**Student Edition**

California Education and the Environment Initiative

10

World History
History-Social
Science Standard
10.4.1.

# New Imperialism: The Search for Natural Resources

**California Education and the Environment Initiative**

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**The Education and the Environment Initiative Curriculum is a cooperative endeavor of the following entities:**

California Environmental Protection Agency

California Natural Resources Agency

California State Board of Education

California Department of Education

Department of Resources Recycling and Recovery (CalRecycle)

**Key Partners:**

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**Office of Education and the Environment**

1001 I Street • Sacramento, California 95814 • (916) 341-6769

**http://www.CaliforniaEEI.org**

# Contents

# Paving the Way for a Cleaner Tomorrow

Our state's trend-setting influence is not limited to fashion. When California passed strict auto emissions laws in the 1960s, 10 other states followed suit. These efforts have dramatically improved the air quality in California's metropolitan areas. In 2004, California took the lead again by creating the California Hydrogen Highway Network (CaH2Net). The mission of this public-private partnership is to develop a "clean" transportation system.

Although the technology for hydrogen-fueled vehicles has existed for some time, it has been challenging to get consumers to "buy-in" to an alternative to the fossil fuels used in most cars and buses.

The Hydrogen Highway Network is administered by the California Air Resources Board (CARB). The CARB is one of the 32 members of the California Fuel Cell Partnership, a collaborative of auto manufacturers, energy companies, fuel cell technology companies, and state and federal agencies. CaFCP's members work collaboratively toward commercializing fuel cell vehicles (FCV) and hydrogen fuel. Hydrogen Highway Network stations in the state that provide fuel to the drivers who operate fuel cell vehicles in demonstration programs.

The combined influence of political, geological, and environmental pressures has made the search for fossil fuel alternatives a national imperative. Much of our nation's oil supply comes from politically unstable regions. According to experts, over 50% of our viable oil reserves are already depleted. In addition, the remaining oil is getting more and more difficult to extract. The increased cost of extraction means gas costs more and consumer prices increase across the board. When resources become


Hydrogen-fueled car

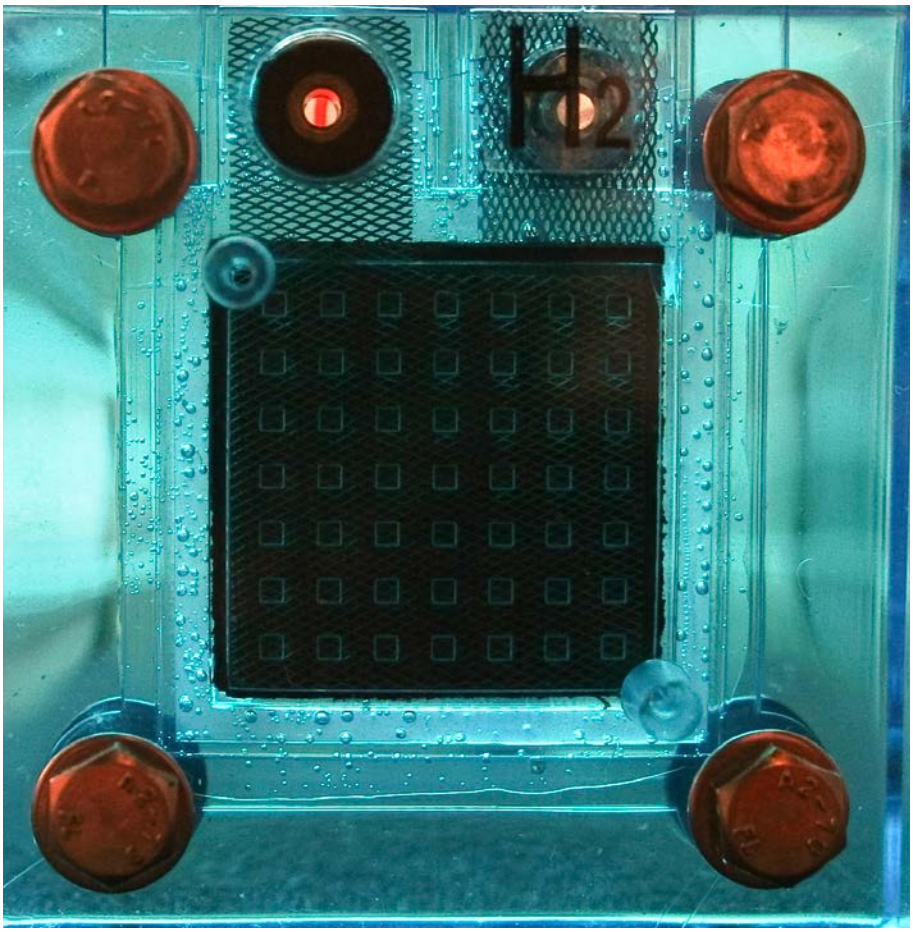
scarce they can also trigger more international conflict as nations fight for control over the remaining energy supplies.

Further, the environmental effects of fossil fuel extraction, transportation, and use are significant, and not without risk of accident. Drilling, transporting, and refining oil contributes to air pollution, and can alter and contaminate ecosystems. Burning fossil fuels for energy creates greenhouse gases, such as carbon dioxide. Some of the carbon is reabsorbed by nature during the natural "carbon cycle." Carbon, which is the backbone of life, changes form, and moves continually between animals, including humans, plants, and the environment. The rapid industrialization of the last century, however, has created a surplus of carbon dioxide and other gases. The excess gases collect in the atmosphere and contribute to accelerated rates of climate change.

Federal and state laws regulate the emission of greenhouse gases, and research is underway on alternative fuels such as ethanol, hydrogen, and batteries. Government and industry have invested billions of dollars over the last few decades to find an alternative fuel that is practical, sustainable, and clean. All alternatives have their challenges, and all are years away from being mainstream. Hydrogen is an excellent long-term solution. The California Hydrogen Highway Network is intent on making this vision a reality.

## Building the Hydrogen Highway

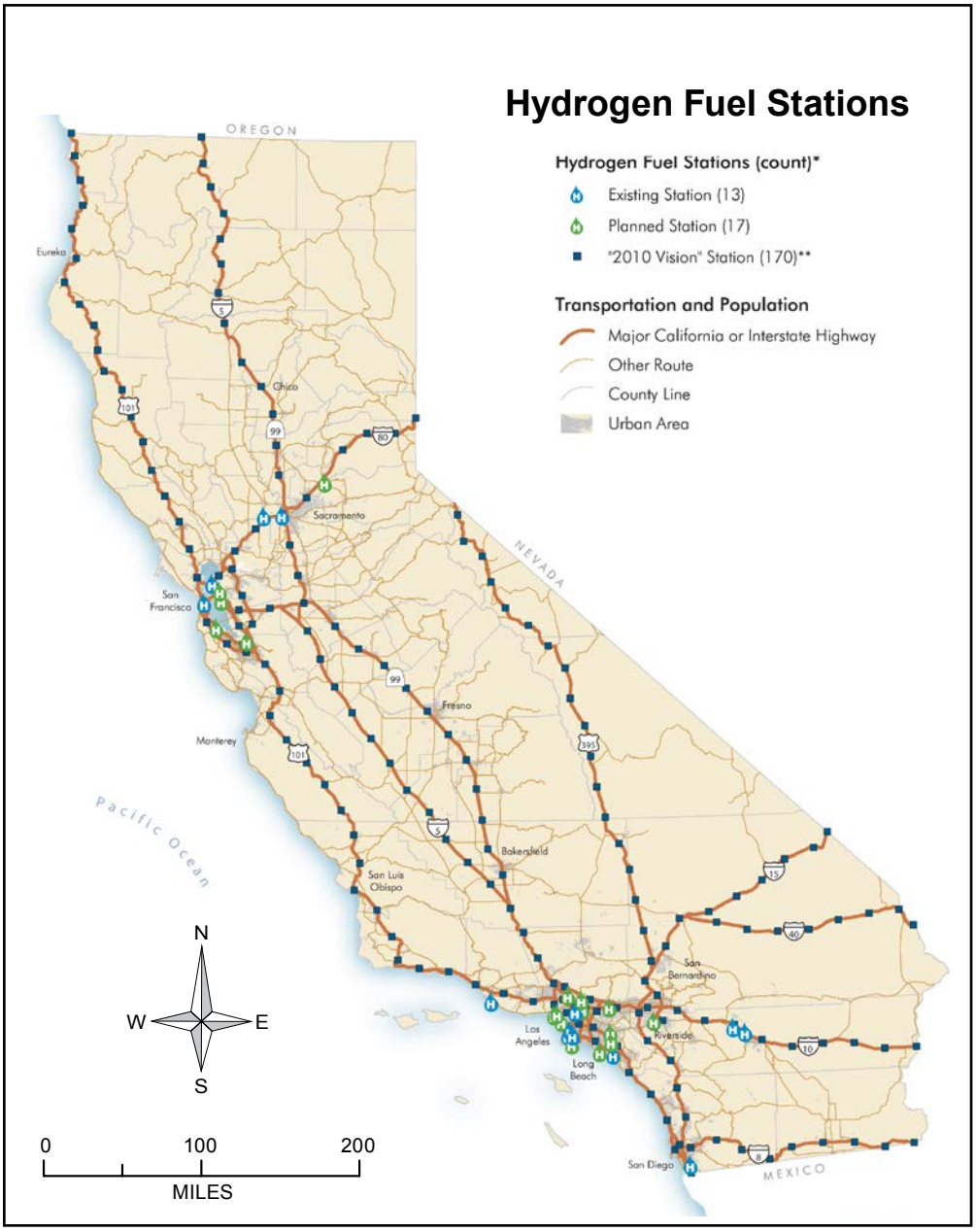
CaH2Net's two keys to success are vehicles that can run on hydrogen and having enough hydrogen fueling stations to deliver fuel to consumers when needed. Vehicles can use hydrogen in two ways: they can burn hydrogen as a conventional vehicle does or convert it to electricity in a fuel cell. Conventional cars burn gas in an internal combustion engine. Their exhaust contains gases such as carbon dioxide, carbon monoxide, and sulfur. Hydrogen combustion engines create so few of these gases that they cannot be measured. Fuel cell vehicles produce energy efficiently without combustion. They operate like a battery that does not need to be recharged. Hydrogen FCVs create electrical energy from the




Hydrogen fuel cell

attractive forces between hydrogen and oxygen. Their "waste" product is water vapor.

Thirteen-million dollars in state and federal funding was initially used to lease fuel cell buses and build hydrogen-fueling stations in urban areas. CaH2Net envisions networks of stations in the two most populated areas of California, the greater Los Angeles and the Sacramento/San Francisco corridor. Later, stations will be built at intervals along California's major highways to provide fuel in other parts of California. The Hydrogen Highway recently reached an important milestone. By fall 2008, FCV's had driven nearly two million miles on California roads. Seven buses and almost 250 passenger vehicles have been placed on roads throughout the state. Twenty-five hydrogen fueling stations were in operation, with 11 more in planning stages or under construction.




## Potential Roadblocks

To be successful, every alternative fuel must be cost effective to produce, logical to store at the station, affordable for drivers, and easy for people to put in their cars. The current demonstration projects and ongoing research and development are exploring these issues and finding solutions.

One of the benefits of hydrogen as a fuel is the variety of sources from which it can be obtained. As with all fuels, creating hydrogen-based fuels requires energy and produces pollution. Most hydrogen is made from natural gas, a process that releases $CO_2$ into the atmosphere. However, hydrogen made this way and used in a fuel

cell vehicle produces 55% fewer greenhouse gases than when gasoline is used in a combustion engine. Hydrogen fuel produced using renewable resources, like solar energy, water, and plant material, generates practically no greenhouse gases. Many hydrogen stations produce fuel at the station. This eliminates the need to transport fuel, but increases the need for novel ideas about storing hydrogen gas at the station.

Research, development, and road testing of the vehicles are proving the technology of fuel cells. People expect vehicles to travel 300 miles on a tank of fuel and last for 150,000 miles. The auto manufacturers are making good progress towards these goals, but are several years from being ready to sell vehicles.

Federal and state governments are helping with the costs of research and development, and the early stages of manufacturing. Governments are also assisting by developing or modifying needed regulations, codes, and standards. For example, to sell any alternative fuel, California's Department of Food and Agriculture sets the quality standards for the fuel and creates tests to measure the fuel as it is dispensed. This ensures that when people pay for fuel, they get what they are paying for.

Hydrogen pumping station

## Moving Ahead

One of many strategies for alternative fuel sources, the work behind the Hydrogen Highway Network is fueled by shared goals: creating energy security and protecting the environment. While there are still many legal and technical challenges ahead for the Hydrogen Highway, many of the needed changes have already occurred. It is the belief that a partnership between government and industry will help bring alternate energy into use.

Companies are also motivated by their business interests. Auto manufacturers see a market for clean, fuel-efficient vehicles. Energy suppliers envision a diverse fuel supply that will never run out. Entrepreneurs and small business owners see a future market built upon something that does not exist today, somewhat like the market that cell phones created.

The push to develop alternatives has additional benefits. It will create new revenue sources and employment opportunities for the state's residents. Moreover, California will have made important progress in the search for cleaner, renewable, energy. California is not alone in this effort. Other states, such as Florida and New York, have hydrogen fuel programs. Hydrogen networks are underway in Canada, China, Japan, and Europe. California is leading the world in the shared vision of energy independence, environmental protection, national security, and improved public health.

# John G. Paton, 1883

For the following reasons we think the British government ought now to take possession of the New Hebrides group of the South Sea islands, of the Solomon group, and of all the intervening chain of islands from Fiji to New Guinea:

New Hebrides men and boys

1. Because she has already taken possession of Fiji in the east, and we hope it will soon be known authoritatively that she has taken possession of New Guinea at the northwest, adjoining her Australian possessions, and the islands between complete this chain of islands lying along the Australian coast.

2. The sympathy of the New Hebrides natives are all with Great Britain, hence they long for British protection, while they fear and hate the French, who appear eager to annex the group, because they have seen the way the French have treated the native races in New Caledonia, the Loyalty Islands, and other South Sea islands...

6. The islands on this group are generally very rich in soil and in tropical products so that if a possession of Great Britain, and if the labor traffic stopped so as to retain what remains of the native populations on them, they would soon, and for ages to come, become rich sources of tropical wealth to these colonies, as sugarcane is extensively cultivated on them by every native of the group, even in this heathen state... The islands also grow corn, cotton, coffee, arrowroot, and spices, etc., and all tropical products could be largely produced on them.

7. Because if any other nation takes possession of them, their excellent and spacious harbors, as on Efate, so well-supplied with the best fresh water, and their near-proximity to Great Britain's Australasian colonies, would in time of war make them dangerous to British interests and commerce in the South Seas and her colonies.

8. The thirteen islands of this group on which life and property are now comparatively safe, the 8000 professed Christians on the group, and all the churches formed from among them are, by God's blessing, the fruits of the labors of British missionaries, who, at great toil, expense, and loss of life have translated, got printed, and taught the natives to read the Bible in part or in whole in nine different languages of this group, while 70,000 at least are longing and ready for the gospel. On this group twenty-one members of the mission families died or were murdered by the savages in beginning God's work among them, not including good Bishop Peterson, of the Melanesian mission, and we fear all this good work would be lost if the New Hebrides fall into other than British hands.

Source: Letter Published by John G. Paton, New Hebrides Mission, 1883. *Accounts and Papers 1883*, (London: HMSO, 1883), Vol. 47: 29–30.

# Paul Leroy-Beaulieu, 1891

The great value of colonies… is not only that they serve to catch the overflow population of the mother country, nor even that they open a particularly reliable area of investment for excess capital, it is also that they give a sharp stimulus to the commerce of the country, that they strengthen and support its industry and furnish to its inhabitants—industrialists, workers, consumers—a growth of profits, of wages, or of interest.

But…these advantages resulting from the prosperity of the colonies, are not limited just to the mother countries; they extend to all the countries of the old world [i.e., Europe] and in fact there is not a nation which does not derive a real benefit from this increase in the productivity of humanity… Imperialism has caused the opening of new sources of production… It is thus that unknown products have been brought to the consumers of Europe to increase their comfort. …That is the first and incontestable result of imperialism. And this is the second: It is to open the new markets for the sale of products manufactured in Europe, markets more profitable and more expandable than those we have been limited to previously, because the new societies have an ability to grow and to create and accumulate riches infinitely greater than the old societies. Thus trade is stimulated and extended, the division of labour is augmented; industry having before it wider openings can and must produce more and such production on a greater scale calls for new improvements and new advances…

The advantages of which we have been speaking so far are general and apply not only to the mother countries, but to all the civilized countries, even those without colonies. …[But] it appears to us incontestable that the home countries gain a special advantage from their own colonies: first, it is the capital of the citizens of the mother country which is sent there, and in this more productive field it is assured of higher interest, which improves the fortunes of the investors, of which a good number without doubt remain in the mother country. Further, the community of language, habits, and traditions, gives an advantage to the home country over all foreign nations even in free trade with the colonies. The colonists retain for a long time the tastes of the mother country… [and] their relations with her have a degree of intimacy which she rarely has with other nations …It is extremely rare that a colony furnishes a net revenue to the mother country: in infancy it is not able, in maturity it does not want to…

Source: S. Pollard et al., *Documents of European Economic History*, Vol. 2: 165–7


French market

# Sir F. Lugard, 1905

…Beyond doubt the development of resources of the tropics and the relations of its peoples to European civilisation will form the greatest problem of the twentieth century. Its products are becoming more and more indispensable to the white races, forming as they do the raw material for our most important industries. In the commercial and industrial competition which is becoming ever more acute between the civilised races it becomes more essential to safeguard and to organize our sources of supply…

…Unconcerned with the bulk of the questions which form the "domestic policy" of the countries of the temperate zones, or even with those connected with *colonisation* (properly so called), it is concerned exclusively with *(a)* the proper control of vast populations who are centuries behind the white races in mental evolution. (Though in some rare instances these may be capable to some degree of self-government, and in others may be governed by alien races domiciled for centuries among them, the guiding and governing impulse must be created by the white races if Africa is to emerge from the apathy and stagnation of centuries.) This is the internal or administrative problem; *(b)* the external problem is purely commercial. Since these countries are not suited for colonisation by white races their value to us depends on their products. Chambers of Commerce are composed of men who though they trade with Africa have themselves never lived there, and who depend for their information chiefly on their employees, who are mostly recruited from an uneducated class. They are apt to lay down theories often contradictory and sometimes prompted chiefly by a study of immediate profit and loss. The economic development should be based on well-considered schemes, fully discussed with scientific experts after careful examination of all experiments made in the tropical possessions of other Powers, and not merely on the views of local trading houses. It should be guided by foresight and continuity of policy, ready at all times to hear the views and accept useful suggestions from men of business, and to explain to them the motive and object of each new departure. The object in my view therefore of a tropical and economic development department would be to provide the Secretary of State with expert advice on both sides of the question, to meet the arguments of missionaries and philanthropists on the one hand and of commercial firms on the other, leaving the Secretary of State as arbiter.

Source: Letter from Lugard to the Colonial Office in Britain

British soldiers in Africa

# David Livingstone, 1858

As far as I am myself concerned, the opening of the new central country is a matter for congratulation only in so far as it opens up a prospect for the elevation of the inhabitants. As I have elsewhere remarked, I view the end of the geographical feat as the beginning of the missionary enterprise.

I take the latter term in its most extended signification, and include every effort made for the amelioration of our race, the promotion of all those means by which God in His providence is working, and bringing all His dealings with man to a glorious consummation. Each man in his sphere, either knowingly or unwittingly, is performing the will of our Father in heaven. Men of science, searching after hidden truths, which, when discovered, will, like the electric telegraph, bind men more closely together—soldiers battling for the right against tyranny—sailors rescuing the victims of oppression from the grasp of heartless men-stealers—merchants teaching the nations lesson of mutual dependence—and many others, as well as missionaries, all work in the same direction, and all efforts are overruled for one glorious end…

Picking cotton

…Their country is well adapted for cotton; and I venture to entertain the hope that by distributing seeds of better kinds than that which is found indigenous, and stimulating the natives to cultivate it by affording them the certainty of a market for all they may produce, we may engender a feeling of mutual dependence between them and ourselves. I have a twofold object in view, and believe that, by guiding our missionary labors so as to benefit our own country, we shall thereby more effectually and permanently benefit the heathen…

We ought to encourage the Africans to cultivate for our markets, as the most effectual means, next to the Gospel, of their elevation.

It is in the hope of working out this idea that I propose the formation of stations on the Zambesi beyond the Portuguese territory, but having communication through them with the coast.

Source: David Livingstone in "Missionary Travels and Researches in South Africa," 1858

**Instructions:** Read about each of the topics below and complete the mapping activities as directed.

# Malaria

Malaria is a disease caused by one of four species of a parasite called *Plasmodia.* It occurs mostly in tropical areas but can occur anywhere mosquitoes thrive. The disease spreads quickly when mosquitoes bite a person who has already been infected. Below is a description of the way in which mosquitoes transmit malaria:

1. Infected human is bitten by a mosquito.
2. *Plasmodia* travel to the mosquito.
3. *Plasmodia* multiply in the mosquito.
4. The mosquito bites a healthy human.
5. *Plasmodia* enters the bloodstream of a healthy human and infects red blood cells, causing them to burst; the healthy human now has malaria.
6. The mosquito continues to bite other healthy humans.

Symptoms include fever, chills, headache, and nausea. Every time a new set of infected red blood cells burst, these symptoms can occur. Some people are afflicted with malaria for years.

No one knows exactly when the parasites that cause malaria first started to spread, but they have been around for thousands of years. Alexander the Great may have contracted malaria back in the 4th century BCE. Chinggis [Genghis] Khan is said to have battled malaria at the same time that he fought infection from battle wounds in the 13th century.

In the 17th and 18th centuries, Europeans risked getting sick when they explored the tropical areas of Asia, Africa, and the Americas. Few Europeans traveled to the interior of Africa. In fact, it was known as “the white man’s grave.” When he finished the first overseas survey of British troops in 1840, Major Alexander Tulloch discovered that approximately 25% of visitors died of disease in Sierra Leone during the early 19th century. Areas outside of West Africa had lower death rates, but disease was always a threat. Europeans knew about the many natural resources in the interior of Africa, but few wanted to risk death to get them.

**Mapping Activity:** Label the continents on which malaria occurs, indicated by the shaded areas on **Quinine and Global Implications of Imperialism**. (1 point each, a total of 4 points)

# Quinine

Rewind to 1638 when a Spanish friar and herbalist living in Peru wrote about a tree whose bark helped cure severe fevers in Lima. This tree was called a *Cinchona* tree. At first, the Jesuit priests had merely collected and distributed the bark near where they lived. By the mid-17th century, however, the priests often sent supplies of *Cinchona* to Rome, and travelers to Peru wanted the tree bark to take back to Europe for its value as a medicine. A little more than one century later, the Spanish port of Cadiz processed *Cinchona* bark harvested in Peru, Bolivia, Ecuador, and Colombia.

**Mapping Activity:** Label the countries of Peru, Bolivia, Ecuador, and Colombia on **Quinine and Global Implications of Imperialism.** Next to each, write a "Q" to represent the origins of the *Cinchona* (quinine) tree. (1 point each, a total of 4 points)

# Government Action

European governments grew tired of spending so much money on *Cinchona* bark and wanted to grow the trees themselves. Additionally, the supply of South American quinine did not meet the needs of all of the European explorers in the tropics. As a result, both the Dutch and the British sent men to South America to gather *Cinchona* seeds—often illegally, because where Cinchona originated had specific laws regarding the removal of the *Cinchona* tree from South American soil. British and Dutch seed collectors sent their specimens directly to their countries' botanical gardens. Some of these specimens were sent immediately to colonial India for cultivation.

**Mapping Activity:** Label Great Britain, the Netherlands, and India on **Quinine and Global Implications of Imperialism**. Draw arrows from the four South American countries where *Cinchona* originated (Q) to Great Britain and the Netherlands. Draw an additional arrow from Great Britain to India. (1 point each, a total of 6 points)

# A Monopoly

The British experiment met with mixed results. In northern India, the climate was too damp for the *Cinchona* trees to grow well. In southern India and Ceylon, however, private planters produced millions of pounds of *Cinchona* bark. The Dutch, too, began experimenting with a different species of the *Cinchona* tree on the island of Java (part of present-day Indonesia) and produced high yields of the bark. By the end of the 19th century, the Dutch established a near monopoly over the production of quinine by running the South American countries out of business.

**Mapping Activity:** Label the Indonesian island of Java on **Quinine and Global Implications of Imperialism**. Draw an arrow from the Netherlands to Java. Draw a star on (or near) Java to represent the "Quinine Monopoly" on the island. (1 point each, a total of 3 points)

# Saving the Empire

The quinine that was harvested in India and Java was used in the British and Dutch colonies to fight malaria. Quinine became available as a medicine to stop malaria in the middle of the 19th century. The supply and distrust of the drug did not wipe out malaria altogether. Still, quinine allowed Europeans to explore the interior of Africa. They soon "carved up" the continent for its abundant natural resources. The *Cinchona* tree helped Europeans get other natural resources that helped fuel their industrial economies at home.

**Mapping Activity:** On **Quinine and Global Implications of Imperialism**, draw arrows from India and Java to Africa. (1 point each, a total of 2 points)

*The following excerpt from the House of Commons Parliamentary Papers is a response to several requests made by the Governor of India to the Honourable Court of Directors of the East India Company. It was to be considered a directive for immediate action.*

## Enclosure to No. 13

*Minute by the Governor General, concurred in by the Members of Government; dated 20 October 1856.*

This important subject engaged the attention of the Government of India, on the representation of the Agricultural Society, made to the Government of Bengal in 1852; and in consequence of a communication made to the Honourable Court of Directors, some seeds and plants were procured, and sent out to India.

The experiment failed, the seeds having in no instance germinated, and only five plants having reached Calcutta alive. These last, after having been kept at the Botanical Gardens during a rainy season, were sent to Darjeeling, where they were killed by the cold of the following winter.

In 1855 the Medical Board took up the question again; but their report by some accident not have been received, a duplicate has been called for, and at the same time the Agricultural Society have again addressed the Government.

The proposals of the Medical Board and of the Agricultural Society are, first, that the experiment of introducing *Cinchona* plants should be tried upon an extensive scale, with several species of the plants…

That officers possessing the requisite botanical and geological knowledge should be deputed to inquire as to the sites best calculated to receive the plants; that these officers, duly supplied with all aids and appliances, should receive the plants upon arrival, and convey them to the selected spots…

I submit that the substance of these proposals should be recommended to the favourable consideration of the Honourable Court. The supply of South American *Cinchona* is actually threatened with extinction; the consequence of the loss of this most valuable febrifuge [fever-reducing chemical] would be most lamentable, and the experiment, if successful, would introduce into India an article which would be largely exported, and would be the source of a considerable revenue…

The experiment, carried out in the manner proposed, will be costly; but it is shown in these papers that in five years the Government of India has expended nearly 54,000 [pounds] in quinine and *Cinchona* bark, and therefore I believe that success will be well worth the cost; and looking to the political condition of the countries in which the plants are to be found, I doubt whether they can be surely procured in any other way…

Under these circumstances, and considering the incalculable benefits to be derived from having a native supply of this most valuable medicine at hand, I am of opinion that the experiment as proposed should be fairly tried, and that the Honourable Court should be moved at once to send a properly qualified collector to South America, to collect and bring to India the best species of *Cinchona*…

*20 October 1856* *(signed)* *Canning.*

We quite agree.

*23 October 1856* *(signed)* *A. Dorin.*
*2 November 1856* *J. P. Grant.*
*5 November 1856* *B. Peacock.*


California STATE BOARD OF EDUCATION

# California Education and the Environment Initiative

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