared to appreciate,–not a grain more. The actual objects which one person will see from a particular hilltop are just as different from those which another will see as the persons are different. The scarlet oak must, in a sense, be in your eye when you go forth. We cannot see anything until we are possessed with the idea of it, and then we can hardly see anything else. In my botanical rambles I find that first the idea, or image, of a plant occupies my thoughts, though it may at first seem very foreign to this locality, and for some weeks or months I go thinking of it and expecting it unconsciously, and at length I surely see it, and it is henceforth an actual neighbor of mine. This is the history of my finding a score or more of rare plants which I could name.

BOTANY

Take one of our selectmen and put him on the highest hill in the township, and tell him to look! What, probably, would he see? What would he select to look at? Sharpening his sight to the utmost, and putting on the glasses that suited him best, aye, using a spy-glass if he liked, straining his optic nerve to its utmost, and making a full report. Of course, he would see a Brocken spectre of himself. Now take Julius Caesar, or Emanuel Swedenborg, or a Fiji-Islander, and set him up there! Let them compare notes afterward. Would it appear that they had enjoyed the same prospect? For aught we know, as strange a man as any of these is always at our elbows. It does not appear that anybody saw Shakespeare when he was about in England looking off, but only some of his raiment.

Why, it takes a sharpshooter to bring down even such trivial game as snipes and woodcocks; he must take very particular aim, and know what he is aiming at. He would stand a very small chance if he fired at random into the sky, being told that snipes were flying there. And so it is with him that shoots at beauty. Not till the sky falls

will he catch larks, unless he is a trained sportsman. He will not bag any if he does not already know its seasons and haunts and the color of its wing,–if he has not dreamed of it, so that he can anticipate it; then, indeed, he flushes it at every step, shoots double and on the wing, with both barrels, even in corn-fields. The sportsman trains himself, dresses, and watches unweariedly, and loads and primes for his particular game.He prays for it, and so he gets it. After due and long preparation, schooling his eye and hand, dreaming awake and asleep, with gun and paddle and boat, he goes out after meadow-hens,–which most of his townsmen never saw nor dreamed of,–paddles for miles against a head wind, and therefore he gets them. He had them half-way into his bag when he started, and has only to shove them down. The fisherman, too, dreams of fish, till he can almost catch them in his sink-spout. The hen scratches, and finds her food right under where she stands; but such is not the way with the hawk.

The true sportsman can shoot you almost any of his game from his windows. It comes and perches at last on the barrel of his gun; but the rest of the world never see it, with the feathers on. He will keep himself supplied by firing up his chimney. The geese fly exactly under his zenith, and honk when they get there. Twenty musquash have the refusal of each one of his traps before it is empty.

WILLIAM SHAKESPEARE

1859

The 1st municipal botanical garden in America was initiated in St. Louis when Henry Shaw the hardware magnate purchased a collection of 62,000 plant specimens from a German botanist. This is now the Missouri Botanical Garden, although locals still refer to it as Shaw's Garden. (A special endowment still pays local Episcopalians $200 per year to hold still for one 19th-Century sermon upon the theme of the wisdom and goodness of God as shown in the growth of flowers, fruits, and other products of the vegetable kingdom.)

Father Jean-Jacques Pouech described fossil eggshell fragments that would eventually be identified as the eggs of a dinosaur.

An exceptionally well-preserved birdlike dinosaur skeleton was discovered in Bavaria that would be identified as Compsognathus, "dainty jaw."

THE SCIENCE OF 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 during this period of separation, 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.

OUR MOST RECENT GLACIATION

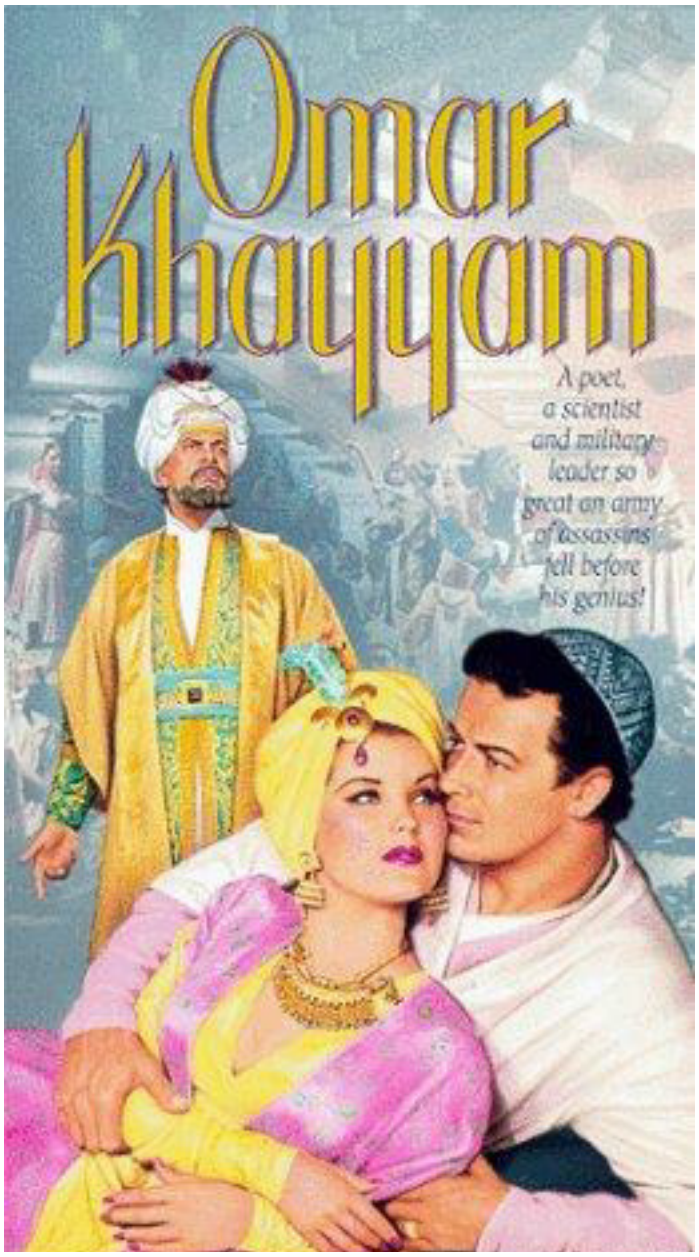
BIOLOGY

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.

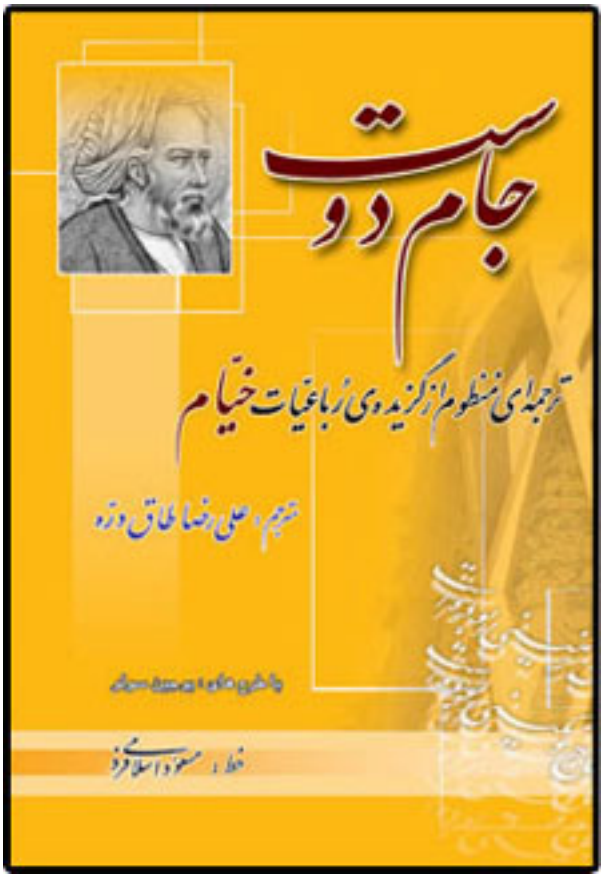
This year would mark the publication not only of the above science but also of Edward J. Fitzgerald's very free "translation" known as THE *RUBAIYAT* OF OMAR KHAYYAM. Did Henry Thoreau have an opportunity to read the following?

> 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.[73]



73. 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.[74]

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

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74. 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.'"

in Astronomy, wherein he attained to a very high pre-eminence. Under the Sultanate of Malik Shah, he came to Merv, and obtained 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.[75] 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.[76] —

> 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.[77] 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

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75. Though all these, like our Smiths, Archers, Millers, Fletchers, etc., may simply retain the Surname of an hereditary calling.
76. "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.
77. 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.'"

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. 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.[78] 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 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,[79] 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

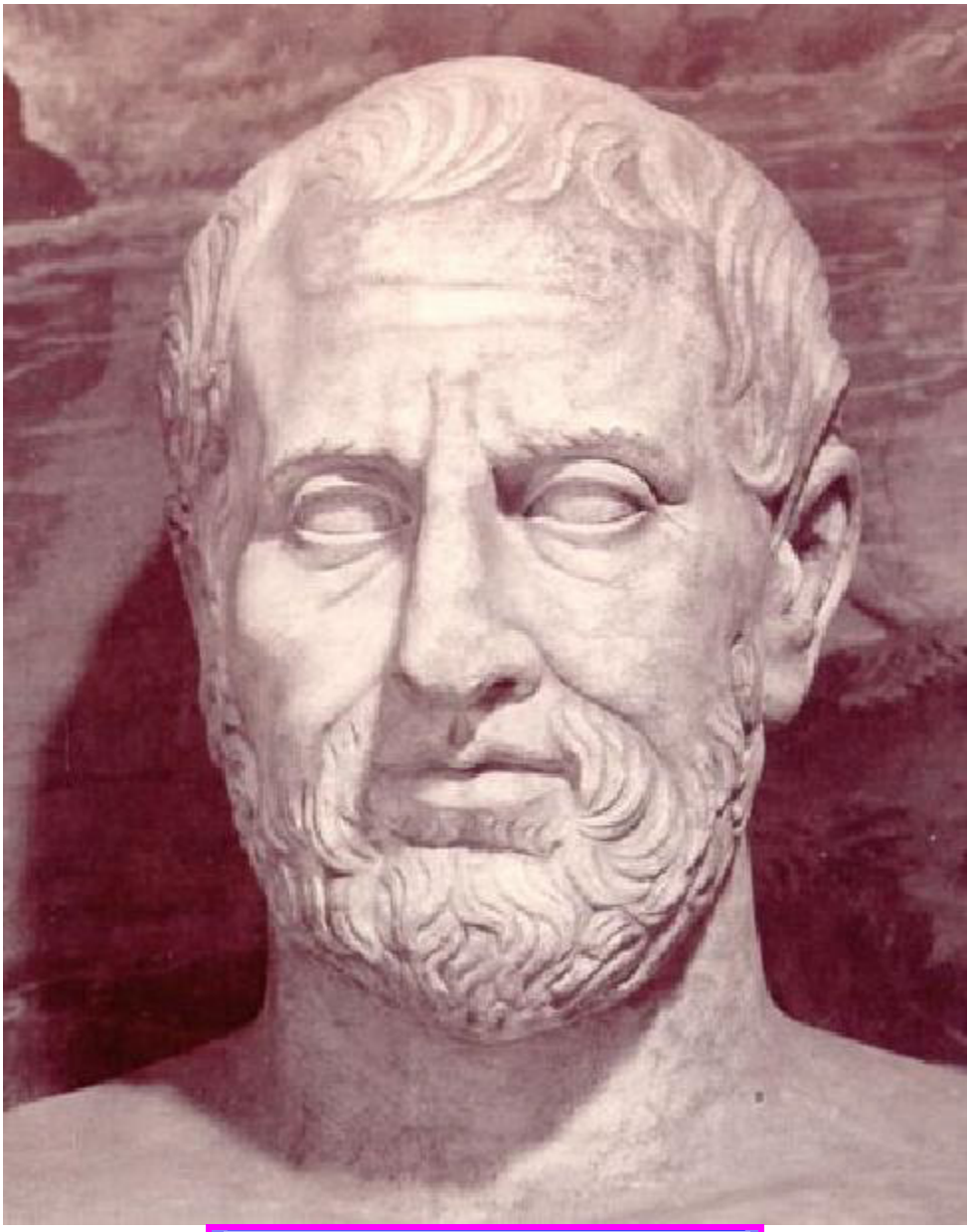
78. "Since this paper was written" (adds the Reviewer in a note), "we have met with a Copy of a very rare Edition, printed at Calcutta in 1836. This contains 438 Tetrastichs, with an Appendix containing 54 others not found in some MSS."
79. Professor Cowell.

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 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[80]

80. Actually I took this from the 3d Edition, not of 1859 but of 1872.

December 16, Friday: Henry Thoreau checked out, from Harvard Library, the 2d volume of a 5-volume set prepared 1818-1821 (*THEOPHRASTI ERESII QUAE SUPERSUNT OPERA: ET EXCERPTA LIBRORUM* by Theophrastus of Eresus (*circa* 372-*circa* 287BCE), JOHANN GOTTLOB SCHNEIDER, HEINRICH FRIEDRICH LINK. Lipsiae: Sumtibus Frid. Christ. Guil. Vogelii) of ΤΗΕΟΠΗΡΑΣΤΥΣ ΕΡΕΣΙΟΝ ΤΑ ΣΟΟΛΟΜΕΝΑ.



THEOPHRASTUS

He also checked out the two volumes of Aristotle's *HISTOIRE DES ANIMAUX D'ARISTOTE* in Greek and in the

French translation by M. Camus (Paris: Chez la veuve Desaint, 1783).

HISTOIRE DES ANIMAUX I

HISTOIRE DES ANIMAUX II

While at the Harvard Library, Thoreau read from but did not check out John Gerard's 1597 botanical resource, THE HERBALL OR GENERALL HISTORIE OF PLANTES:

GREAT HERBALL OF 1597

650 THE SECOND BOOKE OF THE

K The rootes condited after the maner of Eringos, ſerueth for the purpoſes aforeſaide.
L The roote of Enula boiled very ſoft, and mixed in a morter with freſh butter, and the powder of Ginger, maketh an excellent ointment againſt the itche, ſcabs, mangineſſe, and ſuch like.
M The rootes are to be gathered in the end of September, and kept for ſundrie vſes, but it is eſpecially preſerued by thoſe that make ſuccade and ſuch like.

Of Sauce alone, or Jack by the hedge. Chap. 267.

Alliaria.
Sauce alone.

* *The deſcription.*

Sauce alone is ioined with Garlick in name, not becauſe it is like vnto it in forme, but in ſmell: for if it be bruſed or ſtamped, it ſmelleth altogither like Garlicke: the leaues hereof are broad, of a light green colour, nicked round about, and ſharpe pointed: the ſtalke is ſlender, about a cubite high, about the branches whereof growe little white flowers, after which come vp ſlender, ſmall, and long coddes, and in them black ſeede: the roote is long, ſlender and ſomething harde, the whole plant being bruſed ſmelleth of Garlicke, whereof it tooke his name.

* *The place.*

It groweth of it ſelfe by garden hedges, by old walles, by highwaies ſides, or oftentimes in the borders of fieldes.

INTERNET COMMENTARY

December 16, 1859: A.M.–To Cambridge, where I read in Gerard's Herbal. [Vide extracts from preface made in October 1859.] His admirable though quaint descriptions are, to my mind, greatly superior to the modern more scientific ones. He describes not according to rule but to his natural delight in the plants. He brings them vividly before you, as one who has seen and delighted in them. It is almost as good as to see the plants themselves. It suggests that we cannot too often get rid of the barren assumption that is in our science. His leaves are leaves; his flowers, flowers; his fruit, fruit. They are green and colored and fragrant. It is a man's knowledge added to a child's delight. Modern botanical descriptions approach ever nearer to the dryness of an algebraic formula, as if c + y were = to a love-letter. It is the keen joy and discrimination of the child who has just seen a flower for the first time and comes running in with it to its friends. How much better to describe your object in fresh English words rather than in these conventional Latinisms! He has really seen, and smelt, and tasted, and reports his sensations.

BOTANY

Bought a book at Little & Brown's, paying a nine-pence more on a volume than it was offered me for elsewhere. The customer thus pays for the more elegant style of the store.

The Select Committee on the Invasion of Harpers Ferry created by Democratic Senator James Mason of Virginia held its first meeting in regard to the John Brown affair and its Secret "Six" conspiracy.
The committee would be in existence for six months before delivering its final report and would summon, in all, 32 witnesses.

Edwin Coppoc and John E. Cook were hanged in Charlestown, Virginia.[81] Edwin's body would be buried in Winona after a funeral attended by the entire town. Later his body would be reburied in Salem, Ohio.

(Edwin had written from the prison to his adoptive mother, of a nonresistant-abolitionist Quaker farm family, that he was

"sorry to say that I was ever induced to raise a gun."

81. I have been advised that according to THE QUAKERS OF IOWA by Louis Thomas Jones, a scholarly work published under the auspices of the State Historical Iowa at Iowa City, Iowa in 1914 (I haven't myself actually seen this book), prior to their deaths the Coppoc brothers were disowned by the Red Cedar Monthly Meeting of Friends in the West Branch/Springdale area.

Edwin's brother Barclay Coppoc was still eluding capture.)

John E. Cook had made a full confession of his activities with the raiders and at the last moment had sought to save his neck by representing that he had been deceived through false promises, but this had not saved him, nor had the fact that his brother-in-law A.P. Willard was Governor of Indiana.

When it came the turn of John Anderson Copeland, Jr. to be hanged, too short a drop was used. He strangled slowly.

Just before being taken from his cell to the execution field that morning, he had completed a last letter to his family:

Charlestown Jail, Va.,
Dec. 16, '59
Dear Father, Mother, Brothers Henry, William and Freddy, and Sisters Sarah and Mary:
The last Sabbath with me on earth has passed away. The last Monday, Tuesday, Wednesday and Thursday that I shall ever see on this earth have now passed by God's glorious sun, which he has placed in the heavens to illuminate this earth- whose refulgent beams are watched for by this poor invalid, to enter & make as it were in heaven of the room in which he is confined- I have seen declining behind the western mountains for the last time. Last night for the last time, I beheld the soft bright moon as it rose, casting its mellow light into my felons cell, dissipating the darkness and filling it with that soft pleasant light which causes such thrills of joy to all those in like circumstance with myself. This morning for the last time, I beheld the glorious sun of yesterday rising in the far-off East, away off in the country where our Lord Jesus Christ first proclaimed salvation to man, and now as he rises higher and his bright light takes the place of the pale, soft moonlight, I will take my pen, for the last time, to write you who are bound to me by those strong ties (yea, the strongest that God ever instituted,) the ties of blood and relationship. I am well, both in body and in mind. And now, dear ones, if it were not that I

know your hearts will be filled with sorrow at my fate, I could pass from this earth without a regret. Why should you sorrow? Why should your hearts be racked with grief? Have I not everything to gain and nothing to lose by the change? I fully believe that not only myself but also all three of my poor comrades who are to ascend the same scaffold- (a scaffold already made sacred to the cause of freedom, by the death of that great champion of human freedom, Capt. JOHN BROWN) are prepared to meet our God. I am only leaving a world filled with sorrow and woe to enter one in which there is but one lasting day of happiness and bliss. I feel that God in his mercy has spoken peace to my soul, and that all my numerous sins are now forgiven me. Dear parents, brothers and sisters, it is true that I am now in a few hours to start on a journey from which no traveler returns. Yes, long before this reaches you, I shall as I sincerely hope, have met our brother and sister who have for years been worshiping God around his throne — singing praises to him, and thanking him that he gave his Son to die that they might have eternal life. I pray daily and hourly that I may be fitted to have my home with them, and that you, one and all, may prepare your souls to meet your God, that so, in the end, though we meet no more on earth, we shall meet in Heaven, where we shall not be parted by the demands of the cruel and unjust monster Slavery. But think not that I am complaining, for I feel reconciled to meet my fate. I pray God that his will be done; not mine. Let me tell you that it is not the mere act of having to meet death, which I should regret, (if I should express regret I mean,) but that such an unjust institution should exist as the one which demands my life; and not my life only, but the lives of those to whom my life bears but the relative value of zero to the infinite. I beg of you one and all that you will not grieve about me, but that you will thank God that he spared me time to make my peace with Him. And now, dear ones, attach no blame to anyone for my coming here for not any person but myself is to blame. I have no antipathy against anyone, I have freed my mind of all hard feelings against every living being, and I ask all who have any thing against me to do the same. And now dear parents, Brothers and sisters, I must bid you to serve your God and meet me in heaven. I must with a few words, close my correspondence with those who are the most near and dear to me: but I hope, in the end, we may again commune, never to cease. Dear ones, he who writes this will, in a few hours, be in this world no longer. Yes, these fingers which hold the pen with which this is written will, before to-day's sun has reached his meridian have laid it aside forever, and this poor soul have taken its flight to meet its God. And now dear ones I must bid you that last, long, sad farewell. Good-day, Father, Mother, Henry, William, and Freddy, Sarah and Mary, serve your God and meet me in heaven.

Your Son and Brother to eternity,

John A. Copeland.

Is it that Aaron D. Stevens, and ten of Captain Brown's black supporters, having been duly found guilty of treason and murder by a jury of their white male peers, were hanged on this date?

Or is it that the other surrendered survivors of the raid on Harpers Ferry, John Anderson Copeland, Jr., Shields Green, and Aaron D. Stevens, having been duly found guilty of treason and murder by a jury of their white male peers, were hanged on this date?[82]

A monument would be erected by the citizens of Oberlin, Ohio in honor of their three free citizens of color who had died in the raid or been hanged, Shields Green, John Anderson Copeland, Jr., and Lewis Sheridan Leary (the 8-foot marble monument would be moved to Vine Street Park in 1971).

WHAT I'M WRITING IS TRUE BUT NEVER MIND

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82. In THE CAPTURE AND EXECUTION OF JOHN BROWN: A TALE OF MARTYRDOM, BY ELIJAH AVEY, EYE WITNESS, WITH THIRTY ILLUSTRATIONS, dated 1906, we have on page 45 an assertion that the white men John E. Cook and Edwin Coppoc, and then the black men John Anderson Copeland, Jr. and Shields Green, were hanged on December 16th, 1859. The reference says that, the gallows being not large enough, the two black men Copeland and Green were forced to stand and watch the two white men Cook and Coppoc being hanged before themselves ascending the scaffold. But I have from another reference this assertion that it was one surrendered surviving white man, Aaron D. Stevens, who was hanged on the 16th along with ten black supporters of Captain John Brown, and that Cook actually would be among the last hanged. Which account would be correct — and why is there such a glaring discrepancy between the various accounts?

The book SECRET SIX treats each retreating admission of each of the co-conspirators in treason as if it were holy writ. No attempt is made to discern, behind this haze of post-facto explanations and justifications, what the brags of these participants might have been had their plot been successful in initiating the race war they contemplated and had this race war been completed, as it would certainly have been completed, by a historic genocide against black Americans. (Joel Silbey has contended, in "The Civil War Synthesis in American History," that postbellum American historians have been misconstruing antebellum American politics by viewing them in conjunction with our knowledge of the bloodbath that followed. It is only after the fact that we can "know" that the US Civil War amounted to a sectional dispute, North versus South. We avoid learning that before the fact, it was undecided whether this conflict was going to shape up as a race conflict, a class conflict, or a sectional conflict. We avoid knowing that the raid on Harpers Ferry might have resulted in a race war, in which peoples of color would be exterminated in order to create an all-white America, or might have resulted in a class war, in which the laboring classes might have first destroyed the plantation owners' equity by killing his slaves, and then gone on to purge the nation of the white plantation owners themselves, with their privileged-class endowments.) Also, according to the endmatter, the SECRET SIX study had obtained its material on Frederick Douglass basically from McFeely's FREDERICK DOUGLASS of 1991, and its material on Thoreau from Sanborn's Henry David Thoreau of 1917, neither of which were the last word on the subject when the book was prepared. In addition, this work provides no reference whatever for the Emerson life: evidently he was simply presumed not to be of even marginal pertinence. There is no consideration to be found anywhere in this volume of the comparison event, the other American struggle for freedom, the one which had taken place in Haiti under General Toussaint Louverture.
For these reasons, the study is, fundamentally, incompetent. It is as if O.J. Simpson and his dream team had been allowed to control what would appear in our social history texts. Or, as if the White House staff had been allowed to define once and for all the extent of President Richard Milhouse Nixon's involvement in the Watergate break-in, with, after their initial defensive testimony, after their establishment of the official consensus "truth," all explanations accepted at their putative face value — and no further questioning tolerated.

YOU CAN ALWAYS LIE TO YOURSELF

1860

Mr. Shaw's Garden, later to become the Missouri Botanical Garden, in St. Louis, opened to the public.

Professor William Henry Harvey's "Algae" (pages 242-383, plates 185-196 in THE BOTANY OF THE ANTARCTIC VOYAGE, PART III. *FLORA TASMANIAE* (Volume 2, edited by J.D. Hooker) (London: L. Reeve).

During this year and the following one, Professor Sir William Jackson Hooker's A SECOND CENTURY OF FERNS.

AGRICULTURAL TRACT, NO. 1. CULTURE OF THE GRASSES. AN EXTRACT FROM THE FOURTH ANNUAL REPORT OF CHARLES L. FLINT, SECRETARY OF THE STATE BOARD OF AGRICULTURE. PUBLISHED, UNDER THE DIRECTION OF THE MASSACHUSETTS STATE BOARD OF AGRICULTURE, FOR GENERAL CIRCULATION (Boston: William White, Printer to the State).

A copy of this botanical reference would be in the personal library of Henry Thoreau.[83]

83. The numbers below are Ray Angelo's and refer to volume numbers and page numbers in the 1906 edition of Thoreau's journal. For instance, "XII 182" would constitute a reference to Journal Volume XII, page 182.

Poa pratensis, known as Smooth Meadow-grass, Common Meadow Grass, English Grass, June-grass, Sweet Grass, or Kentucky Bluegrass, is a perennial species of grass native to Europe, Asia, northern Africa and North America. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:

FLINT ON THE GRASSES

Poa annua (ANNUAL BLUEGRASS) XII 182

Poa capillaris = *Eragrostis capillaris* (LACE-GRASS) XI 150

Poa compressa (CANADA BLUEGRASS) XII 199, XIII 370, 399, 401

Poa dentata = *Glyceria pallida* (PALE MANNA-GRASS) XIII 374, 385, 404

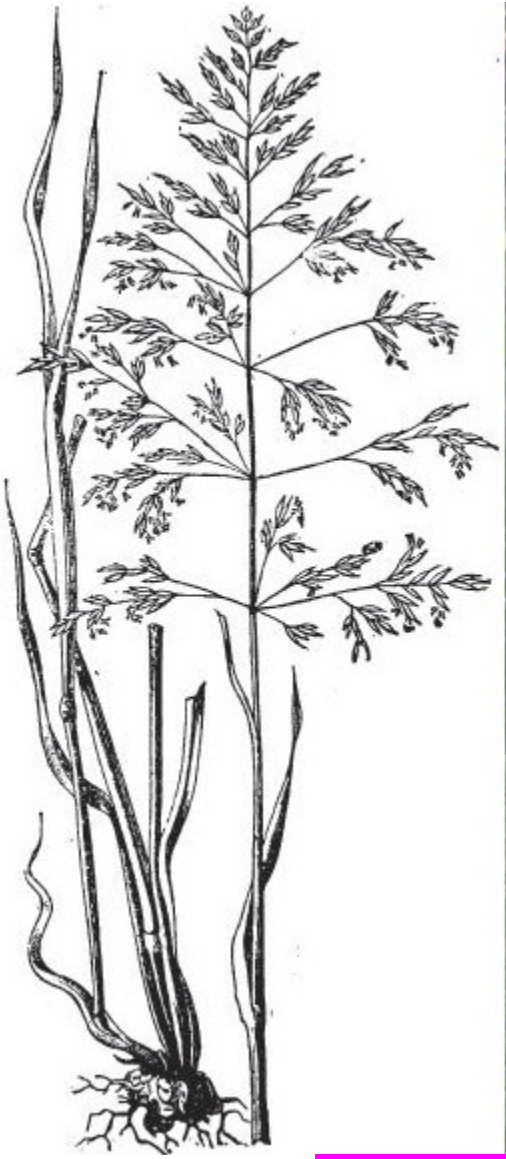
Poa hirsuta = *Eragrostis capillaris* (LACE-GRASS) VI 431, 446, 473, XI 124, 150

Poa serotina = *Poa palustris* (FOWL-MEADOW GRASS) XII 226

English Grass *Poa pratensis* (JUNEGRASS, KENTUCKY BLUEGRASS) II 310, V 443, IX 432[EP], (field) XIII 309

June-grass *Poa pratensis* (JUNEGRASS, KENTUCKY BLUEGRASS) IV 88, 103, 115, 140, V 241, 270, 273, VI 333, VII 413, XI 96, 158, XII 203, 204, XIII 312, 320, 321, 323, 337, 377, 399, 401, 403[EP], (haying) XIII 374

Rough-Stalked Meadow Grass *Poa trivialis* is similar to June-grass *Poa pratensis* but has a rough sheath and a fibrous root, and its sidewise creepers have leaves and run along the surface rather than passing beneath the surface of the soil. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:



Orchard Grass or Rough Cocksfoot *Dactylis glomerata.* On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:

FLINT ON THE GRASSES

[I am as yet unable to discover any references to this species of grass in Thoreau's journal.]

Rye Grass, Virginia wildrye *Elymus virginicus* is a perennial grass of the eastern United States. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:

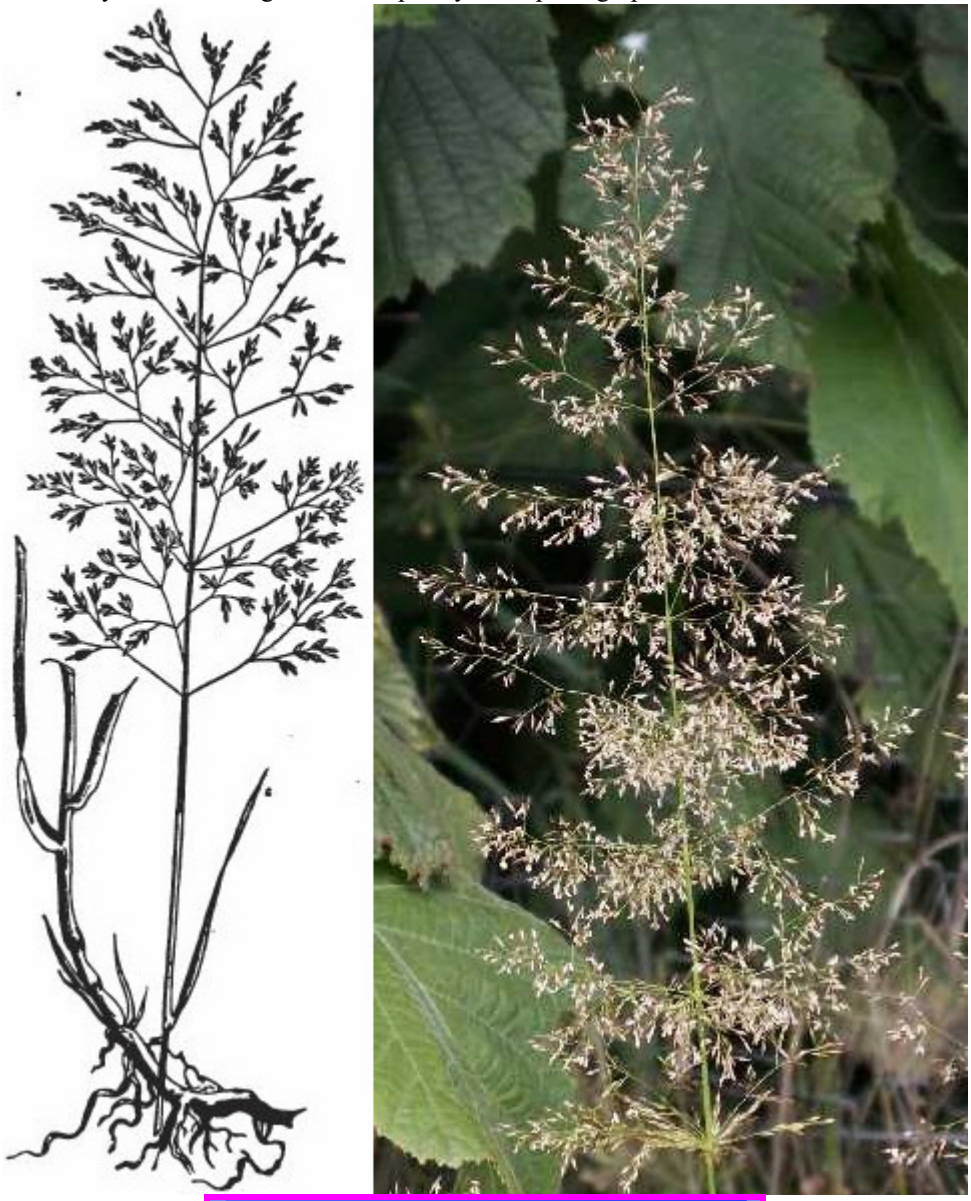
FLINT ON THE GRASSES

Lyme Grass = Rye = *Elymus virginicus* (VIRGINIA WILD RYE) XI 142, 173, XIII 267, XIV 53

Rye = *Secale cereale* (RYE) IV 93, V 155, 178, VI 303

Rye (Wild) = *Elymus virginicus* (VIRGINIA WILD RYE) XI 142, XIII (267)

Red-top Grass *Agrostis alba* var. *vulgaris* flowers from June to August. The flowers are wind pollinated and seed is set from August to October. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:



FLINT ON THE GRASSES

Agrostis alba (REDTOP) see *Agrostis vulgaris*, Red-top, Red-top Grass

Agrostis alba (old usage) = *Agrostis tenuis* (RHODE ISLAND BENT GRASS) XII 216

Agrostis alba var. *palustris* (CREEPING BENT) see Bent Grass, Bent Grass (Purple)

Agrostis perennans (UPLAND BENT GRASS) XI 146, 150, XII 224

Agrostis scabra (FLY-AWAY GRASS) XI 150, XII 217, 224, 258, XIII 370, 385, 387, 397, 401, 404, XIV 27

Flyaway Grass = *Agrostis scabra* (FLY-AWAY GRASS) XI 150, 205, XIV 224

__ (seed) XIV 224

Agrostis tenuis (RHODE ISLAND BENT GRASS) see Agrostis alba (old usage),Bent (White)

Agrostis vulgaris = *Agrostis alba* (REDTOP) XII 216, XIII 370, 401

English bentgrass *Agrostis capillaris* is a rhizomatous and stoloniferous perennial native to Eurasia, that was brought to America through Europe. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:

FLINT ON THE GRASSES

Bent Grass = *Agrostis* spp. (BENT GRASS) IV 115, 131, 151, 237, V 124, VI 292, (light) IV 137

Bent Grass (Purplish) = *Agrostis* spp. (BENT GRASS) VI 285

Bent (White) = *Agrostis tenuis* (RHODE ISLAND BENT GRASS) XI 146

Meadow Fescue Grass (now classed as *Lolium*) has wide flat leaves and is cultivated in Europe and America for permanent pasture and hay and for lawns. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:

FLINT ON THE GRASSES

Fescue = *Festuca* spp. (FESCUE GRASS)/*Vulpia* spp. (FESCUE GRASS) XIII 403

__ (-clad hill) XIII 164

Fescue (Sheep's) = *Festuca ovina* (SHEEP'S FESCUE GRASS) XIII 402, XIV 4

Fescue-grass = *Festuca* spp. (FESCUE GRASS)/*Vulpia* spp. (FESCUE GRASS) II 90, V 529, XIII 367, 414

Fescue-grass (Floating) = *Glyceria septentrionalis* (FLOATING MANNA GRASS) XI 144

Fescue Grass (Sheep's) = *Festuca ovina* (SHEEP'S FESCUE GRASS) XIV 177

Fescue Grass (Tall) = *Festuca elatior* (TALL FESCUE GRASS) XIII 367

Festuca = *Festuca* spp. (FESCUE GRASS) /*Vulpia* spp. (FESCUE GRASS) XIII 352, (-like grass) XII 410

Festuca elatior (TALL FESCUE GRASS) see Fescue Grass (Tall)

Festuca ovina (SHEEP'S FESCUE GRASS) 127 XII 208, XIII 377, 381, 396, 399, 401, XIV 27, see also Fescue (Sheep's), Fescue Grass (Sheep's), Oat Grass (Meadow)

Festuca rubra (RED FESCUE GRASS) see *Festuca ovina*

Festuca tenella = *Vulpia octoflora* (SLENDER FESCUE GRASS) XII 208, XIII 383

Sweet Vernal Grass *Anthoxanthum odoratum*, a low, soft perennial grass producing in the spring narrow spikelike panicles, also known as holy grass, vanilla grass, and buffalo grass, is found wild in acidic grassland in Eurasia and has become a weed species in the bushlands of southeastern Australia. Due to its sweet scent, it can be used as a house plant as well as a lawn feature. The stems are 10 to 16 inches high, with short leaves 0.1 to 0.2 inches wide. It offers flower spikes from April until June, that are 1.6 to 2.4 inches in length and are made up of crowded spikelets of 0.24 to 0.39 inches. Its distinctive scent evokes fresh hay with a hint of vanilla, and is particularly strong when dried. The scent is due to coumarin, a glycoside, plus benzoic acid. On the left is the plant as offered to Thoreau in these materials in his personal library, and on the right a contemporary color photograph:

FLINT ON THE GRASSES

Vernal Grass =*Anthoxanthum odoratum* (SWEET VERNAL GRASS) XIII 279, 307, (399), 402

July 31, Tuesday: George Partridge Bradford found and brought to Henry Thoreau a plant which was judged to be, from a plate in John Claudius Loudon's 1838 botanical reference *ARBORETUM ET FRUTICETUM BRITANNICUM*, the *Potentilla recta* of southern Europe.

July 31, Tuesday: Foggy morning.

M. Pratt sends me Trifolium agrarium (a long time out) from a ditch-side on his land, – yellow hop clover. This specimen is two feet high or long. He had not seen it there for some years.

Mr. Bradford finds and brings to me what I judge from a plate in Loudon to be Potentilla recta of southern Europe; a long time out. Vide press. I find the base of the plant by the east wall, in the road, about six rods south of John Flint's house.

I copy this account of P. recta from Persoon: "Fol. septenatis quinatisque, foliol. lanceolatis grosse dentatis, petalis obcordatis cal. majoribus, caule erecto.… Ad muros et ad agrorum margines. Pet. magna pallida, calyce submajora." This is under his division with digitate leaves and a naked receptacle (?), if this is his word. [It is.] But in this the outside of the calyx or receptacle is shortly pubescent, and the petals are much longer than the calyx. Vide Persoon's other division. [Do not find another so much like it.]

P.M.–Up Assabet.

Decidedly dog-days, and a strong musty scent, not to be wondered at after the copious rains and the heat of yesterday.

At mid-afternoon I am caught in another deluging rain [A great deal fell.] as I stand under a maple by the shore. Looking on a water surface, you can see as well as hear when it rains very hard. At first we had a considerable shower which but slightly dimpled the water, and I saw the differently shaded or lit currents of the river through it all; but anon it began to rain very hard, and there were a myriad white globules dancing or rebounding an inch or two from the surface, where the big drops fell, and I heard a sound as if it rained pebbles or shot. At this season the sound of a gentler rain than this, i.e. the sound of the dripping rain on the leaves, which are now dark

and hard, yields a dry sound as if the drops struck on paper, but six weeks ago, when the leaves were so yellowish and tender, methinks it was a softer sound, as was the rustling.
Now, in the still moonlight, the dark foliage stands almost stiff and dark against the sky.
At 5 P.M. the river is nine and seven eighths inches above summer level.
We may expect to see any common small-seeded European plant springing up by our roadsides in course of time.
Before it rained hardest I could see in the midst of the dark and smoother water a lighter-colored and rougher surface, generally in oblong patches, which moved steadily down the stream, and this, I think, was the new water from above welling up and making its way downward amid the old. The water or currents of a river are thus not homogeneous, but the surface is seen to be of two shades, the smoother and darker water which already fills its bed [?] and the fresh influx of lighter-colored and rougher, probably more rapid, currents which spot it here and there; i. e., some water seems to occupy it as a lake to some extent, other is passing through it as a stream, – the lacustrine and the fluviatile water. These lighter reaches without reflections (?) are, as it were, water wrong side up. But do I ever see these except when it rains? And are they not the rain-water which has not yet mingled with the water of the river?

1861

THE NATURAL HISTORY OF SELBORNE: WITH OBSERVATIONS ON VARIOUS PARTS OF NATURE, AND THE NATURALIST'S CALENDAR / BY THE LATE REV. GILBERT WHITE; WITH ADDITIONS AND SUPPLEMENTARY NOTES BY SIR WILLIAM JARDINE; edited,… London: Henry G. Bohn.[84]

During this year and the following one, Professor Sir William Jackson Hooker's THE BRITISH FERNS.

January 14, Monday: It was reported, in the Observer, that the "infamous author of the "Impending Crisis," Hinton Rowan Helper, had in Fayetteville, North Carolina encountered a somewhat hostile audience.

A LECTURE POSTPONED.—Hinton R. Helper, the infamous author of the "Impending Crisis," advertised extensively in New York last week that he would lecture in Clinton Hall on "slave and free labor." When Helper entered, half an hour after the fixed time, attended by the notorious Professor Hedrick, there were present 7 policemen, 6 reporters, 4 ladies and 33 gentlemen. The lecture was indefinitely postponed, and the anditors (except the dead-heads) had their quarters returned at the door.

Jan. 14. Coldest morning yet; 20° (?).

PLINY

Pliny says, "In minimis Natura praestat" (Nature excels in the least things). The Wellingtonia gigantea, the famous California tree, is a great thing; the seed from which it sprang, a little thing; and so are all seeds or origins of things.

Richard Porson said: "We all speak in metaphors. Those who appear not to do it, only use those which are worn out, and are overlooked as metaphors. The original fellow is therefore regarded as only witty; and the dull are consulted as the wise." He might have said that the former spoke a dead language.

John Horne Tooke is reported in "Recollections" by Samuel Rogers as having said: "Read few books well. We forget names and dates; and reproach our memory. They are of little consequence. We feel our limbs enlarge and strengthen; yet cannot tell the dinner or dish that caused the alteration. Our minds improve though we cannot name the author, and have forgotten the particulars." I think that the opposite would be the truer statement, books differ so immensely in their nutritive qualities, and good ones are so rare.

Gosse, in his "Letters from Alabama," says that he thinks he saw a large dragon-fly (Æslona), which was hawking over a brook, catch and devour some minnows about one inch long, and says it is known that "the larvæ of the greater water-beetles (Dyticidœ) devour fish."

It is the discovery of science that stupendous changes in the earth's surface, such as are referred to the Deluge, for instance, are the result of causes still in operation, which have been at work for an incalculable period. There has not been a sudden re-formation, or, as it were, new creation of the world, but a steady progress according to existing laws. The same is true in detail also. It is a vulgar prejudice that some plants are "spontaneously generated," but science knows that they come from seeds, i.e. are the result of causes still in operation, however slow and unobserved. It is a common saying that "little strokes fall great oaks," and it does not imply much wisdom in him who originated it. The sound of the axe invites our attention to such a catastrophe; we can easily count each stroke as it is given, and all the neighborhood is informed by a loud crash when the deed is consummated. But such, too, is the rise of the oak; little strokes of a different kind and often repeated raise great

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

oaks, but scarcely a traveller hears these or turns aside to converse with Nature, who is dealing them the while. Nature is slow but sure; she works no faster than need be; she is the tortoise that wins the race by her perseverance; she knows that seeds have many other uses than to reproduce their kind. In raising oaks and pines, she works with a leisureliness and security answering to the age and strength of the trees. If every acorn of this year's crop is destroyed, never fear! she has more years to come. It is not necessary that a pine or an oak should bear fruit every year, as it is that a pea-vine should. So, botanically, the greatest changes in the landscape are produced more gradually than we expected. If Nature has a pine or an oak wood to produce, she manifests no haste about it.

BOTANY

Thus we should say that oak forests are produced by a kind of accident, i.e. by the failure of animals to reap the fruit of their labors. Yet who shall say that they have not a fair knowledge of the value of their labors — that the squirrel when it plants an acorn, or the jay when it lets one slip from under its foot, has not a transient thought for its posterity?

Possibly here, a thousand years hence, every oak will know the human hand that planted it.

How many of the botanist's arts and inventions are thus but the rediscovery of a lost art, i.e. lost to him here or elsewhere!

Horace Mann told me some days ago that he found, near the shore in that muddy bay by the willows in the rear of Mrs. Ripley's, a great many of the Sternothœrus odoratus, assembled, he supposed, at their breeding-time, or, rather, about to come out to lay their eggs. He waded in [and] collected –I think he said– about a hundred and fifty of them for Agassiz!

AGASSIZ

I see in the Boston Journal an account of robins in numbers on the savin trees in that neighborhood, feeding on their berries. This suggests that they may plant its berries as well as the crows.

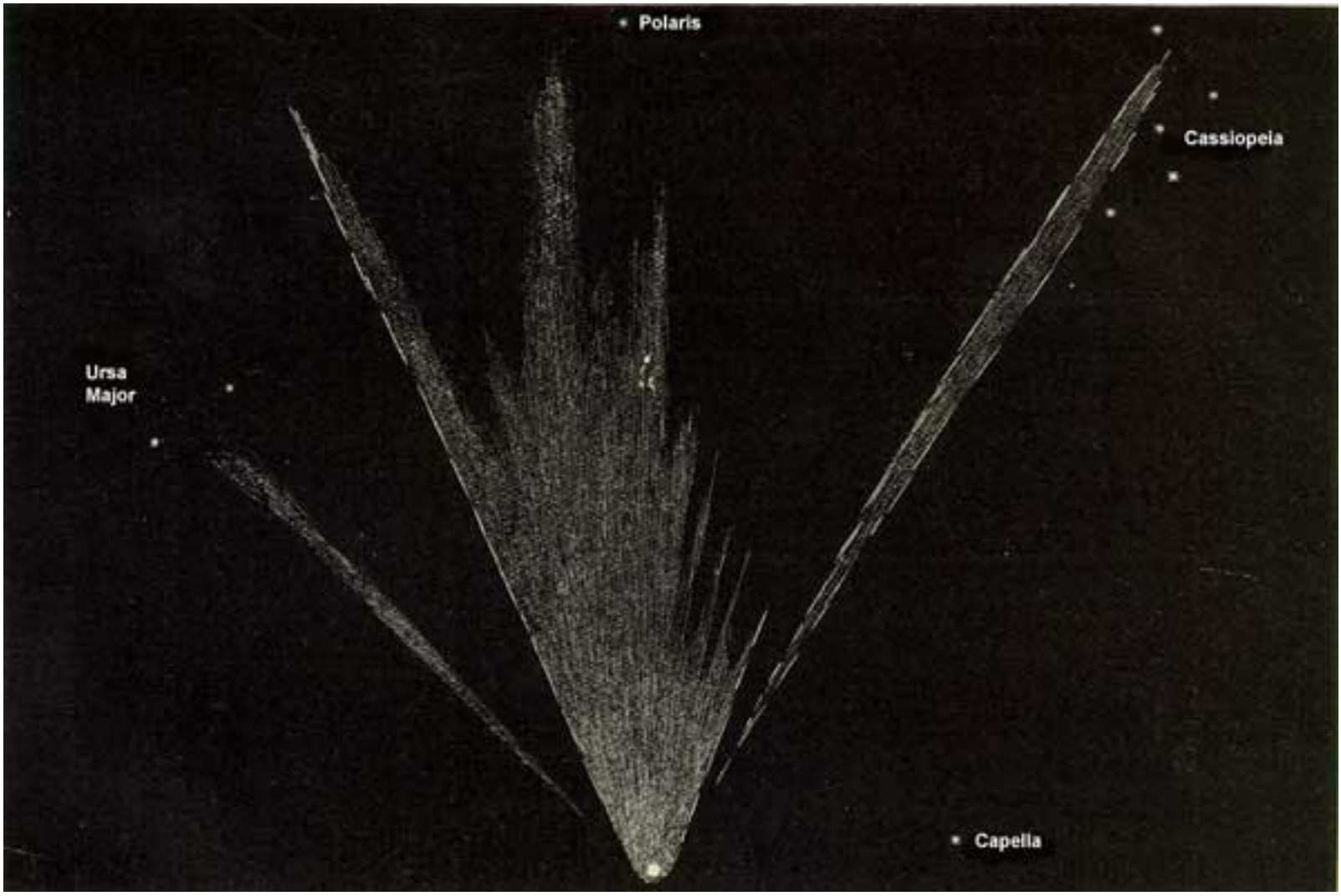
June 30, Sunday evening: An unanticipated comet of enormous size suddenly appeared on the horizon, over the United States and Europe. Calculations indicate that on this night the earth probably was passing directly through the gas and dust of this comet's tail. On this night, actually, the celestial observer E.J. Lowe jotted into his meteor log that the sky had been of a yellowish tinge before sunset, with the sun seeming somehow dimmed and the general levels of illumination less than usual. Also, John Russell Hind reported a certain peculiar phosphorescence in the appearance of the sky, something which may or may not have been entirely attributable to the aurora of the Northern Lights. From the observatory of Athens we have this report from the astronomer Schmidt:

SKY EVENT

> The twilight behind Mt. Parnassus had not yet faded away when I was informed, and I can truthfully say no other surprise could have made so deep an impression. The night before had been absolutely clear and I had not seen a trace of a comet. Now the sky was filled by this majestic figure, spreading the tail from horizon to beyond Polaris, and even across Lyra. It was, to use the language of the past, a comet of truly fearful appearance. At 9 o'clock the head of the comet, looking as large as the moon, was next to Mt. Parnassus. The head and the very wide lower part of the tail appeared like a distant fire, and the tail seemed like windblown smoke illuminated by the fire. After the head had disappeared below the horizon and it had grown dark, one could see that the tail extended to the Milky Way in the constellation Aquila. At 11PM I went to the observatory to watch [for] the reappearance of the head in the northeast.... At midnight and for some time after the tail stood nearly vertically above the northern horizon, its most brilliant portion and the nucleus hidden, the tail reached 30 degrees of arc beyond the zenith [indicating that the total length of this comet's tail above and below the zenith would measure more than 120 degrees]. At 4:27AM the head of the comet became visible again, following reappearance of the brightest parts of the tail which produced

weak but noticeable shadows. Neither the Great Comet of March 1843 nor Donati's comet of October 1858 had been so bright.... I watched the rising of the comet's head with the naked eye; it was an incredible phenomenon that cannot be compared to anything else. The great mass of light hung like a dull smoky fire over the dark outline of the mountains. As it grew lighter the tail disappeared, I could only see about 4 degrees of arc of the tail at 5:30AM. But at 6:08AM when Capella was the only still visible star the nucleus was still clearly luminous.

The 4th great new comet of the 19th Century, I Thatcher, had been first detected from Australia. Of course, since the only way to notify Europe of the detection of this comet was by ship and so, by the time this news arrived in the Northern hemisphere, it had already come been sighted also by Europeans and Americans. This comet appeared inordinately large because it was passing close by our planet and as of this date was brushing across us its complicated tail of changing construction.[85] This comet, together with the double comet I Liais of 1860, would contribute to our Andromedid meteor showers.[86]



As of this date or slightly later, from New Bedford, Henry Thoreau's "Friend Ricketson," Friend Daniel Ricketson, was writing to inform him that he had been "converted" to a strong belief in the truth of Christianity.

> *The Shanty, 30th June 1861*
> *Friend Thoreau,*
> *I have been desirous of hearing from you for a long time, and par-*

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85. Venus, at its closest point to the Earth, is about 23,000,000 miles away, and this comet was passing within 11,000,000 miles. By way of strong comparison, the comet Lexell had in July 1770 passed within 1,401,200 miles. Of course, nothing happened of any great moment in either case, as the tail of a comet is quite insubstantial even by way of contrast with a meteor shower, but this would give rise to stories (sponsored it would appear by adherents of the "God's This Weird Dude" school of theology) connecting the event to the bloodshed of our Civil War.

ticularly in regard to your health, which from your letter of 22^{d} March I was sorry to hear was not as good as usual; but as you speak of your complaint as that of "a severe cold," I hope by this time you have bid farewell to it and are once more tramping about the woods and fields of old Concord and boating on your favorite stream. We had our full share of the snowstorm of which you gave so glowing an account inclusive of your domestic water sentinel (a short way of saying pump!) with its "ghost" of snow. I have kept my usual record of the return of the birds, and am happy to inform you that the Quail has several times of late saluted me with his sweet whistle or call for "Bob White" as the country boys hereabouts translate him. We have had a peculiar singing pewee with an additional stave to his little song very peculiar & rather comical in its way.

I am glad to hear of the success of Friend Alcott, as Superintendent of your village schools– Concord may well be proud to have such a Captain– Please remember me affectionately to him & his family & thank him for me for a copy of his School Report which I duly rec^{d} and read with attention, noting Miss A's happy travesty of the old Scotch border song. I was sorry to find you "aberat" and hope that some less cause than illness prevented you. Concord cant spare any of her ballast.

My dear friend, Since I saw you, & considerably since I wrote you last have I met with some fresh and very unexpected experiences, which have resulted in a change of my religious views. Long, long have I striven to become a good man, rather, to obtain that peace of mind which I conclude to be the evidence of a soul in a state of acceptance with its Creator, but in vain have been my efforts and my researches in the wisdom of the schools of ancient and modern philosophy, the (I fear) delusive and bewitching scepticism of so many noble minds. I am now quite inclined to believe in what are termed the dogmas of Christianity – at least in a part of them & have ceased to rebel against the rest. From my repeated failures in the path of virtue & godliness I am at last convinced of the necessity of regeneration i.e. a new heart – and what may surprise you still more, I am led to believe in the existence of an Evil Spirit, the great adversary of the Soul, whose malign influence has so often destroyed my fondest hopes of peace. I seize upon the truth of the Gospel as recorded in the Old and New Testaments as a shipwrecked sailor to the hand

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86. "COMET TEBBUTT, (C/1861 N1=1861 II). A naked-eye object from discovery until mid-Aug., T=1861 June 12. Extraordinary display created by comet's close encounter with Earth. Spotted in the Southern Hemisphere on May 13th at 4th magnitude. Moved north very slowly across Eridanus. On June 8th, of 2nd magnitude. At mid month, 1st magnitude. Tail already 40 degrees long. Thereafter, motion increased dramatically. On June 24th, when near Rigel, zero magnitude. In conjunction with the Sun on June 29th. Earth passed through the comet's tail! In the Northern Hemisphere, appeared suddenly in Auriga at dawn - immense, brilliant object. Descriptions suggest the head was at least -1 or -2 magnitude. Tail seen to stretch from Auriga to Ophiuchus - 120 degrees! Comet became circumpolar on July 1st. The next night the head was zero magnitude, tail 97 degrees long. On July 8th, when near the Big Dipper, 1st magnitude with a tail up to 60 degrees long. Thereafter rapidly declined. Of 2nd to 3rd magnitude at mid month, 4th at the end. Lost to the unaided eye in mid August."

stretched forth to rescue him from the whelming waves. The spiritual wants of man herein recorded and corroborated by his inward light seem to be so aptly fitted that nothing less than a Divine master could have given them to us. What is human life without the faith and hope thus inspired within the soul! – the faith of so many of the great and good, the saints and Martyrs of the Church of Christ. Oh! dear T. we need it all. "I am not mad most noble Festus" but am willing to be accounted a fool for the sake of the great Head of the Church. I know that you are too good and too pure a man to smile at my new born Zeal or rather newly awakened for I once before long ago was similarly led. Do nt think that I am about to forsake my kind Concord friends, the purest, wisest and best of philosophers, dear noble souls – no – My heart yearns for your spiritual recognition of the revealed word, wherein ye may see that "ye must be born again". What ever takes from our faith and hopes in the future life, robs us of the only possessions that render our earthly existence endurable.

Let us devoutly pray to God for light, for light & strength. We must feel contrite – be ready to smite our breast and cry "God be merciful to me a sinner". O! there must be a listening ear to the fervent petition of the troubled soul– Our Heavenly Father will hear us — He will answer too our prayers. I humbly trust that He has mine.

As I said before I have no rebellion in my heart now– I gladly accept whatever provision God has made for our future happiness, & endeavor to repose with faith upon the arm of Divine Wisdom– Welcome Christ the Saviour of our souls if God so wills, Mystery though it be – purest of the pure, simplest & wisest of all teachers, who died for his faithfulness – the great exemplar & guide of man through the thorny road of earthly life, whose life blood sealed the great testimony of truth he wrought out for us – typical of regeneration He died for us all– How grateful we should feel towards him, the great Head of the Church.

Monday Mrng. July 1. Thus far I wrote last evening & now take my pen to draw my letter to a close. We are just commencing mowing & the scythes are already busy in the hands of my hired men – the most graceful of the farmer's graceful labor – all of which is the living poetry of rural life.

Do let me hear from you soon? And remember me kindly to Channing for whom I shall ever feel an affectionate interest, and to dear father Alcott, and to that complex gentleman, scholar, philosopher & Christian, Radulphus Primus! My wife has had a long illness, but is now recovering. My valued Uncle, James Thornton died 27 April last in his 64th year, of which please inform Channing, who knew him. With kind regards to your mother & sister, I remain truly & affectionately

Your friend,

Dan[l] Ricketson

"Te teneam monius deficiente manu."

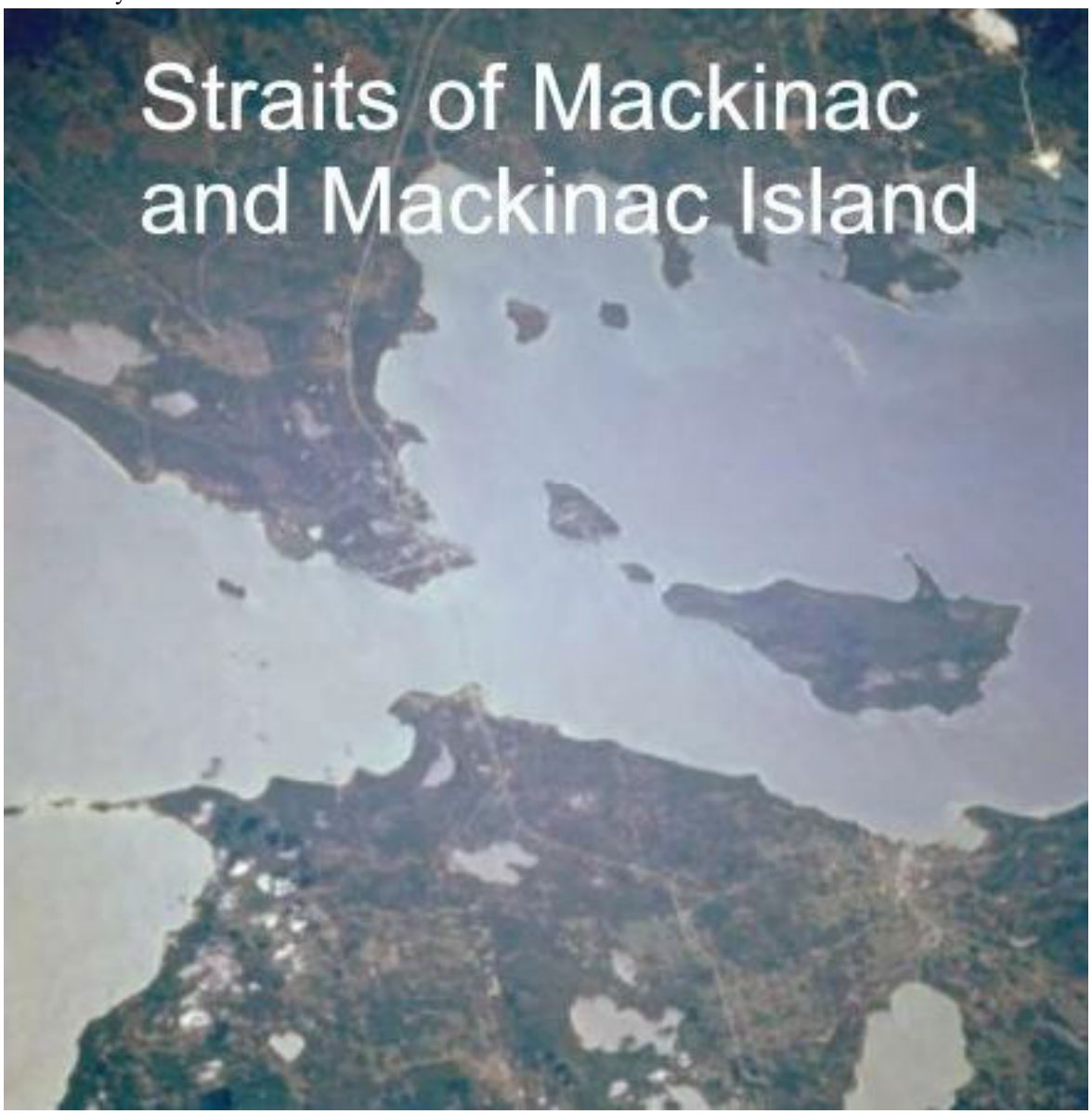
What he meant by that he would feel sufficiently confident to confide to his journal in his extreme old age, in May 1885 just after he had read of and had evidently been perplexed by the supernaturalist beliefs that had passed for religion in the mind of Victor Hugo:

> *I believe in the gentle doctrines of the early Friends — particularly that of "the indwelling light," as the first great teacher and guide, it being … the true interpreter of the Sacred Volume whose pages bear record of this divine manifestation to mankind from the earliest ages.... At the hour of death I hope for grace from on high, to resign myself with childlike confidence into the hands of our Heavenly Father, the great and good Creator, whose protecting care over me in my past youth, manhood, and old age, I have so often witnessed.... As a birthright member of the Society of Friends, I would express my continued faith in its Christian doctrines, so simple and true, so human and charitable when rightly observed, feeling that in the future they will be seen to be the truest interpretation of the Christian truth. So, asking God's blessing upon those who may be called upon to suffer for its principles I would close.*

RELIGIOUS SOCIETY OF FRIENDS

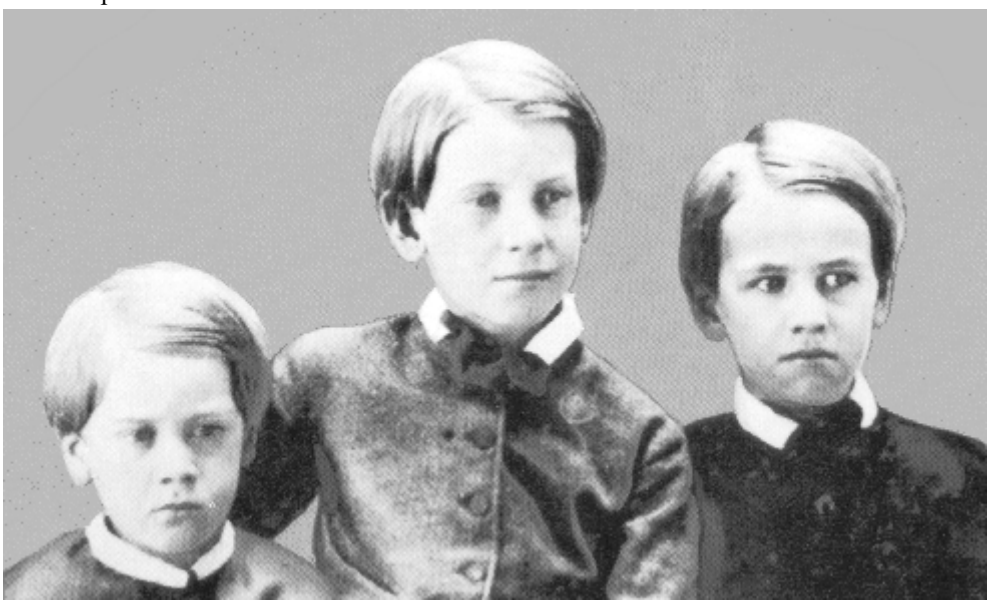
Thoreau jotted down that he and Horace Mann, Jr. had reached the "Mackinaw House" on Mackinac Island. By 1838 this island, which had started out as the Michilimackinac "Green Turtle" burying ground, had already become firmly established as a summer health resort, catering in particular to those suffering from seasonal allergies such as hay fever. In fact some sufferers had to be turned away in earlier years for lack of accommodations. By 1861 there had been a building boom –although the Grand Hotel and the Michigan State Park were still a number of years in the future– and Thoreau and Mann were able to choose among several hotels and boarding houses. It was unseasonably cold and Thoreau was so ill at this point that he spent most

of his time sitting by the fire with Mann bringing botanical collections in to him. Be it noted that Margaret Fuller and William Cullen Bryant had been on Mackinac Island and young Mann had himself been there before as a boy of 13 with his father.



We may recollect a letter written by Horace Mann, Sr. on Mackinac Island in 1857: “I never breathed such air before, and this must be some that was clear out of Eden, and did not get cursed. I slept every night under sheet, blanket, and coverlet, and no day is too warm for smart walking and vigorous bowling. The children are crazy

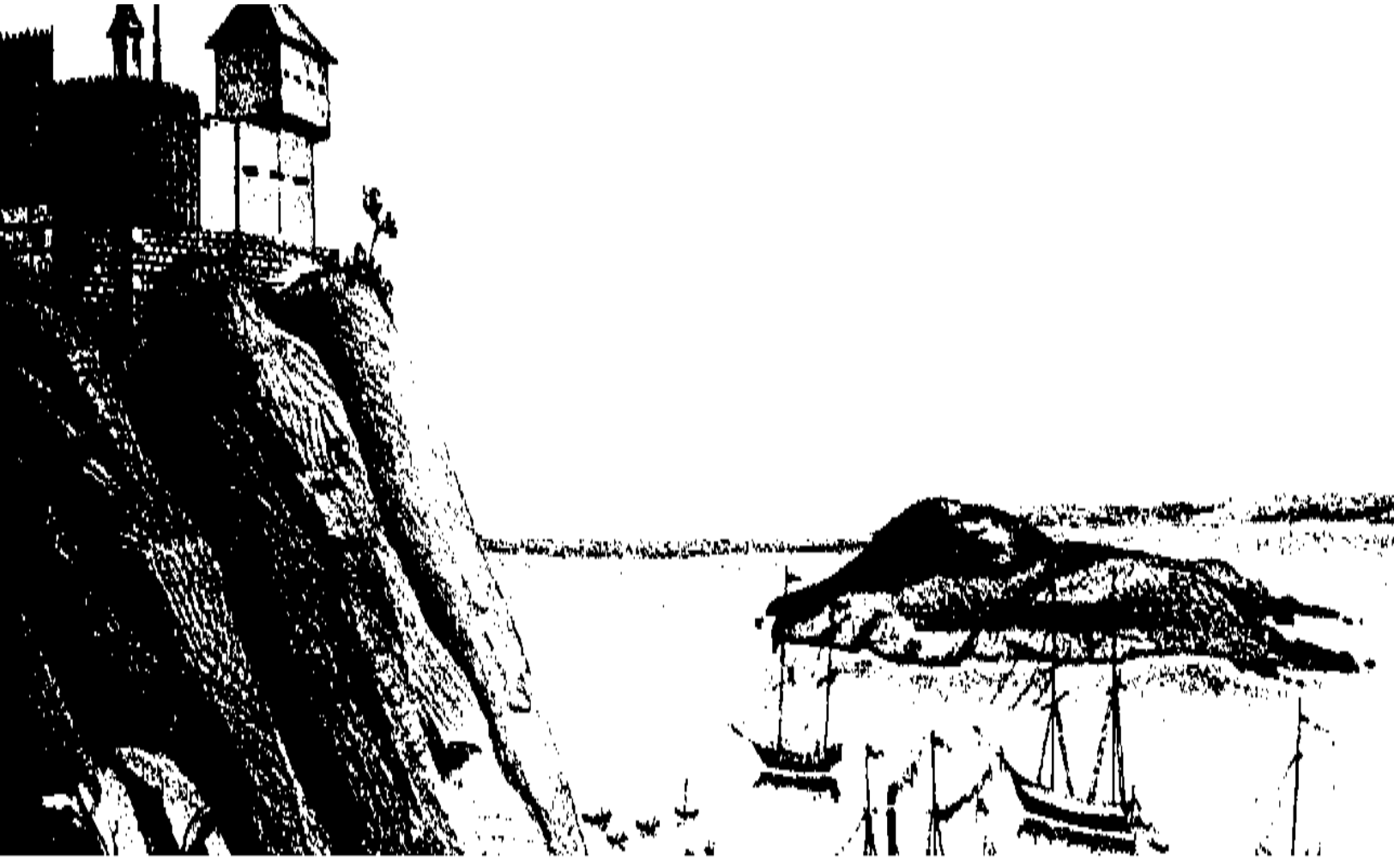
with animal spirits."[87]



Therefore, it is clear, Thoreau did not return to Concord via the Great Lakes by accident, nor stop off at Mackinac Island by happenstance.

ASTRONOMY

87. See pages 157-163 of J.A. Van Fleet, OLD AND NEW MACKINAC (Ann Arbor, 1870).



Michilimackinac “Green Turtle” Island on Lake Michigan

1862

Lord Kelvin asserted that the earth and sun must be cooling from their initial formation, between 20,000,000 and 400,000,000 years ago (he would later adopt the smaller number).

London's Great Exhibition featured a frog that miners claim to have found alive in a coal seam hundreds of feet underground. Naturalist Frank Buckland wrote an angry letter to the editor of The Times of London demanding that said frog be removed from the display.

BIOLOGY

BOTANY

Charles Darwin published the first thorough study of orchid pollination, ON THE VARIOUS CONTRIVANCES BY WHICH BRITISH AND FOREIGN ORCHIDS ARE FERTILISED BY INSECTS, AND ON THE GOOD EFFECTS OF INTERCROSSING.

Joseph Hooker reported on the discovery two years earlier in West Africa of *Welwitschia mirabilis*. He considered this find "the most wonderful, in a botanical point of view, that has been brought to light during the present century."

In this year of Henry David Thoreau's demise there was published **yet another** edition of the Reverend Gilbert White's THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE, this time entitled THE NATURAL HISTORY OF SELBORNE. WITH MISCELLANEOUS OBSERVATIONS AND EXPLANATORY NOTES, this time issued in London by a publishing enterprise "Bell and Daldy" (there's always some greedy but unimaginative publisher eager to republish some uncontroversial and non-innovative thingie that has made money for at least 13 previous editions).[88]

John Muir became consumed by an interest in Botany.

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

1863

Harland Coultas's THE WINTER LIFE OF PLANTS. His THE NATURAL HISTORY OF A BEECH TWIG.

Leaving the university; John Muir returned to Fountain Lake to await being drafted for the Civil War. While waiting he took his 1st botanical foot journey, down the valley of the Wisconsin River to the Mississippi River.

1865

In Auckland, New Zealand, some of the streets were lit by gas for the 1st time. Maori resistance continued.

The New Zealand Exhibition awarded Dr. William Lauder Lindsay a silver medal in recognition of his botanical researches.

1866

The 4th edition of Charles Darwin's ON THE ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION, OR THE PRESERVATION OF FAVORED SPECIES IN THE STRUGGLE FOR LIFE.

ON THE ORIGIN OF SPECIES

In this edition Darwin came out against what we might term "constant-speedism," by inserting the following sentence:

> Many species once formed never undergo any further change...; and the periods, during which species have undergone modification, though long as measured by years, have probably been short in comparison with the periods during which they retain the same form.

(We can see from this that Professor Stephen Jay Gould's theory of "punctuated equilibrium" is not nearly as un-Darwinian as some of its vocal opponents have been asserting it to be.)

Gregor Mendel sent a copy of his paper describing the basic patterns of inheritance and his understanding of the hereditary nature of variation between individuals in a population to the Linnaean Society in London, where the pages would remain uncut (it is startling that this work in botany, though highly complementary to Darwin's concepts, did not emerge for general scientific discussion until after 1900).

1867

Alphonse Louis Pierre Pyramus de Candolle's *LOIS DE LA NOMENCLATURE BOTANIQUE* was accepted by the International Botanical Congress in Paris.

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

1868

James Arnold left a portion of his estate in trust and Harvard College agreed to establish the Arnold Arboretum.

Posthumously, William Henry Harvey's THE GENERA OF SOUTH AFRICAN PLANTS was reissued in London, in an enlarged 2d edition edited by Sir J.D. Hooker.

BOTANIZING

Dr. William Lauder Lindsay's CONTRIBUTIONS TO NEW ZEALAND BOTANY. (Visits to North Germany, Norway, and Iceland would be followed in like manner by studies of the flora of those countries.)

In New Zealand, Maori resistance continued under the leadership of Te Kooti Arikirangi and Titokowaru.

Opening of the American Museum of Natural History in New-York. Let's conserve our natural history — let's

1869

Lydia J. Fisher edited a MEMOIR OF W.H. HARVEY, M.D., F.R.S., ETC., ETC., LATE PROFESSOR OF BOTANY, TRINITY COLLEGE, DUBLIN. WITH SELECTIONS FROM HIS JOURNAL AND CORRESPONDENCE (London: Bell and Daldy, York Street, Covent Garden).

MEMOIR OF W. H. HARVEY

1870

Dr. William Lauder Lindsay's MEMOIRS ON THE SPERMOGENES AND PYCNIDES OF LICHENS, with all drawings by the author, to which he appended a list of his 33 contributions to lichenology, contributions for the most part to Journal of Microscopical Science or Transactions of the Linnean and Royal (Edinburgh) Societies.

BOTANIZING

THE HOME NATURALIST : WITH PRACTICAL INSTRUCTIONS FOR COLLECTING, ARRANGING, AND PRESERVING NATURAL OBJECTS; CHIEFLY DESIGNED TO ASSIST AMATEURS. BY HARLAND COULTAS, LATE LECTURER ON BOTANY AT THE SCHOOL OF MEDICINE, CHARING-CROSS HOSPITAL (London: The Religious Tract Society, 56, Paternoster Row; 65, St. Paul's Churchyard; and 164, Piccadilly).

Henry Youle Hind's "On two gneissoid series in Nova Scotia and New Brunswick, supposed to be the equivalent of the Huronian (Cambrian) and Laurentian" (Geological Society of London, Quarterly Journal, 26: 468-78).

The rivalry between fossil collectors Othniel Charles Marsh and Edward Drinker Cope turned ugly when Marsh publicly pointed out Cope's error in reconstructing a fossil marine reptile (OK, an expert putting an animal's head on the tip of its tail makes for fairly pleasant newspaper copy). Their rivalry was the public's gain as they attempted to outdo each other in identifying new dinosaur species — over 130.

THE SCIENCE OF 1870

Professor Joseph Leidy had his picture taken:

Othniel Charles Marsh discovered, in chalk deposits in Kansas, the 1st North American pterosaur.
He calculated the wingspan at 20 feet (during the following year he would collect more fossils to confirm this calculation).

1872

Professor Asa Gray issued HOW PLANTS BEHAVE.

BOTANIZING

John Muir's articles "Yosemite Valley in Flood" (April), "Twenty Hill Hollow" (July), and "Living Glaciers of California" (December) were published in The Overland Monthly. In the summer of this year Professor Gray, Harvard College's botanist, spent some time with him in Yosemite (Muir had for a decade been consumed by an interest in botany).

Muir met the artist William Keith, who would become a life-long friend. Muir made the 1st ascent of the north face of Mount Ritter (13,000 ft.).

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

April 4: Up to this point Thoreau's journals had been in Maine with his sister Sophia. From this point they would be stored in the attic at Orchard House in Concord (later, it would be in this attic that the books of Thoreau family flute music, with botanical samples still pressed in their pages, would be discovered). Bronson Alcott wrote in his journal: "PM Thoreau's journals, manuscripts and such book as his sister wishes to have in care come to hand. They are sent in three trunks, the MSS. and the books, with a bookcase made by Thoreau himself. I am to hold them sacred from all but Thoreau's friends, allow none to take them away for perusal, subject to his sister's pleasure during her lifetime, and if I survive her then they become mine for quotation or publishing. Many volumes may be compiled from them, and will be when his editor appears. I house them under lock and key safely in my attic. Along with the books are maps and surveys of local value."

TIMELINE OF JOURNAL

View Thoreau's surveys at the Concord Free Public Library:
http://www.concordlibrary.org/scollect/Thoreau_surveys/Thoreau_surveys.htm

1875

Francis Galton undertook experiments on the hereditary characteristics of sweet peas.

1876

Professor Asa Gray issued DARWINIANA.

BOTANY

Charles Darwin's CROSS AND SELF FERTILIZATION IN THE VEGETABLE KINGDOM explained the concept of hybrid vigor, stimulating experiments and studies by other scientists. Though the basic concept of hybrid vigor had been discussed by various researchers during the earlier decades of this century, this was the first complete analysis and description.

Charles Doolittle Walcott was able to find and describe legs of trilobite, putting to rest some speculation about how these creatures had moved about.

PALEONTOLOGY

Unable to have children of their own, Professor Joseph Leidy and Anna Harden Leidy adopted a 7-year-old orphan, Allwina Franck. Professor Leidy was appointed as Director of the Zoological Society of Philadelphia, which was creating a municipal zoo.

Robert Koch validates the germ theory of disease, postulated by Louis Pasteur in the 1860s, identifying a bacterium as the cause of anthrax.

BIOLOGY

Harland Coultas's ZOOLOGY OF THE BIBLE. WITH PREFACE, BY REV. W.F. MOULTON, D.D. (London: Wesleyan Conference Office, 2, Castle Street, City Road. Sold at 66, Paternoster Row). (Also in this year, OUR ZOOLOGICAL FRIENDS.)

Cesare Lombroso's THE CRIMINAL MAN describing physical characteristics that identify inborn criminals.

THE SCIENCE OF 1876

1877

The botanist Harland Coultas died in Hackney, London, England.

A sociological study of the Juke family was unleashed in the US. Unfortunately, because there were so very many Americans who were pleased at the legitimation that this offering provided for all their hottest fantasies and most morbid agendas — it would take us many decades to dope out just how faked and tendentious this scholarship had been.

EUGENICS

British traders sent seed of the rubber tree (*Hevea brasiliensis*) from Brazil to Malaya, to be followed three decades later by development of Dutch plantations in Sumatra. (By 1930 Brazil would have lost the rubber market to plantations in Malaya and elsewhere; the work of 150,000 rubber trappers would slowly dry up, returning the Amazonian city of Manaus to obscurity. In the 1920s the US company Firestone would transform the American near-colony of Liberia into a land of rubber, in the process gaining from the Liberian government a concession of 1,000,000 acres. In 1943 the US dollar would become Liberia's currency. During WWII the US government, recognizing the importance of rubber harvest to the war effort, would maintain there a staff of plant pathologists to help prevent importation of a leaf blight disease from South America.)

BOTANIZING

Frederick William Burbidge was sent to Borneo by James Veitch & Sons to collect orchids and other exotic plants. He met with Peter C. M. Veitch and they went to Kina Balu, Borneo's Sugar Loaf Mountain (returning to England in 1879). The trip would be recorded in THE GARDENS OF THE SUN.

W. J. Beal, working at Michigan Agricultural College (now Michigan State University) made the first controlled crosses of corn in an effort to increase yield. (Later workers would experiment with inbred varieties, devising a system of "double crossing" to produce large quantities of hybrid seed. In 1935 only one percent of US corn would come from hybrid seed but today virtually all corn grown in the US is hybrid, giving increased yields with reduced manpower.)

1878

Alphonse Louis Pierre Pyramus de Candolle's *MONOGRAPHIAE PHANEROGAMARUM* in nine volumes, with Alphonse's son Casimir de Candolle.

BOTANIZING

At about this point Charlotte Hill collected, from the Florissant Formation in Colorado, the well-preserved fossil of a butterfly to be designated *Prodryas persephone*. The formation was about 35,000,000 years old.

Entire skeletons of *Iguanodon* were discovered in Belgium, enabling a more accurate reconstruction of this dinosaur than those done by Owen and Waterhouse Hawkins during the 1850s (engineer-turned-paleontologist Louis Dollo would begin to publish on these fossils in 1882).

THE SCIENCE OF 1878

Alexander Winchell's SKETCHES OF CREATION cost him his job at the University of Vanderbilt, when readers noticed he had suggested that Adam descended from earlier humans (this was a perfect storm: found particularly outrageous was the author's suggestion that these ancestors of Adam might have had dark skins).

PALEONTOLOGY

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.

1880

When French geologist Le Mesle visited an Algerian site to verify local legends about tracks belonging to a giant bird, what he found caused him to concur (the tracks pertained to dinosaurs).

PALEONTOLOGY

Charles Darwin and his son Francis published the results of studies on plant responses to light — phototropism (bending toward the light) was the result of light reaching the top of a plant's shoot.

Professor Asa Gray, Harvard College's Professor of Botany, was invited to deliver two lectures to the Harvard Divinity School, and these would result in a monograph entitled NATURAL SCIENCE AND RELIGION:

> I AM invited to address you upon the relations of science to religion, -in reference, as I suppose, to those claims of natural science which have been thought to be antagonistic to ...religion, and to those assumptions connected with the Christian faith which scientific men in our day are disposed to question....

THE SCIENCE OF 1880

Intelligent Design: The descent of a concept.

By JAMES DAO, New York Times, December 25, 2005

WORDS evolve, even those coined by skeptics of evolution. Consider "intelligent design," a phrase used for over a century by critics of Darwin but only recently bursting into prominence as both a concept and a movement intended to explain, its proponents say, the "irreducible complexity" of nature.

According to the Discovery Institute, a group based in Seattle that promotes intelligent design as an alternative to natural selection, the phrase may have first been used by an Oxford scholar, F.C.S. Schiller, who in 1897 wrote, "It will not be possible to rule out the supposition that the process of Evolution may be guided by an intelligent design."

But paradoxically, one of the most prominent 19th-century scientists to refer to God as an all-knowing designer was a staunch defender of Darwin, a renowned Harvard botanist named Asa Gray.

Professor Gray, a confidant of Darwin's and a deeply religious Christian, agreed with many of Darwin's ideas, defending him against charges of atheism and favorably reviewing ON THE ORIGIN OF SPECIES. A New York Times review of Professor Gray's 1880 book, NATURAL SCIENCE AND RELIGION, said he had demonstrated "the harmony of evolution with a belief in intelligent design."

But Darwin and Professor Gray differed on a fundamental issue: where Darwin saw randomness in nature, Professor Gray saw divine design. He believed, the Times review said, that "variation does

not always seem an accident, but often 'guided in certain lines,' as if by an intelligent power."
Sara Joan Miles, a science historian, wrote in 2001 that "Darwin could not reconcile the seeming randomness of certain particular events with an overall, foreordained plan." Professor Gray, though, "knew from Scripture the attributes of God, and therefore could accept the errors, evil and suffering of Nature," Professor Miles wrote.
Flash forward to 2005. Once used by Asa Gray to reconcile the theory of natural selection with Christian theology, the concept of intelligent design is now presented as an alternative, a challenge really, to Darwin's ideas. What changed?
Professor Miles, the founding dean of Esperanza College in Philadelphia, says science and religion have become increasingly fearful of and defensive about each other. She recommends they study the cordial debates between Asa Gray and Darwin for clues about how to coexist, or at least talk.
Indeed, in a letter to Professor Gray in 1860, Darwin, an agnostic, seemed to accept the possibility of an all-wise designer without softening his scientific skepticism. "I can see no reason why a man, or other animal, may not have been aboriginally produced by other laws, and that all these laws may have been expressly designed by an omniscient Creator, who foresaw every future event and consequence," he wrote.
"But the more I think, the more bewildered I become; as indeed I probably have shown by this letter."

Here, then, are Professor Gray's two lectures:

NATURAL SCIENCE AND RELIGION

TWO LECTURES, DELIVERED TO THE THEOLOGICAL SCHOOL OF YALE COLLEGE

By ASA GRAY

NEW YORK CHARLES SCRIBNER'S SONS, 743 AND 745 BROADWAY

1880

LECTURE I. -SCIENTIFIC BELIEFS.

I AM invited to address you upon the relations of science to religion, -in reference, as I suppose, to those claims of natural science which have been thought to be antagonistic to supernatural religion, and to those assumptions connected with the Christian faith which scientific men in our day are disposed to question or to reject. While listening weekly-I hope with edification -to the sermons which it is my privilege and

duty to hear, it has now and then occurred to me that it might be well if an occasional discourse could be addressed from the pews to the pulpit. But, until your invitation reached me, I had no idea that I should ever be called upon to put this passing thought into practice. I am sufficiently convinced already that the members of a profession know their own calling better than anyone else can know it; and in respect to the debatable land which lies along the borders of theology and natural science, and which as been harried by many a raid from both ides, I am not confident that I can be helpful in composing strifes or in the fixing of boundaries; nor that you will agree with me that some of the encounters were inevitable, and some of he alarm groundless. Indeed upon much that may have to say, I expect rather the charitable judgment than the full assent of those whose approbation I could most wish to win. But I take it for granted that you do not wish to hear an echo from the pulpit nor from the theological class-room. You ask a layman to speak from this desk because you would have a layman's thoughts, expressed from a layman's point of view; because you would know what a naturalist comes to think upon matters of common interest. And you would have him liberate his mind frankly, unconventionally, and with as little as may be of the technicalities of our several professions. Frankness is always commendable; but outspokenness upon delicate and unsettled problems, in the ground of which, cherished convictions are rooted, ought to be tempered with consideration. Now I, as a lay-man, may claim a certain license in this regard; and any over-free handling of sensitive themes should compromise no one but myself. As a student who has devoted an ordinary lifetime to one branch of natural history, in which he is supposed to have accumulated a fair amount of particular experience and to have gained a general acquaintance with scientific methods and aims, -as one, moreover, who has taken kindly to the new turn of biological study in these latter years, but is free from partisanship, -I am asked to confer with other and younger students, of another kind of science, in respect to the tendencies of certain recently developed doctrines, which in schools of theology are almost everywhere spoken against, but which are everywhere permeating the lay mind- whether for good or for evil- and are raising questions more or less perplexing to all of us. But our younger and middle-aged men must not think that such perplexities and antagonisms have only recently begun. Some of them are very old; some are old questions transferred to new ground, in which they spring to rankness of growth, or sink their roots till they touch deeper issues than before, -issues of philosophy rather than of science, upon which the momentous question of theism or non-theism eventually turns. Some on the other hand are mere survivals, now troublesome only to those who are holding fast to theological positions, which the advance of actual knowledge has rendered un- tenable, but which they do not well know how to abandon; yet which, in principle, have mostly been abandoned already. To begin with trite examples. Among the questions which disquieted pious souls in my younger days, but which have ceased to disquiet any of us, are those respecting the age and gradual development of the earth and of the solar system, which came in with geology and modern astronomy. I remember the time when it

was a mooted question whether geology and orthodox Christianity were compatible; and I suppose that when, in these quarters, the balance inclined to the affirmative, it was owing quite as much to Professor Silliman's transparent Christian character as to his scientific ability. One need not be an old man to know that Laplace was accounted an atheist because he developed the nebular hypothesis, and because of his remark that he had no need to postulate a Creator for the mathematical discussion of a physical theorem; for a venerable and most religious astronomer, still living, who adopted this hypothesis in his "Exposition of certain Harmonies of the Solar System," published only five years ago, thought it needful to add an appendix, asking the question, "Is the nebular hypothesis, in any form, essentially atheistical in its character?" He answered it in the negative, but with the salvo, that "this hypothesis, having to do with a strictly azoic period, enforces no connection with 'the development theory' of the beginning or of the progress of life." The great antiquity of the habitable world, and of existing races was the next question. It gave some anxiety fifty years ago; but is now, I suppose, generally acquiesced in, -in the sense that existing species of plants and animals have been in existence for many thousands of years; and, as to their associate, man, all agree that the length of his occupation is not at all measured by the generations of the biblical chronology, and are awaiting the result of an open discussion as to whether the earliest known traces of his presence are in quaternary or in the latest tertiary deposits. As connected with this class of questions, many of us remember the time when schemes for reconciling Genesis with Geology had an importance in the churches, and among thoughtful people, which few if any would now assign to them; when it was thought necessary -for only necessity could justify it -to bring the details of the two into agreement by extraneous suppositions and forced constructions of language, such as would now offend our critical and sometimes our moral sense. The change of view which we have witnessed amounts to this. Our predecessors implicitly held that Holy Scripture must somehow truly teach such natural science as it had occasion to refer to, or at least could never contradict it; while the most that is now intelligently claimed is, that the teachings of the, two, properly understood, are not incompatible. We may take it to be the accepted idea that the Mosaic books were not handed down to us for our instruction in scientific knowledge, and that it is our duty to ground our scientific beliefs upon observation and inference, unmixed with considerations of a different order. Then, when fundamental principles of the cosmogony in Genesis are found to coincide with established facts and probable inferences, the coincidence has its value; and wherever the particulars are incongruous, the discrepancy does not distress us, I may add, does not concern us. I trust that the veneration rightly due to the Old Testament is not impaired by the ascertaining that the Mosaic is not an original but a compiled cosmogony. Its glory is, that while its materials were the earlier property of the race, they were in this record purged of polytheism and Nature-worship, and impregnated with ideas which we suppose the world will never outgrow. For its fundamental note is, the declaration of one

God, maker of heaven and earth, and of all things, visible and invisible, -a declaration which, if physical science is unable to establish, it is equally unable to overthrow. But, leaving aside for the present all questions of this sort, I proceed with the proper subject of this discourse; namely, the further changes in scientific belief, which have occurred within my own recollection, even since the time when I first aspired to authorship, now forty- five years ago. There will be no need to go much beyond the line of subjects which it has been my business to study, in order to bring before you, in a cursory review, not indeed all the disturbing topics of the time, but quite enough of them for our purpose. For the changes which we have to consider are all more or less connected I with the evolutionary theories which are now uppermost in the popular mind. In this presentation, it is best to set them forth in their in their simplest or most general form, divested of all theological or philosophical considerations, which have been or may be attached to them. I should rather say, to some of them. For the foundations, or at least the buttresses, of the now prevalent doctrine of the derivative origin of species mainly rest upon researches independently made, without speculative bias, being the general contributions to biological science in this century; the results of which have been accepted as far as made out without apprehension or other than scientific controversy. Upon no one of these particular points has there been a completer change of view than upon the distinctness of the animal and vegetable kingdoms. The former conviction that these two kingdoms were wholly different in structure, in function, and in kind of life, was not seriously disturbed by the difficulties which the naturalist encountered when he undertook to define them. It was always understood that plants and animals, though completely contrasted in their higher representatives, approached each other very closely in their lower and simpler forms. But they were believed not to blend. It was implicitly supposed that every living thing was distinctively plant or animal; that there were real and profound differences between the two, if only they could be seized; and that increased powers of investigation- microscopical and chemical- might be expected to discover them. This expectation has not been fulfilled. It is true that the ambiguities of a hundred years ago are settled now. The zoophytes are all remanded to their proper places, though the animal kingdom at first claimed more than belonged to it. But other, more recondite and insurmountable, difficulties arose in their place. The best, I am disposed to say the settled, opinion now is, that there are multitudinous forms which are not sufficiently differentiated to be distinctively either plant or animal, while, as respects ordinary plants and animals, the difficulty of laying down a definition has become far greater than ever before. In short, the animal and vegetable lines, diverging widely above, join below in a loop. Naturalists may help classification, but do not alter these facts; when they sever this loop arbitrarily at what they deem the lowest point, or when they cut away the whole loop, and form of it a separate kingdom -the Protista of Haeckel. The only objection to the latter is (that the definition of this tertium quid from plant

on the one hand and animal on the other is equally impracticable. One difficulty is removed only to have two in its place. The fact is, that a new article has recently been added to the scientific creed, -the essential oneness of the two kingdoms of organic nature. I crave your patience while I enter somewhat into particulars. Not many years ago it was taught that plants and animals were composed of different materials: plants, of a chemical substance of three elements,- carbon, hydrogen, and oxygen; animals of one of four elements, nitrogen being added to the other three. The plant substance, named cellulose, because it formed the cell-walls, was supposed to constitute the whole vegetable fabric. It was known that all plants produced nitrogenous matter in the form of a compound of four elements; but this was thought to be merely a contained product, in a structureless condition, and to be not so much essential to the plant's life as to that of the animals which the plants nourished. It was known to be structure-building material for animals: it was not known to be essential plant-structure also. But it was soon ascertained that this quaternary matter of the animal body was chemically the same in the plant, was elaborated there, and only appropriated by the animal. Next it was found that it was physiologically and structurally the same in the plant, that it was the living part of the plant, that which manifested the life and did the work in vegetable as well as in animal organisms. This substance, which is manifold in its forms and protean in its transformations, has, in its state of living matter, one physiological name which has become familiar, that of protoplasm. The statement that "protoplasm is the physical basis of life" must be accepted as true. As Professor Allman puts it, "wherever there is life, from its lowest to its highest manifestations, there is protoplasm; wherever there is protoplasm, there too is life," or has been. The cellulose or solid material which composes the bulk of a tree or herb did not produce the protoplasm contained in its living parts, as was formerly supposed, but the protoplasm produced the cellulose: the semi- liquid and mobile matter within produced the cell-walls which enclose it. The walls or solid parts are to the protoplasm what the shell is to he oyster. The contents not only preceded he protective, investment, but can exist and prosper apart from it, as many a mollusk does, as many a simple plant does throughout the earlier and most active period of its life. Indeed this slimy matter lives before and apart from any thing which can be called a living being. A formless, apparently diffluent and structureless mass is seen to exhibit the essential phenomena of life, -to move, to feed, to grow, to multiply. We have spoken of beings so low in the scale that the individuals throughout their whole existence are not sufficiently specialized to be distinctively plant or animal: yet these are definite in form and fixed in phase, are individual beings, though we may not determine to which kingdom they belong. But there is life in simpler shape,

"If shape it might be called that shape has none,
Distinguishable in member, joint, or limb,"

there is vital activity in that which has not attained even the

semblance of individuality. Little lumps of protoplasm are these, with out- line in a state of perpetual change, divisible into two or three or more, or two or three combining into one mass, either way without hindering or altering their manifestations. This living matter -of which Bathybius, if there be a Bathybius, or if it be any thing more than protoplasm of sponges, is one example -is said to have nothing more than molecular structure. It would be safer to say that the microscope has as yet revealed no organic structure. The natural history of protoplasm has recently been well expounded by Professor Allman, late President of the British Association, a most judicious naturalist, of conservative tendency; and his address, which you have read or should read, saves me from further de: tails, and enables me to proceed to other evidences of the substantial oneness of the two kingdoms of organic nature. Cellulose makes up the bulk of a vegetable, and was thought to be its true element. But it is now known to be not even peculiar to it: it enters largely into the fabric of certain animals, not of the very lowest grade. Starch was equally regarded as a purely and characteristically vegetable production; and its presence, in ambiguous cases, has been taken as a test. But it follows the example of cellulose. Being a prepared material from which cellulose in the plant is made by a molecular change, we are not now surprised to learn that starch-grains of animal origin have been found. We cannot conceive any thing more characteristic of a vegetable than chlorophyll, the green of herbage; for in it the special work of the plant is done, -namely, the transformation of mineral matter into organic, under the light of the sun, this being the prerogative of vegetation. Now, not only does chlorophyll abound in many ambiguous microscopical organisms of fresh and salt water, which except for this would be taken for animals, but it has recently been detected in hydras and sea-anemones and planarias, which are as certainly animals as are oysters and clams. Nor can it be thought that they possess something merely resembling chlorophyll; for it performs the characteristic work of that peculiar substance, which, as I have said, is the characteristic work of vegetation. For the index and essential accompaniment of this work (i.e., of the conversion of mineral into organic matter) is the evolution of oxygen gas from the decomposition of carbonic acid, water, &c., in which, if in any thing, vegetation consists. Now, the proof that what these animals possess is chlorophyll itself is demonstrated by their performance of the same function. They decompose carbonic acid and evolve oxygen gas, just as a green leaf does. Moreover, the chlorophyll has been extracted and identified by the spectroscopic test. Here, then, animals, undoubted animals, in addition to their own proper functions, take on the essential function of plants. There is no avoiding the conclusion that such animals are doing the duty of vegetables. Although I make little account of it, I should not overlook a more empirical distinction between the two kingdoms which has also failed. The characteristic features of an animal were mouth and stomach. This is the normal correlation of an animal with its conditions. Having to feed on vegetable matter, or what has been vegetable matter, in solid as well as liquid form, a mouth opening into

an internal cavity of some sort was the natural pattern, to which all animals were supposed to conform. But Nature, with all her fondness for patterns, will not be arbitrarily held to them. Entozoa feed like rhizophytes; and turbellarias and their relatives have no alimentary canal, -the food taken by what answers to mouth passing as directly into the general tissue as does the material which a parasitic root imbibes from its host, or an ordinary root from the soil. While animals are thus overpassing the boundary in one direction, vegetables are making reprisals on the other. The rule is, that vegetables create organic matter, and animals consume it, producing none. But, while some animals produce some organic matter, some plants even among those of the highest grade feed wholly upon other plants, or even upon animals or their products. Like animals, some are herbivorous and some are carnivorous. That certain plants live parasitically upon other plants or upon animals, has long been too familiar to be remarkable. But that plants of the highest grade could capture or in some way take possession of small animals, extract and feed upon their juices, and appropriate these, as nourishment, is essentially a recent wonder and a recently ascertained fact. Yet some of the facts which point to this conclusion are old enough; and the conclusion would probably have been reached years ago, except for the preconception that plants and animals were too distinct for interchange of functions. Now that we know they are not, and that the living structure in the two is fundamentally identical, what were formerly regarded as freaks of Nature are no longer mere wonderments, but parts of a system, and. capable of being correlated with the rest by investigation. And investigation soon ascertained that this carnivorous attachment to the vegetable organism in Diona'a and Drosera was an organ for digesting as well as capturing animal food. Juices are imbibed by it directly, as in animals from the stomach; and nourishing solid parts are rendered soluble and assimilate by imbuing them with peptones or digestive ferments, analogous in composition and in action to the gastric juice of the higher animals. Perhaps nothing in Nature can be more wonderful than all this; and nothing is more characteristic of the change which has come over scientific mind in our day than the manner in which such a discovery is received. The leading facts were well known a hundred years ago, and more. But, until recently, these phenomena were regarded as altogether anomalous; and such anomalies appear to have troubled no-body, except the framers of definitions. "Lusus natura" was a convenient phrase, and stood in the place of explanation, -as if the play of Nature was something apart from her work. No one seems to have had any difficulty in believing that a few particular plants were endowed with faculties of which no other plants were sharers. The thoughtful naturalist of our day is in a different frame of mind. He expects to find that the extraordinary is only an extreme case of the ordinary; and he looks for instances leading up from the one to the other. I cannot tarry to explain how this expectation has directed observation and stimulated research in this particular field, and reached the result that these wonderful plants are distinguished only by higher degrees and more prominent manifestations of a power which is in some sort

common to many or to all their brethren. We learn, even, that the germinating embryo of a grain of corn feeds upon and digests the solid maternal nourishment which surrounds it, and the humblest mould appropriates the organic matter which it attacks, by the aid of a peptone or inversive ferment, not different in nature and -office from the gastric and other juices by aid of which we appropriate our daily meals. It does appear also that the lowest organisms, which live a kind of scavenger life, by using over again dead or effete organic matter running to decay -but to some of which living juices come not amiss -have also the power, certain salts being given, of creating organic matter, and building up a fabric without sun-light and without chlorophyll. Here, then, is the simplest organic life, -in which, germs being given, i.e. first individuals of the sort supplied and placed in favorable surroundings, they increase and multiply into more, each to multiply again, and so on, in geometrical progression. From such lowly basis the two kingdoms may be conceived to rise, diverging as they ascend in separate lines, -the one developing close relations with sunlight and becoming the food-producing vegetable realm; the other, the food-consuming animal realm, which, dispensed from the labor of assimilation, and from the fixity of position which generally attends it, may rise to higher and freer manifestations of life. Such, at least, appear to be the relations of the two kingdoms to each other and to their common base; and such is the conception through which we may attain to an explanation of how it may be that members of each line possess so many characteristics of the other. I have said, "germs being given," the forms increase and multiply. If asked, Whence the germs, and were they everywhere and always prerequisite? the scientific answer must be yes, so far as we know. Thus far, spontaneous generation, or abiogenesis, -the incoming of life apart from that which is living, -is not supported by any unequivocal evidence, though not a little may be said in its favor. However it may be in the future, here scientific belief stands mainly where it did forty-five years ago, only on a better-tried and firmer footing. It remains to mention two supposed distinctions between vegetables and animals which were until recently prominent, but which are no longer criteria, even as between the higher forms of the two. The first is the faculty of automatic movement, or -to take up the question only on the highest plane -the faculty of making movements in reference to ends. This is affirmed of animals, and is an undoubted faculty of all of them, but was long denied to plants, perhaps from a notion that such movements argued consciousness. But consciousness, in any legitimate sense of the term, pertains only to the higher animals. To show the breaking down of the distinction, it would suffice to contrast the rooted fixity and vegetative growth of very many lower animals with the free loco-motion of most microscopic aquatic plants and of the genus of those not microscopic; but plants of the highest organization furnish obvious "examples better suited to our purpose." Is there not an independent movement, in response to an external impression, and in reference to an end, when the two sides of the trap of Dionaea suddenly enclose an alighted fly, cross their fringe of marginal bristles over the only avenue of escape, remain

quiescent in this position long enough to give a small fly full opportunity to crawl out, soon open if this hap- pens, but after due interval shut down firmly upon one of greater size which cannot get out, then pour out digestive juices, and in due time re-absorb the whole? So, when the free end of a twining stem, or the whole length of a tendril, outreaches horizontally and makes circular sweeps, and secures thereby a support, to which it clings by coiling; when a tendril, having fixed its tip to a distant support, shortens itself by coiling, so bringing the next tendril nearer the support; when a free revolving tendril avoids winding up itself uselessly around the stem it belongs to, and ill the only practicable way, namely, by changing from the horizontal to the vertical position until it passes by it, and then rapidly resumes its horizontal sweep, to result in reaching a distant support,-is it possible to think that these are not movements in reference to ends? You may say that all such movements are capable of explanation, or in time will be so; are the result of mechanism, and adjustments, and of common physical forces. No doubt; and this is equally true of every animal movement, not excepting. those instigated by volition. "Still it moves," as the humbled Galileo said of the earth; and the idea that such movements are in reference to ends is not superseded by any yet devised explanation of the mechanism. A remaining distinction between plants and animals was based on the relations they respectively sustain to the air we breathe. This has already been stated, and the exceptions noted; but the topic is resumed in order to bring to view the substantially different relations of the two kingdoms to physical force. Plants give out oxygen gas, and thus purify the air or the respiration of animals. Animals, consuming this oxygen, breathe it back to the air in the form of carbonic acid. But the putting of this contrast is only another way of saying that plants produce organic matter and animals decompose it. The oxygen gas given out by sun-lit foliage is just what is left over when carbonic acid is decomposed and the carbon enters into the composition of the vegetable matter then produced. This elaborated matter, more complex and unstable than the materials of which it was made, is the food of animals, is first appropriated, then decomposed by them, and in the decomposition the carbon is given back to the air recombined with the oxygen they inhale, the carbon again taking the oxygen which was separated from it by the plant. So respiration means decomposition; and this decomposition in the animal economy means organic material used up, work done, energy degraded. It means that the clock-weight which was wound up by the sun in the plant has run down. It means that, very much as the sun, shining on the earth and ocean, converts water into vapor and lifts it into the upper air, so the same luminary, shining upon the plant, there raises mineral matter to a higher and unstable state, in what we call organic products, -in both cases endowing the affected matter with a certain energy. The exalted matter in the one case falls at length as rain, perhaps directly into the ocean from which it was lifted, perhaps upon a mountain summit, where as snow or glacier-ice it may long remain poised and comparatively stationary. But sooner or later it falls into the rivulet and the river, and in its fall and flow it expends its

endowment of energy, and does work, -turns wheels and spins or forges, if man so directs, -and, when it has reached stable equilibrium at the level of the ocean, it will have expended just the energy which was imparted to it in the raising. So the energy with which the sun endowed vegetable matter when it was raised to the organic state may be given up as heat when this matter is restored to its original condition by burning, or falls slowly back to the same condition in the process of natural decay; or the heat, like the falling water, may do mechanical work. But also the organic material may be consumed in the plant itself. For the plant, like the animal, is a consumer. The only difference is that, whereas the animal is always and only a consumer and decomposer, the plant creates or composes likewise, and it produces vastly more than it consumes or decomposes. It decomposes only when it does mechanical work. But all its processes, all movements; all transformations, are work done at the expense of organized material and accumulated energy. Even the act of storing up solar force in the green herbage, or rather the changes connected with it, can only be done at a certain cost, though the cost is small in comparison with the gain. But every transference of material from one place or one state to another is done only by the decomposition and loss of some portion of it, -one part suffering that another may be changed and saved. When the germ feeds upon the maternal store in the seed, a considerable part is consumed in order to make the rest available; and the loss is made manifest, just in the breathing of an animal or in the combustion of fuel, by the evolution of carbonic acid and of heat. The same thing in its measure occurs in the upbuilding of the fabric, the carrying of material high into the air, -into a tree-top, for instance; and in all the processes of flowering, and in storing up in the seed the richest products as an outfit for a new generation. Where visible movements take place, the quicker action is at equivalent cost. The sensitive tendril, which will coil promptly after the first brushing with my finger, will coil again only after an interval of rest, and upon the third or fourth excitation, or after a certain number of spontaneous revolutions, it falls exhausted. But material endowed with energy in the plant is largely transferred as food to animals. It brings to them an energy which they may use, but did not originate. Not many years ago, it was taken for granted that living things moved and had their being, and did their work, by strength of their own; that the power by which I strike a blow, or write on my paper, or move my lips in articulate speech, was somehow an original contribution to, rather than a directed use of, the common forces of physical nature. To all who have familiarized themselves with the facts of the case, the contrary is now substantially certain. The sun is the source of all motion and force manifested in life on the earth, and plants are the medium in which energy is exalted to the most serviceable state. The work done by living beings is at the expense of, and is measured by, the passage of so much matter from an unstable to a relatively stable equilibrium, by the coming together of molecules in to closer and; firmer positions, and by the attendant fall of so much energy from an exalted to a relatively degraded condition. So plants, animals, men, in all their

doings, add nothing to and take nothing from the sum of physical force. Their prerogative is, each in its measure, to direct the application of physical force, and to direct it to ends. The idea of ends involves that of individuality. The higher animals, and men among them, are complete individuals. We cannot make the idea of individuality any clearer than by adducing them as examples of it. In the lowest form of life, in those amorphous or indefinitely polymorphous "little lumps of protoplasm" which the biologists have made known to us, and even, perhaps, in a stratum or mass which takes the form of whatever bounds it, it is said that we may contemplate the phenomena of life in that which has no manifest individuality. What have we between these two extremes? The first and simplest individuality is that of cells. Cell-doctrine, or the cellular composition of plants and animals, belongs wholly to the biological science of the last half-century, although the name is older, and some knowledge of the structure in plants is as old as the micro-scope. The homologizing of animals with plants in this regard began about forty years ago; and the doctrine of the individual life of cells is recent. Unfortunately the rather inappropriate name cell came into use before the structure was rightly understood, and may be misleading. It was given, naturally enough, to the walls circumscribing cavities in ordinary plant-tissue, before it was understood that the walls were not made and then filled, -before it was known that the contents are the living thing, and the wall an encasement or shell. The substance of our recent knowledge is, -that a plant is an aggregate of organic units, mostly of very small size; that these are to the herb or tree what the bricks and stones of this chapel are to the edifice. Only they "are living stones, fitly framed together" in organic growth, and their walls answer to the cement. Animals do not differ materially, except that the mortar is mostly of the same nature as the bricks, and there is a greater or at length complete fusion or confluence of the cells. The component material, the protoplasm, is essentially the same, as has already been stated. But each aggregate, each ordinary plant or animal, begins as one cell, which is then the simple individual. This is growth and propagation divides itself into two, these two into four, these into sixteen, and so on, thus building up the structure, -a whole, of which the individual cells are component parts. The simplest plant begins in the same way with an initial cell, but this, instead of multiplying with cohesion into a structure, multiplies with separation into progeny. Other simple plants go on without separation to form a row of similar cells, which may casually fall apart into individuals or may remain connected; but in either case each has its own life, and does what the others do, so that the separation or the continued connection is a matter of indifference. But when, higher in the scale, structures are built up, what were individuals become parts or organs, or the thousandth or millionth part of an organ; then the life of the cells is their own no less, but their individuality blends in the common life of the aggregate. By increasing complexity of organization, with increasing subordination of parts and specialization of office, the highest plants and animals are composed. In them each unit or cell has its own life and its own nutrition, while also contributing to

the common weal, -some by this function, some by that; but in the higher forms all are somehow controlled by a pervasive life and directed to common ends, -ends the more various, complex, and special, in proportion to the rank of the organism in the scale of being. So, too, the component cells become effete and die, while the aggregate life continues; and the continued structure, which is nothing but an aggregate, is somehow informed, animated, and operated by a common life of higher grade than that of any or all its components. In numerous lower plants and animals we cannot definitely determine what are organisms and what are organs; in the herb or tree, and in the coral polypidom, organ, individual, colony are inextricably blended; in the higher animals subordination of parts to a whole is completely attained. All along the ascent that which controls and subordinates parts aggrandizes its manifestations. The lowest animals add very little to merely vegetative life, except greater sensitiveness to external impressions and more free and varied response; a step higher brings in a greater range of unconscious feeling; the higher brute animals have attained unto specific desires, affections, imagination, and the elements of simple thought; the highest, gifted with reflective reason, may make their own thoughts the subject of thought. So, our conception of individuality is from ourselves, conscious beings: it is carried down unqualified to the brute animals with which we are associated; it becomes vague and shadowy in plants, but still, somehow, the idea inheres throughout all organisms. The beginning of organization is individuation or tendency to individualize. The completed self is man. Here let me interject a remark in correction of a common misapprehension as regards the nature of the simplicity of the lowest organisms. An animalcule and a unicellular plant, or the cellular components of common plants or animals, are simple indeed, comparatively. But the recent science which has brought out the close connection of the lower with the higher forms (and showed that through all "one increasing purpose runs") is also showing, in all the latest microscopic work, that the plant-cell and the animal-cell are really very complex structures, and the processes through which one cell becomes two, instead of being a simple bisection, prove to be very elaborate and wonderful. The further the investigation is carried under the modern microscope, the more complex and recondite does their structure and behavior appear to be. They seemed to be simple because they are small; but much of the simplicity vanishes upon intimate acquaintance. Wherefore, in view of recent discoveries of this sort, it is premature to conclude that the "little lumps of protoplasm" described by Haeckel are really destitute of organic structure. It is an illusion to fancy that the mystery of life is less in an amoeba or a blood-corpuscle than in a man. From individuals in themselves, let us pass to questions relating to their succession and kinds. Plants and animals, each propagating their kind, produce lines of individuals, sustaining to each other the relation of parent and progeny. These lines are the species of the naturalist. Have the species come down from the beginning of life, unaltered or altered; or have there been successive creations? Taking first the vegetable and animal kingdoms as a whole, it has long been

well understood that ages upon ages have passed since the earth was stocked with living beings of numerous sorts. Kind after kind has appeared, flourished, and disappeared; and, in the long succession, species of progressively higher rank have come into existence, the forms more and more approximating those which now exist. There is good reason to believe that at more than one epoch the earth has been as fully stocked with species as it is now, and in equal diversity, except as to the highest types. What relation have these beings of the earlier and of the succeeding times sustained to each other and to the present inhabitants of the earth? Half a century ago; when I began to read scientific books and journals, the commonly received doctrine was, that the earth had been completely depopulated and repopulated over and over, each time with a distinct population; and that the species which now, along with man, occupy the present surface of the earth, belong to an ultimate and independent creation, having an Ideal but no genealogical connection with those that preceded. This view, as a rounded whole and in all its essential elements, has very recently disappeared from science. It died a royal death with Agassiz, who maintained it with all his great ability, as long as it was tenable. I am not aware that it now has any scientific upholder. It is certain that there has been no absolute severance of the present from the nearer past; for while some species have taken the place of other species, not a few have survived unchanged, or almost unchanged. And, it is most probable that this holds throughout; for certain species appear to have bridged the intervals between successive epochs all along the line, surviving from one to another, and justifying the inference that species -however originated -have come in and gone out one by one, and that probably no universal catastrophe has ever blotted out life from the earth. Life seems to have gone on, through many and great vicissitudes, now with losses, now with renewals, and everywhere at length with change; but from first to last it has inhered in one system of nature, one vegetable and one animal kingdom, which themselves show indications of a common starting-point. As respects the vegetation, from which I should naturally draw illustrations, the nature and amount of the likeness between the existing flora and that of a preceding geological period has recently been summed up by Saporta in the statement that there is not a tree nor a shrub in Europe or North America which has not recognizable relatives in the fossil remains of the tertiary period. It is like visiting a country church-yard, where “The rude forefathers of the hamlet sleep,” and spelling out, one by one, from mossed and broken gravestones, the names of most of the living inhabitants of the parish, -names differing it may be in orthography from those on the village signs; but, as of the people, so of the trees, it is beyond reasonable doubt that the later are descendants of the earlier., The same holds true of animals; and the facts therefore point toward the conclusion that existing species in general are descended from tertiary ancestors. But if so they have mostly undergone change, and great change as we go farther back with the comparison. And there are many existing forms of which no fossil ancestor is known. What relation, if any, can these sustain to a by-gone flora or fauna? And, with what

reason do we predicate change of species in former times if they are not change- able now? This brings up the question of the fixity or variability of species. Scientific opinion upon this point is not what it was thirty or forty years ago. Then it was generally, though not universally, believed that species are perfectly definite and stable; capable of variation, indeed, but only within circumscribed limits. Wherever it was difficult or impracticable to discriminate them, the difficulty was presumed to be, not in the things themselves, but in the imperfection of the naturalist's knowledge or acumen. There was the evidence of a good number of cases to show that species had not perceptibly altered in four or five thousand years, and of some having lasted for a vastly longer time. Hence it was an article of scientific faith that species on the whole were fixed now, and that probably they have come down essentially unaltered from the beginning,- a beginning which was wholly beyond the ken and scope of science, which is concerned with questions about how things go on, and has nothing to say as to how they absolutely began. The naturalists of that day might suppose -certainly many of them did suppose -that existing species may have come into being by other than direct supernatural origination, and, indeed, the foremost of them were well aware that the "'question' of origin would have to be reargued at no distant day. But, so far, the various speculative attempts at explaining the mystery of the incoming of species had not been encouraging, and eminent naturalists deprecated all general theories of the sort, as at the best a waste of time. So the fixity and inscrutability of species -though silently doubted by some, and controverted by a few was still the postulate of natural history; and more than one laborious naturalist has been known to declare that, if this fixity was not complete, natural history was not worth pursuing as a science. There is now a different attitude toward this class of questions. First, the absoluteness of species is no longer taken for granted. That species have a stability, that every form reproduces after its kind, is obvious; but it is equally obvious that the similarity of its individuals is not complete. It had been assumed that the differences brought about by variation are always comparatively small, unessential, and limited. This is now partly doubted, and partly explained away. In the first place, much of the popular idea of the distinctness of all species rests on a fallacy, which is obvious enough when once pointed out. In systematic works, every plant and animal must be referred to some species, every species is described by such and such marks, and in the books one species is as good as another. The absoluteness of species, being the postulate of the science, was taken for granted to begin with; and so all the forms which have been named and admitted into the systematic works as species, are thereby assumed to be completely distinct. All the doubts and uncertainties which may have embarrassed the naturalist when he proposed or admitted a particular species, the nice balancing of the probabilities and the hesitating character of the judgment, either do not appear at all in the record or are overlooked by all but the critical student. Whether the form under consideration should be regarded as a new species, or should be combined with others into a more generalized and variable species, is a question which a

naturalist has to decide for the time being, often upon insufficient and always upon incomplete knowledge; and increasing knowledge and wider observation generally raise full as many doubts as they settle. This may not be so decidedly the case in zoology as in botany; but I incline to the opinion that there is no wide difference in this respect. The patient and plodding botanist spends much of his time in the endeavor to draw specific lines between the parts of a series the extremes of which are patently different, while the means seem to fill the interval. When he is addressed by the triumphant popular argument, "if one form and one species has been derived from another, show us the intermediate forms which prove it," he can only ejaculate his wish that this ideal vegetable kingdom was the one he had to deal with. Moreover when he shows the connecting links, he is told, "Then these are all varieties of one species; species are fixed, only with wider variation than was thought." And when he points to the wide difference between the extremes, as being greater than that between undoubted species, he is met with the rejoinder, "Then here are two or three or more species which undoubtedly have true distinctions, if only you would find them out." That is quite possible, but it is hardly possible that such fine differences are supernatural. Some one when asked if he believed in ghosts, replied, No, he had seen too many of them. So I have been at the making and unmaking of far too many species to retain any overweening confidence in their definiteness and stability. I believe in them, certainly. I do not exactly agree that they "are shadows, not 'substantial things'," but I believe that they have only a relative fixity and permanence. You will ask if lack of capacity to interbreed is not a criterion of species. I must answer, No. As a matter of course individuals of widely diverse species cannot interbreed; those of related species not uncommonly do; but it is said that when they do interbreed the hybrid progeny is sterile. Commonly it is so, sometimes not. The rule is not sufficiently true to serve as a test, either in the vegetable or in the animal kingdom. The only practical use of the test is for the discrimination of the higher grade of varieties from species. Now in fact some varieties of the same species will hardly interbreed at all; while some species interbreed most freely, and produce fully fertile offspring. So the supposed criterion fails in the only cases in which it could be of service. All that can be said is, that whereas known varieties tend to interbreed with unimpaired and sometimes with increased fertility, distinct species of near re- semblance tend not to interbreed at all; and between the two extremes there are all inter- mediate conditions. Here, as throughout organic nature, the extremes are far apart; the, interval is filled with gradations. What then is the substantial difference between varieties and species? Just here is the turning-point between the former view and the present. The former doctrine was that varieties come about in the course of nature, but species not; that varieties became what they are, but that species were originally made what they are. I suppose that, even before the day of Darwin- ism, most working naturalists were reaching the conviction that this distinction was untenable; that the same rule was applicable to both; and therefore that either

varieties did not come in the course of nature, or that species did. Perfectly apprehending the alternative and its consequences, Agassiz took the ground that varieties as well as species were primordial, or rather that the more marked forms called varieties by most naturalists were species, and. therefore original creations. Rightly to understand his view, it must be taken along with his conception of species, as consisting from the very first of a multitude of individuals. Other naturalists were looking to the opposite alternative, and were coming to the conclusion that species as well as varieties were natural developments. In botany, this conclusion was reached more than sixty years ago, through it observation and experiment, by an English clergyman and naturalist, Herbert, afterward Dean of Manchester. He announced his conviction that "horticultural experiments have established, beyond the possibility of doubt, that botanical species are only a higher and more permanent class of varieties," and, consequently, that the genus is the progenitor of the species belonging to it. Others have reached the same conclusion by more speculative routes, and have deduced the theoretical consequences. But no marked impression was made until the hypothesis of natural selection, or the preservation of favored races in the struggle for life was promulgated, and supplied a scientific reason for the diversification of varieties into species. The principle brought to view is too obvious to have been wholly overlooked. It is interesting to notice: that the earliest known anticipation of that principle which Darwin and Wallace developed almost simultaneously, was published sixty years ago, by Dr. Wells, the sagacious author of the theory of dew, who hit upon the idea of natural selection while resident in America. As abstracted by Mr. Darwin, who evidently takes delight in the discovery of these anticipations, the points which Dr. Wells made were substantially these: - "All animals vary more or less: agriculturists improve domesticated animals by selection." What is thus done by art is done with equal efficacy, though more slowly, by Nature, in the formation of varieties of mankind, fitted for the country which they inhabit, and in this way: Negroes and mulattoes enjoy immunity from certain tropical diseases, and white men a comparative immunity from those of cold climates. Under the variation common to all animals, some of the darker would be better adapted than the rest to bear the diseases of a warm country, -say of tropical Africa. This race would consequently multiply, while the others would decrease, directly, because the prevalent diseases would be more fatal to them, and indirectly, by inability to contend with their more vigorous neighbors. Through the continued operation of the same causes, darker and darker races would prevail over the less dark, and in time would monopolize the region where they originated or into which they had advanced. Similarly would white races, to the exclusion of dark, be developed and prevail in cooler regions. Now, this simple principle, -extended from races to species; from the present to geological ages; from man and domesticated animals to all animals and plants; from struggle with disease to struggle for food, for room, and against the diverse hardships which at times beset all living things, and

which are intensified by the Malthusian law of the pressure of population on subsistence, -population tending to multiply in geometrical progression, while food can increase only in a much lower ratio, and room may not be increasable at all, so that out of multitudinous progeny only the few fittest to the special circumstances in each generation can possibly survive and propagate, -this is Darwinism; that is, Darwinism pure and simple, free from all speculative accretions. Here, it may be remarked that natural selection by itself is not an hypothesis, nor even a theory. It is a truth, -a catena of facts and direct inferences from facts. As has been happily said, it is a truth of the same kind as that which we enunciate in saying that round stones will roll down a hill further than flat ones. There is no doubt that natural selection operates; the open question is, what do its operations amount to. The hypothesis based on this principle is, that the struggle for life and survival of only the fittest among individuals, all disposed to vary and no two exactly alike, will account for the diversification of the species and forms of vegetable and animal life, -will even account for the rise, in the course of countless ages, from simpler and lower to higher and more specialized living beings. We need not here enter into any further explanation of this now familiar but not always well-understood hypothesis; nor need I here pronounce any judgment of my own upon it. No doubt it may account for much which has not received other scientific explanation; and Mr. Darwin is not the man to claim that it will account for every thing. But before we can judge at all of its capabilities, we need clearly to understand what is contained in the hypothesis; for what can be got out of it, in the way of explanation, depends upon what has gone into it. So certain discriminations should here be attended to. Natural selection we understand to be a sort of personification or generalized expression for the processes and the results of the whole interplay of living things on the earth with their inorganic surroundings and with each other. The hypothesis asserts that these may account, not for the introduction of life, but for its diversification into the forms and kinds which we now behold. This, I suppose, is tantamount .to asserting that the differences between one species and another now existing, and between these and their predecessors, has come to pass in the course of Nature; that is, without miracle. In these days, all agree that a scientific inquiry whether this may be so -that is, whether there are probable grounds for believing it (no thoughtful person expects to prove it) -is perfectly legitimate; and, so far as it becomes probable, I imagine that you might safely accept it. For the hypothesis, in its normal and simplest form,- when kept close to the facts, and free from extraneous assumptions -is merely this:- Given the observed capacity for variation as an inexhaustible factor, assuming that what has varied is still prone to vary (and there are grounds for the assumption), and natural selection will- so to say-pick out for preservation the fittest forms for particular surroundings, lead on and diversify them, and, by continual elimination of the less fit, segregate the survivors into distinct species. This, you see, assumes, and does not account for, the impulse to variation, assumes that

variation is an inherent and universal capacity, and is the efficient cause of all the diversity; while natural selection is the proximate cause of it. So it is the selection, not the creation of forms that is accounted for. Darwinism does not so much explain why we have the actual forms, as it does why we have only these and not all intermediate forms, -in short, why we have species. There is of course a cause for the variation. Nobody supposes that any thing changes without a cause; and there is no reason for thinking that proximate causes of variation may not come to be known; but we hardly know the conditions, still less the causes now. The point I wish to make here is that natural selection -however you expand its meaning -cannot be invoked as the cause of that upon which it operates, i. e., variation. Otherwise, if by natural selection is meant the totality of all the known and unknown causes of whatever comes to pass in organic nature, then the term is no longer an allowable personification, but a sheer abstraction, which meaning every thing, can explain nothing. It is like saying that whatever happens is the cause of whatever comes to pass. We may conclude, therefore, that natural selection, in the sense of the originator of the term, and in the only congruous sense, stands for the influence of inorganic nature upon living things, along with the influence of these upon each other; and that what it purports to ac-count for is the picking out, from the multitude of incipient variations, of the few which are to survive, and which thereby acquire distinctness. There is a further assumption in the hypo- thesis which must not be overlooked; namely, that the variation of plants and animals, out of which so much comes, is indefinite or all-directioned and accidental. This, I would insist, is no fundamental part of the hypothesis of the derivation of species, and is clearly no part of the principle of natural selection. But it is an assumption which Mr. Darwin judges to be war- ranted by the facts, and in some of its elements it is unavoidable. Evidently if the innate tendency to vary upon which physical circumstances operate is indefinite, then the variations which the circumstances elicit, and which could not otherwise amount to any thing, must be accidental in the same sense as are the circumstances themselves. Out of this would immediately rise the question as to what can be the foundation and beginning of this long and wonderful chapter of accidents which has produced and maintained, not only for this time but through all biological periods, an ever-varying yet ever well-adapted cosmos. But the facts, so far as I can judge, do not support the assumption of every-sided and in- different variation. Variation is somehow and somewhere introduced in the transit from parent to offspring. The actual variations displayed by the progeny of a particular plant or animal may differ much in grade, and tend in more than one direction, but in fact they do not appear to tend in many directions. It is generally agreed that the variation is from within, is an internal response to external impressions. All that we can possibly know of the nature of the inherent tendency to vary must be gathered from the facts of the response. And these, I judge, are not such as to require or support the assumption of a tendency to wholly vague and all-directioned variation. Let us here correct a common impression

that Darwinian evolution predicates actual or necessary variation of all existing species, and counts that the variation must be in some de- finite ratio to the time. That is not the idea, nor the fact. "Evolution is not a course of hap-hazard and incessant change, but a continuing re-adjustment, which mayor may not, according to circumstances, involve considerable changes in a given time." Every form is in a relatively stable equilibrium, else it would not *exist*. Forms adjusted to their surroundings ought by the hypothesis to remain unchanged until the circumstances change. Only those of their variations could come to any thing which happened to be equally well adapted to the unchanged circumstances; and this may be what we have when two or more nearly related species inhabit similar stations in the, same area. From this point of view you see how wide of the mark are those who imagine that Darwinian evolution supposes that the organic world was in early times, or at any time, out of joint or in ill relations to the surroundings. On the contrary, it is of the very nature of natural selection, that, while inducing changes eventually immense, it should preserve throughout all "time a condition of harmonious adaptation." Catastrophes must destroy; but gradual modification, under the long and silent struggle which never hastes and never rests, preserves while it renovates and diversifies the races. I ought here to state that there are eminent naturalists (one of them of your own university) who accept the doctrine of evolution, but who think little of natural selection as a modus operandi in the diversification of species; and there are distinguished writers, not naturalists, who, from other points of view are ready to accept "the doctrine of the successive evolution from ancestral germs of higher and higher forms of life and mind," while they profess to have buried the principle of natural selection and with it the Malthusian theory of population in one common grave. These are evolutionists, in their way, because the probability of evolutionary theories springs from the very various lines of facts, otherwise inexplicable, which they harmonize and explain: -in geology, the previous existence of forms more and more like those now existing, and at length coalescing in them; in geography, the actual distribution of species and genera over the earths surface; in systematic natural history, the reason why species and genera and orders are so variously related, are here connected by transitions and there separated by wide gaps; in morphology why the same functions may be assumed by different organs, or the same kind of organ may perform here one function and there another, or again exist as a vestige, of no service at all; in anatomy and biology, the transition from one element of structure to another, the gradual specialization of organs, and the remarkable coincidence between the order of the development in the individual animal and that of the rise from low to high in the scale of being, and that of the successive appearance of the grades in time; finally in psychology, the gradations between beings endowed with rudimentary sensation and beings endowed with mind. Here, where the "touch of Nature makes the whole world kin," we reach the sensitive point. Man, while on the one side a wholly exceptional being, is on the other an object of natural history, -a part of the animal kingdom. If you agree

with Quatrefages that man is a kingdom by himself, you must agree with him that this kingdom is solely intellectual; that he is as certainly and completely an animal as he is certainly something more. We are sharers not only of animal but of vegetable life, sharers with the higher brute animals in common instincts and feelings and affections. It seems to me that there is a sort of meanness in the wish to ignore the tie. I fancy that human beings may be more humane when they realize that, as their dependent associates live a life in which man has a share, so they have rights which man is bound to respect. Man, in short, is a partaker of the natural as well as of the spiritual. And the evolutionist may say with the apostle: "Howbeit that was not first which is spiritual, but that which is natural, and afterward that which is spiritual." Man, "formed of the dust of the ground," endowed with "the breath of life," "became a living soul." Is there any warrant for affirming that these processes were instantaneous? As has just been intimated, the characteristic of that particular theory of evolution which is now in the ascendant is that, by taking advantage of "every creature's best" for bettering conditions, it has "made strife work for good, throughout" an immensely long line of adjustments and readjustments, in a series ascending as it advanced; that it supposes a process, not from discord to harmony, but from simpler to fuller and richer harmonies, conserving through- out the best adaptations to the then existing conditions. So while its advocates nowhere contemplate a state

"When Nature underneath a heap,
Of jarring atoms lay,
And could not heave her head,"

they may appropriate Dryden's closing lines,-

"From harmony, from heavenly harmony,
This universal frame began,
From harmony to harmony
Through all the compass of the notes it ran,
The diapason closing full in man."

I have now indicated, at more than sufficient length for one discourse, some of the principal recent changes and present tendencies in scientific belief, especially in biology. Even the most advanced of the views here presented are held by very many scientific men, -some as established truths, some as probable opinions. There is a class, moreover, by whom all these scientific theories, and more are held as ascertained facts, and as the basis of philosophical inferences which strike at the root of theistic beliefs. It remains to consider what attitude thoughtful men and Christian believers should take respecting them, and how they stand related to beliefs of another order. That will be the topic of a following lecture.

LECTURE II

THE RELATIONS OF SCIENTIFIC TO RELIGIOUS BELIEF.

IN a preceding discourse I brought to your (if notice a series of changes in view and opinion which have taken place among scientific men within my own remembrance. I restricted the survey to the biological sciences (with merely a reference to the principle of the conservation of energy in its application to the organic world), and in these to the supposed facts and immediate inferences, to what may be called their natural-historical interpretation. These new views are full of interest of a kind which you cannot expect a naturalist to under- value. For they have greatly exalted his calling. In the days of Linnaeus, who died only a hundred and two years ago, and throughout a long generation of his followers, species were looked upon as "simple curiosities of Nature," to be inventoried and described; and striking phenomena in plants and animals, as something to be wondered at, but not to be explained. With the advent of Morphology, the precursor and parent of Evolution, Natural History developed from a curious pursuit, training the observing powers, to that of a true science, engaging the reason in the search for causes. According to one definition, "Science is the labor of mind applied to Nature." In this sense, modern botany and zoology have certainly become scientific. They are at least attempting great labors. But in widely extending, as they now do, the operation of natural causes in the organic world, they make close connections between biology and physics, or what used to be called, and I think deserves to be called, natural philosophy. And the connection brings in, or brings up afresh, considerations which affect the ground of natural and revealed religion. Under this aspect, they properly excite your anxious attention. I used throughout the phrase "scientific belief," as the one best suited to the occasion. The term is comprehensive and elastic, covering many degrees of conviction or assent, from moral certainty down to probable opinion. In this respect, scientific and theological beliefs are similar; as they also are in being mainly states of mind toward that which is incapable of demonstration, -either because, as in the case of ultimate beliefs (on which all science and knowledge are based) it is impossible to go beyond them, or else Because the subject-matter is not positively known, and certainty is unattainable from the nature or the present conditions of the case. The proofs upon which both biological and theological investigations have to rely are largely probabilities, some of a higher, some of a lower order, and much that is accepted for the time is taken on trial or on prima facie evidence. Much also is or should be held under suspense of judgment, a state of mind eminently favorable to accurate investigation. As to those who can forthwith assort the contents of their minds into two compartments, one for what they believe and the other for what they disbelieve, neither their belief nor their denial can be of much account. In all subjects of inquiry, those only are to be trusted who discriminate between inevitable beliefs, established convictions, probable opinions, and hypotheses on trial. Now, our general inquiry in this lecture is, What should

be the attitude, I will not say of theological students, but of thoughtful men, in respect to scientific beliefs, tendencies, and anticipations, such as we have been considering? To a certain extent it may well be a waiting attitude. The strictly scientific matters must necessarily be left mainly to the experts, whose very various and independent investigations, pursued under every diversity of bias, must in time reach reasonably satisfactory conclusions. But the naturalists claim no monopoly in the consideration of the great problems which now interest us, in which indeed most of them de- cline to take any part. Perhaps theological students and divines might be asked to wait until views and hypotheses still ardently controverted among scientific investigators are I brought nearer to a settlement. But the disposition to discount expected results, either for or against supernatural religion, has always prevailed. The theologians at least have never waited, and cannot be expected to wait; and while some of their contributions to the subject have been inconsiderate, others have been most valuable. In any case, there is no call to wait on the ground that the disturbing views are only hypotheses. For, in the first place, we should have long to wait for demonstration one way or the other; and one crop of hypotheses is the fertile seed of another. Besides, hypothesis is the proper instrument for dealing with this class of questions; indeed, it is the essential precursor of every fruitful investigation in physical nature. You can seldom sound with the plummet while standing on the shore. To do this to any purpose, you must launch out on the sea, and brave some risks. Nearly all valuable results have been gained in this way. Newton's theory of gravitation was a typical hypothesis, and one which happened to be capable of early and sufficient verification. The undulatory theory of light was another. The nebular hypothesis, or portions of it, and the, kinetic theory -of gases, less verifiable, are accepted willingly because of the success with which they explain the facts. Evolution is a more complex, loose and less provable hypothesis, or congeries of d hypotheses, which can at most have only a relative, though perhaps continually increasing probability from its power of explaining a great variety of facts. Its strength appears on comparing it with the rival hypothesis -for such it is- of immediate creation, which neither ex- plains nor pretends to explain any. How the more exact physical sciences are becoming more reconditely hypothetical, especially in the imagination of entities of which there can be no possible proof beyond their serviceability in explaining phenomena, we must not stop to consider. Only this may be said, that the adage, "Where faith begins science ends" is now well nigh inverted. For faith, in a just sense of the word, assumes as prominent a place in science as in religion. It is indispensable to both. Let it be noted, moreover, that the case we have to consider does not come before the tribunal of reason with antecedent presumptions all on one side, as theologians generally suppose. They say to the naturalists, not improperly, we will think about adopting your conclusions, contrary as they are to all our prepossessions, when they are thoroughly and irrevocably substantiated, and not till then. Your theory may prove true, but it seems vastly

improbable. Here the naturalist is ready with a rejoinder: In this world of law you cannot expect us to adopt your assumption of specific creations by miraculous intervention with the course of Nature, not once for all at a beginning, but over and over in time. We will accept intervention only when and where you can convincingly establish it, and where we are unable: to explain it away, as in the case of absolute beginning. If the naturalist starts with the presumption against him when he broaches the theory of the descent of later from preceding forms in the course of Nature, so no less does the theologian when in a world governed by law he asserts a break in the continuity of natural cause and effect. But, indeed, you are not so much concerned to know whether evolutionary theories are actually well-founded or ill-founded, as you are to know whether if true, or if received as true, they would impair the foundations of religion. And, surely, if views of Nature which are incompatible with theism and with Christianity can be established, or can be made as tenable as the contrary, it is quite time that we knew it. If, on the other hand, all real facts and necessary inferences from them can be adjusted to our grounded religious convictions, as well as other ascertained facts have been adjusted, it may relieve many to be assured of it. The best contribution that I can offer towards the settlement of these mooted questions may be the statement and explanation of my own attitude in this regard, and of the reasons which determine it. I accept substantially, as facts, or as apparently well-grounded inferences, or as fairly probable opinions, -according to their nature and degree, -the principal series of changed views which I brought before you in the preceding lecture. I have no particular predilection for any of them; and I have no particular dread of any of the consequences which legitimately flow from them, beyond the general awe and sense of total insufficiency with which a mortal man contemplates the mysteries which shut him in on every side. I claim, moreover, not merely allowance, but the right to hold these opinions along with the doctrines of natural religion and the verities of the Christian faith. There are perplexities enough to bewilder our souls whenever and wherever we look for the causes and reasons of things; but I am unable to perceive that the idea of the evolution of one species from another, and of all from an initial form of life, adds any new perplexity to theism. In unfolding my thoughts upon the subject, I wish to keep as close "to the solid ground of Nature" as I possibly can, even where the discourse must rise from the ground of science into the finer air of philosophy. Specially I must heed the injunction: "If thou hast any tidings; prithee, deliver them like a man of this world," and not trouble myself, nor you, with metaphysical refinements and distinctions which, however needful in their way and place, are unnecessary to our purpose. I take for granted, "like a man of this world," the objective reality and substantiality of what we see and deal with, though I am told it cannot be proved; and I assume, -although demonstration is impossible, that what I and my fellow-men cannot help believing we ought to believe, or at least must rest content with. I suppose you will agree with me that it is not science, at least not natural science, which raises the most formidable

difficulties to Christian theism, but philosophy, and that it is for philosophy to surmount them. The question which science asks of all it meets is, What is the system and course of things, and how is this or that a part of it in the fixed sequence of cause and effect? Philosophy asks whence the system itself, and what are causes and effects. Theology is partly historical science, and partly philosophy. Now I, as a scientific man, might rest in the probability of evolution as a general inference from the facts or a good hypothesis, and relegate the questions you would ask to the philosophers and theologians. But I am not one of those who think that scientific men should not concern themselves with such matters; and having gone so far as to say that the evolution which I accept does not seem to me to add any new perplexity to theism, and well knowing that others are of a contrary opinion, I am bound to further explanation and argument. But I have not the presumption to suppose that I can make any new contribution to this discussion; and what I may suggest must not be expected to cover the ground widely nor penetrate it deeply. I am sure that you will not look to me for the rehandling of insoluble problems and inevitable contradictions, into which the philosophical consideration of the relations of Nature and man to God ultimately lands us. Certainly they are not peculiar to evolution. So, in so far as we may fairly refer any of its perplexities to old antinomies, which can neither be reconciled nor evaded, the burden will be off our shoulders. It might suffice to show that evolution need raise no other nor greater religious or philosophical difficulties than the views which have already been accepted, and held to be not inimical to religion. But, indeed, our universal concession that Nature is, and that it is a system of fixed laws and uniformities, under which every thing we see and know in the inorganic universe, and very much in the organic world, have come to be as they are, in unbroken sequence, implicitly gives away the principle of all ordinary objection to the evolution of living as well as of life- less forms, of species as well as of individuals. It leaves the matter simply as one of fact and evidence. Indeed, mediate creation is just what the thoughtful and thorough observer of the ways of God in Nature would expect, and is what some of the most illustrious of the philosophic saints and fathers of the church have more or less believed in. In saying that the doctrine of the evolution of species has taken its place among scientific beliefs, I do not mean that it is accepted by all living naturalists; for there are some who wholly reject it. Nor that it is held with equal conviction and in the same way by all who receive it; for some teach it dogmatically, along with assumptions, both scientific and philosophical, which are to us both unwarranted and unwelcome; more accept it, with various confidence, and in a tentative way, for its purely scientific uses, and without any obvious reference to Its ultimate outcome; and some, looking to its probable prevalence, are adjusting their conditional belief in it to cherished beliefs of another order. One thing is clear, that the current is all running one way, and seems unlikely to run dry; and that evolutionary doctrines are profoundly affecting all natural science. Here you remark that your objection is not so much to the idea of mediate creation as to

the form it has assumed; that the mediate production of species mall indeed be completely theistic. But that, whereas their immediate creation directly asserts Divine action, their incoming under Nature only implies it. To those who already believe in a Supreme Being the two views may religiously amount to the same thing. But, you continue, living beings were thought to afford a kind of demonstration of a supernatural creator. Science, in taking this away, leaves us only the assurance that if we bring the idea of God to Nature we may find Nature wholly compatible with that idea. Well, what is lost in directness may perhaps be gained in breadth and depth. It is certain that the whole progress of physical science tends, in respect to Divine action, to consider that mediate, general, and in a sense indirect, which had been thought to be immediate and special. Youth is ever taught by instances, manhood by laws. You go on to say: The evolution of species now, so commended to us by science, not long ago seemed as improbable to scientific as to ordinary minds. What assurance can we unscientific people have that science will not reverse its present judgments? None, perhaps, except -that, while many particular judgments have been reversed or altered, the general course of e thought has run in one direction. And theologians, like naturalists, must be content with the best judgments they can form upon the present showing, and be ready to modify them upon better. Finally, and to reach the present point, you a pertinently commend to scientific men their own saying: "Science asks of every thing how it is a part of the system of Nature, of the chain of cause and effect." An hypothesis must give the how and why, and from its own resources, before it is worth attending to. A credible hypothesis should assign real and known causes, and ascertain their actual operation somewhere before assuming their operation everywhere. A complete hypothesis should assign not only real but sufficient causes for all the effects; and when it assumes them in invisible and intangible forms, such as molecules and molecular movements, it is bound to show that all the observed consequences flow from the assumption. Now to declare that species come through evolution, without either proving it by facts or clearly conceiving the mode and manner how, is only supporting a thesis which was until lately deemed scientifically improbable by hypotheses of a kind which have always been regarded as invalid. Just here Darwinism comes in with a modus operandi, in which lies all its essential value. As the conception of the derivation of one form from another is the only distinctly-pointed alternative to specific supernatural creation, so the principle of natural selection, taken in its fullest sense, is the only one known to me which can be termed a real cause in the scientific sense of the term. Other modern hypotheses assign metaphysical, vague, or verbal causes, such as development, anticipation, laws of molecular constitution, without indicating what the special constitution is, -none of which have much advantage over the "nisus formativus" of earlier science. I have no time to recapitulate what I briefly said of natural selection in a former lecture; nor to analyze the applications of the principle by Darwin, Wallace, and others to critical instances; nor to specify its limitations and apparent failures. The discussion or even the presentation of these would

fill the hour, and divert me from my particular task. Instead of this, I will merely give my impression of the present state of the case as respects the points now before us. You will remember the distinction which I pointed out between the principle of natural selection, which I take to be a true one, and the Darwinian hypothesis founded on it, which I take to be to a considerable extent probable. That is, I think that the influences and actions which the term "natural selection" stands for, give a sufficient scientific explanation of the way in which smaller differences among plants and animals may rise into greater, varieties into species. Given differences -and an internal tendency to differ more, i.e., given variation as an inexhaustible factor, and natural selection should suffice for the preservation and increase of the select few as a consequence of the destruction of the intermediate many. Surely there is nothing either improbable or irreligious in the idea that lines of individuals or races, once in existence, should be subject to the conditions of Nature, and that the fittest for particular conditions should thereby be preserved. As to variation, that really occurs as a fact, though we know not how; and, if we frame explanations of the mode and get conceptions of the causes of the variation of living things, still we probably shall never be able to carry our knowledge very much further back; for in each variation lies hidden the mystery of a beginning. We cannot tell why offspring should be like unto parent; how then should we know why it should sometimes be different? So then Darwinism has real causes at its foundation, viz., the fact of variation and the inevitable operation of natural selection, determining the survival only of the fittest forms for the time and place. It is therefore a good hypothesis, so far. But is it a sufficient and a complete hypothesis? Does it furnish scientific explanation of (i.e., assign natural causes for) the rise of living forms from low to high, from simple to complex, from protoplasm to simple plant and animal, from fish to flesh, from lower animal to higher animal, from brute to man? Does it scientifically account for the formation of any organ, show that under given conditions sensitive eye-spot, initial hand or brain, or even a different hue or texture, must then and there be developed as the consequence of assignable conditions? Does it explain how and why so much, or any, sensitiveness, faculty of response by movement, perception, consciousness, intellect, is correlated with such and such an organism? I answer, Not at all! The hypothesis does none of these things. For my own part I can hardly conceive that anyone should think that natural selection scientifically accounts for these phenomena. Let us here discriminate. To account scientifically for phenomena, or for complex series of phenomena, by assigning real and sufficient natural causes, is one thing. To believe that the phenomena have occurred in the course of nature, and have natural causal connection, is another. It is not natural selection which has led Mr. Darwin and many others to believe that life "was originally breathed by the Creator into a few forms or into one," and "that the production and extinction of the past and present inhabitants of the world has been due to secondary causes;" but it is the observed fact of likenesses and that of gradation from form to form which suggested the idea of

an actual evolution from form to form having somehow taken place. Variation and natural selection are now assigned as causes or reasons of the evolution. Variation originates all the differences. Natural selection, determining which forms shall survive, reduces their number and intensifies their character. But Darwin may likewise consistently speak of his favorite principle as a cause of the evolution, it being that in the absence of which the evolution could not take effect. A cause of variation it certainly is not, but it is a necessary occasion of it, or of its progress. Because without natural selection to pave the way, the wheels of variation would at once be clogged and all progress be arrested. Variation provides that upon which natural selection operates; the operation of natural selection makes room for further variation, gives opportunity for variability to change its fashions and display its novelties; and so the two go on, hand in hand. But, although thus conjoined, there is always this difference between the two, that natural selection works externally, with known natural agencies, and in the light of common day; variation works internally, in darkness, and its agencies and ways are recondite and past finding out. Or, when we find out something, -as we may hope to do, -we only resolve a before unexplained phenomenon into two factors, one of them a now ascertained natural process, the other a something which still eludes our search. But we suppose it to be natural, although as yet unknown. Surely we are not to suppose that natural agencies cease just where we fail to make them out. To Proceed: what Darwinism maintains is that variation, which is the origination of small differences, and species-production, which represents somewhat larger differences, and genus- production, which represents still greater differences, are parts of a series and differ only in degree, and therefore have common natural causes whatever these may be; and that natural selection gives a clear conception of a way in which continually or occasionally arising small differences may be added up into large sums in the course of time. This is a legitimate and on the whole a good working hypothesis. The questionable point is whether the sum of the differences can be obtained from the individually small variations by simple addition. I very much doubt it. I doubt especially if simple addition is capable of congruously adding up such different denominations. That is, while I see how variations of a given organ or structure can be led on to great modification, I cannot conceive how non-existent organs come thus to be, how wholly new parts are initiated, how any thing can be led on which is not there to be taken hold of. Nor am I at all helped in this respect by being shown that the new organs are developed little by little. The doubt is not whether the organs and forms were actually evolved in the course of Nature. I agree with Darwin that they probably were, and if so then doubtless under natural selection. And I cannot help thinking that Darwin would agree with me that the principle of natural selection does not account for it. That is, we both account for it all, only by assuming as an inexplicable fact that variation does occur to the whole extent of the extreme differences. All appears to have come to pass in the course of Nature, and therefore under second causes; but what these are, or how

connected and interfused with first cause, we know not now, perhaps shall never know. Now views like these, when formulated by religious instead of scientific thought, make more of Divine providence and fore-ordination than of Divine intervention; but perhaps they are not the less theistical on that account. Nor are they incompatible with "special creative act," unless natural process generally is incompatible with it, -which no theist can allow. No Christian theist can eliminate the idea of Divine intervention any more than he can that of Divine ordination; neither, on the other hand, can he agree that what science removes from the supernatural to the natural is lost to theism. But, the business of science is with the course of Nature, not with interruptions of it, which must rest on their own special evidence. Still more, it is the business of science to question searchingly all seeming interruptions of it, and its privilege, to refer events and phenomena not at the first but in the last resort to Divine will. Moreover, "special creative act" is not excluded by evolutionists on scientific ground, is not excluded at all on principle, except by those who adopt a philosophy which antecedently rules out all possibility of it. Darwin postulates one creative act and a probability of more, and so in principle is at one with Wallace and with Dana, who insist on more. But it has been said, and indeed is said over and over, even by thoughtful men, that, although Darwinism is not necessarily atheistic, yet, when once started it dispenses with further need of God. "Given [it is said] the laws which we find, then there is no more use for God, and all things have come out as we find them with none of his supervision. There may have been -we do not know -a God once; but law and not God, is the great Creator." A few words should dispose of this. First, by what right is it assumed that the Darwinian differs from the orthodox conception of law? In the next place, this line of argument applies equally to a series of creative acts separated by intervals, during which it could with the same reason (or unreason) be said that there is no use for God, that there may have been a God at times! So it cuts away the ground from under the Christian evolution which the writer quoted from allows, as well as from that which he deprecates. And it equally dispenses with use for God in Nature for the several thousand years which have passed since creation under the biblical view was finished, and "the Creator rested from all the work which he had made." There is no more validity in the argument in the one case than in the others. A word or two upon the subject of creative acts occurring in time may not be out of place. These, when spoken of in the present connection, do not usually refer to the making of a new form of plant or animal instanter out of the dust of the ground. However it might have I been when there was only one act of creation to think of, the enormous crudeness of such a conception when applied to a long succession of animals would now be seriously felt by every one. It is a phrase most used by those who accept the idea of the evolution of one species from another, but who feel the utter incompetence of known natural causes to account for it. In the absence of such causes, they, being theists, naturally (and I cannot say unphilosophically) assign the simpler and seemingly easier part of evolution to recondite natural causes which they are unable to specify, the

more difficult or inscrutable to a diviner and more direct or supernatural act, which they liken to creation. I suppose they do not feel the necessity, as they have not the ability, to draw any definite line between what they think mere Nature may accomplish, and what they believe she cannot. Probably what they have in mind is mediate creation and not miracle. Perhaps they are convinced that if they could behold the birth of a species, they would see nothing more miraculous than in the birth of an individual. They mean that the springs of Nature are somehow touched by a new form or instance of force directed to some new end. Yet so they must be in a degree in the origination of a new race or variety. This whole conception of mediate creation is logically carried out to its extreme by my philosophical colleague, Professor Bowen, when he concludes that "not only every new species but that each individual living organism, originated in a special act of creation." So the difference between pure Darwinism and a more theistically expressed evolution is not so great as it seemed. Both agree in the opinion that species are evolved from species, and that evolution somehow occurs in the course of Nature. Darwinism opines that the whole is a natural result of general causes such as we know of and in a degree understand, such as we recognize under the concrete terms of variability, heredity, and the like, -terms which we can estimate and limit only by reference to what we see coming to pass, -along with complex physical interactions which are more measurable and predictable. The very much that it has not accounted for by these causes and processes, it assumes may be in time accounted for by them, or by as yet unrecognized general causes like them. The specially theistic evolution referred to judges that these general causes cannot account for the whole work, and that the unknown causes are of a more special character and higher order. I think it does not declare that these are not secondary causes, and whether they would be ranked as natural causes would depend upon the sense in which the term Nature was at the moment used. Probably such evolutionists, if they had to give form to their conceptions, would vary in all degrees between the direct interposition of a supernatural hand at certain stages or crises, and that extreme extension of the Supernatural into and through the Natural which Professor Bowen reaches the assertion that each individual living organism, as well as every new species, originated in a special act of creation. This, the complete assimilation of specific to individual origination, is simply Darwinism, expressed in less appropriate language. What the one calls "special act" the other, along with the rest of mankind, calls general process. The common principle of the Divine ordination of Nature, which the philosopher here asserts in a paradoxical way, the Darwinian implies, or even postulates, on appropriate occasions. The Darwinian Naturalist, I mean, not the monistic and agnostic philosopher, -from whom, so far, we have kept as clear as has Mr. Darwin in every volume and every line. Suppose now that we are shut up to Nature for the evolution of the forms of living things. As theists, we are not debarred from the sup- position of supernatural origination, mediate or immediate. But suppose the facts suggest and inferentially warrant the conclusion that the course of natural history has been along an unbroken line;

that -account for it or not- the origination of the kinds of plants and animals comes to stand on the same footing as the rest of Nature. As this is the complete outcome of Darwinian evolution, it has to be met and considered. The inquiry, what attitude should we,- Christian theists, present to this form of scientific belief, should not be a difficult one to answer in my opinion, we should not denounce it as atheistical, or as practical atheism, or as absurd. Although, from the nature of the case, this conception can never be demonstrated, it can be believed, and is coming to be largely believed; and it falls in very well with doctrine said to have been taught by philosophers and saints, by Leibnitz and, Malebranche, Thomas Aquinas, and Augustine. So it may possibly even share in the commendation bestowed by the Pope, in a recent sensible if not infallible allocution, upon the teaching of "the Angelic Doctor," and make a part of that genuine philosophy which the Pope declares to stand in no real opposition to religious truth. Seriously it would be rash and wrong for us to declare that this conception is opposed to theism. Our idea of Nature is that of an ordered and fixed system of forms and means working to ultimate ends. If this is our idea of inorganic nature, shall we abandon or depreciate it when we pass from mere things to organisms, to creatures which are themselves both means and ends? Surely it would be suicidal to do so. We may, and indeed we do, question gravely whether all this work is committed to Nature; but we all agree that much is so done, far more than was formerly thought possible; we cannot pretend to draw the line between what may-be and what may not be so done, or what is and what is not so done; and so it is not for us to object to the further extension of the principle on sufficient evidence. I trust it is not necessary to press this consideration, though it is needful to present it, in order to warn Christian theists from the folly of playing into their adversary's hand, as is too often done. But I am aware that we have not yet reached the root of the difficulty. We are convinced theists. We bring our theism to the interpretation of Nature, and Nature responds like an echo to our thought. Not always unequivocally: broken, confused, and even contradictory sounds are sometimes given back to us; yet as we listen to and ponder them, they mainly harmonize with our inner idea, and give us reasonable assurance that the God of our religion is the author of Nature. But what of those- you will say -who are not already convinced of His existence? We thought that we had an independent demonstration of His existence, Ii and that we could go out into the highways of unbelief and "compel them to come in;" that "the invisible things of Him from the creation of the world were clearly seen, being understood by the things that are made," "so that they are without excuse." We could shut them up to the strict alternative of Divinity or Chance, with the odds incalculably against Chance. But now Darwinism has given them an excuse and placed us on the defensive. Now we have as much as we can do, and some think more, to reshape the argument in such wise as "to harmonize our ineradicable belief in design with the fundamental scientific belief of continuity in nature, now extended to organic as well as inorganic forms, to living beings as well as inanimate things." The field which we took to be thickly sown with design

seems, under the light of Darwinism, to yield only a crop of accidents. Where we thought to reap the golden grain, we find only tares. The outlook is certainly serious, yet not altogether disheartening. Perhaps we cannot now safely separate the wheat from the tares, but must let them grow together unto the harvest. Nobody expects in this world to ascertain the limits between design and contingency. Nobody expects to demonstrate any design, except his own to himself by consciousness; he cannot really prove his own to his bosom friend; though his assertion may give his friend, and his actions may give his enemy, convincing reasons for inferring it. But we are sure that every intellectual being has designs, that the reach and pervasiveness of design must be in proportion to the wisdom; and that the designs of the Author of Nature, if any there be, must be all-pervading and fathomless. Yet if they be wrought into a system of adaptations, some of the adaptations themselves may be such as irresistibly to suggest their reason to our minds. At least they suggest reason, even if we fail to apprehend, or wrongly apprehend, the reason. The sense that there is reason why is as innate in man, as that there is cause whereby. Now, to adopt the apt words of Francis Newman, "after stripping off all that goes beyond the mark of sober and cautious thought, there remain in this world fitnesses innumerable on I the largest and the smallest scale, in which alike common sense and uncommon sense see I design, and the only mode of evading this belief is by carrying out the cumbrous Epicurean argument to a length of which Epicurus could not dream. We cannot prove, we are told, that the eye was intended to see, or the hand to grasp, or the fingers to work delicately. Of course we cannot. But what is the alternative? To believe that it came about by blind chance. No science has any calculus or apparatus to decide between the two theories. Common sense, not science, has to decide, and the most accomplished physical student has in the decision no a vantage whatever over a simple thoughtful man." Arrangements innumerable, extending through all nature, subserving all ends, of course involve innumerable contingencies. The theist is not expected to have any definite idea of the respective limits of these. He can. only guess at the limits of intention and contingency in the actions of his nearest neighbor. The non-theist gains nothing by eliminating instances, unless he can eliminate all design from the system. Until he does this, he gains nothing by showing that particular fitnesses come to pass little by little, and under natural causes. He cannot point to a time where there were no fitnesses, apparent or latent, and if he argues that all fitnesses were germinal in the nebulous matter of our solar system, he does not harm our case. The throwing of design ever so far back in time does not harm it, nor deprive it of its ever-present and ever-efficient character. For, as has been acutely said, "If design has once operated in rerum natura (as in the production of a first life-germ), how can it stop operating and undesigned formation succeed it? It can-not, and intention in Nature having once existed, the test of the amount of that intention is not the commencement but the end, not the first low organism, but the climax and consummation of the whole." I am not going to re-argue an old thesis of my own that Darwinism does not weaken the substantial ground of the

argument, as between theism and non-theism, for design in Nature. I think it brought in no new difficulty, though it brought old ones into prominence. It must be reasonably clear to all who have taken pains to understand the matter that the true issue as regards design is not between Darwinism and direct Creationism, but between design and fortuity, between any intention or intellectual cause and no intention nor predicable first cause. It is really narrowed down to this, and on this line all maintainers of the affirmative may present an unbroken front. The holding of this line secures all; the weakening of it in the attempted defence of unessential and now untenable outposts endangers all. I have only to add a few observations and exhortations addressed to Christian theists. If intention must pervade every theistic system of Nature, if we give credit to Mr. Darwin when in this regard he likens his divergence from the orthodox view to the difference between general and particular Providence, is it safe to declare that his theory, and his denial that particular forms were specially created, are practically atheistical? I might complain of this as unfair: it is more to my purpose to complain of it as suicidal. It is in effect holding a theistic conception of Nature for our private use, but acting on the opposite when we would discredit an unwelcome theory. Or else it is trusting so little to our own belief that we abandon it as soon as any weight is laid upon it. As soon as you do this, by conceding that the evolution of forms under natural laws militates against design in Nature, you are at the mercy of those reasoners, who, looking at the probabilities of the case from their own point of view, coolly remark that:- "On the whole, therefore, we seem entitled to conclude that, during such time as we have evidence of, no intelligence or volition has been concerned in events happening within the range of the solar system, except that of animals living on the planets." You may say that implicit belief of intention in Nature affords an insufficient foundation for theism. But you are not asked to ground your theism upon it, nor upon the whole world of external phenomena. You may reiterate that you cannot believe that all these events have occurred under natural laws. Nothing hinders your assuming what you need from the supernatural; but allow that the need of other minds may not be identical with yours. As I have said before, what you want is, not a system which may be adjusted to theism, nor even one which finds its most reasonable interpretation in theism, but one which theism only can account for. That, it seems to me, you have. An excellent judge, a gifted adept in physical science and exact reasoning, the late Clerk-Maxwell, is reported to have said, not long before he left the world, that he had scrutinized all the agnostic hypotheses he knew of, and found that they one and all needed a God to make them workable. When you ask for more than this, namely, for that which will compel belief in a personal Divine Being, you ask for that which He has not been pleased to provide. Experience proves that the opposite hypothesis is possible. Some rest in it, but few I think on scientific grounds. The affirmative hypothesis gives us a workable conception of how "the world of forms and means" is related to "the world of worths and ends." The negative hypothesis gives no mental or ethical satisfaction whatever.

Like the theory of the immediate creation of forms, it explains nothing. You inquire, whither are we to look for independent evidence of mind and will "concerned in natural events happening within the range; of the solar system." Certainly not to the court of pure physical science. For that has ruled this case out of its jurisdiction by assuming a fixed dependence of consequent upon antecedent throughout its domain. There are plenty of phenomena to which it cannot assign known causal antecedents; but it supplies their place at once, either by assuming that there is a physical antecedent still unguessed, or by inventing one in an hypothesis. It deals in effects and causes, and knows nothing of ends. It has no verdict to render against our case, for it does not entertain it, and has no jurisdiction under which to try it. But its wiser judges do not insist that theirs is the only court in the realm. We have not to go beyond Nature for a jurisdiction, which may be likened to that of Equity, since it enforces specific performance, and which adds to causes and effects the consideration of ends. Biology takes cognizance of the former, like physics, of which it is on one side a part, but also of ends; and here ends (which mean intention) become a legitimate scientific study. The natural history of ends becomes consistent and reasonably intelligible under the light of evolution. As the forms and kinds rise gradually out of that which was well-nigh formless into a consummate form, so do biological ends rise and assert themselves in increasing distinctness, variety, and dignity. Vegetables and animals have paved the earth with intentions. The study and the estimate of these is quite the same, under whatever view of the mode in which the structures and beings that exemplify them came to be. The highest of these exemplars is himself conscious of ends. He pronounces that critical monosyllable I. I am, I will, I accomplish ends. I modify the outcome of Nature. Here, at length, is something "on the planets" it which "has been concerned in events;" and in my opinion it is just now a good and useful theistic view which connects this something with all the lower psychological phenomena that preceded and accompany it. Our wills, in their limited degree, modify the course of Nature, subservient though that be to fixed laws. By our will we make these laws sub serve our ends. We momently violate the uniformity of Nature. But we do not violate the law of the uniformity of Nature. Is it not legitimate, is it not inevitable, that a being who knows that he is a will, and a power, and a successful contriver, should explain what he sees around and above him by the hypothesis of a higher and supreme will? A will which has disposed things in view of ends in establishing Nature, and which may, it Deed be, dispose to particular and timed ends, either with or without perceptible suspension of the law of the uniformity of Nature, The question I ask has "been adversely answered, substantially as follows: It may be that in the first instance men can hardly avoid predicating a being who has done and is doing all this. Nevertheless a trained mind soon reaches the incongruity of it, at least "as concerns any events which have happened within the range of the solar system." For the belief that a supernatural power has so acted contradicts that very belief in the uniformity of Nature upon which all scientific reasoning and

practical judgments rest. To this it is well rejoined, that the ultimate scientific belief on which our reason reposes "is that belief in the uniformity of Nature which is equivalent to a belief in the law of universal causation; which again is equivalent to a belief that similar antecedents are always followed by similar consequents. But this belief is in no way inconsistent with a belief in supernatural interference. If the principle of the uniformity of Nature asserted that every natural effect is, and has ever been, preceded by natural causes, then it would be in terms inconsistent with supernatural interference and with supernatural origination of the system. But science does not give us nor find any such principle. All scientific beliefs are in themselves as true and as fully proved if supernatural interference be possible as they are if such interference be impossible. A law does no more than state that under certain circumstances (positive and negative) certain phenomena will occur. If on some occasions these circumstances, owing to supernatural interference, do not occur, the fact that the phenomena do not follow proves nothing as to the truth or falsehood of the law." If such interference violates the law of the uniformity of Nature, the human will, and all wills, and all direction of material forces to ends, are every day violating it. It is also urged that giving particular direction in a special act would be an addition to the plenum of force in the universe, and therefore a contradiction to the recently acquired scientific principle of the conservation of energy. The answer may be this. It is not at all certain that all direction given to force expends force; it is certain that, under collocations, a minute use of force (as pulling a hair-trigger or jostling a valve) may bring about immense results; and, finally, increments of force by Divine action in time, of the kind in question, if such there be, could never in the least be known to science. The only remaining supposition that I now think of is the crude one that thought and will are functions of the body, secretions as it were of the organ through which they are manifested, "psychical modes of motion." Then, as has well been said, they must be correlated with physical modes of motion, at least in conception; but it is conceded by all sensible I thinkers that thought cannot be translated into extension, nor extension into thought. Now, since the only conceivable source of physical force is supernatural power, still more must this be the only conceivable source of thought. There is an old objection which threatens to undermine the ground on which we infer Divine will from the analogy of human; namely, that our wills, being a part of the course of Nature and amenable to its laws, their movements, though seemingly free, are as fixed as physical sequences upon this insoluble problem we have nothing practical to say, except to admit that so much of choice is determined by antecedent conditions and the surroundings, by hereditary bias, by what has been made for the individual and inwrought into his nature, that, granting the will has an element of freedom, it may be in effect a small factor. I can only urge that it is not an insignificant factor. As to this, a pertinent although homely suggestion came to me in the remark of a humble but shrewd neighbor, to the effect that he found the difference between people and people he dealt with was really very little, but that

what there is was very important. So facts and reasonings may shut us up to the conclusion that the will, sovereign as it seems to the user, is practically a small factor in the determination of events. But what there is makes all the difference in the world in man! And now, as to man himself in relation to evolution. I have no time left for the discussion of questions which naturally interest you more than any other, but which, even with time at disposal, are not easy to treat. I will not undertake I to consider what your attitude should be upon a matter which connects itself with grave ulterior considerations; but I will very briefly and frankly intimate what views I think a scientific man, religiously disposed, is likely to entertain. To pursue the illustration just ventured upon: The anatomical and physiological difference between man and the higher brutes is not great from a natural-history point of view, compared with the difference between these and lower grades of animals; but we may justly say that what corporeal difference there is extremely important. The series of considerations which suggest evolution up to man, suggest man's evolution also. We may, indeed, fall back upon Mr. Darwin's declaration, in a case germane to this, that "analogy may be a deceitful guide." Yet here it is the only guide we have. If the alternative be the immediate origination out of nothing, or out of the soil, of the human form with all its actual marks, there can be no doubt which side a scientific man will take. Mediate creation, derivative origination will at once be accepted; and the mooted question comes to be narrowed down to this: Can the corporeal differences between man and the rest of the animal kingdom be accounted for by known natural causes, or must they be attributed to unknown causes? And shall we assume these unknown causes to be natural or supernatural? As to the first question, you are aware, from my whole line of thought and argument, that I know no natural process for the transformation of a brute mammal into a man. But I am equally at a loss as respects the processes through which any one species, anyone variety, gives birth to another. Yet I do not presume to limit Nature by my small knowledge of its laws and powers. I know that a part of these still occult processes are in the every-day course of Nature; I am persuaded that it is so through the animal kingdom generally; I cannot deny it as respects the "highest members" of that kingdom. I allow, however, that the superlative importance of comparatively small corporeal differences in this consummate case may justify anyone in regarding it as exceptional. In most respects, man is an exceptional creature. If, however, I decline to regard man's origin as exceptional in the sense of directly supernatural, you will understand that it is because, under my thoroughly theistic conception of Nature, and my belief in mediate creation, I am at a loss to know what I should mean by the exception. I do not allow myself to believe that immediate creation would make man's origin more divine. And I do not approve either the divinity or the science of those who are prompt to invoke the supernatural to cover our ignorance of natural causes, and equally so to discard its aid whenever natural causes are found sufficient. It is probable that the idea of mediate creation would be more readily received, except for a prevalent misconception upon a point or genealogy. When the naturalist is asked, what and

whence the origin of man, he can only answer in the words of Quatrefages and Virchow, "We do not know at all." We have traces of his existence up to and even anterior to the latest marked climatic change in our temperate zone: but he was then perfected man; and no vestige of an earlier form is known. The believer in direct or special creation is entitled to the advantage which this negative evidence gives. A totally unknown ancestry has the characteristics of nobility. The evolutionist can give one satisfactory assurance. As the wolf in the fable was captious in his complaint that the lamb below had muddied the brook he was drinking from, so those are mistaken who suppose that the simian race can have defiled the stream along which evolution traces human descent. Sober evolutionists do not suppose that man has descended from monkeys. The stream must have branched too early for that. The resemblances, which are the same in fact under any theory, are supposed to denote collateral relationship. The psychological differences between man and the higher brute animals you do not expect me now to discuss. Here, too, we may say that, although gradations abridge the wide interval, the transcendent character of the superadded must count for more than a host of lower similarities and identities; for, surely, what difference there is between the man arid the animal in this respect is supremely important. If we cannot reasonably solve the problems even of inorganic nature without assuming initial causation, and if we assume for that supreme intelligence, shall we not more freely assume it, and with all the directness the case may require, in the field where intelligence at length develops intelligences? But while, on the one hand, we rise in thought into the supernatural, on the other we need not forget that one of the three old orthodox opinions,- the one held to be tenable if not directly favored by Augustine, and most accordant to his theology, as it is to observation, - is that souls as well as lives are propagated in the order of Nature. Here we may note, in passing, that since the "theologians are as much puzzled to form a satisfactory conception of the origin of each individual- soul as naturalists are to conceive of the origin of species," and since the Darwinian and the theologian (at least the Traducian) take similar courses to find a way out of their difficulties, they might have a little more sympathy for each other. The high Calvinist and the Darwinian have a goodly number of points in common. View these high matters as you will, the out-come, as concerns us, of the vast and partly comprehensible system, which under one aspect we call Nature, and under another Providence, and in part under another: Creation, is seen in the emergence of a free and self-determining personality, which, being capable of conceiving it, may hope for immortality. "May hope for immortality." You ask for the reasons of this hope upon these lines of thought. I suppose that they are the same as your own, so far as natural reasons go. A being who has the faculty - however bestowed -of reflective, abstract thought superadded to all lower psychical faculties, is thereby per saltum immeasurably exalted. This, and only this, brings with it language and all that comes from that wonderful instrument; it carries the germs of all invention and all improvement, all that man does and may do in his rule over Nature and his power of

ideally soaring above it. So we may well deem this a special gift, the gift beyond recall, in which all hope is enshrined. None of us have any scientific or philosophical explanation to offer as to how it carried to be added to what we share with the brutes that perish; but it puts man into another world than theirs, both here, and -with the aid of some evolutionary ideas, we may add-here- after. Let us consider. It must be that the Eternal can alone impart the gift of eternal life. But He alone originates life. Now what of that life which reaches so near to ours, yet misses it so completely? The perplexity this question raises was as great as it is now before evolution has ever heard of; it has been turned into something much more trying than perplexity by the assurance with which monistic evolutionists press their answer to the question; but a better line of evolutionary doctrine may do something toward disposing of it. It will not do to say that thought carries the implication of immortality. For our humble companions have the elements of that, or of simple ratiocination, and the power of reproducing conceptions in memory, and -what is even more to the present purpose -in dreams. Once admit this to imply immortality and you will be obliged to make soul coextensive with life, as some have done, thereby well-nigh crushing the whole doctrine of immortality with the load laid upon it. At least this is poising the ponderous pyramid on its apex, and the apex on a logical fallacy. For the entire conception that the highest brute animals may be endowed with an immortal principle is a reflection from the conception of such a principle in ourselves; and so the farther down you carry it, the wider and more egregious the circle you are reasoning in. Still, with all life goes duality. There is the matter, and there is the life, and we cannot get one out of the other, unless you define matter as something which works to ends. As all agree that reflective thought cannot be translated into terms of extension (matter and motion), nor the converse, so as truly it cannot be translated into terms of sensation and perception, of desire and affection, of even the feeblest vital response to external impressions, of simplest life. The duality runs through the whole. You cannot reasonably give over any part of the field to the monist, and retain the rest. Now see how evolution may help you; -in its conception that, while all the lower serves its purpose for the time being, and is a stage toward better and higher, the lower sooner or later perish, the higher, the consummate, survive. The soul in its bodily tenement is the final outcome of Nature. May it not well be that the perfected soul alone survives the final struggle of life, and indeed "then chiefly lives," -because in it all worths and ends inhere; because it only is worth immortality, because it alone carries in itself the promise and potentiality of eternal life! Certainly in it only is the potentiality of religion, or that which aspires to immortality. Here I should close; but, in justice to myself and to you, a word must still be added. You rightly will say that, although theism is at the foundation of religion, the foundation is of small practical value without the, superstructure. Your supreme interest is Christianity; and you ask me if I maintain that the doc- trine of evolution is compatible with this. I am bound to do so. Yet I have left myself no time in which to vindicate my

claim; which I should wish to do most earnestly, yet very deferentially, considering where and to whom I speak. Here we reverse positions: you are the professional experts; I am the unskilled Inquirer. I accept Christianity on its own evidence, which I am not here to specify or to justify; and I am yet to learn how physical or any other science conflicts with it any more than it conflicts with simple theism. I take it that religion is based on the idea of a Divine Mind revealing himself to intelligent creatures for moral ends. We shall perhaps agree that the revelation on which our religion is based is an example of evolution; that it has been developed by degrees and in stages, much of it in connection with second causes and human actions; and that the current of revelation has been mingled with the course of events. I suppose that the Old Testament carried the earlier revelation and the germs of Christianity, as the apostles carried the treasures of the gospel, in earthen vessels. I trust it is reverent, I am confident it is safe and wise, to consider that revelation in its essence concerns things moral and spiritual; and that the knowledge of God's character and will which has descended from the fountain- head in the earlier ages has come down to us, through annalists and prophets and psalmists, in a mingled stream, more or less tinged or rendered turbid by the earthly channels through which it has worn its way. The stream brings down precious gold, and so may be called a golden stream; but the water -the vehicle of transportation -is not gold. Moreover the analogy of our inquiry into design in Nature may teach us that we may be unable always accurately to sift out the gold from the earthy sediment. But, however we may differ in regard to the earlier stages of religious development, we shall agree in this, that revelation culminated, and for us most essentially consists, in the advent of a Divine Person, who, being made man, manifested the Divine Nature in union with the human; and that this manifestation constitutes Christianity. Having accepted the doctrine of the incarnation, itself the crowning miracle, attendant miracles are not obstacles to belief. Their primary use must have been for those who witnessed them; and we may allow that the record of a miracle cannot have the convincing force of the miracle itself. But the very reasons on which scientific men reject miracles for the carrying on of Nature may operate in favor of miracles to attest an incoming of the super- natural for moral ends. At least they have nothing to declare against them. If now you ask me, What are the essential contents of that Christianity which is in my view a compatible with my evolutionary conceptions as with former scientific beliefs, it may suffice to answer that they are briefly summed up in the early creeds of the Christian Church, reasonably interpreted. The creeds to be taken into account are only two,- one commonly called the Apostles', the other the Nicene. The latter and larger is remarkable for its complete avoidance of conflict with physical science. The language in which its users "look for the resurrection of the dead" bears -and doubtless at its adoption had in the minds of at least some of the council- a worthier interpretation than that naturally suggested by the short western creed, namely, the crude notion of the revivification of the human body, against which St. Paul earnestly protested. Moreover, as brethren

uniting in a common worship, we may honorably, edifyingly, and wisely use that which we should not have formulated, but may on due occasion qualify,- statements, for instance, dogmatically pronouncing upon the essential nature of the Supreme Being (of which nothing can be known and nothing is revealed), instead of the Divine manifestation. We may add more to our confession: we all of us draw more from the exhaustless revelation of Christ in the gospels; but this should suffice for the profession of Christianity. If you ask, must we require that, I reply that I am merely stating what I accept. Whoever else will accept Him who is himself the substance of Christianity, let him do it in his own way. In conclusion, we students of natural science and of theology have very similar tasks. Nature is a complex, of which the human race through investigation is learning more and more the meaning and the uses. The Scriptures are complex, an accumulation of a long series of records, which are to be well understood only by investigation. It cannot be that in all these years we have learned nothing new of their meaning and uses to us, and have nothing still to learn. Nor can it be that we are not free to use what we learn in one line of study to limit, correct, or remodel the ideas which we obtain from another. Gentlemen of the Theological School, about to become ministers of the gospel, receive this discourse with full allowance for the different point of view from which we survey the field. If I, in my solicitude to attract scientific men to religion, be thought to have minimized the divergence of certain scientific from religious beliefs, I pray that you on the other hand will never needlessly exaggerate them; for that may be more harmful. I am persuaded that you, in your day, will enjoy the comfort of a much better understanding between the scientific and the religious mind than has prevailed. Yet without doubt a full share of intellectual and traditional difficulties will fall to your lot. Discreetly to deal with them, as well for your- selves as for those who may look to you for guidance, rightly to present sensible and sound doctrine both to the learned and the ignorant, the lowly and the lofty-minded, the simple believer and the astute speculatist, you will need all the knowledge and judgment you can acquire from science and philosophy, and all the superior wisdom your supplications may draw from the Infinite Source of knowledge, wisdom, and grace.

1883

James Hall named Cryptozoon, on the basis of cabbagelike rocks up to meter across — for such gullibility he would come under heavy criticism, although he was right.

PALEONTOLOGY

Alphonse Louis Pierre Pyramus de Candolle was elected to the US's National Academy of Sciences. He published his *ORIGINE DES PLANTES CULTIVÉES.*

THE SCIENCE OF 1883

BOTANIZING

Benjamin Gilbert Ferris's A NEW THEORY OF THE ORIGIN OF SPECIES (New York: Fowler & Wells) attempted to render the mechanism of evolution subordinate to a Whiggish teleology of the gradual evolution of improvement along a path of minimum pain and disruption (this, it would seem, was a work not of biological research, but rather one of inventive armchair theologizing; had Thoreau lived, it would have been interesting to discover what he might have had to say about it).

NEW THEORY OF ORIGIN

Excerpts follow:

> It is difficult to see how the belief in the existence of a personal Deity could have obtained a lodgment in the mind except upon the basis of its truth. The belief may now be regarded as universal, save with those men of science who have reasoned themselves into disbelief.
>
> Man, the last creation, having physically the highest and most complete organization, according to this theory, could only be formed through the medium of the highest animal structure next below him -the ape- and his ape birth furnishes the strongest proof of the truth of the theory. The difference between the mind of man and that of the most intelligent animal is so great, that the idea of his propagation by the sexual connection of apes is utterly absurd. Nothing short of direct divine Influx into the ape ovum could have produced the wonderful result.
>
> The world -the Christian world, at least- has witnessed, historically, the exhibition of that which is called the "miraculous conception" in the production of a Human so infinitely above common humanity as to be capable of complete one-ness with Divinity. Even in that grandest display of divine benevolence, involving the salvation of mankind, God has seen fit not to depart from His established laws of creation. And thus has been completed the mighty cycle of being, which begins and ends in Himself.
> Darwin. with that candor for which he is most remarkable, says: "There can be no doubt that the difference between the mind of the lowest man and that of the highest animal is immense. An anthropomorphous ape, if he could take a dispassionate view of his own case, would admit, that though he could form an artful

plan to plunder a garden — though he could use stones for fighting or for breaking open nuts, yet that the thought of fashioning a stone into a tool was quite beyond his scope. Still less, as he would admit, could he follow out a train of metaphysical reasoning, or solve a mathematical problem, or reflect on God, or admire a grand natural scene."

Nevertheless he insists, that the difference is one of degree only and not of kind and refers to "the various emotions and faculties, such as love, memory, attention, curiosity, imitation, reason, &c., of which man boasts," as being, "found in an incipient, or even sometimes in a well developed condition, in the lower animals" (The Descent of Man, Volume I, page 100).

But it seems to me, that in my theory of creation, there is a more rational and satisfactory explanation of these phenomena. There is a manifest preparation in the animal kingdom for the production of man in reference to his mind as well as body. Suppose him born of the ape as to body-if the ape mother had no higher psychological qualities than an oyster, there would have been no basis for human mentality, and he might just as well have been created from a lump of earth. But he has a dual existence-he is both animal and man; and in this double character, he dominates the entire animal kingdom. The lower part of his mind is, primarily, inherited from the ape, and forms a basis for the higher or human part; and the necessity of this explains why the incipient "emotions and faculties," referred to are found in certain of the higher animals.

In one sense the theory here presented may be said to be one of special creation; but proceeding upon a plan of creative evolution, it is just as free from any feature of the miraculous as the germination and growth of a plant was in ordinary generation. At first creation proceeded by short transitions, as is evident from a study of the lower organisms; but as it advanced the forms became more complicated, the gaps wider and wider, until the appearance of man, and whatever may be claimed as to structural resemblances, the mental differences between him and the ape are immense.

1891

Ethnologist Frank Cushing learned of a Zuni legend about life forms turning to stone while the earth was young (the natives of the American southwest were of course attempting to explain the fossils they kept coming across).

PALEONTOLOGY

Ravenstein added up the carrying capacity of the planet Earth at some 5,994,000,000 people (capable of surviving on its 73,200,000 square kilometers of fertile lands at perhaps some 80 persons per square kilometer, and its 36,000,000 square kilometers of grasslands at perhaps some 3.9 people per square kilometer, and its 10,900,000 square kilometers of desert at perhaps some 0.4 people per square kilometer).

THE SCIENCE OF 1891

Carnegie Hall opened in New York.

The Forest Reserves Act was passed by Congress; it authorized withdrawal of public lands for a national forest reserve as lumber king Frederick Weyerhaeuser expanded his holdings. This began a policy that will set aside more than 185,000,000 acres of national forests in 40 states during the following 80 years.

Kohler began a placer operation at North Wash Bar. This undermined Cass Hite's efforts to obtain mining investors, so Hite killed him. Convicted of 2d-degree murder, Hite would be pardoned by the state Governor.

Bromide Basin mines were in full operation. There were about 100 men and a 5-stamp mill, that in a couple of years would produce about $15,000 (in 1891 dollars) in gold.

The Denver Rio Grande Western Railroad made a preliminary survey of a route from Green River to Eagle City.

The Bartram Botanical Garden which had been purchased and preserved by Andrew M. Eastwick in 1850 at this point became part of Philadelphia's park system.

1896

J. de Morgan described nine pierced fossil urchins found in a Chalcolithic tomb at Toukh.

Daniel Cunningham concluded that Neanderthals represented an intermediate step between *Pithecanthropus erectus* and modern humans.

PALEONTOLOGY

A gelatinous blob that had washed ashore at St. Augustine, Florida was inspected by cephalopod expert Addison Verrill, who at first suspected it to be the remains of a giant octopus but, after examining a tissue sample, found it to have been from a decomposing whale.

THE SCIENCE OF 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

1899

Charles Doolittle Walcott identified *Chuaria*, millimeter-sized black fossil disks, as the compressed shells of marine invertebrates. He was correct that these disks had come from a form of living thing — although actually they had been unusually large planktonic alga.

PALEONTOLOGY

THE SCIENCE OF 1899

Daniel Chester French did two busts of Sherman Hoar (who had just died in Concord of typhoid fever), after having sculpted Ebenezer Rockwood Hoar in 1886. He would sculpt George Frisbie Hoar, for the Senator Hoar Memorial, in 1908.

A letter from John Witt Randall sent to Francis Ellingwood Abbott on January 9, 1857 about Henry Thoreau was included in POEMS OF NATURE AND LIFE (Boston: George H. Ellis, page 109):

> *I hope you will find Mr. Thoreau a pleasant companion. I have met him at Mr. Hoar's, and was pleased with the accuracy of his botanical observations. He seemed to know what he knew — by no means, I think, the most common of characteristics.*

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.[89]

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

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

1903

Wilson, collecting for Veitch, successfully reintroduced the blue poppy *Meconopsis* to Europe, though his greatest triumph was the successful introduction of the regal lily *Lilium regale*.

Henry E. Huntington purchased San Marino Ranch, where he began to create his estate, complete with museum collections and botanical gardens.

Ernest Rutherford pointed out at the British Association that because radioactivity could power the sun and maintain its heat, the estimate that Lord Kelvin had made of the age of the solar system would likely be found to be too conservative.

THE SCIENCE OF 1903

Human bones from Gough's Cave in Cheddar Gorge, England, sometimes referred to as "Cheddar Man" the earliest Englishman, turned out to be only some 15,000 years old.

PALEONTOLOGY

L. de Vesly described 1st-Century to 3d-Century remains at Gallo Roman temples and wells near Rouen, France. Finds there included a cache of Neolithic axes and fossil sea urchins — evidence of association of axes and urchins over thousands of years.

From this year into 1906, Ernesto Schiaparelli would be excavating at Heliopolis, Egypt. One of his finds would be of a fossil sea urchin that had been engraved with hieroglyphs. The inscription would eventually be translated as "Found in the south of the quarry of Sopdu by the god's-father Tja-nefer" — archaeologists would surmise that the fossil might have been found by a New Kingdom miner or scribe, perhaps near Sinai.

1904

When entomologist G.W. Kirkaldy provided species descriptions for a series of insects whose names all ended in "-*chisme*" (pronounced "kiss me"), the guy must have been terminally horny, for among his species names are such as *Polychisme*, *Marichisme* and *Dollischisme*.

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

THE TASK OF THE HISTORIAN IS TO CREATE HINDSIGHT WHILE INTERCEPTING ANY ILLUSION OF FORESIGHT. NOTHING A HUMAN CAN SEE CAN EVER BE SEEN AS IF THROUGH THE EYE OF GOD.

1906

Pierre du Pont purchased the Pierce house and arboretum, property he would develop as Longwood Gardens.

BOTANIZING

1908

Charles and George Sternberg discovered a dinosaur “mummy” — a duckbill fossil that still possessed skin, tendons, and bits of flesh.

PALEONTOLOGY

From this year into 1911, Oliver P. Hay would be contending that the posture of dinosaurs had been crocodilian (that is, that they should not be displayed with upright legs).

THE SCIENCE OF 1908

When Otto Hauser uncovered the body of a Neanderthal youth at Le Moustier, he persisted in burying and “rediscovering” the Neanderthal as important visitors arrived. In a pit at La Chapelle-aux-Saints, Amadee Bouyssonie and Jean Bouyssonie discovered the skeleton of a Neanderthal (their find would encourage the hypotheses of intentional Neanderthal burial of the dead, although some opposition would arise among anthropologists).

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

1911

A NATURE CALENDAR. Edited and with an introduction by Wilfred Mark Webb. London, Selborne Society.

GILBERT WHITE

Edward Sherman Hoar's collection of some thousand plant specimens was presented by his daughter Florence

1912

Hoar (Mrs. Moses B.L. Bradford) to the New England Botanical Club (this included some hundred grasses and sedges that had been collected by Henry Thoreau).

PLANTS

1915

R.J. Reynolds's chewing tobacco manufacturing company in Winston, North Carolina had developed a line of pipe tobaccos, and had in 1913 introduced the first American blend cigarette, known as "Camel." By his death in 1918 of a pancreatic cancer that hypothetically might now be linked to a lifetime of chewing tobacco, Reynolds would have brought economic development in North Carolina.[90] By this year, however, 14 states had banned cigarettes while others enacted control regulations. The taxes on tobacco products had increased, and the government had broken up a trade cartel. An advertising campaign began for a new brand of cigarettes, made of a very much milder than usual mixture of American and Turkish tobacco:

(By 1927 such prohibitions against tobacco would have been rescinded in all states because income from taxes upon tobacco products had rendered our government a full-profit participant in this aspect of the drug trade.)

Richard Martin Willstätter was awarded a Nobel Prize for his work with plant pigments, particularly chlorophyll. After World War I, Willstätter would continue his work in biological chemistry, investigating the synthesis of cocaine and the nature of enzymes. By World War II, Willstätter would suffer the isolation and persecution of so many other Jewish German scientists, and eventually would feel obliged to migrate to Switzerland. At one point during the war Gestapo agents would attempt to take him into custody: "He was in

90. R.J. Reynolds had four children one of whom was either murdered or a suicide, one of whom died of a stomach cancer that may have been smoking-related, and two of whom definitively died because of smoking.

his garden at the time, however, and the Gestapo did not think to look for him there."

BOTANIZING

1921

Hugo Leander Blomquist received the degree of PhD in botany from the University of Chicago. He was strongly influenced by the morphology tradition of that institution, where his teachers had included the botanists John Merle Coulter (1851-1928), Henry Chandler Cowles (1869-1939), and Charles Joseph Chamberlain (1863-1943). Dr. Blomquist's first professional position would be as Assistant Professor of Biology at Trinity College (which in 1924 would become Duke University) in North Carolina.

BOTANIZING

ESSENCES ARE FUZZY, GENERIC, CONCEPTUAL; ARISTOTLE WAS RIGHT WHEN HE INSISTED THAT ALL TRUTH IS SPECIFIC AND PARTICULAR (AND WRONG WHEN HE CHARACTERIZED TRUTH AS A GENERALIZATION).

1922

W.J. Robbins initiated plant tissue culture studies.

THE SCIENCE OF 1922

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.

From this point into 1924, Guy Brunton and Flinders Petrie would be discovering caches of fossil bones, in shrines and tombs dating to the 13th Century BCE at Qau and Matmar, devoted to the Egyptian deity Set.

PALEONTOLOGY

Roy Chapman Andrews of the American Museum of Natural History began a series of excavations in central Mongolia, hoping to find human fossils (they found, instead, dinosaur fossils).

This photograph, allegedly of a giant tortoise who had been introduced to, or met, or at least sighted, Napoléon on St. Helena, appeared in Volume 22 of NATURAL HISTORY, a publication of the American Museum of Natural History. No provenance or justification whatever for the caption was provided by that scholarly source.

Courtesy of Monsieur V. Forbin

The only creature now alive that looked upon Napoleon

Here, with poetic license, is a poem by Michael McNeilley, © 1997, riffing yet further upon this urban legend:

The turtle who looked at Napoleon

Exiled to Saint Helena
in the South Atlantic, in 1815 Napoleon turned
to gardening, turning the soil with the
simple implements at hand, spacing the tiny seeds
in straight long rows with military precision.

Napoleon's jailer, Sir Hudson Lowe found
himself as bothered by rows of the Corsican Guard disguised
as radishes, ranked across the earth outside
his office window, as by Napoleon's contentment.
In a singular act of creative malevolence,

Lowe sent off to the Galapagos
for two giant land turtles.
The frigate bearing them arrived,
Lowe named the turtles Jonathan and Josephine
and set them loose in the garden of Napoleon.

Bulldozers by nature,
the giant tortoises nosed up and
swallowed down the radishes, tomatoes,
turnips, carrots and onions, smearing
Napoleon's careful rows into the dust.

Over morning coffee, through office window bars
Sir Hudson sat smiling at Napoleon's eaten and
uprooted, flattened garden.
One day as he watched, Napoleon himself
rounded the corner, moving slowly, contemplating the sea.

Dressed in gardener's tunic, head towel-draped
against the heat of the South Atlantic sun,
Napoleon bumped along, crouched on the back of
Jonathan, eyes straining past the breakers, as if
to spot Nelson's flagship.

Lowe watched, somewhat dismayed
as Napoleon surveyed
the sea from his rolling helm,
squinting into the noon sun for the
mirage of his emancipation.

But Napoleon died in 1821, his power drained,
unable to adapt to turtle life:
powerless to attain contentment
in slow uncoverings, green vegetation
and long waiting.

Wild goats pulled up the grass of the Galapagos,
and the big land turtles suffered starvation, their
ancient ranks further thinned by sailors
who found them excellent for soup and shell.
But fine grass grew on the grave of Napoleon, and

on the grave of Jonathan's mate, who died soon after
of some turtle disease.
A turtle grieves long,
but Saint Helena offers
food and good weather,

and Jonathan remains there today, lifting his old head
among the flies, "Bonaparte," still barely legible,
carved low near the rim of his giant shell.
Jonathan opens a red-rimmed, baleful eye
to the morning,

an eye that gazed upon Napoleon,
the eye of a turtle of destiny, who thought
no more of the little man long ago riding
than he thinks of today's flies.
But Jonathan still

considers the radishes, as they
arrive each day at sunset,
compliments of the British government,
a longtime legacy of Sir Hudson Lowe,
and Jonathan is often content.

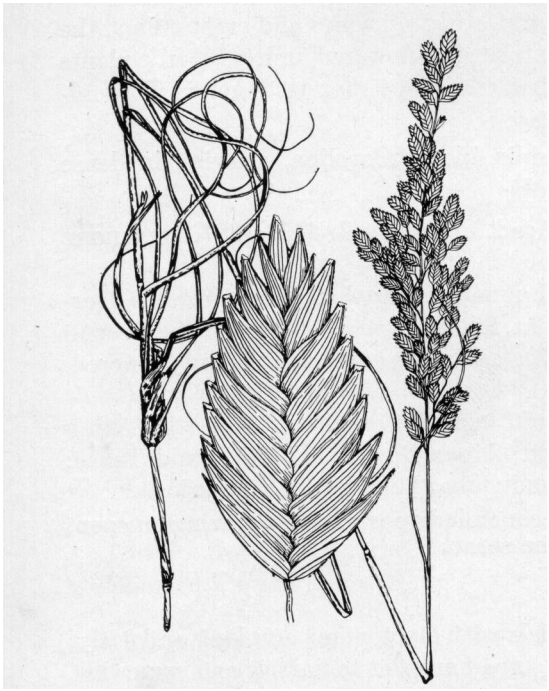
In 1840 Napoleon's remains
were shipped to Paris; In the compound in Saint Helena
little of Napoleon but his death mask now remains.
Not even a tree grows there still, that gave Napoleon shade.
But Jonathan moves slowly on

across the volcanic surface,

through what once was a garden, resolute,
his three-chambered heart slowly beating,
eye upon a nearby clump of grass, as green
and new as once upon Galapagos.

1923

Dr. Hugo Leander Blomquist became a professor in the Department of Biology at Trinity College (which in 1924 would become Duke University) in Durham, North Carolina. Always intrigued by the "difficult" plants, he was concentrating on such groups of vascular plants as grasses, sedges, rushes, Xyris, orchids, and composites.



BOTANIZING

Establishment of the Barro Colorado Island research preserve, Panama.

"MAGISTERIAL HISTORY" IS FANTASIZING: HISTORY IS CHRONOLOGY

1929

Blomquist, H.L. “The relation of capillary cavities in the *Jungermanniaceae* to water absorption and storage.” Ecology 10: 556-557.

BOTANIZING

CHANGE IS ETERNITY, STASIS A FIGMENT

1930

Blomquist, H.L. "Archegonial plants of *Tortula pagorum* (Milde) De Not. In North Carolina." The Bryologist 33(4): 41-43.

At the Sarah P. Duke Gardens in Durham adjacent to the West Campus of Duke University, a section would be devoted to the flora of the Southeastern United States. This section would eventually be known as "The H.L. Blomquist Garden of Native Plants" in honor of long-term chair of Duke's Department of Botany, Professor Hugo Leander Blomquist.

BOTANIZING

NO-ONE'S LIFE IS EVER NOT DRIVEN PRIMARILY BY HAPPENSTANCE

1931

The City of Charleston adopted a Planning and Zoning Ordinance establishing the "Old and Historic District," protecting some 400 residential properties in a 23-block area south of Broad Street.

Blomquist, H.L. "Checklist of the common mosses of Durham, North Carolina." Jour. Elisha Mitchell Sci. Soc. 46: 170-178. Also, "Genetics of mosses." Journ. Elisha Mitchell Sci. Soc. 46: 267-275.
Also, "Some *Pteridophytes* of North Carolina and their distribution." Am. Fern J. 21 (3): 81-90.

BOTANIZING

THE FALLACY OF MOMENTISM: THIS STARRY UNIVERSE DOES NOT CONSIST OF A SEQUENCE OF MOMENTS. THAT IS A FIGMENT, ONE WE HAVE RECOURSE TO IN ORDER TO PRIVILEGE TIME OVER CHANGE, A PRIVILEGING THAT MAKES CHANGE SEEM UNREAL, DERIVATIVE, A MERE APPEARANCE. IN FACT IT IS CHANGE AND ONLY CHANGE WHICH WE EXPERIENCE AS REALITY, TIME BEING BY WAY OF RADICAL CONTRAST UNEXPERIENCED — A MERE INTELLECTUAL CONSTRUCT. THERE EXISTS NO SUCH THING AS A MOMENT. NO "INSTANT" HAS EVER FOR AN INSTANT EXISTED.

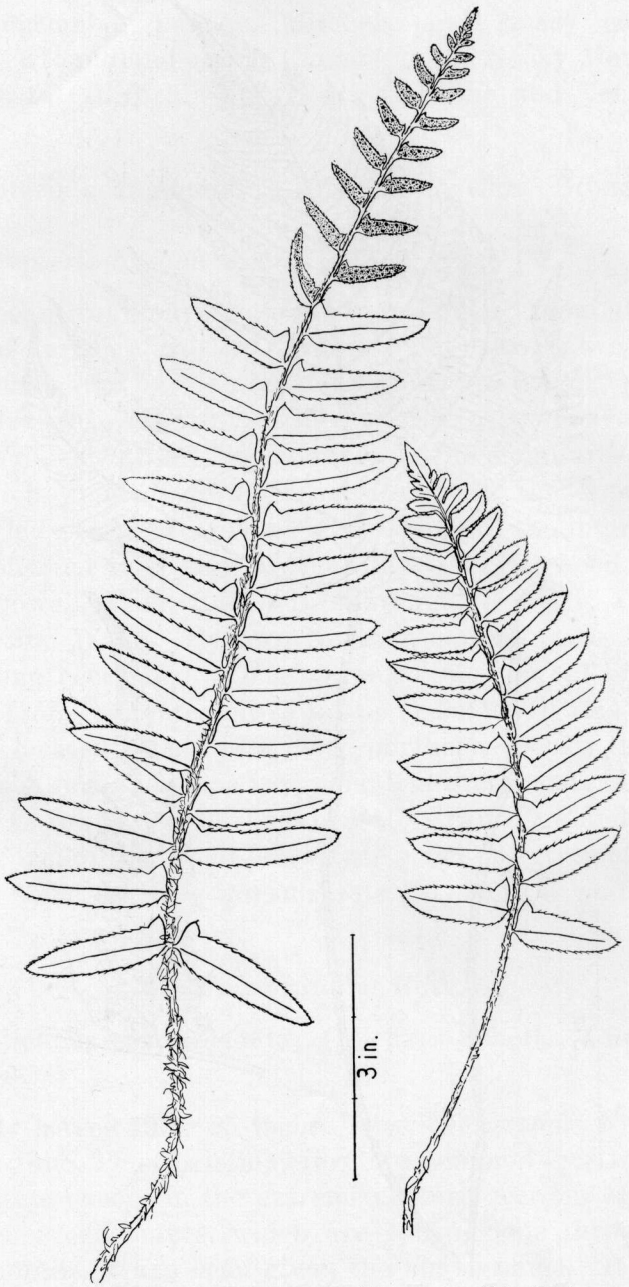
1934

George Gershwin arrived in Charleston to research and write “Porgy and Bess,” the first American opera, including its famous song “Summertime.”

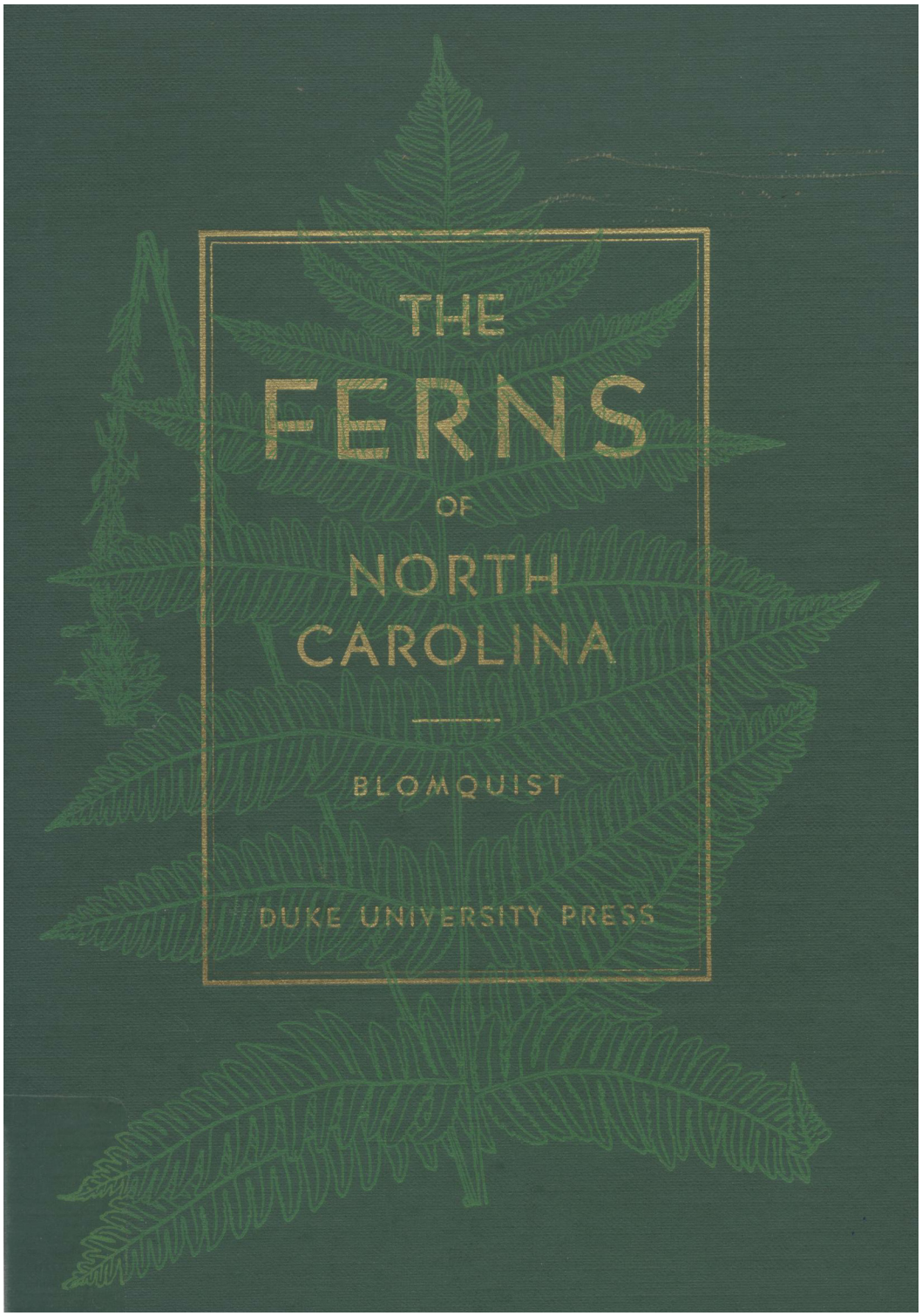
Blomquist, H.L. “The American Welsh *Polypody* in North America.” Am. Fern J. 24 (1): 24-26.
Also, “The North Carolina Academy of Science.” Science, New Series 79 (2061): 592.
Also, FERNS OF NORTH CAROLINA. (Duke UP: Durham NC. Illustrated with the author’s own drawings; introduction by the botanist Donald Culross Peattie.)

BOTANIZING

BETWEEN ANY TWO MOMENTS ARE AN INFINITE NUMBER OF MOMENTS, AND BETWEEN THESE OTHER MOMENTS LIKEWISE AN INFINITE NUMBER, THERE BEING NO ATOMIC MOMENT JUST AS THERE IS NO ATOMIC POINT ALONG A LINE. MOMENTS ARE THEREFORE FIGMENTS. THE PRESENT MOMENT IS A MOMENT AND AS SUCH IS A FIGMENT, A FLIGHT OF THE IMAGINATION TO WHICH NOTHING REAL CORRESPONDS. SINCE PAST MOMENTS HAVE PASSED OUT OF EXISTENCE AND FUTURE MOMENTS HAVE YET TO ARRIVE, WE NOTE THAT THE PRESENT MOMENT IS ALL THAT EVER EXISTS — AND YET THE PRESENT MOMENT BEING A MOMENT IS A FIGMENT TO WHICH NOTHING IN REALITY CORRESPONDS.



CHRISTMAS FERN (Polystichum acrostichoides).


THE
FERNS
OF
NORTH
CAROLINA
BLOMQUIST
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1935

Founding of the Charleston Symphony Orchestra.

M. Baudouin described more than 80 fossil sea urchins drilled for use as jewelry — some of them turned into personal adornments as long as 35,000 years ago.

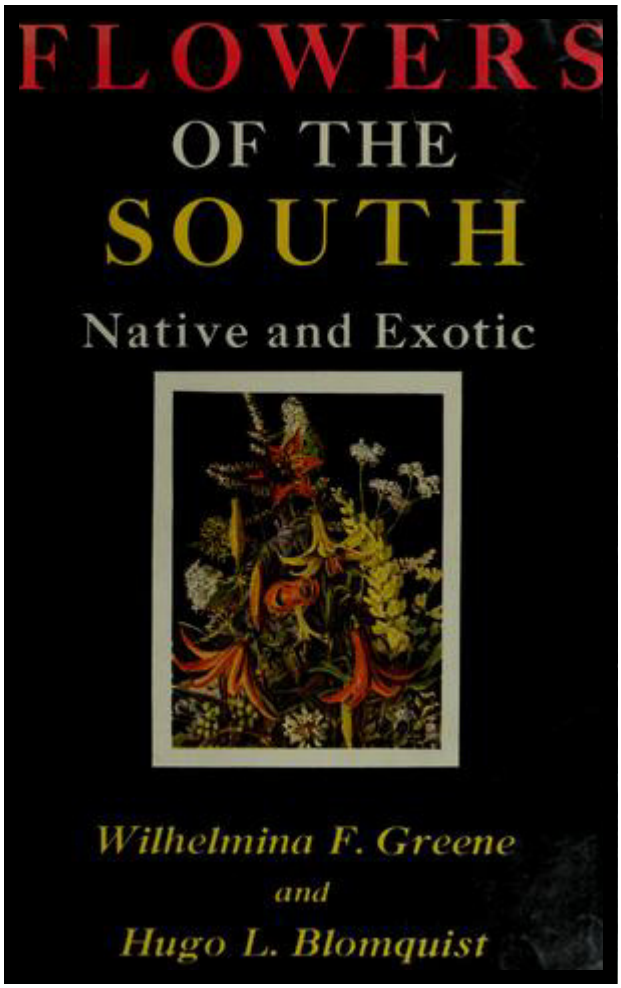
PALEONTOLOGY

Professor Arthur George Tansley coined the term "ecosystem" to characterize the interactivity that exists between the "biocoenosis" or group of living creatures and their "biotope" or environment in which they live. By virtue of this new understanding, ecology would come to be understood as the science of ecosystems.

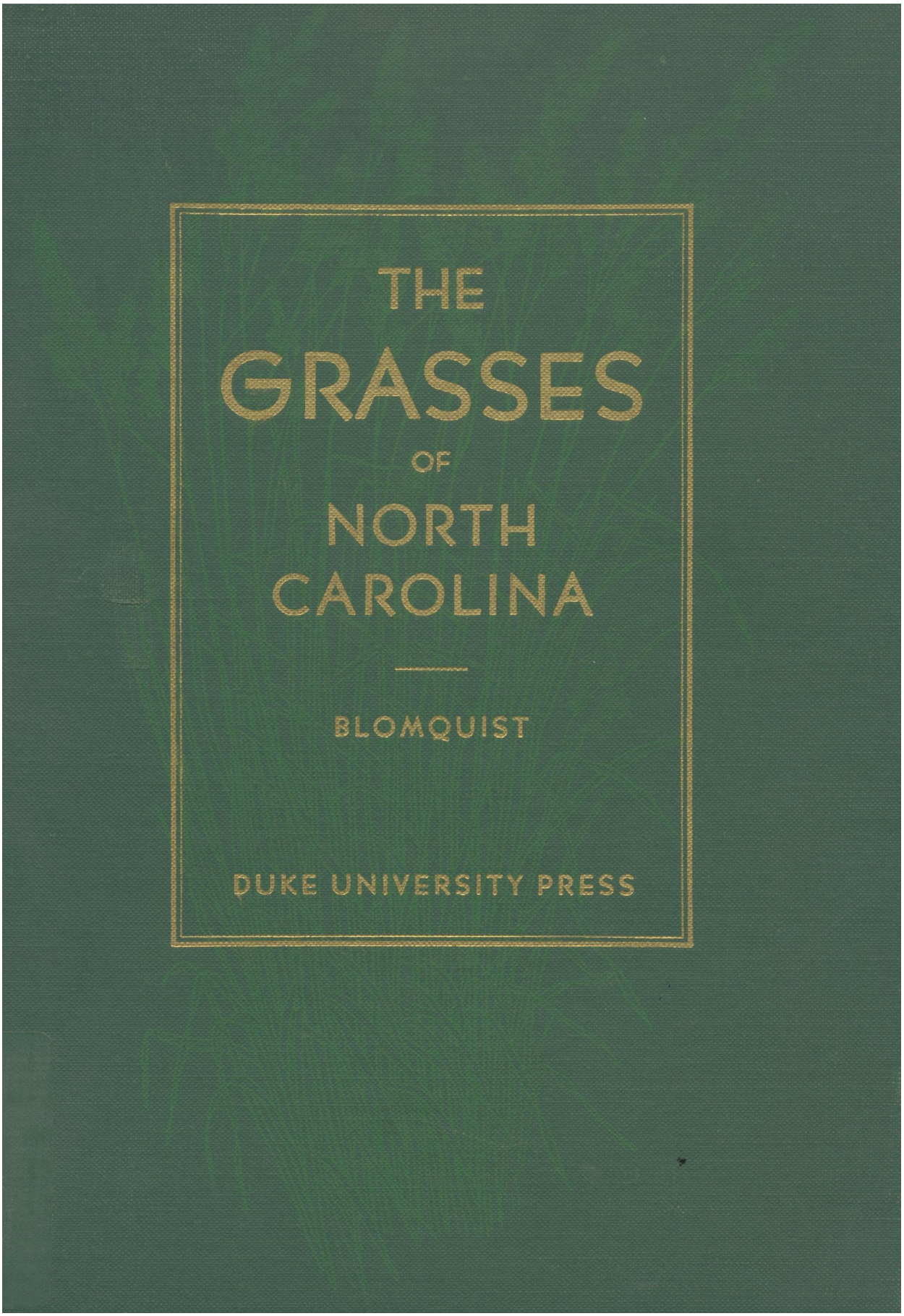
THE SCIENCE OF 1935

With division of the Department of Biology at Duke University in Durham, North Carolina, Professor Hugo Leander Blomquist became Chair of the new department of Botany (a post he would hold until 1953). Professor Blomquist's researches included studies of every major group of plants except the fungi, and for many years in addition he would offer classes in bacteriology. In addition to bryological studies, he published on freshwater and marine algae. He would become the author of a book on the grasses of North Carolina, illustrated with his own drawings. Other books would include a GUIDE TO THE SPRING AND EARLY SUMMER FLORA OF THE PIEDMONT OF NORTH CAROLINA, written in 1948 with Associate Professor Henry John Oosting (a well known flora that would appear in six editions) and FLOWERS OF THE SOUTH, NATIVE AND EXOTIC,

a popular work that he would undertake in 1953 in collaboration with the artist Wilhelmina F. Greene.



The Durham Committee on the Affairs of Black People was organized by C.C. Spaulding and Dr. James E. Shepard.


THE
GRASSES
OF
NORTH
CAROLINA
BLOMQUIST
DUKE UNIVERSITY PRESS

1936

Blomquist, H.L. "*Hepaticae* of North Carolina." The Bryologist 39 (3): 49-67.
Also, "The North Carolina Academy of Science." Science, New Series 84 (2166): 20.

BOTANIZING

FIGURING OUT WHAT AMOUNTS TO A "HISTORICAL CONTEXT" IS WHAT THE CRAFT OF HISTORICIZING AMOUNTS TO, AND THIS NECESSITATES DISTINGUISHING BETWEEN THE SET OF EVENTS THAT MUST HAVE TAKEN PLACE BEFORE EVENT E COULD BECOME POSSIBLE, AND MOST CAREFULLY DISTINGUISHING THEM FROM ANOTHER SET OF EVENTS THAT COULD NOT POSSIBLY OCCUR UNTIL SUBSEQUENT TO EVENT E.

1937

THE FORT UNION OF THE CRAZY MOUNTAIN FIELD, MONTANA, AND ITS MAMMALIAN FAUNAS
(George Gaylord Simpson's tour de force of biostratigraphy, paleoecology, and taxonomy).

PALEONTOLOGY

Ales Hrdlicka asserted that the aboriginal peoples of the Americas had always resembled modern Native Americans (this view would predominate for decades).

THE SCIENCE OF 1937

Blomquist, H.L. "*Hepaticae* collected in the vicinity of Mountain Lake Biological Station, Va., 1934." Claytonia 4: 6-9. Also, "Mosses of North Carolina I. Sphagnales." The Bryologist 40 (4): 67-71. Also, "The North Carolina Academy of Science." Science, New Series 85 (2217): 607.

BOTANIZING

THE FUTURE IS MOST READILY PREDICTED IN RETROSPECT

June 8, Tuesday: A 60-pound bulb from Sumatra bloomed at the Bronx Botanical Garden of New York City, creating a flower 8 feet high and 4 feet across.

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.

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-Gyögyi 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

THE FUTURE CAN BE EASILY PREDICTED IN RETROSPECT

1939

Blomquist, H.L. “Grasses new to North Carolina.” Castanea 4 (4/5): 50-55. Also, “Notes on southern *Hepaticae*.” The Bryologist 42 (2): 29-32. Also, “A new species of *Plagiochila* from the southern Appalachian Mountains.” The Bryologist 42 (5): 113-117. Also, “The North Carolina Academy of Science.” Science, New Series 90 (2331): 212-213.

BOTANIZING

NOBODY COULD GUESS WHAT WOULD HAPPEN NEXT

1940

During this year and the following one Professor Hugo Leander Blomquist of Duke University would be exchange Professor of Botany at the University of Puerto Rico (at the point at which his health began to decline, he was at work on a manual of the marine algae of Puerto Rico). Also, INTRODUCTION TO THE GRASSES OF NORTH CAROLINA. Also, "Another new species of Plagiochila from the southern Appalachian Mountains." The Bryologist 43 (4): 89-95. Also, "Foray of the Southern Appalachian Botanical Club at Highlands, North Carolina." Castanea 5 (7): 110.

BOTANIZING

1941

Blomquist, H.L. and Lora Lee Robertson. “The development of the peristome in *Aulacomnium heterostichum*.” Bull. Torrey Bot. Club 68 (8): 569-584.

BOTANIZING

1943

Blomquist, H.L. “Drifting ‘seaweed’ at Beaufort, North Carolina.” Am. J. of Botany 30 (1): 28-32.

BOTANIZING

1944

Chinese botanists reported the discovery of the dawn redwood (*Metasequoia glyptostroboides*).
The tree hitherto had been known only from fossil material that was at least 20 million years old.

BOTANIZING

1945

Blomquist, H.L. “A new species of *Hexastylis* from North Carolina.” Castanea 10 (3): 75-80.
Also, “Development of reproductive structures in the brown alga *Turbinaria turbinata*.” Bot. Gazette 106 (3): 290-304.

BOTANIZING

1947

Louis G. Williams and H.L. Blomquist. “A collection of marine algae from Brazil.” Bull. Torrey Bot. Club 74(5): 383-397.

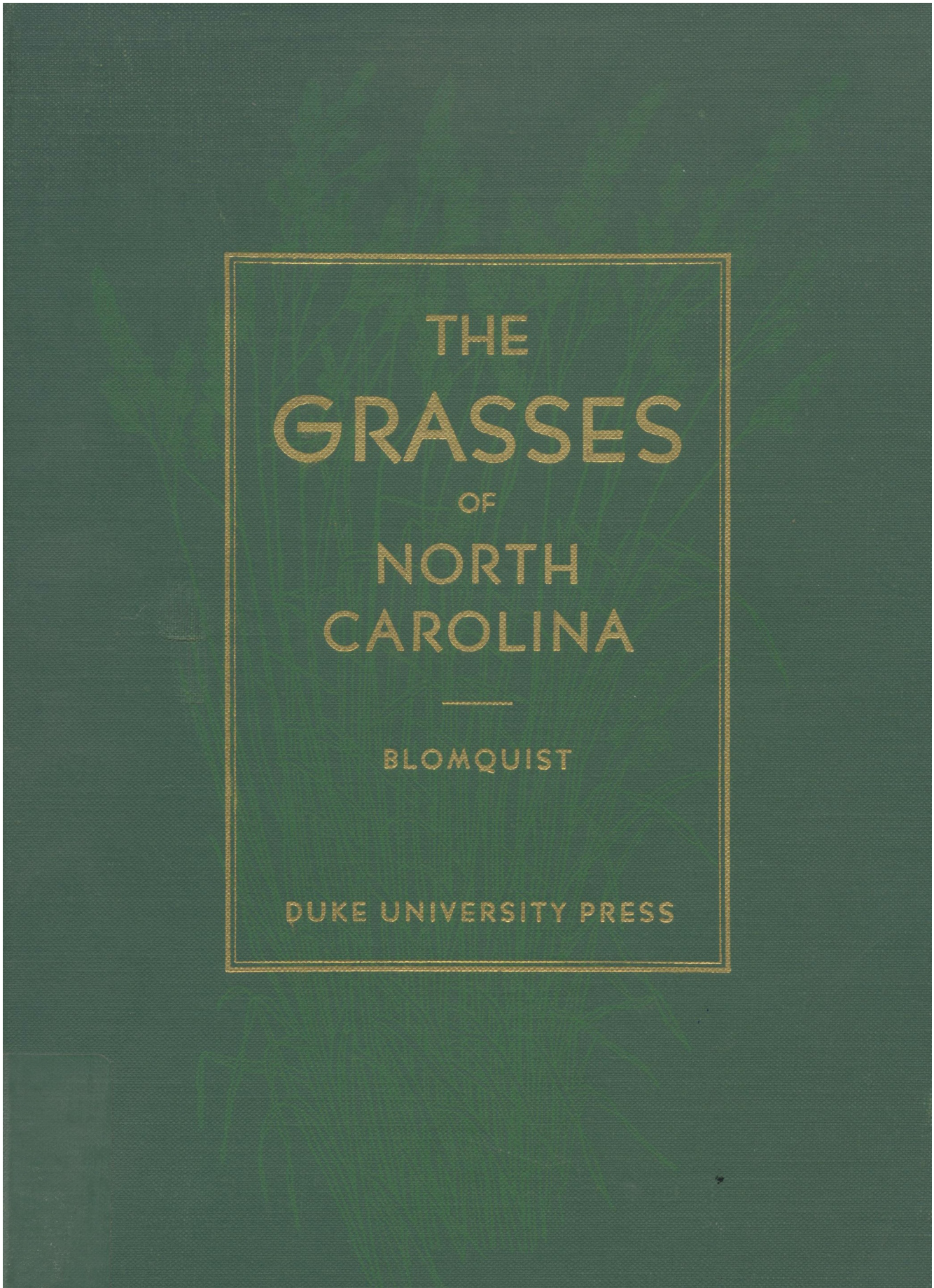
BOTANIZING

1948

Blomquist, H.L. and Henry John Oosting.[91] GUIDE TO THE SPRING AND EARLY SUMMER FLORA OF THE PIEDMONT OF NORTH CAROLINA (Durham, North Carolina: Published by the authors). Also, Blomquist, H.L. "*Asplenium monanthes* in South Carolina." Am. Fern J. 38 (4): 171-176. Also, THE GRASSES OF NORTH CAROLINA.

BOTANIZING

91. In this year Dr. Oosting was also publishing his THE STUDY OF PLANT COMMUNITIES and in the following year he would be accepted in Duke University's Department of Botany as a full professor.


THE
GRASSES
OF
NORTH
CAROLINA
BLOMQUIST
DUKE UNIVERSITY PRESS

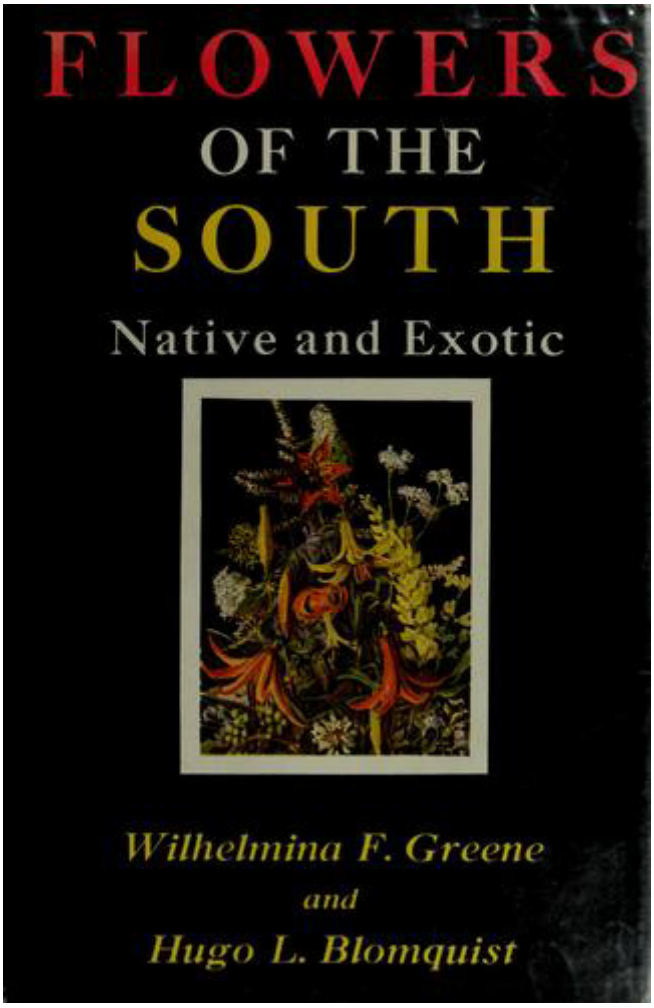
1951

Blomquist, H.L. and Hollis J. Rogers. "*Sphagnum macrophyllum* Bernh." The Bryologist 54(2): 95-102.

1953

Wilhelmina F. Greene and Hugo L. Blomquist. FLOWERS OF THE SOUTH, NATIVE AND EXOTIC (Chapel Hill: U of North Carolina P).

BOTANIZING



Eugene Pleasants Odum's FUNDAMENTALS OF ECOLOGY summarized his life work on ecosystem ecology.

Chemical analysis confirmed that the Piltdown fossils were fraudulent.

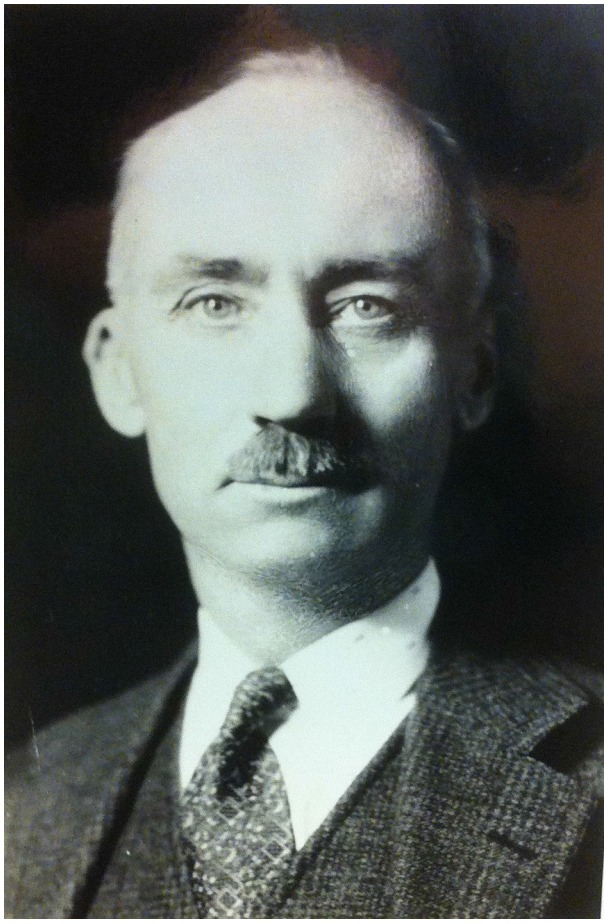
1955

Schuster, R. M. and H.L. Blomquist. “A comparative study of *Telaranea* nematodes.” Am. J. Bot. 42: 588-593.

1957

Italian composer Gian Carlo Menotti came to Charleston, South Carolina at the instigation of Countess Alicia Paolozzi (who owned a home in the city) and began negotiations to make Charleston the American site of Menotti's Festival of Two Worlds, later to be called the Spoleto Festival.

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.

Extracts from the common periwinkle were found effective in the treatment of childhood leukemia.

PLANTS

1959

December: Thoroughly re-educated, the model citizen worker Henry Pu-yi was released from the Chinese prison camp, to a mechanical repair shop at a Peking botanical garden.

1960

Blomquist, H.L. “Fruiting specimens of *Sphagnum portoricense*.” The Bryologist 63: 225-229.

BOTANIZING

Howard Thomas Odum’s ECOLOGICAL POTENTIAL AND ANALOG CIRCUITS FOR THE ECOSYSTEM and TEN CLASSROOM SESSIONS IN ECOLOGY.

1964

November 28, Saturday: Mariner 4 was launched, the initial interplanetary probe that would succeed in flying by Mars.

The joint US/Belgium mission to rescue white hostages from Congolese rebels concluded with 76 refugees landing in Léopoldville.

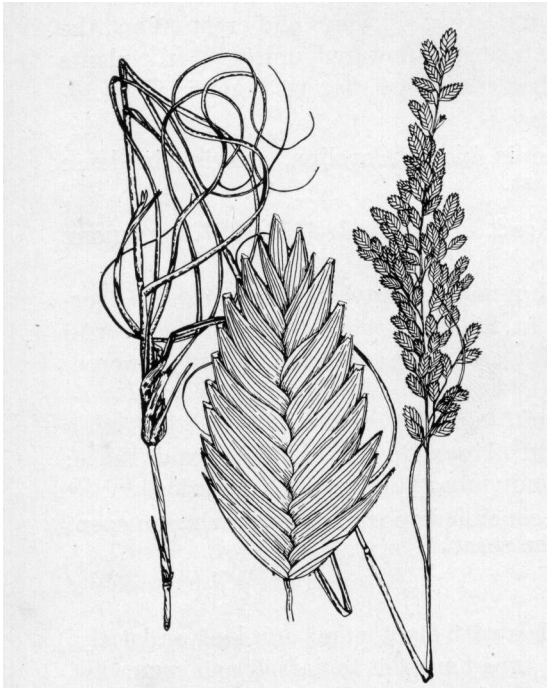
A mob of about 2,000 attacked the US, Belgium, UK, and Congo embassies in Moscow (the crowd, mostly African, Asian, and Latin American students, appeared to be coordinated by Soviet police).

At Ecker in the Hoggar of southern Algeria, France exploded its “Turquois” nuclear device of less than 20 kilotons, underground.

Hugo Leander Blomquist died at his home in Durham, North Carolina. The granite gravestone of Hugo and his wife Margaret Lane Mordecai Blomquist at the Oakwood Cemetery of Raleigh depicts the glade fern *Homalosorus pycnocarpos*.

1968

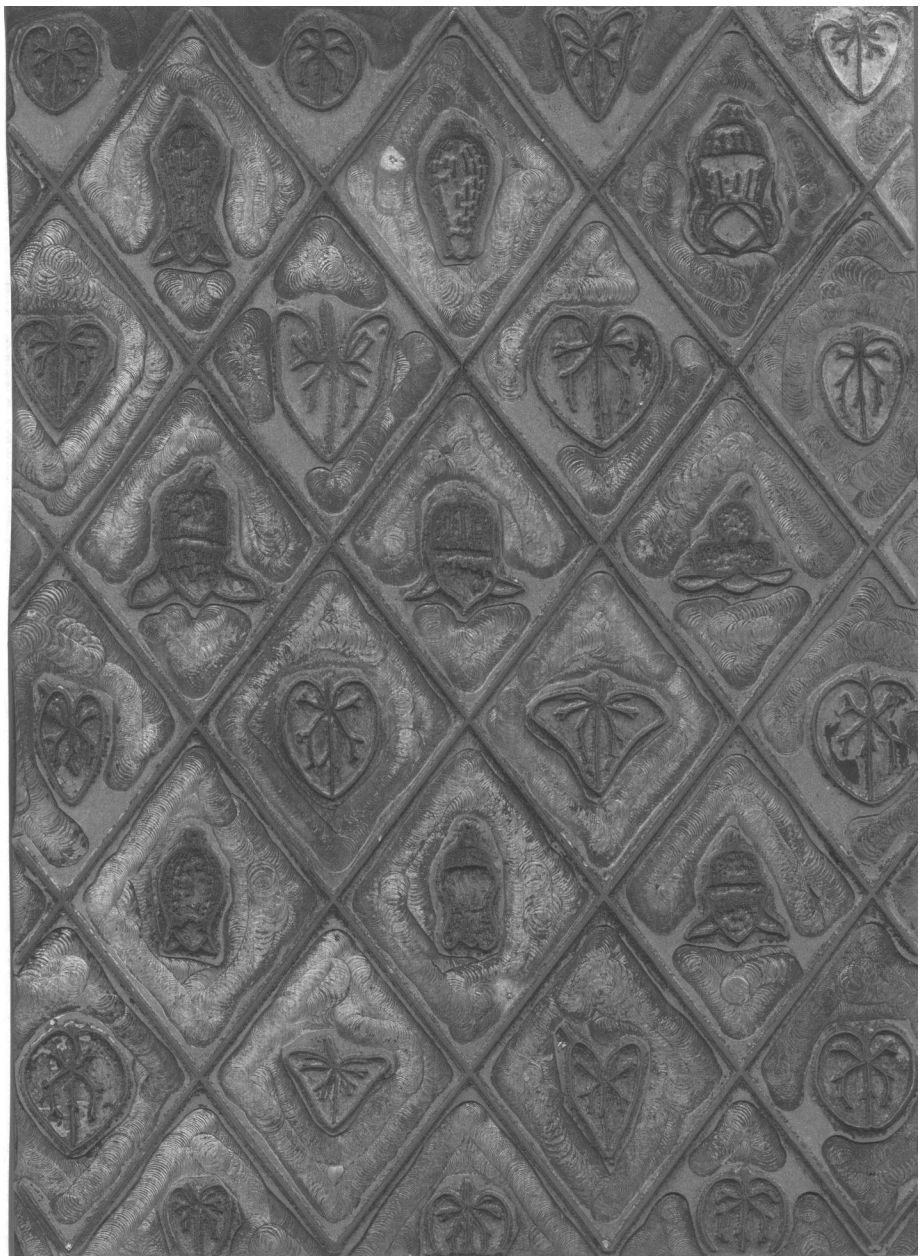
Albert E. Radford and C. Ritchie Bell's MANUAL OF THE VASCULAR FLORA OF THE CAROLINAS. Most of the grasses and ferns of this manual had been collected by Professor Hugo Leander Blomquist of Duke University.



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



1974

Richard Eaton's FLORA OF CONCORD. It is to be noted that of the 540 named plant species recorded by Dr. Edward Jarvis, Eaton has not listed 39 locally — could changes in scientific nomenclature over the years account for this discrepancy?

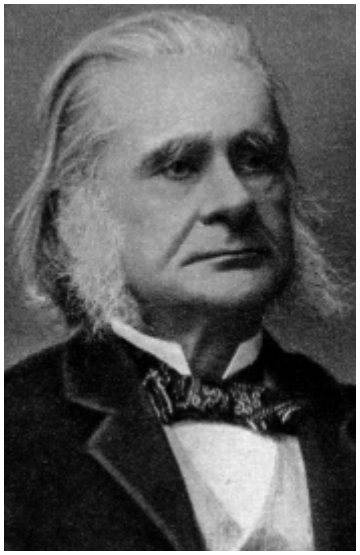
THE SCIENCE OF 1974

BOTANIZING

Donald Johanson and his team discovered a female fossil hominid (to be named *Australopithecus afarensis*) and called her "Lucy." This specimen established that hominids did walk upright before developing large brains, which overturned some long-held presumptions about hominid evolution. Lucy's status as a direct ancestor of modern humans would, however, remain conjectural.

PALEONTOLOGY

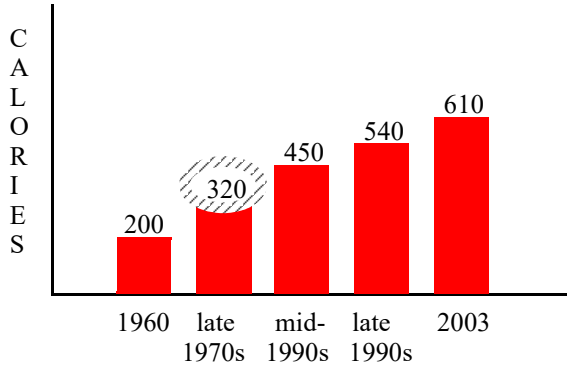
John Ostrom's "*Archaeopteryx* and the Origin of Flight" revived a theory advanced by Thomas Henry Huxley during the 1860s.



While leveling ground for a building, Porky Hansen turned up a mammoth tusk. The site would reveal many more mammoths and would become, for Hot Springs, South Dakota, a valuable tourist attraction.

1978

The super-sizing of the American consumer:



One Serving, McDonald's French Fries (w/o catsup)

Rafael Guzman, a student at the University of Guadalajara, discovered an extant stand of perennial corn (a kind of teosinte) in the mountains near Jalisco. Each ear was, it goes without saying, very small.

BOTANIZING

1980

At an auction, the Reverend Gilbert White's original holograph of his book manuscript THE NATURAL HISTORY OF SELBORNE, which he had created from his copies of letters he had written to the gentleman naturalist Daines Barrington and to the zoologist Thomas Pennant over a period of two decades, were purchased by The Oates Memorial Library and Museum.[92]

> 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].

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

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

1994

At a rock concert in Boston, Peter Garrett, the shave-headed lead singer for an Australian group calling themselves “Midnight Oil,” was preparing to sing a song called “My Country.” So he shouted into his microphone “Thoreau, Noam Chomsky, and … the Hulk!”

An unusual stand of trees was discovered in Wollemi National Park within 200 kilometers of Sydney, Australia. The trees were found to represent an entirely new genus and species, *Wollemia nobilis*, in the Araucariaceae (the monkey-puzzle tree family).

BOTANIZING

The Japanese Cherry Blossom Festival of Washington DC was expanded from one week to two.

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

1998

Chancellor John R. Silber and his wife Kathryn Underwood Silber donated $1,000,000 toward full-tuition scholarships for graduates of Texas public schools who would attend Boston University's College of Arts and Sciences.

Texas, a district known for its chivalry, has not since the execution of Chipita Rodriguez in the Year of Our Lord 1863 (for the murder of a horse trader) executed any woman — until, in this Year of Our Lord 1998, Governor George W. Bush sent the repentant Karla Faye Tucker to Heaven.

The Department of Botany at The University of Texas at Austin was dismantled, following the 3-decade trend in major research universities to redistribute biological sciences based on descriptive and organismic studies versus molecular, biotechnological, and microbiological.

John S.D. Eisenhower's AGENT OF DESTINY: THE LIFE AND TIMES OF GENERAL WINFIELD SCOTT (NY and London: The Free Press, reviewed for H-SHEAR by James M. McCaffrey <McCaffreyJ@zeus.dt.uh.edu> of the University of Houston-Downtown):

> Winfield Scott entered the U.S. Army in 1808 as a captain of artillery and spent most of the next fifty-three years on active duty. Scott's long and notable career, as John Eisenhower relates in this book, encompassed the War of 1812, the Seminole Wars, the Mexican War, and the early phases of the Civil War. It is difficult to imagine another American soldier, with the possible exception of Douglas MacArthur, who had such a long and colorful career.
>
> Scott's career was almost stillborn, however. He was dissatisfied with his first assignment, under General James Wilkinson near New Orleans, and submitted his resignation from the army in 1809. When war with England began to appear more and more likely, Scott had second thoughts and asked for reinstatement. Secretary of War William Eustis complied with his request, but then sent him right back to his original unit where his outspoken criticism of General Wilkinson earned him a court-martial. Finding him guilty of unofficer-like conduct, the court ordered Captain Scott suspended for twelve months.
>
> Captain Scott was reinstated in 1811, in time for our second war with England beginning the following year. The major theater of operations for most of the war was along the border with Canada, and American land forces there had a spotty record at best.
>
> Scott's conduct, however, was one of the bright spots in an otherwise disappointing series of campaigns. His personal bravery under fire was an inspiration to his men, and his dedication to the benefits of training soon bore fruit at Chippewa and at Lundy's Lane. By the end of the war, Winfield Scott wore the star of a brigadier general.
>
> During the 1820s, Scott completed work on a set of general regulations for administering the army and also compiled a drill manual for the troops which, with periodic updating, remained in use until the eve of the Civil War. He also continued feuding with other high-ranking military leaders, including Andrew Jackson and Edmund Gaines.

The early 1830s saw an outbreak of Indian troubles on the northwestern frontier. Scott led a contingent of troops against Black Hawk and his band, but cholera struck the soldiers before they reached the seat of war. By the time the disease had subsided enough for Scott to continue, the short war was over. With the onset of the Second Seminole War in late 1835, however, Scott again faced armed combat. American troops were not very successful against Osceola's warriors, and this lack of success gave General Scott an opportunity to lash out at fellow officers. His intemperate language led to a court of inquiry in which his old nemesis General Edmund Gaines placed General Scott on the same level as Benedict Arnold.

Upon the death the general-in-chief of the army, in 1841, General Scott unabashedly put himself forward to fill the void. "I take it for granted," he wrote to the secretary of war, "that my name will be sent, in a day or two, to fill the vacancy [resulting from] the death of Major-General Macomb" (p. 208). His assumption proved correct, and for the next twenty years Winfield Scott would be the nation's highest ranking soldier.

War with Mexico saw Scott take active command of one of the major armies that the United States put into the field. Following the steps of Hernando Cortez several centuries earlier, Scott put his force ashore near Veracruz and led it in a successful march on the enemy capital, bringing the war to an end within six months. Americans seem to like to reward military leaders with high political office, and Winfield Scott was more than ready to accept such rewards. Unfortunately, it was General Zachary Taylor who rode his own military reputation into the White House immediately following the Mexican War. Scott willingly ran for that office in 1852 as the dying Whig Party's last such candidate, but was defeated by Franklin Pierce who had led volunteer troops in the late war.

The secession of some of the Southern slave states from the Union in early 1861 found General Scott almost seventy-five years old. He was bothered by various health problems and was no longer in any shape to take to the field. After contributing some thoughts on the Union's potential grand strategy, Winfield Scott left the actual military leadership to younger men. The old general left active service in November 1861 and died almost five years later. He had been a major player in much of the development of the nation in the first half of the nineteenth century, and Mr. Eisenhower's characterization of him as an "Agent of Destiny" seems fitting. In fact, a more appropriate title might be AGENT OF MANIFEST DESTINY.

In reading this life of an American general, I was struck by what, to me, were the striking similarities between this soldier's life and that of one who came along a century later — Douglas MacArthur. Each reached flag rank at a relatively young age and maintained a strong influence on American military affairs for a long time. Each was foiled in his attempt to secure the presidency. Each left the army in the midst of a war. Each had a monumental ego.

It has been a long time since a full-blown biography of Winfield Scott has been published, and John Eisenhower does a fine job of bringing him alive. Eisenhower, as fits his pattern, consulted a vast array of published sources in preparing this

book but virtually no unpublished works. I cannot help but wonder what information there might be in untapped manuscript sources that would have enhanced the story told here. Surely there are diaries or collections of letters left behind by Scott's contemporaries that might shine new light on the character of the man himself. Perhaps there are unpublished letters between Scott and his wife that would yield interesting insights.

This book also contains a fair number of factual errors of varying degrees of importance. For example, Eisenhower tells us that the British government rescinded the despised Orders in Council on the very day in 1812 that the United States declared war on England, when in fact the British decision was announced two days earlier (p. 25). Several other dates, such as the fall of the Alamo, are incorrectly given (p. 154). Lake of the Woods, Minnesota appears in Michigan (p. 214). General Scott, rather than Navy Lieutenant George M. Totten, receives credit for having designed the surfboats used to get the troops ashore at Veracruz in 1847 (pages. 234, 239). Gideon Pillow appears, incorrectly, as President James K. Polk's former law partner (pages. 254, 316). Henry Clay, rather than Stephen Douglas, was credited with breaking the Compromise of 1850 up into its component parts to win passage in the Congress (p. 323).

In spite of these, and other lapses, I would still commend this book to college history professors looking for something to bolster their textbooks in courses such as U.S. Military History, Representative Military Leaders, or the U.S. to 1865/ 1877.

April 8, Wednesday: The International Union for the Conservation of Nature reported that according to their 20-year statistical study, done in cooperation with 15 other research organizations, 1 of every 8 known existing species of plants was either threatened with extinction, or nearly extinct.

PLANTS

2004

The International Union of Geological Sciences added a new period to the earth's geologic timescale: the "Ediacaran" period ranging from approximately 600,000,000 to 542, 000,000 years ago. This was to represent the period that began after the final "Snowball Earth" ice age and resulted in the Cambrian period (this has been the 1st new geologic period to be designated in 120 years).
Heather Wilson and Lyall Anderson described the oldest land animal fossil yet recovered, found by Mike Newman: *Pneumodesmus newmani*, a 428,000,000-year-old, centimeter-long millipede.

M.-Y. Zhu and collaborators described munched *trilobite* parts inside another arthropod, confirming our suspicion that other animals had been snacking on these abundant little water bugs.

Naama Goren-Inbar and her team described controlled fire use by hominids at a 790,000-year-old site in Israel, thus pushing the earliest known use of fire back 300,000 years from previous estimates.

X. Wang and Z. Zhou described the initial known *pterosaur* egg to contain an exquisitely preserved embryo. Inside an egg slightly smaller than your average chicken egg, the embryo sported a 27-centimeter wingspan. Several months later Z. Zhou and F. Zhang described a Cretaceous bird embryo, the 1st found with feathers.

Using CT scans on femurs of the early hominid *Orrorin tugenensis* discovered in Kenya, Galik and collaborators pushed back the development of bipedalism in hominids to 6,000,000 years (2,000,000 earlier than *Australopithecus anamensis*).

Qingjin Meng and collaborators described an adult *Psittacosaurus* dinosaur associated with 34 juveniles, apparent evidence of parental care.

When a team of Japanese researchers took the 1st photograph of a giant squid in the wild, in the process they unfortunately ripped off one of its tentacles. Oops, sorry.

The British Museum began excavation at Happisburgh in Norfolk. Over six years they would uncover evidence pushing back human activity at such a high latitude (45 degrees) to perhaps even 950,000 years.

D. Néraudeau described deposits in western France containing hundreds of Acheulian and Mousterian tools, a dozen of them bearing fossils.

Peter Brown, Mike Morwood, and collaborators discovered on the Indonesian island of Flores an 18,000-year-old, 1-meter-tall hominid. Found near remains of giant lizards and pygmy elephants, they would name this *Homo floresiensis* and nickname it "the hobbit." Though some suspected this to have been a malformed, small-brained midget, the results of braincase scans and wrist bones too primitive to be *Homo sapiens*, plus the discovery of other such individuals, now suggest direct ancestry from *Homo erectus*.

THE SCIENCE OF 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

2009

September 8, Tuesday: A most interesting article by Carl Zimmer led off the "Science Times" section of The New York Times. The article was a report on research into the origins of flowering plants, driven both by the discovery of new fossils and by the development of a new field of research, paleobotany, one based upon genetic experiments in laboratories. In Henry Thoreau's day, Charles Darwin hadn't been able to understand flowers because the mechanics of genetics hadn't yet been sufficiently worked out. The best available work in the field had been done in 1790 by Johann Wolfgang von Goethe in his "Urpflanze" in *VERSUCH DIE METAMORPHOSE DER PFLANZEN ZU ERKLÄREN* (AN ATTEMPT TO EXPLAIN THE METAMORPHOSIS OF PLANTS). Well, guess who was greatly impressed by Goethe's theorizing? —Henry. That was where Henry's section on the sandbank, in WALDEN; OR, LIFE IN THE WOODS, came from. Goethe had formed the idea that nature creates the novelty of various apparently greatly different plant structures in a basically simple manner, and began to suspect that what we need to do, in order to understand this complexity of development, is recover that underlying simplicity of origin. His grand concept had been that all plant organs, including the various parts of the various flowers, all had started out as leaves.

> From first to last, the plant is nothing but a leaf.

Half a century later, while Darwin was still puzzling, Thoreau was incorporated Goethe's insight into WALDEN. Thoreau's version was:

> The maker of this earth but patented a leaf.

http://www.nytimes.com/pages/science/

The newspaper article mentioned that Darwin had failed to grasp Goethe's profound insight but –this goes without saying– it omitted to mention that a contemporary of Darwin, Thoreau, had not failed to grasp Goethe's profound insight.

PEOPLE OF WALDEN

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

GEOLOGY

"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: April 22, 2016

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.