THE BLACK DEATH, THE VOYAGES OF COLUMBUS,
AND OTHER TIMELY ACTS OF GOD


David D. Haddock

According to traditional tales of exploration, the discovery and settlement of the American continents were manifestations of the markets in spices and silks, religious persecutions, and the derring-do of the same marvelous people who brought us the Renaissance. It is wanton of cliometricians to purge all joy from the study of history, so allow me to state at the outset that I have but two substantial complaints against these traditional histories: The traditional tales "explain" history by appeal to endogeneous events and, to make matters worse, they appeal to possibly constant <u>levels</u> of one variable to explain discrete <u>changes in the trend</u> of another. For example, the overland spice and silk routes to the Far East were open for centuries prior to the exploits of Columbus, but, mysteriously, they arise as "explanations" for increasing rates of exploration only in literature concerning the 15th Century.* Similarly, the reports of Columbus and other explorers did not excite the European imagination until several decades had passed. Migration and settlement (as opposed to plunder) finally became a matter of significance only in the mid-1500s. Many modern men view the initial discoveries as sufficient reason for settlement and so do not wonder at the lag.

If the discovery and settlement of America were not direct Acts of God, is it possible to identify the change in the state of the world (or, rather,

---

* It is clear Turkish invaders were overthrowing Arab-Islamic rulers who had long engaged in the eastern trade, but it is less obvious why the new Turkish rulers would have found their interests furthered by interference in a lucrative business. Furthermore, it is unclear that the Turkish invasions were more disruptive than the warfare associated with the crusades, 1096 to 1270. Yet none of the 15th Century enthusiasm for marine exploration is evident during the time of the crusades.

the state of Europe) which led to the change in exploration and settlement patterns? Hopefully, the shock will have occurred outside the ken of economics or historical theory, enabling cliometricians to label the event "exogenous". The rules of the game do not require explication of exogenous events -- genuine, warranteed Acts of God.

The handiest Act to follow is the Black Death. I argue below that the Black Death resulted in a rightward shift in the aggregate demand for Asian imports.

Previously, the modest level of European trade with the Orient was insufficient to persuade European nations to make the large investment necessary to locate an all-water route to Asia. Europeans knew that marginal costs of shipment by water were below the costs of shipment by land. However, the present value of the savings expected from an all-water route was less than the expected cost of locating such a route. Increasing quantities of Asian imports followed the great plagues and made exploration of the seas a more attractive venture; the fixed cost of exploration could be spread over a larger volume of imports. In their attempt to locate a water route to the Orient, the Europeans accidentally discovered America.*

America initially held attraction only for brigands and thieves interested in stealing Indian gold. The western continents were too distant to warrant exploitation by more respectable folk. Transportation costs to Europe were high and no appreciable American markets existed. A sizable

---

* Actually, the Europeans rediscovered America. Several Europeans, the most famous being Leif Ericsson, had brought back reports of a large North Atlantic land-mass [Morison]. To Columbus's surprise, the land-mass extended far to the south, virtually blocking all approaches to Asia from the east.

local market attracted producers of foodstuffs and fibers only after the production of sugar moved to America.

The transfer of sugar production to America resulted from a plague-induced rightward shift in the aggregate demand for sugar. Following the Black Death, all available sugar land in the Old World was soon occupied in response to the shifting demand curve. Further demand shifts led to a European price for sugar high enough for producers to bear the transport costs from America. Producers of more mundane commodities were then drawn to America to feed and clothe the slaves on the sugar plantations.

## The Discovery of America and Other Misfortunes

Population figures from the 14th Century are meager, but the proportion of the European population which died during the Plagues of 1346 through 1388 could hardly have been less than one-quarter [Ziegler]. Assuming the Black Death was reasonably egalitarian, at least one-quarter of the European labor supply and human capital stocks were missing in 1388 while all the land and physical capital remained.

In a relatively stable economy, the technologies employed complement historically prevalent factor proportions, and, in the short-run, such technologies are usually inappropriate for vastly different proportions. Hence, an initial impact of the Black Death may have been to reduce output/capita as land, capital and institutions were abandoned. A reduction in output/capita does not necessarily imply that consumption/capita would have declined, for some part of the capital (oxen and the like) may have been eaten.*

After the passage of some period of time, technologies would have begun evolving which were more appropriate to the new factor proportions. Then, until the labor supply completed all long-run adjustments, it is reasonable to suppose that output/capita exceeded its pre-Plague levels. I find it difficult to believe that the gains from specialization were so high and the long-run substitutibility among factors so low as to prevent such increases in per capita output. During the initial stages of the post-Plague era, not

---

* In keeping with the highly technical tone of the paper, I should say the oxen-capital may have been depreciated rapidly.

only would incomes have been high, they would have been rising as the economy slowly developed new and better technologies to cope with the unfamiliar factor proportions.

When per capita output levels changed, shifts occurred in <u>individual</u> demand curves for specific commodities. Those commodities with positive income elasticities would have shifted to the right while those with negative income elasticities would have shifted to the left. For a plague-induced change in output, <u>aggregate</u> demand curves would have shifted in a more complex manner than did individual demand curves. Many of the individuals disappeared entirely, which, to an economist, means their demand curves for everything became coincident with the vertical axis. Nevertheless, if the income elasticity of a commodity was "high enough", the aggregate demand curve for that commodity would have shifted to the right. By ignoring second-order effects, it is shown below that "high enough" income elasticities are $\frac{1}{\phi}$, where $\phi$ is a function of the aggregate production function with $0 < \phi < 1$. Hence, the income elasticity for the commodity must have exceeded unity, but by how much can only be determined by knowing the explicit form of the aggregate production function.

It was once common for economists to define as luxuries commodities with income elasticities greater than unity. Although in time that definition exposed a few unexpected and rather startling luxuries to the view of science, the grain of truth axiom allows the assertion that the income elasticities of silks and spices exceeded unity, hopefully by comfortable margins.

If the income elasticities of silks and spices were high enough, the aggregate European demand curves for those commodities shifted out as

increasing per capita incomes followed the plagues. During the 14th and 15th

Centuries, much of the silk and spice consumed by Europeans was imported

overland from the Far East. Because the European population was low as

compared to Asian, and because of high transport costs between Asia and

Europe, European consumption comprised a trivial part of the world market

for silks and spices. Consequently, I hypothesize silk and spice prices

did not change noticably following the European plagues, but quantities
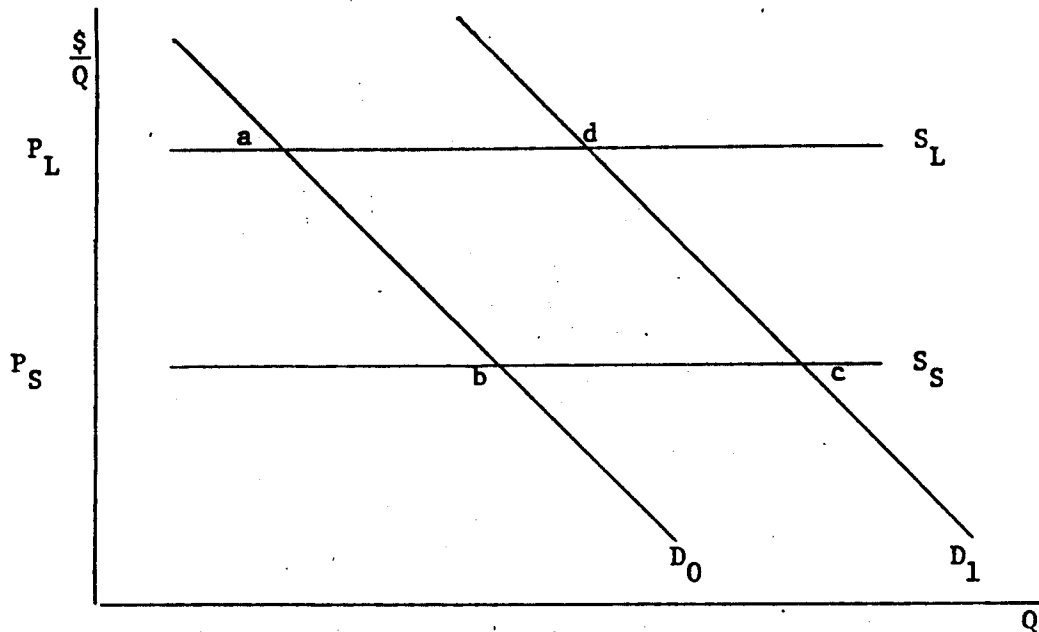
consumed in Europe increased.*



Figure 1

Examining Figure 1, assume that $D_0$ represents the pre-plague demand

for silk by some European state while $D_1$ represents the post-plague demand.

---

* The plague also attacked the Far East during the time of the Black Death
in Europe, but with much less severity. Wu reports that, at most, 13 million
died in China. This compares to 25 million deaths in Europe on a smaller
base population.

It is curious that all "explanations" of increased tastes for explora-
tion (including the present paper) concentrate on European imports. However,
the silk and spice producers of the Far East were not shipping these commodi-
ties west as gifts. Presumably, something was exported from Europe in
exchange. What were the Europeans exporting? I do not know, but if I did,
my argument might be altered considerably. More work.

Suppose that $S_L$ represents the overland supply curve facing Europe while $S_S$ represents the supply curve the "relevant people" -- the kings and princes who might finance exploration -- think would prevail if a sea-route could be found.* The area $P_S P_L ab$ is the instantaneous pre-plague value to the state of discovering a sea-route. Call this instantaneous value $v_0$.** The present value of the stream of services from the sea route is

$$V_0 = {}_{t=0}\!\int^T v_0 e^{-\rho_0 t} dt$$

where T is the last date for which the sea route is expected to be used and $\rho_0$ is the pre-plague rate of discount.

Letting the expected pre-plague cost of discovering the appropriate sea route be $C_0$, exploration will not take place if $C_0 > V_0$.

Following the plague, the relevant demand curve in Figure 1 is $D_1$ and the instantaneous value of a sea-route to Asia becomes $v_1$, which is represented graphically by $P_L P_S cd$.*** The expected stream of services from the sea route becomes

$$V_1 = {}_{t=0}\!\int^T v_1 e^{-\rho_1 t} dt$$

---

* One may imagine that any adjustments to $S_S$ necessitated by uncertainty and risk-aversion have been made prior to the construction of Figure 1.

** The state shown might become a monopolist in selling to the rest of Europe -- if they could keep a secret. Such an eventuality introduces no interesting results but does introduce some boring work. My native sluggardliness has forced me to spare the reader such a discussion of monopoly. In a similar fashion, I have solved the related game-theoretic problem of determining who explores and who waits for his neighbor to explore.

*** Actually, this estimate of $v_1$ may be biased downward. If ocean shipping is less labor intensive than overland shipping, the plague-induced increase in real wage rates will increase the distance between $S_L$ and $S_S$.

Since the labor/capital ratio had fallen and since the income elasticity of savings seems to be approximately unity [Friedman], $\rho_1 < \rho_0$. Additionally, $v_1 > v_0$. Therefore, $V_1 > V_0$. It is thus possible for $V_1 > C_0$, implying post-plague exploration, even though $V_0 < C_0$, which implied no pre-plague exploration.

The proper comparison is $\bar{V}_1 \gtrless C_1$? but, not knowing whether ocean exploration (as opposed to ocean shipping) is relatively labor-intensive or capital-intensive, $C_0 - C_1$ cannot be signed and I ignore any change in the expected cost of locating a sea route to Asia. This seems to be a rather benign slight of hand.*

The newly perceived positive net benefit of an Asian sea route induced increased expenditures on exploration by several European states, notably Spain and Portugal.** Christopher Columbus, heading west, found his way barred by an unexpected and unwanted land mass and failed in the quest.*** In 1498, the Portuguese explorer Vasco da Gama reached India by sailing around Africa. Except in the minds of a handful of eccentrics and soldiers of fortune, the way west lost the attention of Europe.

---

* Wait until you see some of the stuff below!

** England and France were impoverishing each other in the course of the Hundred Years War, 1337 to 1453, and were in no condition to send explorers nosing around on the edges of the world. Other European states of that day were too small or too poor to participate in such ventures.

*** Now there is an Act of God. Actually, Columbus was lucky America barred the route. He had grossly under-estimated the distance to Asia and would probably have starved had the way west been open. That would certainly have diminished the importance of Columbus Day.

## The Belated (But Sweet) Settlement of America

I suggest that the settlement of America occurred in response to the same factors which led to its discovery, to wit, plague-induced shifts in demand curves, in this case the demand for sugar. I think the assertion that sugar was America's first large export industry is not in serious dispute. But to say that the cultivation of American sugar arose through demand shifts rather than via supply shifts associated with low land rents in America requires further argument.

The case of sugar differs from the case of spices and silks treated in the previous section. First, it is less satisfying to assume a high income elasticity for sugar than it is for silks or spices. Second, unlike silks and spices, sugar was not imported into Europe during the 14th and 15th Centuries but was produced in the southern portions of the continent. When factor price ratios changed following the Black Death, it is unconvincing to assume the supply curve remained stable. One must find additional information implying that supply shifts are not explanation enough.

The present argument contends that America was not settled quickly after discovery because most American resources were worthless. With the rare exception of commodities with high value/weight, such as gold and silver, the high transport costs of the early 1500s created negative net value for most potential American production. Any lone producer moving to America would find his entire market located overseas.*

---

* We all know that today the Americas are continents of great value and are occupied by some of the wealthiest economies on earth. But imagine the decline in value of those continents if each individual could be divided into a producing half and a consuming half with all the consuming halves then moved to Europe. American resources are so valuable because transport costs necessary to connect the resources with consumers are relatively low, largely because the consumers are close at hand. Such was untrue in 1500. Cf. Gunderson, p. 29.

In time, the transport costs facing many potential American producers fell. Costs did not fall because there were dramatic changes in shipping rates but, rather, because a large market moved close to hand with a consequent decline in the distance goods had to be shipped. The large market which moved to America was that associated with the sugar plantations.

We know sugar was introduced into Europe in the eleventh century by crusaders who found it used in Asia Minor [Fogel and Engerman, pp. 16-19]. Cultivation was quickly introduced into Sicily, Corsica, and Crete. Having spread to those three Mediterranean islands, it apparently spread no further for four centuries. Then, during the 1400s, sugar cultivation spread to the Iberian peninsula and on around the western edge of Africa to the Cape Verdes, the Madeiras, and São Thomé. An industry which had been geographically stable for four centuries spread rapidly within a single century following the Black Death.

The spread of sugar cultivation could hardly have resulted from a plague-induced supply shift. It could, perhaps, be argued that the spread to Iberia was the result of such a supply shift, but, in moving into Madeira, sugar cultivation was being expanded into an area long known but previously unused.* To argue from a supply shift, one must say that when land became less scarce relative to labor, the margin of cultivation expanded.

Furthermore, sugar cultivation appears to have been a relatively labor intensive form of agriculture. To produce sugar in the Atlantic islands,

---

* Accurate representations of Madeira appeared on European maps at least as early as 1351. Sugar plantations did not appear until after 1420. In 1462 sugar cultivation was extended to the Cape Verdes to be followed by São Thomé in the 1470s.

planters imported large numbers of African slaves, the first major utiliza-
tion of this labor source.* [Fogel and Engerman, p. 17.]

Possibly the cultivation of sugar moved to the Atlantic islands to be
near the now-attractive African labor sources. But if so, why did sugar
production then spread to Brazil and the Caribbean? Although Indian slaves
were tried in America, long-distance imports of Africans soon became the
more important source of labor. For imports from Africa, America had no
distance advantage over Europe.

The beginning of sugar cultivation in Brazil begins at about the worst
possible moment for the supply shift argument. The first small efforts at
American sugar production did not occur for almost half a century after
the discovery of America (1538), and this casts doubt on the cheap-land
hypothesis. On the other hand, an assertion that sugar production shifted
to the islands off Africa to avoid labor-scarce Europe cannot explain the
obvious momentum which then drove the crop across the Atlantic and made
Brazil the world's leading sugar producer by 1600.

Having cast a jaundiced eye on supply shifts, at least as a complete
explanation of the expansion of sugar production to America, the researcher
has only demand as an alternative.

Assume the 14th Century European aggregate production function was
linearly homogeneous, that all non-labor factors of production (which I
shall call capital) were perfectly malleable, and that all factors of pro-
duction had positive marginal physical products. Assume, further, that
Europeans were homogeneous, both as workers and as consumers. Letting L

---

* Sugar production in the Mediterranean was based on slave labor, but most
of those slaves were Caucasian captives of the Crusades and other Christian
versus Moslem disagreements.

represent the labor input, K represent the capital input, and Q represent the aggregated output,

$$Q = f(L, K).$$

Linear homogeneity implies

$$\lambda Q = f(\lambda L, \lambda K).$$

By letting $\lambda = 4$

$$4Q = f(4L, 4K)$$

and per capita output (i.e., average income y) was

$$\frac{4Q}{4L} = \frac{Q}{L} = y.$$

Per capita demand for sugar was given by

$$s_0 = g(y, p_s) = g(\frac{Q}{L}, p_s). \tag{1}$$

Hence, aggregate demand for sugar was

$$S_0 = 4Ls_0 = 4L \, g(\frac{Q}{L}, p_s).$$

When the Black Death had finished with Europe, one-quarter of the population (labor force and consumers) had died, but all non-human factors of production remained. Aggregate output would have been represented by $f(3L, 4K)$. Since there was a positive marginal physical product of labor,

$$4Q = f(4L, 4K) > f(3L, 4K). \tag{2}$$

But the marginal physical product of capital was assumed positive also. Therefore,

$$f(3L, 4K) > f(3L, 3K) = 3Q. \tag{3}$$

Combining, (2) with (3)

$$4Q > f(3L, 4K) > 3Q.$$

We may represent $f(3L, 4K)$ as $(3 + \phi)Q$ where

$$0 < \phi < 1.$$

The exact magnitude of $\phi$ was determined by the (unknown) explicit form of the aggregate production function.

Output per capita would have been

$$\frac{(3+\phi)Q}{3L} = \frac{Q}{L} + \frac{\phi}{3}\frac{Q}{L}$$

and by (1), per capita sugar demand would have been

$$s_1 = g(\frac{Q}{L} + \frac{\phi}{3}\frac{Q}{L}, p_s). \qquad (4)$$

Holding the price of sugar constant at $\overline{p_s}$, (4) may be written

$$s_1 = s_0 + \varepsilon_s \frac{\phi}{3} s_0$$

where $\varepsilon_s$ was the income elasticity of sugar. Aggregate demand for sugar at $\overline{p_s}$ would have been

$$S_1 = 3Ls_1 = 3Ls_0 + 3L\varepsilon_s \frac{\phi}{3} s_0$$

Since $S_0 = 4Ls_0$

$$S_1 > S_0 \text{ if and only if}$$

$$3L\varepsilon_s \frac{\phi}{3} s_0 > Ls_0$$

or $$\varepsilon_s > \frac{1}{\phi}.$$

Since $0 < \phi < 1$, $1 < \varepsilon_s$. Hence, in order for the aggregate demand for sugar to have been shifting to the right, it would have been necessary (but not sufficient) that the income elasticity of sugar was greater than unity.

The only usable income elasticity I have located is an estimate of the income elasticity of confectionary for modern Netherlands [Bridge, p. 147]. The sample estimate from Bridge is .458, hardly encouraging at first glance.

However, if the variety of products produced expands with aggregate income, it is possible, even likely, that income elasticities for most

commodities will fall with increasing aggregate incomes. If so, the income elasticity for sugar in 15th Century Europe could have been higher than the elasticity which now prevails in the Netherlands.

It is an identity that

$$1 = \sigma_{10}\epsilon_{10} + \sigma_{20}\epsilon_{20} + \cdots \sigma_{n0}\epsilon_{n0} \qquad (5)$$

where $\sigma_{ij}$ is the share of the ith commodity in the budgets of the jth time period and $\epsilon_{ij}$ is the income elasticity similarly defined.

If between periods 0 and 1, some $(n+1)^{th}$ commodity is added to those available in the economy,

$$1 = \sigma_{11}\epsilon_{11} + \sigma_{21}\epsilon_{21} + \cdots \sigma_{n1}\epsilon_{n1} + \sigma_{(n+1)1}\epsilon_{(n+1)1} \qquad (6)$$

Let $\epsilon_{i1} = \epsilon_{10} + d\epsilon_i$ for all commodities 1 through n. Then (6) becomes

$$1 = \sigma_{11}[\epsilon_{10} + d\epsilon_1] + \cdots + \sigma_{n1}[\epsilon_{n0} + d\epsilon_n] +$$
$$\sigma_{(n+1)1}\epsilon_{(n+1)1} \qquad (7)$$

Subtracting (7) from (5) yields

$$0 = (\sigma_{10} - \sigma_{11})\epsilon_{10} - \sigma_{11}d\epsilon_1 + \cdots + (\sigma_{n0} - \sigma_{n1})\epsilon_{n0} - \sigma_{n1}d\epsilon_n -$$
$$\sigma_{(n+1)1}\epsilon_{(n+1)1}$$

But the share of the $(n+1)^{th}$ commodity in time 1 must equal the sum of the decline in the shares of the other n commodities. Or,

$$\sigma_{(n+1)1} = (\sigma_{10} - \sigma_{11}) + \cdots + (\sigma_{n0} - \sigma_{n1}).$$

Therefore,

$$0 = (\sigma_{10} - \sigma_{11})\epsilon_{10} - \sigma_{11}d\epsilon_1 + \cdots + (\sigma_{n0} - \sigma_{n1})\epsilon_{n0} - \sigma_{n1}d\epsilon_n -$$
$$(\sigma_{10} - \sigma_{11})\epsilon_{(n+1)1} - \cdots - (\sigma_{n0} - \sigma_{n1})\epsilon_{(n+1)1}$$

Or,

$$0 = (\sigma_{10} - \sigma_{11})[\epsilon_{10} - \epsilon_{(n+1)1}] - \sigma_{11}d\epsilon_1 + \cdots +$$
$$(\sigma_{n0} - \sigma_{n1})[\epsilon_{n0} - \epsilon_{(n+1)1}] - \sigma_{n1}d\epsilon_n.$$

If $d\varepsilon_i < 0$ for all $i$, in other words, if the income elasticity of all

commodities declines between time 0 and time 1, $-\sigma_{11}d\varepsilon_i > 0$. Therefore,

$(\sigma_{10} - \sigma_{11})[\varepsilon_{10} - \varepsilon_{(n+1)1}] < 0$, at least for the average commodity $i \neq n+1$.

But $(\sigma_{10} - \sigma_{11}) > 0$ by hypothesis, so $[\varepsilon_{10} - \varepsilon_{(n+1)1}] < 0$ or $\varepsilon_{10} < \varepsilon_{(n+1)1}$.

The above says that commodities recently added to the consumption

bundle tend to be more "luxury-like" than commodities added at lower income

levels. Commodities may enter the consumption bundle as "luxuries" and,

over time, become "necessities" and perhaps eventually become inferior

goods.

It is plausible that the income elasticity of sugar did exceed unity

during the 15th and 16th Centuries but, due to rising European income

levels, declined subsequently. To investigate such an hypothesis, I cast

about for data with which I could estimate the income elasticity for sugar

for some modern area which is poorer than the Netherlands. Happily, the

British Colonial Office published usable yearly statistics for the colonies

of Kenya, Uganda, and Tanganyika for the eleven years 1949 through 1959,

[BCO, no. 47]. No adjustment has been made for growth in population over

the 11 year span but, since this imparts an upward bias in estimates of

changes in income per capita, the estimate of the income elasticity for

sugar will be biased downward. Another, more serious, bias is present in

the estimation, for I have been unable to control for changes in the real

price of sugar during the period under consideration. Since changes in real

sugar prices introduce uncontrolled variance into the consumption of sugar,

the estimated income elasticity is subject to the familiar problem of errors

in variables. In the present case, such errors cause an upward bias in the

estimated income elasticity. Nevertheless, the results of the estimation

are encouraging, $\varepsilon_s$ = .811.

Although the (biased) estimate of income elasticity is still less than unity, it exceeds contemporaneous estimates for the wealthier Dutch. Thus, if 15th Century European incomes were sufficiently low, the income elasticity for sugar may have been large. The aggregate demand for sugar may have shifted to the right as Europe slowly adjusted to altered factor proportions following the Black Death. The shifting demand curve for sugar may have driven the early settlement of the American continents by sugar planters. Finally, the movement to America of a large market for foodstuffs may have encouraged the early settlement of what is now the United States and led to the famous triangular trade among Europe and the two Americas.

## Conclusion

The points which end the previous section are suggested rather than concluded. To my mind, the present study has raised more questions than it has answered. Nevertheless, it seems extraordinary that the discovery and settlement of America are treated as if those events are akin to volcanic eruptions, inexplicable, currently beyond precise comprehension.

Europeans would have discovered the Americas if spices and silks were unknown. After all, those continents are visable from satellites. America would have been settled without the help of sugar, a minor product by modern standards.

The timing would have been different, however, and that is the point I wish to make. Within a century, tobacco had replaced foodstuffs as the major export of the British colonies. Coffee has long since replaced sugar as the primary export of Brazil. But those production shifts occurred in each region at a relatively advanced stage of its history. Had Europeans withheld settlement until those later products achieved importance, the world as a whole would likely be somewhat different, even today.

There is a more fundamental point, however, which may be received with less resistance than the story I tell above. This more fundamental point is that we lose a great deal by our tendency to regionalize economic history. There is no such thing as American economic history. That which occurred in Europe or Asia cannot be treated as exogenous without great loss in our understanding of our own economy. It is high time we realize that American history began before 1492, and that, even today, it continues in diverse and exotic corners of the globe.

Appendix:   Why America and not Africa?   Mere Speculation on the

Progress of Sugar Cultivation


Sugar cultivation utilized massive amounts of slave labor.  Although

American Indians were enslaved to work on plantations, they proved unaccep-

table to the planters.  Why did those planters not move to Africa where

most slaves originated?  Surely, many areas of Africa were as adaptable to

sugar cultivation as Brazil, witness modern production.

The answer, perhaps, is that it was cheaper to establish property

rights in America -- so much cheaper it was worth transporting the labor.

Although they were eventually subjugated, powerful African kingdoms existed

during the American colonial period -- the Ashanti in modern Ghana, the

Bucongo at the mouth of the Congo and in Angola, the list could continue

for some time [Davidson].  Unlike the Indians of the Brazilian sugar

regions, the coastal African nations were politically and militarily power-

ful, they were reasonably numerous and they constructed iron weapons and

armor.

The coastal nations of Africa were so powerful, slave traders rarely

ventured a slave-raid themselves.  Instead, the traders formed amicable

links with the coastal nations and exchanged European manufactures, includ-

ing fire arms, for slaves.  The increasingly well-armed coastal nations

responded to the rightward shift in the demand for slaves by attacking

neighboring tribes who, being further inland, obtained fire arms with

greater difficulty.  Prisoners were sold to Europeans living at coastal

forts where the slaves were "inventoried" until a European ship arrived to

offer a cruise to the new world.

Amazing, economics.

# References


Bridge, J. L.; <u>Applied Econometrics</u>; Amsterdam; North Holland Publishing
Company; 1971.


British Colonial Office; <u>Quarterly Digest of Colonial Statistics</u>; London;
Her Majesty's Stationery Office.


Davidson, Basil; <u>Black Mother:  The Years of the African Slave Trade</u>; Boston;
Little, Brown; 1961.


Fogel, Robert W. and Stanley L. Engerman; <u>Time on the Cross:  The Economics
of American Negro Slavery</u>; Boston; Little, Brown; 1974.


Friedman, Milton; <u>A Theory of the Consumption Function</u>; Princeton; Princeton
University Press; 1957.


Gunderson, Gerald: <u>A New Economic History of America</u>; New York City;
McGraw-Hill; 1976.


Morison, Samuel Eliot; <u>The European Discovery of America</u>; New York City;
Oxford; 1971.


Wu, Lien-Teh, J. W. H. Chun, R. Pollitzer, and C. Y. Wu; <u>Plague</u>; Shanghai;
National Quarantine Service; 1936.


Ziegler, P.; <u>The Black Death</u>; New York City; John Day Co.; 1969.