TONIC WATERS AND BUBBLY WATER

GLEN NAGEL, ND HERBAL MIXOLOGIST

M.E.E.T THE HERBS
MY HERBAL PHILOSOPHY

- **M**edicine making is a medicine.
- **E**xperience is the best teacher, make it something to remember and experience
- **E**veryday practice your craft, your art.
- **T**aste is the teacher, the new active ingredient is Taste, smell, sight.

HERBAL MIXOLOGY : DEFINED AS

- The power of herbal phytochemicals driven into the blood stream by alcohol and wrapped in an organoleptically rich sensual experience: This is the magic and power to Herbal Mixology.
- The art and science of adding medicinal value and action to the world of tasty alcoholic drinks
- Bringing the value of medical tonics back to the roots of botanical medicine
- My path as an herbalist, naturopathic doctor
- Making medicine is medicine, DIY

Herbal MIXOLOGY 101

A three-part series focusing on blending botanicals into tasty tonics

3.0 general CEUs approved for each class by OBNM

Blending the ancient world of botanical medicine with that of the modern bar mixologist, this class develops a flavorful and healing balance between the nasty tasting tinctures of the past and cocktails loaded with sugar at your local bar. *All sessions, led by Dr. Glen Nagel, include lectures and hands-on projects with recipes to take home.*

Bitters, Digestives and Aperitifs | Thursday, April 21, 6–9 p.m.

Liqueurs and Cordials | Thursday, May 12, 6–9 p.m.

Shrubs and Drinking Vinegars | Thursday, June 9, 6–9 p.m.

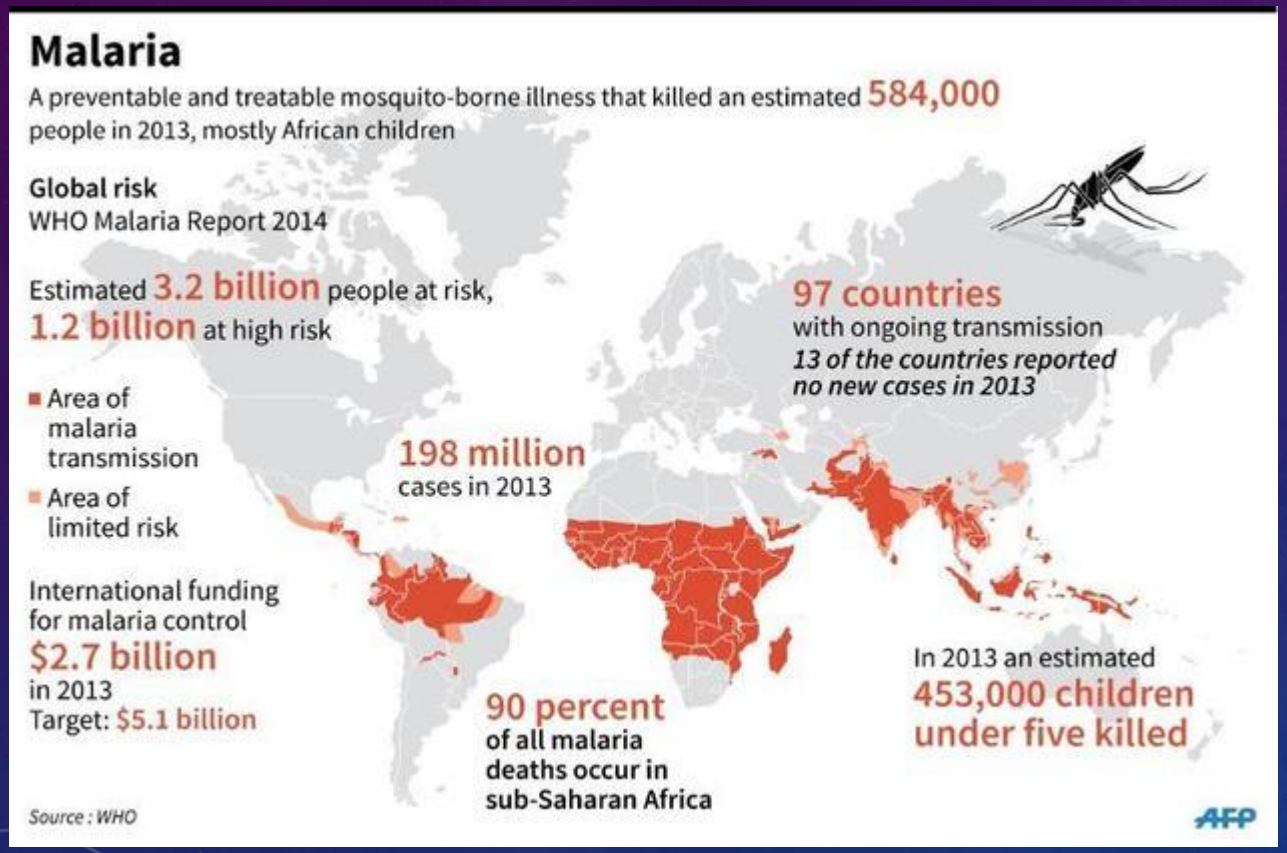
INDIVIDUAL CLASS RATE
$85 medical professionals, $70 general public, $25 full-time students with ID.

SERIES RATE
$215 medical professionals, $195 general public, $60 full-time students with ID.

For registration and more information, visit: traditionalroots.org
All classes will be held on the NCNM campus.
049 SW Porter St., Portland, OR

traditional roots INSTITUTE
NATIONAL COLLEGE OF NATURAL MEDICINE

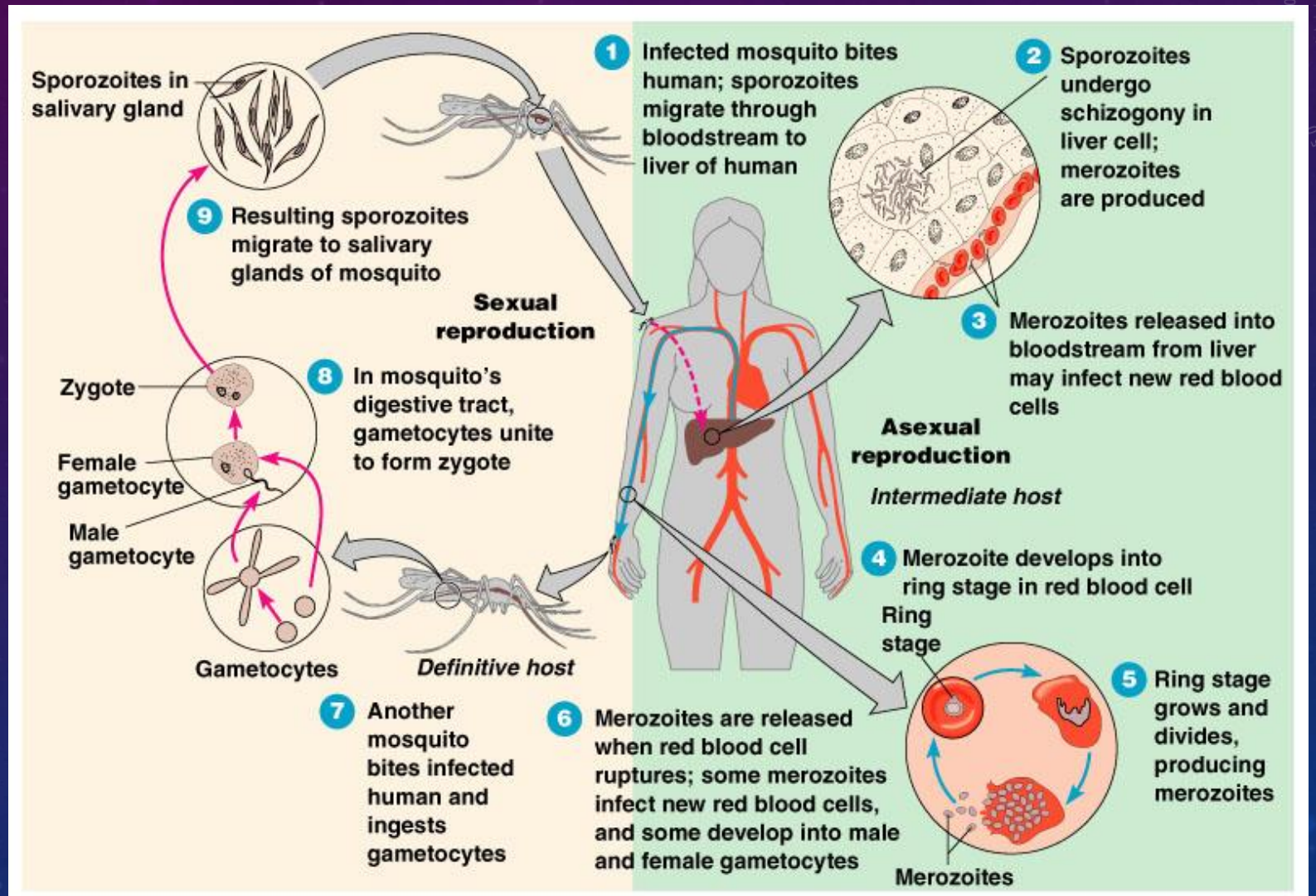
MALARIA: WORLD WIDE PROBLEM



CLINICAL FEATURES

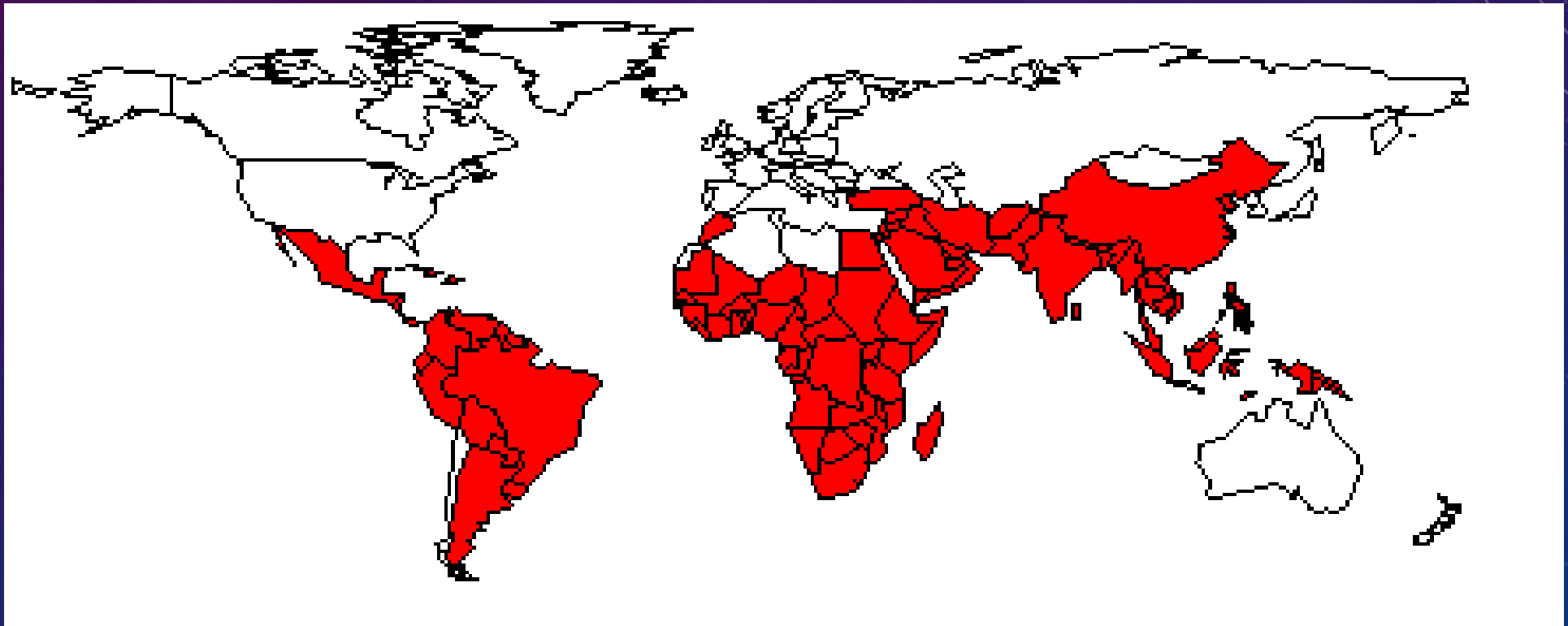
- First symptoms are non specific:
  - Headache
  - Fatigue
  - Myalgia and Arthralgia
- Incubation period:
  - Depends on species
  - 8 to 25 days
  - Affected by partial immunity
- Signs:
  - Non specific
  - Anemia
  - Hepatolienal syndrome

MALARIA CYCLE



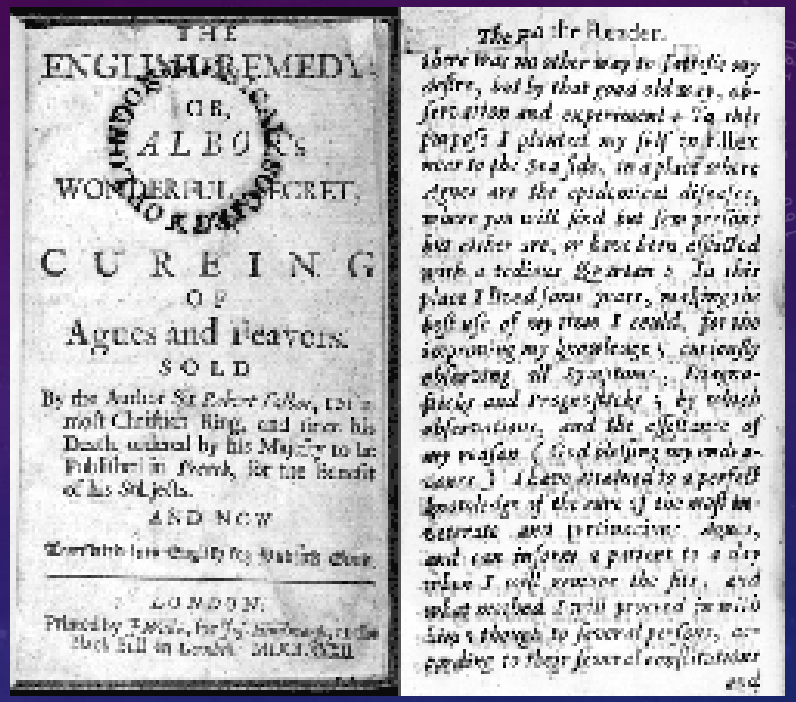
ANOPHELES FREEBORNI MOSQUITO – INTERMEDIATE HOST AND VECTOR FOR *PLASMODIUM SP.*

RED AREAS SHOW COUNTRIES WITH MALARIA TODAY



HISTORICAL USE OF CINCHONA BARK

- As early as the 17th century, the Jesuits in South America were using the bark of the cinchona tree as a cure for malaria.



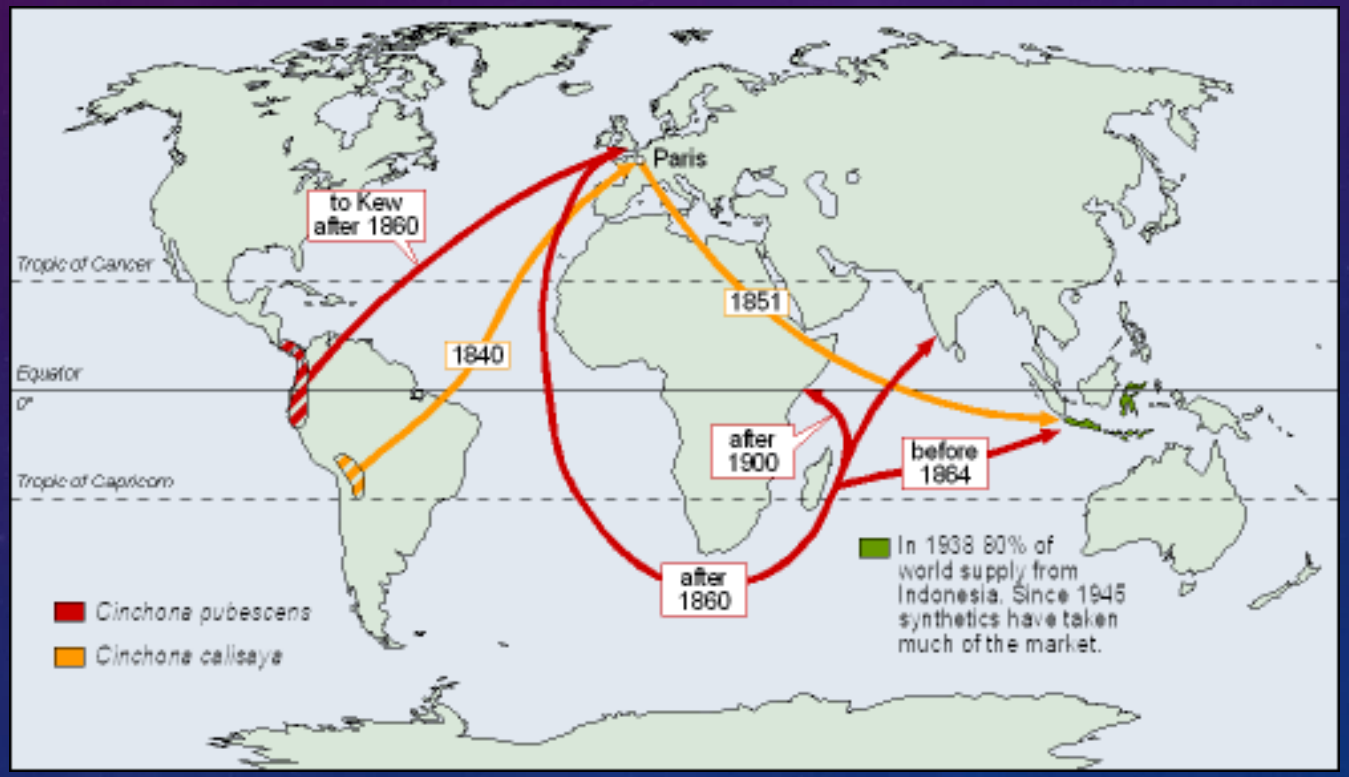
THE
ENGLISH REMEDY:
OR,
ALBOR's
WONDERFUL SECRET,
CUREING
OF
Agues and Feavers.
SOLD
By the Author Sir Robert Talbor, late
most Christian King, and since his
Death, ordered by his Majesty to be
Published in French, for the benefit
of his Subjects.
AND NOW
Translated into English for Publick Good.
LONDON:
Printed by T. Ratcliffe, for Jeffery Newborough, at the
Black Bull in Leadenhall-street. MDCLXXII.

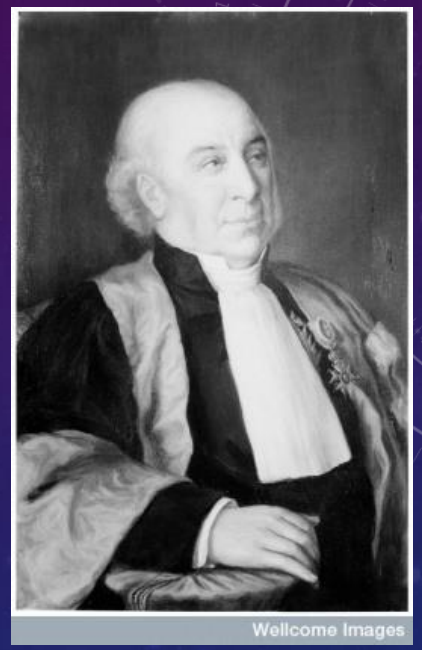
The Preface to the Reader.

there was no other way to satisfie my desire, but by that good old way, observation and experiment. To this purpose I planted my self in Villes near to the Sea side, in a place where Agues are the epidemical diseases, where you will find but few persons but either are, or have been afflicted with a tedious Ague. In this place I lived some years, making the best use of my time I could, for the improving my knowledge, carefully observing all Symptoms, Prognostick and Prognostick; by which observations, and the assistance of my reason (God blessing my endeavours) I have attained to a perfect knowledge of the cure of the most inveterate and pertinacious Agues, and can infallibly a patient in a day when I will recover the fits, and what method I will proceed in will seem strange to several persons, according to their several constitutions and

- The cure was brought to Europe, but was not immediately accepted.
- Robert Talbor, a London apothecary published a small book called *A Rational Account of the Cause and Cure of Agues*, and eventually used the drug to cure several royals, including King Charles II.

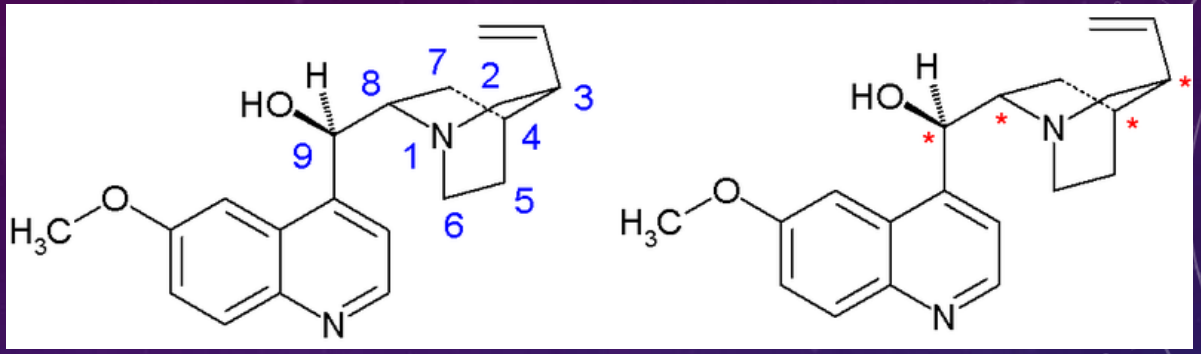
SOURCE OF QUININE



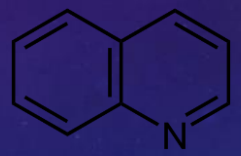


- Pierre Joseph *Pelletier* and Joseph Bienaimé Caventou succeeded in isolating the active principle, of the cinchona, quinine, in 1820.
- The purified quinine was much superior to the nauseating unpalatable cinchona powder and thus immensely successful.

- By 1826, Pelletier and Caventou had opened two factories where they were processing 150,000 kg of cinchona bark yearly, yielding around 3600 kg of quinine sulfate.



Quinine



General structure of heterocycle quinoline

- In 1907, Paul Rabe proposed the correct structure of quinine (Rabe, P.; Ackerman, E.; Schneider, W. Ber. **1907**, 40, 3655), which was later confirmed by a total synthesis by Robert B. Woodward.

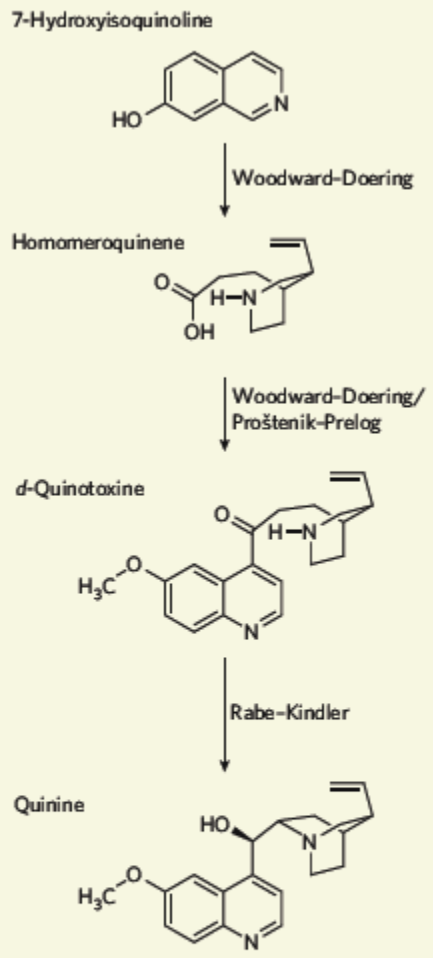


Figure 2 | The formal synthesis of quinine. This simplified scheme shows the steps achieved in the 1940s by Woodward and Doering (7-hydroxyisoquinoline to *d*-quinotoxine) and Proštenik and Prelog (homomeroquinene to *d*-quinotoxine). The claim to a full synthesis depended, however, on the final stage depicted here, which was published in 1918 by Rabe and Kindler and has only now been validated experimentally[3], in which quinine is a product.

May, 1944 COMMUNICAT

THE TOTAL SYNTHESIS OF QUININE[1]

Sir:

Quinine preparations have been known and used for centuries in the treatment of malaria. The pure crystalline alkaloid was isolated in 1820, and the extensive degradative researches of the last century culminated in the proposal of the correct structure in 1908, but the complexity of the molecule has placed hitherto insurmountable difficulties in the way of the total synthesis of the drug. We wish to record the first total synthesis of quinine.

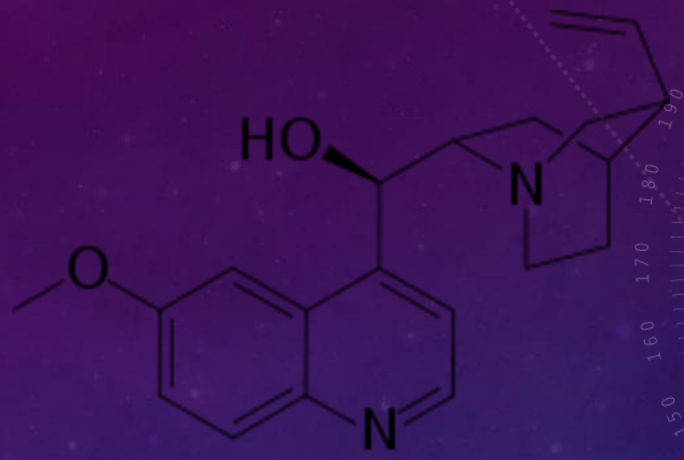
- The formal synthesis of quinine, published by R. B. Woodward and W. E. Doering was the launch of Woodward's career as a master of the art of organic synthesis, and eventually led to a Nobel Prize.

CINCHONA BARK DRYING IN THE SUN IN ECUADOR, 1944

CINCHONA CALISAYA AND SUCCIRUBRA

- **Cinchona**
- **Family:** **Rubiaceae**
- **Common name:** Peruvian Bark, Jesuit's Bark, Red Cinchona, Yellow Cinchona
- **Habitat:** Native to South America.
- **Botanical description**: Cinchona trees grow up to 60 feet tall. The elliptical leaves are up to 30 cm in length. The flowers are up to 2 cm long and are light pink in color. The bark is 2 to 3 mm. thick with a gray outer surface and a reddish brown inner surface with fine longitudinal striations.
- Commercially useful quantities of quinine are found in the bark of only two main species, *C. pubescens*, which has sometimes been cultivated under the name *C. succirubra*, and *C. calisaya*. *Cinchona calisaya* has sometimes been cultivated under the name *C. ledgeriana* and has also been sometimes confused with *C. officinalis*, however *C. officinalis* is a separate species found the Andes of southern Ecuador that does not contain quinine in its bark.
- **Parts used**: Bark

CHEMISTRY OF CINCHONA



- **Constituents**:
- *Quinoline alkaloids:* (5%-15%): quinine, quinidine, cinchonine, cinchonidine and 40+ others, cinchonidine bitter triterpene acid monoglycosides, in particular chinovic acid-3-chinovoside, chinovic acid-3-glucoside , Catechol tannins (8%);
- **Pharmacology:**
- Cinchona is the original source of quinine, which in its purified form is used as a cure for malaria, the mosquito-borne plague of the tropics. In addition, quinine-based drugs such as Quinaglute and Quinidex are prescribed to control dangerous heartbeat irregularities.
- It was found that the two potassium channel blockers, quinine and quinidine, markedly enhanced phosphatidylserine synthesis and strongly decreased both phosphatidylcholine and phosphatidylethanolamine synthesis. The inhibition of phosphatidylcholine and phosphatidylethanolamine synthesis was due to the inhibition of the uptake of choline or ethanolamine, respectively, by the cells. This effect was also observed when using either cinchonine, cinchonidine and chloroquine. In contrast, these three drugs were unable to modify phosphatidylserine synthesis, indicating that the K+ channel blockers, quinine and quinidine, specifically affect the synthesis of this phospholipid.
- **Medicinal actions:** Bitter, antimicrobial, topically antiseptic, astringent, cholagogue
- *Source: PDR for Herbal Medicines*. Medical Economics Company Inc., Montvale, NJ. 2001
- Pelassy, C. Effect of Cinchona bark alkaloids and chloroquine on phospholipid synthesis. K+ channel blockers specifically enhance the activity of the serine base exchange enzyme system in Jurkat T cells.
Pharmacology. 1993 Jul;47(1):28-35.

CURRANT MEDICAL USE

- Cardiovascular Conditions: Quinine is a cardiac depressant and may be useful in tachycardic hearts.
- Gastrointestinal Conditions: Digestive insufficiency manifesting as decreased appetite, abdominal distention, and flatulence indicate the use of Cinchona. Cinchona bark is used to correct loss of appetite, dyspepsia and flatulence with a sense fullness because it stimulates the secretion of saliva and gastric juices. When ingested, Cinchona imparts a warming influence on the digestive organs.
- Inflammatory Conditions: Cinchona imparts strength and tone to a weakened system. This is especially true when the patient has a febrile, eruptive and inflammatory disease in which the symptoms appear with periodicity. During the phases of lesser symptoms, Cinchona is most effective. Cinchona may maintain nervous tension, which is one component of averting periodic chill. Periodic fevers, diarrhea, dyspepsia, and neuralgia will respond favorably to Cinchona bark in most cases. Cinchona may also be used as a tonic after an exhausting illness or episode of hemorrhage. Cinchona is not to be used in acute inflammatory states, states of deficient secretions or during fever. Internally, the analgesic effects are most notable in terms of reducing the achiness that may accompany a cold or flu.
- Infectious Conditions: Cinchona has antimicrobial effects as well. Cinchona can be used to prevent the progression of a common cold. The alkaloids in Cinchona, particularly quinine, are antimalarial. Although, this is primarily a historical usage, quinine may again be helpful in treating malaria, which is resistant to newer drugs.
- Topical Applications: Cinchona has mild analgesic effects. These effects are evident with external use and may help to relieve muscle spasm and pain.
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- *PDR for Herbal Medicines*. Medical Economics Company Inc., Montvale, NJ. 2001

TRADITIONAL MEDICINAL USE

Cinchona was frequently used by both Physiomedicalists and Eclectics with few other herbs observed so completely in regard to the scope of action on the body.

- Cook described the bark as a slow and very permanent stimulant and astringent to nervous tissue. This effect, he observed, begins in the stomach, slowly and steadily extending first, the sympathetic nerves; second, the sensory nerves in general; and third, the spinal cord and brain (only with large doses or continued use). The astringency causes a protracted state of tension in the nervous tissue. Through the nerves, Cinchona reaches nearly all the organs of the body, thereby leading to increased sensibility and excitement, and inducing a peculiar and marked state of tension throughout.
- By indirectly affecting the system at large, Cook observed that it causes excitement of the stomach and throat, with dryness; constipation, and warmth throughout the bowels; increased frequency and hardness of the pulse after a time, and dry warmth upon the surface; a general diminution of the secretions; finally a throbbing headache, and perhaps giddiness, with a general feeling of increased
- firmness of the muscular and other structures, as if the patient were " strung up." These results advance slowly, generally requiring from four to six hours; and may not entirely pass away under ten or twelve hours.
- It was considered valuable in conditions of atony and laxity of the tissues; and where there are excesses of secretion consequent to atony. It is sometimes beneficial in chronic congestions (where Cook differentiates this from inflammation) as a secondary agent when the system is enfeebled. In other atonic difficulties, it is useful, as in gangrene, passive hemorrhages, chronic leucorrhea and diarrhea with laxity of fiber, etc.

CINCHONA TOXICITY:

- **Toxicity**: Apparently, up to 30% of patients demonstrate a reaction to Cinchona. A hypersensitivity skin rash and fever may result. Rarely, some people may experience bleeding because of an induced thrombocytopenia. Chronic overdose may result in cinchonism, which is characterized by: headache, abdominal pain, rashes and visual disturbances. Pregnant women, people with quinine hypersensitivity and people with peptic or gastric ulcers should not take Cinchona.
- Common side effects include headache, ringing in the ears, trouble seeing, and sweating. More severe side effects include deafness, low blood platelets, and an irregular heartbeat. Use can make one more prone to sunburn. While it is unclear if use during pregnancy causes harm to the baby, use to treat malaria during pregnancy is still recommended. How it works is not entirely clear.[2]
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Brinker, F. Herb Contraindications and Drug Interactions, 3rd ed. Eclectic Medical Publications, Sandy, OR 2001. p65

QUASSIA: *QUASSIA AMARA*

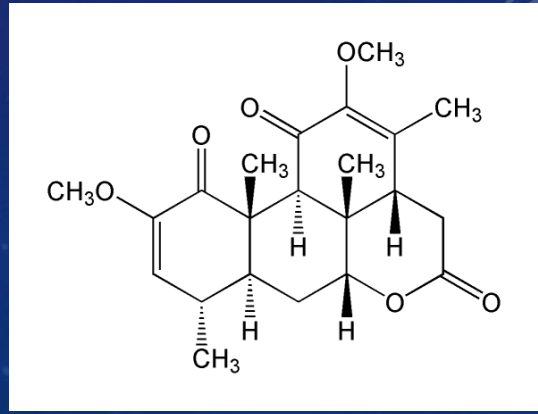
Quassia amara
Formaly as: Picraena excelsa (LINDL.)
Family: N.O. Simarubeae

- **Synonyms---**Bitter Wood. Jamaica Quassia. Bitter Ash. Quassia Amara (Linn.). Quassia Lignum, B.P.
  Part Used---Wood of trunks and branches.
- **Habitat---**Jamaica.
- Quassia, also known as Jamaica Quassia and Bitter Wood, is a small, shrubby tree native to the West Indies. Its species name, *amara*, is derived from the Spanish word *amargo*, which means "bitter."
- The name fits since the bark of **the tree contains quassin, a substance 50 times more bitter than quinine**. In fact, it's the bitterest naturally-occurring chemical known to exist. Although quassia bark is an ingredient in herbal bitters in moderate amounts, the presence of this highly bitter phytochemical makes infusions made with this herb very effective natural insecticides.

QUASSIA AMARA: TROPICAL BITTER

- In the wood a share of 0.09 to 0.17% of quassin and 0.05 to 0.11% of neoquassin was detected in Costa Rician plants.
- Quassin is one of the most bitter substances found in nature.

- Other identified components of bitterwood are: beta-carbolines, beta-sitostenone, beta-sitosterol, dehydroquassins, gallic acid, gentisic acid,



EFFICACY OF QUININE

- Quinine is traditional and effective preventative of malaria
- Synthetic preventatives such as chloroquine, maloprim, and fansidar have largely replaced the use of quinine
- Many strains of *Plasmodium* have developed resistances to the synthetics and the synthetics are more toxic. It is recommended that people do not take fansidar for more than 3 months due to potential liver damage.

ONE OF THE SOURCES OF QUININE – *CINCHONA SUCCIRUBRA- RED CINCHONA*

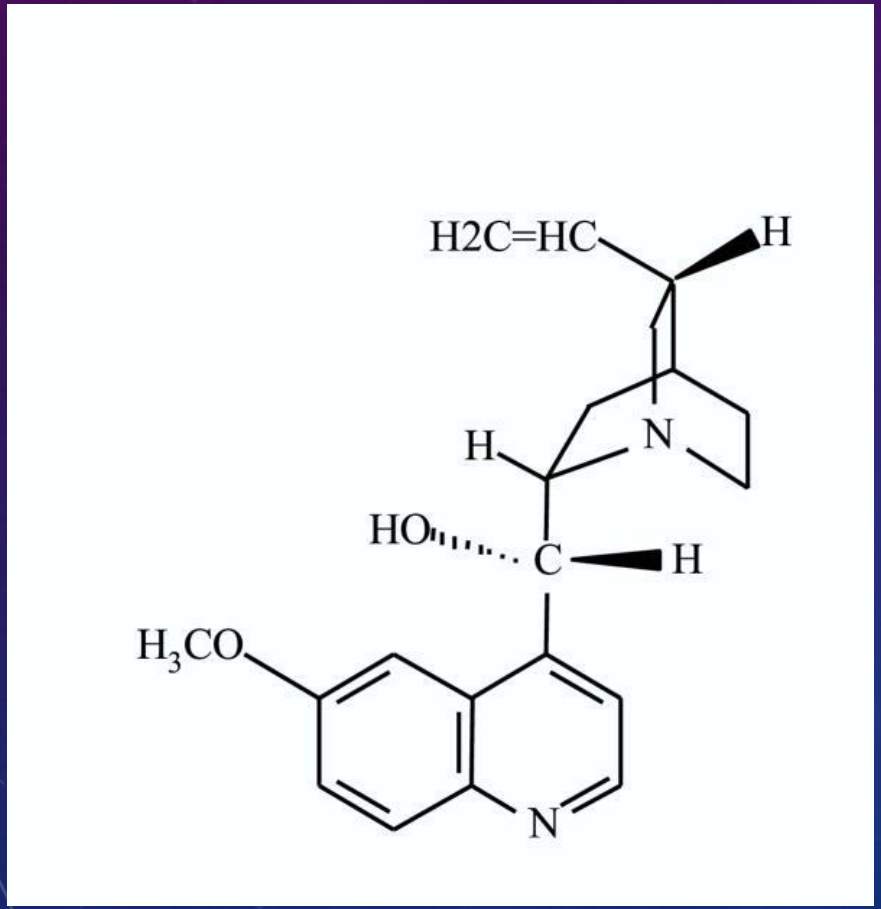
TIMELINE OF QUININE USE

- 1633, a Jesuit priest named Father Calancha described how to use quinine bark to cure fevers
- 1645 Father Bartolome Tafur took some bark to Rome and many of the clergy used it
- Cardinal John de Lugo wrote a pamphlet to be distributed with the bark - use of the bark became so widespread that in the papal conclave of 1655 no one died of malaria
- 1654 – English aware of use of quinine bark
- 1735, a French botanist named Joseph de Jussieu journeyed to South America and found and described the tree that is the source of the bark - he sent samples to Sweden where in 1739, Carl Linneaus named the tree genus *Cinchona*

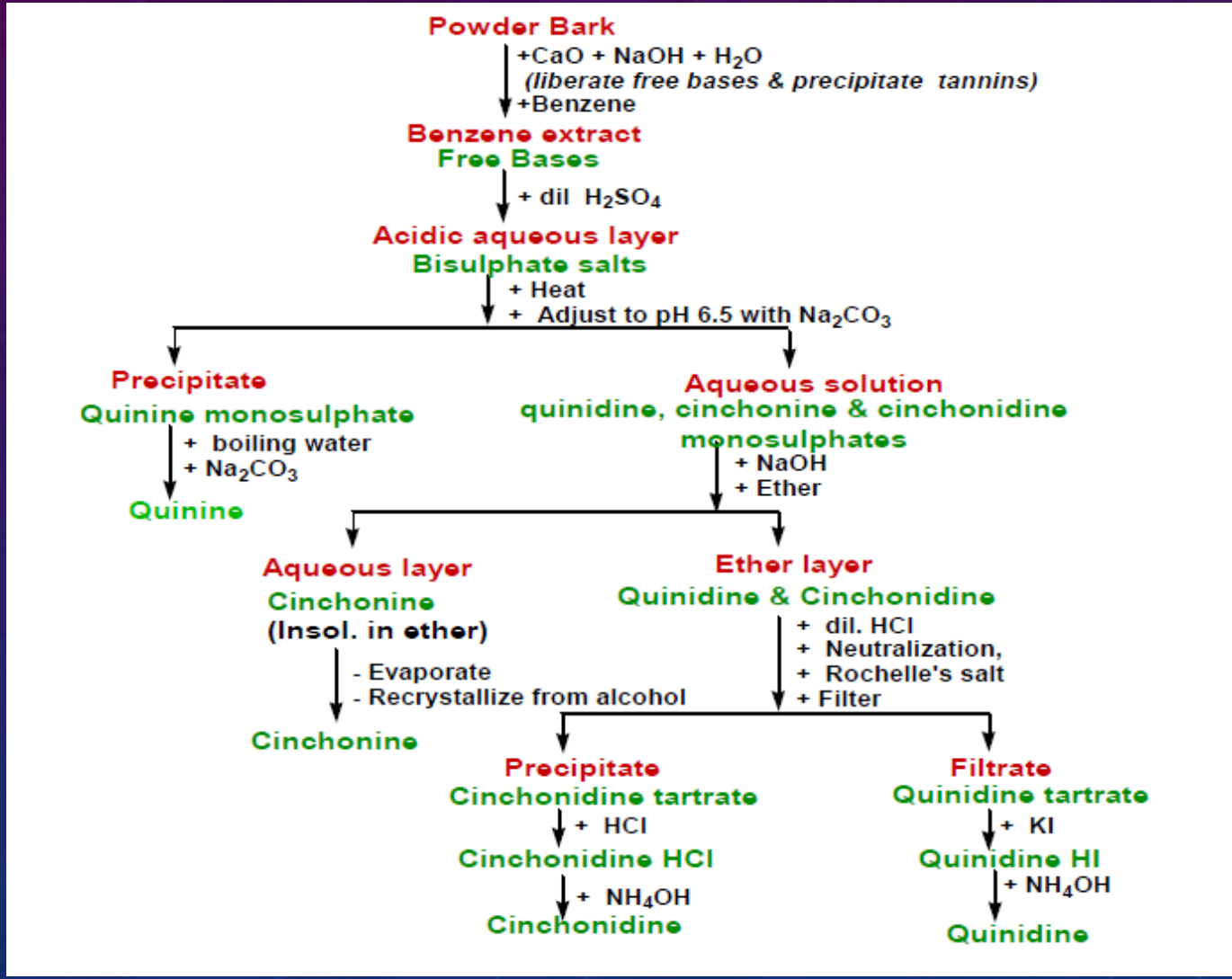
TIMELINE OF QUININE USE

- 20 to 40 species of *Cinchona* - the species are very hard to tell apart and the species will hybridize, so the exact number of species is unknown – mostly understorey trees
- 1820 the French chemists Joseph Pelletier and Joseph Caventou isolated the alkaloid quinine from the bark and identified it was the active ingredient in Peruvian bark
- 1861, an Australian named Charles Ledger obtained seeds from an Aymara Indian named Manuel Incra
- by 1930, the Dutch orchards in Java produced 22 million pounds of quinine, 97% of the world's market

CHEMICAL STRUCTURE OF QUININE



PURIFICATION OF QUININE FROM BARK



PROPERTIES OF QUININE

- Quinine itself is an odorless white powder with an extremely bitter taste
- It can be used to treat cardiac arrhythmias as well as malaria - it is also used as a flavoring agent
- Quinine prevents malaria by suppressing reproduction of the *Plasmodium* and also helps prevent some of the fevers and pain associated with malaria

QUININE FLUORESCES UNDER UV LIGHT

SOFT DRINKS AND CARBONATED BEVERAGES

Historical Background of Soft Drinks and Carbonated Beverages

- The first soft-drinks enjoyed centuries ago, were simply the effervescent waters from certain natural springs.
- **Lemon juice and scurvy:** Lemon juice was discovered as a good antidote to scurvy, (this is brought on by a lack of vitamin C in the diet).
- **Spread of soft drinks in Europe:** growing availability of sugar from the new plantations in the West Indies a fashion arose for lemon juice sugared and flavored with water. 17th century French government created the Compagnie de Lemonadiers allowing these tradesmen to gain a monopoly; eventually these tradesmen set up shops and were popularly known as “Lemonadiers”.
- **Carbonation is discovered:** (1790s) Jacob Schweppe and Nicholas Paul developed the manufacture of their carbonated waters in London (1799) A.R Thwaites and Company of Dublin develop single and double strength soda water (1886) in Atlanta, Georgia Dr. John Styth Pemberton formulated syrup, which went on sale at Jacob’s Pharmacy for 5 cents a glass, originally promoted as an “Intellectual Beverage and Health Drink” known today as Coca Cola .
- Early carbonated beverages were sold in bottles sealed with porcelain stoppers which, when pushed in, released the carbon dioxide with a loud pop. Thus in the 1890’s era of gleaming marble soda fountains the expression “**soda pop**” was born.

FAMOUS SOFT DRINKS

- **Coca Cola:** 1886 John Pemberton (pharmacist, Atlanta), adopted French doctor, Angelo Mariani idea of using coca leaves, started selling Pemberton's French wine coca in Jacob's pharmacy as medical aid. 1888 (Asa G. Candler bought company, 4 years later Coca Cola sold in every state, memorabilia ideas begin. 1904 (caffeine added to replace the cocaine) for safety. 1919 E. Woodruff (Atlanta took over. 1930s: Coca Cola invent modern day Santa Claus (dress code to match company colours), 1982 (Coca Cola launch Diet Coke 1st brand extension. 2010 Diet Coke sold 927 million cases.

- **Pepsi:** 1989 first made in North Carolina by Caleb Bradham (sold it from his drug store called it Brad's drink), marketed as a digestive drink (contained pectin). 1901 renamed Pepsi Cola.

- **7-up:** 1929 originally used as a hangover cure for hospital and home use titled 'Bib label Lithanted Lemon Lime Soda'. 1930 7-up joined 600 lemon and lime drinks in the marketplace. 1986 taken over by Pepsi Cola Company.

HEALTH BENEFITS OF CARBONATED WATER

- Health Benefits of Carbonated Water high levels of minerals contained in the beverage aid in the function of the digestive system relieves stomach pains, diarrhea, and constipation. Since a majority of the population was living under poor conditions, they were often exposed to food and water contamination, causing stomach pains and problems in the digestive system. Since carbonated water was rather cheap at the time (costing 5 cents or less), they used the beverage as a remedy for pain relief.

HEALTH BENEFITS OF CARBONATED WATER

- In a small but double-blinded randomized trial, patients with frequent dyspepsia or constipation were assigned to drink either still or sparkling water for 15 days. Then they were given a series of tests. Both conditions improved in the people drinking sparkling water and showed no improvement in those **drinking tap water**.
- If you drink a lot of sparkling water you might find you feel bloated, but researchers in Japan have found that this side-effect could be put to good use. They had a group of women fast overnight and then slowly drink either still or sparkling water. They found that 900ml of gas was released from just 250ml of water, so not surprisingly the women's stomachs distended slightly and the had the perception of feeling full,**even though they hadn't eaten**. They didn't feel uncomfortable and so fizzy water has been suggested as a way of avoiding overeating, because it makes you feel fuller.

HEALTH BENEFITS OF CARBONATED WATER

- Are mineral waters safe for long term drinking
- But in 2001, the Birmingham team examined seven different brands of mineral water, again pouring them over extracted teeth to see what happened. **They found sparkling waters** had a pH of between 5 and 6 (so not as acidic as some cola drinks which can be as high as 2.5), compared with still water which was neutral at 7. In other words, they are a weak acid, as suspected. But when it came to the erosive potential of that weak acid on the teeth, the effect was 100-times less than that of some other kinds of fizzy drinks. Of course the mouth itself is a different environment from a jar, but so far the evidence for harm doesn't seem to be very strong.
- So if you want a change from plain old water, then although it's mildly acidic, so far there isn't strong evidence to suggest that it's harmful to your bones, your stomach or your teeth. But if you want to play safe and keep it away from your teeth, when you answer the question "still or sparkling", perhaps you should also ask for a straw.

MINERAL WATER/ SELTZER WATER

- Sparkling mineral water comes from a natural spring which contains various minerals, like salts and sulfur compounds. It's defined by its "constant level and relative proportions of mineral and trace elements at the point of emergence from the source." Minerals aren't added to this water and neither is carbonation (with the exception of San Pellegrino, which has additional carbonation added by the bottler). That means that the bubbles in these bottles are completely natural. You would typically drink this water as is (not mixed in a cocktail), since it's a tad expensive and has a slight mineral-y taste.
- Seltzer water is just plain water that has been artificially carbonated. This water, which contains no sodium salts, gets its name from the German town of Selters, which was renowned for its natural springs. Seltzer water was first introduced as a cheap alternative to sparkling mineral water — and it still is an economical option today.

CLUB SODA / TONIC WATER

- Seltzer water and club soda are very similar, but there *is* a notable difference between the two. Unlike seltzer, mineral-like ingredients are added to club soda to enhance the flavor. If you look on the list of ingredients, you'll likely see potassium bicarbonate and potassium sulfate listed. Regardless, you could still swap one for the other without really being able to pick up on a difference of taste .
- Tonic water has a distinct flavor and it certainly can't be swapped out (or in) for carbonated water. Tonic water is a bitter drink (a result of the addition of quinine) which pairs particularly well with gin. Also unlike the other waters, Tonic contains calories most often from high fructose corn syrup

HISTORY OF TONIC WATER

- Tonic water was first enjoyed in 1825 when ingenious (or hard drinking, depending on how you look at it) British officers in the Indian Army improved their bitter anti-malaria medicine—Peruvian quinine extract—by mixing it with soda water, sugar, and gin. Instead of drinking the medicine with their troops at dawn, the officers figured out how to enjoy it at cocktail hour. The original gin and tonic was born, and it soon became the quintessential drink of the British Empire.
- Tonic water's story begins two centuries earlier, in 1638. The wife of the Spanish Viceroy in Peru, the Countess of Chinchon, had fallen violently ill with malaria. Her husband begged the local Incas for an antidote. In a show of generosity, the Incas instructed her to drink a potion containing the ground bark of the native "Quinquina" tree, which grew on the slopes of the Andes. The potion worked and she quickly recovered. In her honor, the Spanish renamed the Peruvian tree the "Cinchona" tree. They also killed off the Incas, stole their gold, and colonized their land.

TONIC WATER LABELS

WHY WE LOVE CARBONATION IN FLUIDS ?

Bubbles add a liveliness and fun

Naturally found only in past in brewing

Make mild flavors more bold

Mix well with sharp alcohol

Taste is prickly , like salty and sour at the same time

CARBONATION BASICS

- Remember the three C's
- Clarity: You will have problems carbonating anything that is not clear, no solids or sediment because they cause nucleation sites.
- Coldness: the closer to freezing the more CO_2 they will hold, heat drive the bubbles out rapidly.
- Composition: When mixing, lower alcohol will hold more CO_2 , higher does not, avoid lots of natural foaming agents like eggs, ect.
    - Up the surface area to get more CO_2 into liquid or shake frequently.

CARBONATION BY WHIPPER

Use 500 ml Whipper by ISI which is best made brand

Also makes 1000 mls

Do not over fill, there is a line on the inside

Do not over pressurize one or two cartridges max

Shake well and keep cold.

You can buy NO2 but must be 21, (nitrous oxide is laughing gas)

CO2 anyone can buy.

Clean and dry well,

Consider buying the extraction kit for making instant tinctures

CARBONATION BY SODA STREAM

- Brings CO_2 to everyone
- Uses small CO_2 bottles
- Can be used for more that soda

- Do not use anything besides water unless you know what you are doing.
- Under $100
- For water follow instructions, make sure water is cold
- For Alcoholic drinks, don’t add more that 11 oz or 165 mls, to prevent foaming
- Pressurize and release many time to get a good blend

HOW MUCH CO2 IN DRINKS

- For practice weigh the bottle with cold water and no top before adding CO2
- Add 3-5 grams per litter for average drink
- Weight after charging and see the difference.
- Keep near freezing for best retentions
- Pour into clean glass

Style Carbonation Ranges			
Style	**Vol CO^2**	**Style**	**Vol CO^2**
American Ales	2.4 - 2.8	American Lagers	2.5 - 2.8
British/Scottish/Irish Ales	1.2 - 2.2		
European Ales	2.2 - 2.7	European Lagers	2.3 - 2.7
Belgian Ales	1.9 - 2.5	Wheat Beers	3.0 - 4.0
Belgian Lambics	2.5 - 4.5	Belgian Wit	2.1 - 2.6
Soda	6 + *	Sparkling Fruit Juice	3 + *
Root Beer	5 + *	Sparkling Mead	3.5 - 6 + *
Cider	1 - 4	Sparkling Wine	3.7 - 6 + *
Water	4 - 6		
* Never carbonate above the pressure your container can safely handle!			

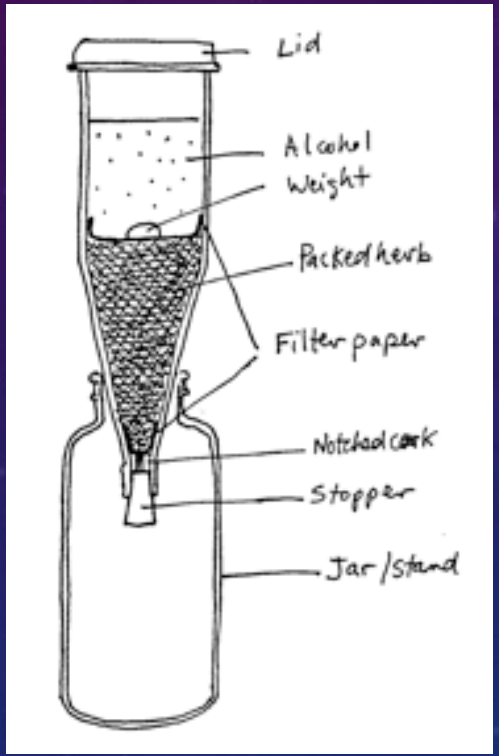
AROMATIC SYRUP OF CINCHONA: RECIPE

500 ml of pure water
30 gram fresh grapefruit zest
30 gram fresh lemon peel
Juice of 1 lemon
10 gram of cinnamon
Add it all to sauce pan and bring to boil for 20 minutes
Strain and add 400 grams organic sugar
Add 5 grams citric acid
½ tsp of rose water and orange water
When cool add 2 ounces of cinchona tincture, shake well and bottle.

RAPID NO2 EXTRACTION OF RED CINCHONA BARK

- 6 grams of Red Cinchona powdered
- 15 gram dried orange peel
- 15 grams dried lemon peel
- Add to whipper with 150 mls of vodka or 40% alcohol of choice, Gin can be nice for a little more flavor
- Tighten down and ad 1 NO2 cartridge, then add another wait at least 20 minutes, shake well.
- Let pressure off then strain and bottle
- Use this tincture to make instant tonic water or as a base for the syrup.

PERCOLATED TINCTURE OF RED CINCHONA



- Moisten Herb with alcohol
- Wait 24 hours is best
- Add to percolator and drip thru
- General extracts are 1 to 5 strength
- 1 gram herb to 5 mls of alcohol
- Cinchona or bitter herbs like Quassia can be made at 1/10
- Measure and filter into bottle.