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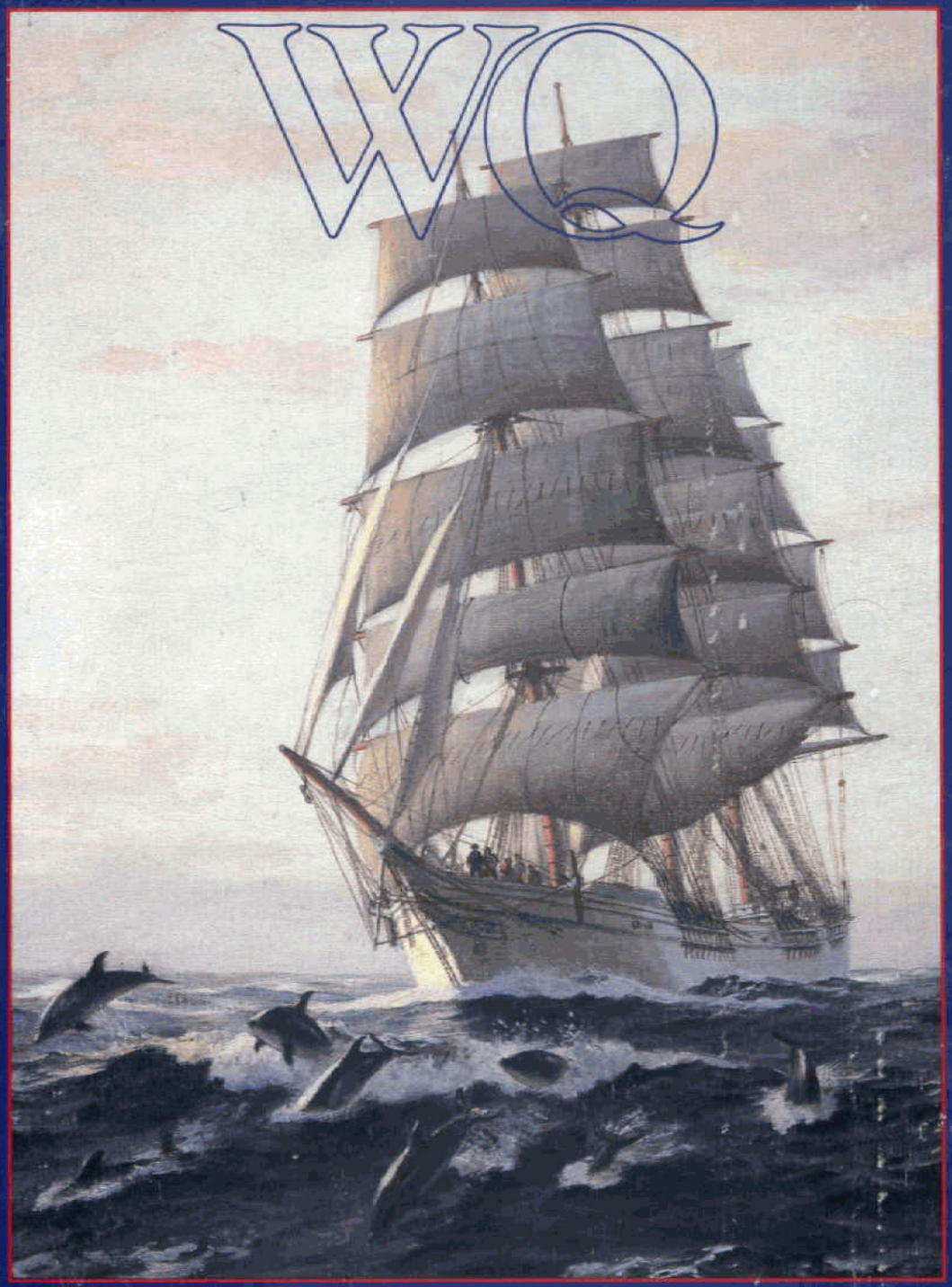

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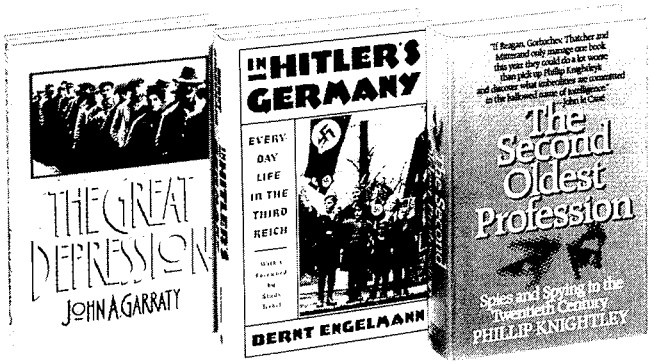

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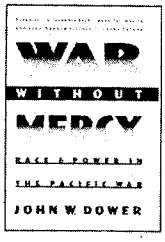

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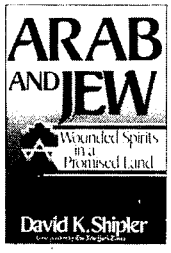

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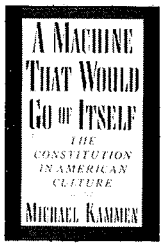

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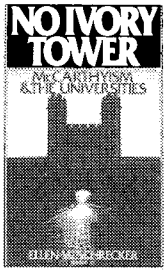

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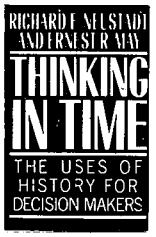

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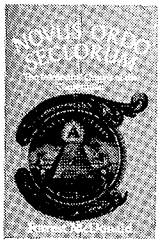

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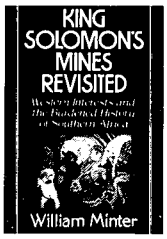

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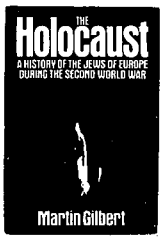

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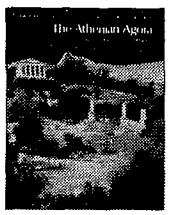

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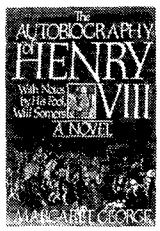

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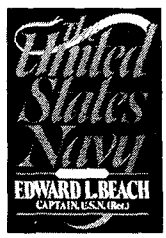

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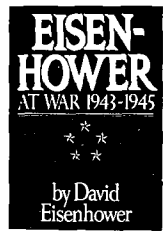

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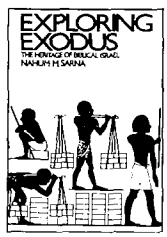

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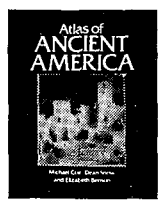

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Editor's Comment

The United States is so big, so diverse and vigorous in its local politics, that many, if not most, of its citizens' more interesting quarrels never make it onto the national news menu. If a dispute occurs close to home, of course, it may loom large to news managers based in New York or Washington. One example: current feminist efforts to abolish men's clubs in Manhattan and the nation's capital. A hot mayoralty election in Chicago, a debate over secular humanism in Mobile, Alabama, a civil rights march in Forsyth County, Georgia—these, too, arouse interest. But, inevitably, much local political activity is encapsulated in nationwide statistics, e.g., there are now 6,424 black elected officials in America.

For four decades, there have been fierce, but nationally obscure, political battles in America's cities and towns over a seemingly mundane matter: fluoridation of the local water supply as a dental health measure. Thanks to the popular referendum, a legacy of the Progressive Era, decisions by elected city councils or county boards have been regularly challenged at the polls by antifluoridation activists. In roughly 60 percent of such referendums—in Los Angeles, in Springfield, Massachusetts, in Billings, Montana—the antis have won. Why this is so, and what it tells us about American political behavior, is the subject of our essay on the latest such contest—in San Antonio, Texas (p. 162).

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POLITICS & GOVERNMENT

Tip's Tenure

"O'Neill's Legacy for the House" by Steven S. Smith, in *The Brookings Review* (Winter 1987), 1775 Massachusetts Ave. N.W., Washington, D.C. 20036.

"He was nondoctrinaire, grandfatherly, tough-minded, shrewd, an activist, a partisan, a gut liberal, adaptable." That is how Smith, a Brookings Institution Senior Fellow, describes the recently retired Speaker of the House, Thomas P. "Tip" O'Neill.

A man with such qualities, it seems, would have made a powerful Speaker of the House. But the Massachusetts Democrat's tenure (1977–87) in that post, Smith says, "was shaped more by the institutional context of the House than by [O'Neill's] personal traits."

Since the late 1960s, the author says, a trend toward egalitarianism has fostered "uncertainty and confusion" in the U.S. House of Representatives. Under the bright but indecisive Speaker Carl Albert (D.-Okla., 1971–77), a group of mostly young, mostly liberal Democrats demanded and won far-reaching procedural reforms that undermined the authority of long-powerful committee chairmen and eroded party leadership.

Nevertheless, Tip O'Neill's future looked bright when he became Speaker in 1977. In that year, House Democrats outnumbered Republicans by more than 2 to 1 (292–143). O'Neill was convinced that the House would enthusiastically endorse the new Democratic administration's programs. "We'll make [Jimmy Carter] a great president," he said.

But due in part to the new Speaker's own "strategy of inclusion," many of the power-diffusing trends that began under Albert continued under O'Neill. During his tenure, O'Neill, for example, allowed the number of seats on the Steering and Policy Committee (which gives Democratic members their committee assignments) to increase from 24 to 31, and often referred House bills to several committees at once.

As one result, O'Neill did not have the power to push President Carter's legislative agenda through Congress. He failed to win support for Carter's tax and consumer protection legislation. And, in 1981, Tip was

unable to prevent the Democrat-controlled House from approving President Reagan's budget-cutting measures. "I regret to say, Tip is reeling on the ropes," observed Representative Les Aspin (D.-Wisc.).

Smith, however, does not blame O'Neill alone for the Democrats' defeats. The Speaker's political skills, he concludes, "could not overcome weaknesses in party [cohesion]."

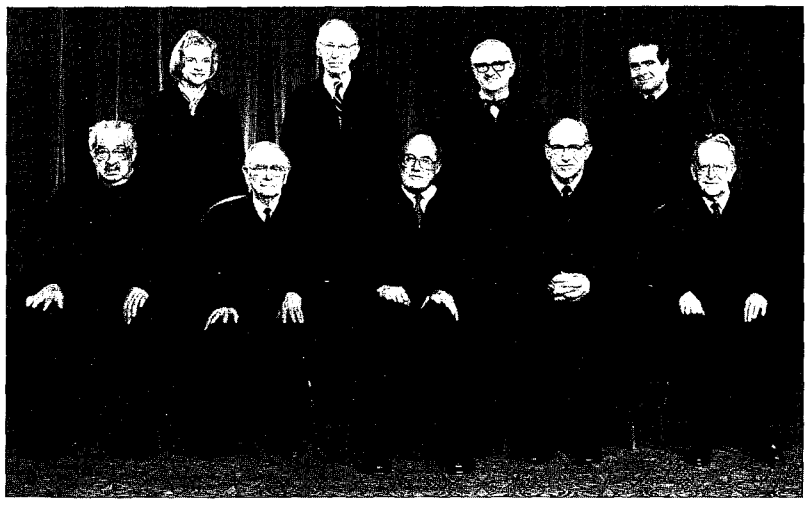
Rehnquist's Choice

"The Supreme Court: What to Expect" by David M. O'Brien, in *PS* (Winter 1987), 1527 New Hampshire Ave. N.W., Washington, D.C. 20036.

The ideological makeup of the nine-member U.S. Supreme Court seemed to change very little when William H. Rehnquist became chief justice last September. Rehnquist had already served on the Court since 1972. And Antonin Scalia, who took Rehnquist's former post as associate justice, was, like departing chief justice Warren E. Burger, a judicial conservative.

But O'Brien, a University of Virginia government professor, predicts that, compared with his predecessor, Rehnquist will exercise far more influence over the *choice* of cases that the Court will consider. That is why the new Court, he says, "holds the potential. . . . for greater change than at any other time in the recent past."

Nearly 20 years have elapsed, O'Brien observes, since the Supreme Court acted as a strong force for social change. Under Earl Warren (1953–69), the Court "revolutionized constitutional law and American society" by



The Supreme Court: (l. to r.): Thurgood Marshall (sworn in: 1967), Sandra Day O'Connor (1981), William J. Brennan, Jr. (1956), Lewis F. Powell, Jr. (1972), William H. Rehnquist (1972), John Paul Stevens (1975), Byron R. White (1962), Antonin Scalia (1986), and Harry A. Blackmun (1970).

handing down a series of rulings that greatly expanded the rights of the individual vis-á-vis the state. The Court's "liberal-egalitarian jurisprudence" rankled many conservatives. They believed, however, that under Burger (1969–86), the Court would reverse many of the Warren Court's liberal decisions. But Burger, O'Brien says, lacked both the strength of personality and intellectual prowess needed to lead his independent-minded brethren to the right.

Rehnquist, O'Brien observes, is "sharper, more thoughtful, more commanding, and wittier than his predecessor." As chief justice, he will exercise more influence over the Court's most crucial function: deciding, out of some 5,000 possible cases each year, which 170 will receive consideration.

According to custom, the chief justice circulates, before each weekly conference, a short "Discuss List," and a much longer "Dead List" of cases that the Court will not discuss at the weekly conference.

The chief justice then leads the meeting. As the Court is now constituted, Rehnquist does not have four dependable allies who will vote with him. But only four votes are needed to *select* cases for review. Thus, Rehnquist and three fellow conservatives (Antonin Scalia, Sandra Day O'Conner, and Byron White) will be able to pick cases that will enable ad hoc majorities "to carve out exceptions or to cut back on Warren Court rulings expanding [civil rights] guarantees."

Rehnquist and his conservative allies may not decide the outcome of many cases. "But controlling the Court's agenda," O'Brien says, "is the first step in altering the direction of the Court and redefining its role in American society."

Bureaucrats

"The American Bureaucrat: A History of a Sheep in Wolves' Clothing" by Barry D. Karl, in *Public Administration Review* (Jan.-Feb. 1987), American Society for Public Administration, 1120 G St. N.W., Washington, D.C. 20005.

During the 1972 presidential campaign, Alabama's Governor George Wallace complained that Washington was full of "pointy-headed government bureaucrats who couldn't park their bicycles straight."

Then, as later, many other Americans (including Ronald Reagan) agreed that the federal bureaucracy in Washington—like all bureaucracies—was bloated, inefficient, and perhaps even un-American. Karl, a University of Chicago historian, argues that such sentiments are deeply rooted in U.S. history and the American psyche.

The framers of the U.S. Constitution, Karl says, considered government bureaucracies—along with political parties, patronage, and self-interest—to be antidemocratic. Both Jeffersonians and Federalists believed that the public interest was best served when elected officials carried out the functions of government. When Thomas Jefferson was president, he employed only one secretary—whom he paid out of his own pocket.

But by 1828 the United States could no longer be governed by politicians and their small circles of friends and allies. President Andrew Jackson's populist supporters, Karl says, sought an administrative system that

would hold public servants accountable to the people. The Jacksonian apparatus evolved into a "two-tiered system" of political management. Top jobs went to political allies; professionals—drawn from banking, law, and business—carried out the day-to-day administration of government. While the Jacksonian approach has had its merits, Karl says, it also began the "conflict between mass democracy and elite professionalism" that still characterizes the American regime.

During the 19th century, the American dislike of big government matured—partly because American intellectuals blamed European bureaucracies for causing trouble on the Continent. In "The Study of Administration" (1887), Woodrow Wilson argued that the efficient governments of France and Prussia had not, on balance, improved the lives of ordinary citizens. "We should not like to have had Prussia's history," he wrote, "for the sake of having Prussia's administrative skill.... It is better to be untrained and free than to be servile and systematic."

Even Franklin D. Roosevelt's New Deal, which brought electricity, roads, and parks to rural and urban Americans, did not win big government much popularity. Agencies needed to deliver such services, says Karl, were condemned both as a "radical takeover of authority by a suspect elite" and as "partisan boondoggles writ large."

Americans dislike bureaucracy, Karl says, in spite of the advantages it has to offer, because they have never resolved the conflict between "mass democracy" and "class leadership" that the Jacksonians first introduced into U.S. government. Moreover, they are still committed to 18th-century ideals of self-government. A professional bureaucracy, they believe, separates the common man from his elected leaders.

Redistricting The South

"Does Redistricting Aimed to Help Blacks Necessarily Help Republicans?" by Kimball Brace, Bernard Grofman, and Lisa Handley, in *The Journal of Politics* (Feb. 1987), Dept. of Political Science, Univ. of Fla., Gainesville, Fla. 32611.

In recent years, under the 1965 Voting Rights Act, numerous federal court orders have forced Southern states to reapportion legislative districts to ensure that black residents are fairly represented in state and local elections. Some commentators have argued that black leaders have colluded with Republicans in the Reagan Justice Department to help each other gain Southern seats. However, Brace and Handley of Election Data Services, and Grofman, a professor of political science at the University of California, Irvine, conclude that any help given by blacks to Republicans in the South is inadvertant.

The authors examined 11 plans for redistricting the 46-member South Carolina State Senate. Plans proposed by blacks created districts in which the black majority seats were 12 to 18 percent more Democratic than black. Republicans used a Justice Department plan that created districts that aided blacks and, as a consequence, aided Republicans.

Republican seats, the authors found, "soak up white Democrats (and

thus benefit blacks), and black seats soak up white Democrats (and thus benefit Republicans)."

The authors expect that blacks and white Republicans will continue to gain ground in Southern state legislatures at the expense of white Democrats. Black majority districts will continue to elect blacks; newly formed districts with few blacks will either elect incumbents or "more conservative candidates."

Southern Republicans, the authors believe, will gain ground for other reasons as well. As the Democratic party in the South, the authors say, becomes "more closely identified with the interests of blacks.... Republican gains in the South, [which have been] modest to date at the state and local level, will begin to accelerate."

FOREIGN POLICY & DEFENSE

Gorbachev's Charm Offensive

"Gorbachev: A New Foreign Policy?" by Dimitri K. Simes, in *Foreign Affairs* ("America and the World" Special Issue 1986), Council on Foreign Relations, 58 East 68th St., New York, N.Y. 10021.

Soviet Communist Party leader Mikhail Gorbachev has declared that Moscow's foreign policy will be based on *glasnost*, or "openness."

Indeed, during the past two years, the Kremlin seems to have liberalized both foreign and domestic policies. Officials have freed dissident Andrei Sakharov from internal exile, allowed the publication of once-banned books, such as Boris Pasternak's *Dr. Zhivago*, and tolerated criticism of normally sacrosanct state-run corporations.

Does this "charm offensive" represent a substantive or superficial change in Soviet policies and goals?

Simes, a senior associate at the Carnegie Endowment for International Peace, argues that most of Gorbachev's reforms are illusory. The Soviet leader, he believes, will not depart from what have been the Soviet Union's foreign policy goals since the end of World War II: controlling the nations of Eastern Europe, "decoupling" the United States from Western Europe, and ensuring the Soviet military's ability to project force anywhere in the world. *Glasnost*, he says, embodies only a "refreshing tactical flexibility" in pursuing "traditional Soviet objectives."

Less has changed in the Soviet Union than many Western commentators like to believe. Ordinary Soviet citizens may still not criticize Gorbachev and his policies. Outspoken Soviet dissidents are still either imprisoned or, as with Anatoly Shcharansky and Yuri Orlov, swapped for spies. Soviet officials, says Simes, let Sakharov go only because his health was failing, and they did not want to be blamed for the dissident's "de facto murder."

Perhaps as part of his *glasnost* campaign, Gorbachev has conceded that Moscow has "encountered considerable difficulties" in asserting its

influence in the Third World. But the Kremlin has not curtailed its ventures abroad (the Afghan war cost Moscow $3 billion last year) nor indicated that Soviet arms and advisers deployed in client states such as Nicaragua and Angola will be brought home anytime soon.

America has assumed more importance in Soviet foreign relations under Gorbachev. The United States "remains the toughest obstacle to the expansion of Soviet global power." It is also the Soviets' chief competitor for influence in many parts of the world.

Simes suggests that *glasnost* resembles the policies of former Soviet leader Nikita Khrushchev (1955–64). While Khrushchev seemed liberal by encouraging a literary "thaw" and withdrawing Soviet forces from Austria and Finland, he also was responsible for crushing the Hungarian Revolution of 1956, erecting the Berlin Wall, and placing missiles in Cuba.

Simes warns Americans to pay heed to Kremlin foreign policy, lest they forget that "its final act is supposed to be their own demise."

Wrong Target

"The Case for the $435 Hammer" by James Fairhall, in ***The Washington Monthly*** (Jan. 1987), 1711 Connecticut Ave. N.W., Washington, D.C. 20009.

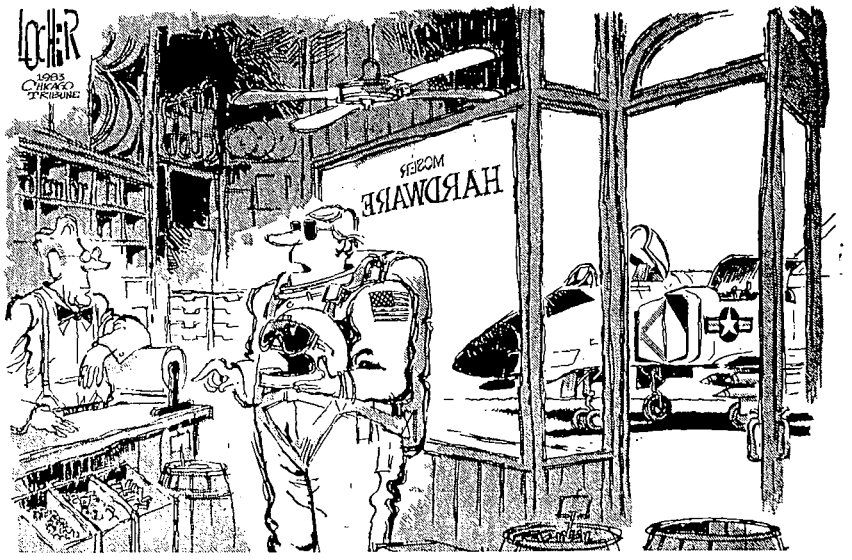
In 1983, newspapers reported that the Pentagon had paid a defense contractor $435 for an ordinary claw hammer. The report outraged everyone from the cartoon character Beetle Bailey to Democratic presidential candidate Walter Mondale.

But Fairhall, a former contracting officer for the U.S. Defense Logistics Agency, argues that U.S. taxpayers did ***not*** necessarily pay too much for the hammer. Obsessed by the apparent swindle, both Congress and the public, he adds, have overlooked "deeper, more complex, [and] less newsworthy sources of defense waste."

The hammer episode began in 1981, when the Navy offered a contract to a Long Island, N.Y., electronics company—Gould, Inc.—to manufacture a flight instrument trainer for T-34C aircraft. The Defense Contract Administration Services Management Area negotiated Gould's contract, and agreed to pay $847,000 for services, parts, and tools. The contract's listed price for each ***hammer***: $435.

In 1983, a chief petty officer working in the repair department of the Pensacola, Fla., naval air station saw the unit-price list for the T-34C trainer, and started asking questions. To head off any bad publicity, Gould quickly refunded $84,000 to the Pentagon. Nevertheless, the hammer story eventually leaked out: "Would You Pay $435 for This?" asked a *Newsday* headline, which ran next to a picture of the infamous hammer. Meanwhile, Representative Berkley Bedell (D.-Iowa) launched a congressional investigation.

But Bedell and the press, Fairhall says, were befuddled. Neither understood the "equal allocation method" of negotiating contracts involving large numbers of spare parts. Under this method, all "support" costs are apportioned among all of the parts involved. A contract with support costs of $100,000 involving 100 different items, for example, would necessarily allocate $1,000 to each part—whether it were a circuit card assembly or a



A 1983 cartoon: "I'm too far away from the Pentagon to purchase the $2,970 washer I need.... gimme those 3 for 69 cents replacements." The Pentagon now has "more rules, more people checking on the checkers."

plastic knob. The billing price equals the cost of the part, plus $1,000.

A thorough Defense Contract Agency audit finally concluded that Gould had overcharged the government $92,000—for reasons that had nothing to do with the hammer. Since then, the Pentagon has stopped using the equal allocation method.

Should the public therefore dismiss press accounts of $435 hammers and $7,600 coffee pots—and relax? Not at all, Fairhall says. In other ways—say, by awarding sole-source contracts or by refusing to punish inefficient defense contractors—the Pentagon can still waste the U.S. taxpayer's money.

A Pacifist Pentagon

"Pentagon Strategy 'WWNH'" by John F. Ahearne, in *The Washington Post* (March 4, 1987), 1150 15th St. N.W., Washington, D.C. 20071.

Since fiscal year 1981, the annual U.S. defense budget has increased from $158 billion to $282 billion—to pay for higher military salaries and new hardware. Surely, the Pentagon is now ready to fight if war comes.

Not really, contends Ahearne, a deputy assistant secretary of defense under President Jimmy Carter. "The real strategy," he says, seems to be based on a "WWNH" concept—War Will Never Happen, or at least not for the next few years.

How so? The author says that post-Vietnam Pentagon thinking has led

to an emphasis on impressing foes and friends with expensive "symbols," notably a 600-ship "show-the-flag" Navy and an array of high-technology armor and aircraft. The WWNH philosophy makes it logical to underfund unit readiness, keep munitions stockpiles low, and "not be overly concerned whether a weapons system [e.g., the B-1 bomber] works before it is bought in large numbers."

Meanwhile, Pentagon tests (such as "Nifty Nugget" in 1978) have shown grave deficiencies in U.S. mobilization and deployment planning for a possible war in Europe. The 1983 invasion of Grenada revealed so many weaknesses in command and control that it helped spur last year's congressional overhaul of the U.S. military command system. The 1986 raid on Libya showed that two U.S. Sixth Fleet carrier task forces still needed help from 18 land-based Air Force F-111 bombers to strike targets defended by what Ahearne calls a "second-rank military power."

"Supporters of the current [defense] programs," says Ahearne, "argue that the reason war has not happened and won't, is [because the Soviet Bloc's leaders are deterred by] the strong and large forces of the United States. But our adversary is smart... the originator of the Potemkin Village, a façade. The USSR is not likely to be fooled. Real deterrence requires real capability."

Contadora Confusion

"Contadora: The Failure of Diplomacy" by Bruce Michael Bagley, in *Journal of Interamerican Studies and World Affairs* (Fall 1986), Univ. of Miami North-South Center for the Institute of Interamerican Studies, P.O. Box 248134, Coral Gables, Fla. 33124.

The so-called Contadora nations have been trying to negotiate a peace pact in Central America for over four years. But their efforts are doomed, suggests Bagley, a Johns Hopkins University specialist in Latin American affairs, because the interests of the United States and Nicaragua are fundamentally at odds.

Representatives from Mexico, Colombia, Venezuela and Panama first met on Panama's Contadora Island in January 1983 to discuss how they could peacefully contain the revolutionaries in Nicaragua and El Salvador, and limit U.S., Soviet, and Cuban activity in the region. Their September 1983 "Document of Objectives" called for the expulsion of all foreign troops, bases, and advisers from Central America, and for the holding of (verifiably) democratic elections. In public, the Reagan administration applauded the "Contadora process," but supported the *contra* rebels against Nicaragua's Marxist regime. The Kissinger Commission's January 1984 report to President Reagan warned that the Contadora nations' interests "do not always comport with our own."

In September 1984, the Contadora group released its first draft treaty—the so-called Revised Act, which required Nicaragua to expel all Soviet Bloc military advisers, halt arms imports, reduce its 60,000-man army, and end all assistance to the Salvadoran guerrillas. It also instructed Washington to cease its support for the *contras* and end U.S. military maneuvers in the region within 30 days.

Nicaragua, perhaps as a bold propaganda move, accepted the treaty, which Washington dismissed as a "draft" document. Seeking the Reagan administration's support, the Contadora group presented a revised proposed treaty on September 12, 1985, which eliminated the requirement that the United States immediately cease supporting the *contras*. This time Nicaragua refused to sign and in December seconded Costa Rica's proposal for a six-month suspension of the Contadora negotiations. The talks eventually did resume, and produced, on June 6, 1986, a treaty that linked the banning of U.S. advisers, bases, and exercises to limits on the size of the Nicaraguan army. Once again, Nicaragua accepted the treaty, but Washington rejected it.

The Reagan administration, Bagley concludes, simply will not trade U.S. acceptance of the Nicaraguan regime for Managua's promises not to team up with Cuba and the Soviet Union, or to threaten its neighbors. There is "little benefit to be gained from talking about a negotiated accord," one U.S. official told Bagley, because Washington has been "hoping for the overthrow [by the *contras*] of the Sandinistas."

For their part, President Daniel Ortega's Sandinistas have done little to allay Washington's suspicions. Managua has failed to hold elections that included opposition leaders, or (as El Salvador, Honduras, and Costa Rica have requested) to reduce the number of its own troops and Soviet Bloc advisers in Nicaragua.

As long as Washington rejects the Sandinistas, and Managua's actions inspire mistrust in Washington, the much-touted Contadora process, Bagley says, will remain "largely irrelevant."

ECONOMICS, LABOR & BUSINESS

Rohatyn's Plea

"The Blight on Wall Street" by Felix Rohatyn, in *The New York Review of Books* (Mar. 12, 1987), 250 West 57th St., New York, N.Y. 10107.

Today's stock market has soared to record highs, but this boom, warns veteran investment banker Rohatyn, has little to do with America's real economic growth. While speculators make runaway profits, "business is relatively slow and major sectors of our economy are in serious difficulty."

Shakily financed corporate takeover bids head Rohatyn's list of market abuses. Speculators with no long-term interest in the target attempt to acquire a company by "raiding" its stocks (buying up large numbers of shares) for quick profits. The corporate "raider" finances his bid with "junk bonds" that cost him little up front and give high yields. Financial institutions sell these bonds (which substitute for real equity) "in the tens of billions of dollars."

Under today's market rules, raiders can make bids without committing themselves to purchase. Once a bid is made, short-term traders rush to acquire large speculative holdings of shares. Generally, if the target com-

pany agrees to pay "greenmail" to the raider—buying back its shares at a premium—the raider will agree to stop the takeover campaign. If the takeover succeeds, the speculator may cannibalize the company's assets or cut back on research and development to service the huge debt on his "junk" bonds.

Takeover bids—or fear of them—led to the mergers of Chevron and Gulf, Occidental and Cities Service, Mobil and Superior. In each case, the companies' profits have plummeted.

In the effort to repel takeover bids, some companies (including FMC, Colt Industries, Owens-Corning Fiberglas, and Gillette) have increased the price of their stocks to make themselves less desirable. Earlier raids and the resultant expense of "greenmail" undermined these companies by reducing their equity and increasing their amount of debt.

Market rules should be tightened, Rohatyn says, to curb speculative abuse. "If America is to compete with Japan," he argues, "we must invest in and create new products, instead of tearing apart our industries and simply inventing new kinds of paper."

No De-Industrialization

"U.S. Manufacturing: Any Cause for Alarm?" by Molly McUsic, in *New England Economic Review* (Jan.-Feb. 1987), Federal Reserve Bank of Boston, 600 Atlantic Ave., Boston, Mass. 02106.

Is America "de-industrializing?"

No, says McUsic, a former senior research assistant at the Federal Reserve Bank of Boston. "The fears of a rising service economy, with barber shops and laundromats replacing steel mills and auto plants, are greatly exaggerated."

Since 1960, manufacturing's share of U.S. nonagricultural employment has dropped from 28 to 21 percent. McUsic attributes this to two causes:

U.S. manufacturers have become more efficient, increasing factory productivity an average of 2.2 percent a year since 1973. Since the last recession in 1980–82, the nation's "overall level of manufacturing productivity [has remained] the highest in the world."

Many factory jobs once considered goods-producing have now become "services." A security guard on the payroll of a textile company is counted as part of the manufacturing sector. If the same guard were working for a firm under contract to the textile company, he would then be providing a "service," and manufacturing employment statistics would drop. If one-third of the 3,741,000 jobs created by the "business services" sector from 1960 to 1984 were filled by factory employees, McUsic says, "there would have been no drop in 'manufacturing employment.'"

Moreover, America is still more efficient than other industrialized nations. Manufacturing output per hour of work increased 5.8 percent in the United States between 1982 and 1984, compared with 4.6 percent in France and 4.4 percent in Italy. McUsic calculates that American manufacturing is 14 percent more productive than Canada's and 41 percent more productive than Britain's.

All well-to-do industrialized nations increase services, which "tend to grow along with an expanding stock of goods." Third World manufacturing growth (e.g., in Korea, Brazil, Taiwan) does not necessarily mean Americans will be worse off. America's share of world manufacturing output has declined since World War II, yet the American gross domestic product per capita in the 1980s has increased 30 percent faster than Britain's and 23 percent faster than Japan's.

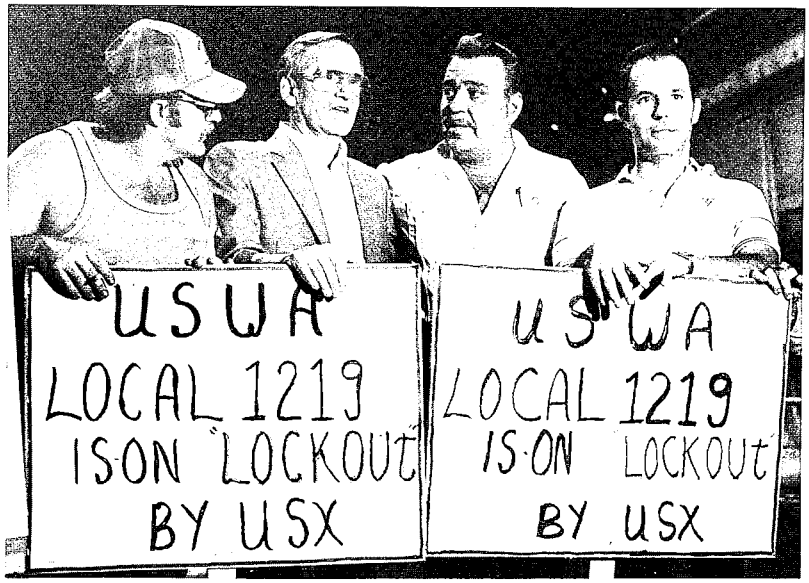
Not all U.S. industries are flourishing, McUsic concedes, but the data does not reveal "evidence of profound economic ills."

Labor Truce

"Labor-management scene in 1986 reflects continuing difficulties" by George Ruben, in *Monthly Labor Review* (Jan. 1987), U.S. Dept. of Labor, Bureau of Labor Statistics, Washington, D.C. 20212.

With American steel, automobile, and farm machinery manufacturers in trouble, unions and management have declared a temporary truce. Both, reports Ruben, a Bureau of Labor Statistics project director, are joining to cut costs to keep American industry competitive.

During the relatively prosperous period from 1946 to 1980, American unions won concessions with 200 to 400 major walkouts a year. In 1985—threatened with plant closures and layoffs—workers went out on only 52 major strikes (a record low), and in the first 10 months of 1986, only 65.



After a six-month dispute with USX, Braddock, Pa., steelworkers returned to work last February. They accepted pay cuts but gained job security.

Yet Ruben's data suggests that today's labor-management truce has mixed results. At hard-hit Bethlehem Steel Corporation, where steelworkers agreed to suspend COLAs (cost-of-living allowances) and to cut pay by $1.97 an hour, employees still enjoy a high $23 hourly wage. Workers at the farm equipment manufacturer Allis-Chalmers, reduced in number to 2,000 in 1983 from a peak of 20,000 in 1950, accepted a wage cut, but company profits continued to decline.

Companies now seek ways to compensate workers other than by increasing their pay. Lump-sum bonuses cost management less in terms of (wage-based) pension benefits, as do profit-sharing, stock options, and assurances of job security. Chrysler distributed more than $550 million in cash and stock to 87,500 employees under its employee stock ownership plan. Steelworkers at CF & I Steel Corporation in Pueblo, Colo., traded cuts in already modest wages ($8–14 per hour) for job security and 38 percent employee ownership of the corporation after three years.

Facing increased foreign competition in the small car market, General Motors (GM) decided to save money by slowing completion of its ambitious Saturn manufacturing complex. GM also plans to shut down nine plants and reduce production at two by 1990. "Industry observers agree," says Ruben, "that General Motors [with 142,000 salaried employees in the U.S and Canada] is overstaffed."

The automobile manufacturing giant is also trying to trim expenses on employee health insurance, which increase approximately 14 percent a year. GM paid out $2.3 billion in health benefits in 1984, but managed to save a record $213 million in 1985 by offering its employees a choice of less costly HMO (health maintenance organization) and "preferred provider" plans along with "traditional" insurance.

What Deficit?

"The Real Federal Deficit: What It Is, How It Matters, and What It Should Be" by Robert Eisner, in *The Quarterly Review of Economics and Business* (Winter 1986), Univ. of Ill., 1206 South Sixth St., Champaign, Ill. 61820.

"Everybody—or almost everybody—is talking about 'the deficit,'" Eisner writes. "Very few know what they are talking about."

Eisner, a professor of economics at Northwestern University, argues that federal budget deficits are not always the demons many politicians make them out to be. "Deficits do matter," he says, "but it [seems] important to see how." If used properly, they can be a valuable tool in restoring economic health.

In order to assess federal deficits correctly, economists should first redetermine when a deficit occurs. Eisner suggests that federal deficit statistics should be adjusted in two ways. Because much of the federal debt is incurred by selling bonds with floating interest rates, deficit statistics should be adjusted to account for the variance in interest rates. Deficits should also be measured in constant dollars, since inflation decreases the value of the debt over time.

If this is done, new patterns in the rise and fall of the deficit emerge. By official reckoning, the Carter years (1977–80) produced a cumulative budget deficit of $152 billion. As adjusted by Eisner for interest rates and inflation, the Carter years actually produced a surplus of $72 billion. Double-digit interest rates and double-digit inflation made deficits appear to be much larger than they actually were.

Carter's economic advisers and the Federal Reserve Board tried to fight the red ink through a combination of tight-money policies and spending cuts; the result, in Eisner's view, was the recession of 1981–82. The Reagan administration used another tactic, slashing taxes and increasing military spending, which resulted, even after Eisner's adjustment, in the largest U.S. budget deficits in history. Yet these deficits, by reducing unemployment and stimulating growth, resulted in the start of economic recovery in 1983.

The current goal of deficit reduction envisioned in the 1985 Gramm-Rudman Act is misguided, Eisner contends. Gramm-Rudman, if actually implemented by Congress, will result in "real" budget surpluses, which will reproduce the sluggish economy of the Carter years.

Politicians, Eisner concludes, should drop the ideal of a balanced budget at any cost and accept deficits as a permanent—and somewhat helpful—element in American economic life. "A budget balanced by current federal rules of accounting," Eisner warns, "is an invitation to the worst economic downturn in half a century."

SOCIETY

Volunteers of America

"Volunteering in America" by Natalie de Combray, in *American Demographics* (Mar. 1987), 127 West State St., Ithaca, N.Y. 14850.

Americans would rather give away their money than their time, reports de Combray, a freelance writer; nearly 90 percent of Americans gave to charities in 1985, but fewer than half volunteered time. Still, volunteer work is alive and well, if not exactly burgeoning. It grew six percent from 1981 to 1985. Eighty-nine million men and women helped out more than three hours per week in 1985.

With federal budget cuts pinching many nonprofit organizations, free help is more in demand than ever. Where will it come from? Independent Sector, a coalition of nonprofit groups, has compiled the following demographic profile:

Women still make up the volunteer core, a tradition that extends back to the 19th century, when ladies organized temperance crusades or fought prostitution. Today, as 44 percent of the work force, women have less free time than men—16 hours a week, compared with men's 20—but they dominate volunteer groups by a six percent margin.

Most two-career couples manage to find a few spare hours to help; single people, with more free time, don't. Likewise, college-age Americans

On May 25, 1986, celebrities such as Raquel Welch and Dudley Moore joined "Hands Across America" to raise $24 million for the nation's homeless.

(18 to 24), despite enviable vacations, commit less time than hard-working 35-to-49-year-olds.

Finally, geography and the seasons play a role. Westerners volunteer more (54 percent) than Easterners (43 percent), and suburbanites help more (55 percent) than city folk (46 percent). Everyone gives more time in winter, around holidays, than in summer.

People need both selfish and selfless motives to sustain their interest, notes the author. Thus, church and neighborhood groups draw the most volunteers, and charities that attract celebrities with their attendant press coverage are especially popular. Pity the homeless if next year's fashionable cause sweeps them aside.

Nursing Homes Dilemma

"Improving the Quality of Nursing Homes: Regulation or Competition?" by John A. Nyman, in *Journal of Policy Analysis and Management* (Winter 1987), 605 Third Ave., New York, N.Y. 10158.

Scandals involving U.S. nursing homes for the aged make few headlines now, but the drama continues. In 1974, a major Senate report estimated that, in about half of all nursing homes, bad care led to patients' deterioration or even threatened their lives. In 1986, the Institute of Medicine and the Senate's Special Subcommittee on Aging again condemned most of the nation's nursing homes for substandard facilities and treatment.

Why hasn't this situation been remedied? According to Nyman, a health economist at the University of Iowa's College of Medicine, state and federal authorities *did* take various corrective steps during the past decade, but all were doomed to failure because of a shortage of beds. With demand exceeding supply, even badly run homes can charge high prices. According to the 1986 Senate report, 600,000 more beds will be needed by 1990.

The bed shortage, ironically, results from state actions. Housing officials imposed moratoriums on private nursing home construction throughout the 1980s in order to limit their cost outlays for Medicaid recipients. When brutal mistreatment, especially of lower-paying public patients, came to light during the 1970s, state governments raised Medicaid payments until they were nearly competitive with fees charged to private patients. They also devised penalties, including closures, for operators who failed to meet certain standards.

Of course, all parties saw the loophole: Official sanctions could not be invoked because patients had no place else to go. Moreover, higher Medicaid payments backfired. The average nursing home operator had a guaranteed base of publicly supported Medicaid patients (over 60 percent of all nursing home occupants) who were able to pay at least 70 percent of the average private fee. His financial incentive to increase quality (to attract more private patients), weighed against the cost of improvements, was nil.

Can anything be done? Governments could more credibly threaten substandard homes with receivership (taking over until a new buyer can be found) than with closure, says the author. But what constitutes superior medical treatment, let alone the intangible "caring" patients need? The only real solution, Nyman argues, is for states to encourage new private construction and allow nursing homes to operate competitively as restaurants, hotels, or hospitals do—with enough controls to prevent or expose truly glaring problems.

These measures could improve the overall situation, says Nyman. One other ingredient must be present: "patient power," the willingness of individual patients and their families to assert their rights.

Vietnam Vets

"Labor force status of Vietnam-era veterans" by Sharon R. Cohany, in *Monthly Labor Review* (Feb. 1987), U.S. Dept. of Labor, Bureau of Labor Statistics, Washington, D.C. 20212.

Often portraying Vietnam GIs as either victims or psychopaths, the popular film *Platoon* continues a Hollywood tradition: the idea that Vietnam veterans were—and still are—"losers."

Cohany, a Bureau of Labor Statistics economist, refutes that notion. Were soldiers of the Vietnam era (1964–75) reluctant draftees, disproportionately black and Hispanic? In fact, 60 percent of the troops in 1968 (the peak of Vietnam combat) were volunteers. As for ethnic mix, blacks (nine percent) and Hispanics (four percent) were *under*-represented in the Vietnam-era military.

Today, 12 years after the war, one in four males in the labor force between the ages of 30 and 44 is a Vietnam-era vet. Like their nonveteran

peers, says Cohany, 94 percent have jobs or are actively seeking work. Unlike black and Hispanic nonveterans, black and Hispanic veterans are as likely to be in the labor force as whites. (But *all* black males are two-and-a-half to three times as likely as all white males to be unemployed.)

A Vietnam-era vet may well have a better job than his peer who never served. Although more nonvets hold higher degrees, 15.6 percent of Vietnam-era veterans fill "executive, administrative or managerial" positions, as opposed to the nonveterans' 12.0 percent. Seventy percent of Vietnam-era veterans went to school on the GI Bill—a fact perhaps reflected in the 23.5 percent who now hold skilled-craft jobs, compared to 20.2 percent of nonvets. Fewer vets (3.8 percent) work as low-paid, unskilled laborers, as against 6.4 percent in the nonvet male population.

Serving Uncle Sam apparently benefited black Vietnam-era veterans, more of whom stay in the labor force than do their black nonveteran peers (93.6 versus 72.9 percent). And thanks to training programs and preferential hiring for vets, more black ex-GIs work in white-collar, public sector jobs than do black males who never served.

PRESS & TELEVISION

All the News?

"The Bay of Pigs and The New York *Times*: Another View of What Happened" by Daniel D. Kennedy, in *Journalism Quarterly* (Autumn 1986), Univ. of S.C., Columbia, S.C. 29208.

A newspaper that prides itself on its independence is bound to attract skeptics. But, contrary to popular journalistic myth, the New York *Times* did not 'suppress' what it knew about President John F. Kennedy's planned Bay of Pigs invasion, says the author, a senior editor of the *Daily Times Chronicle* in Wilburn, Mass. In fact, a few people—foremost the president himself—seem to have suppressed their memories.

The *Times*'s lead story on April 7, 1961, by reporter Tad Szulc, was headlined: "ANTI-CASTRO UNITS TRAINED TO FIGHT AT FLORIDA BASES." Having persuaded the *New Republic* to kill a similar story the month before, President Kennedy was furious. "Castro doesn't need any agents over here," he exploded. "It's all laid out for him."

Yet, by September of the following year, the president, oddly, was blaming the *Times* for withholding a story that would have forced him not to invade Cuba on April 17. "I am just sorry you didn't tell it at the time," he bitterly remarked to the paper's publisher, Orvil Dryfoos. Likewise, White House historian Arthur Schlesinger, Jr., damned the *Times* with faint praise by wishing it had "behaved irresponsibly." And Szulc later hinted that his article had been watered down.

What did the *Times* hold back? According to then managing editor Turner Catledge and others, not much. Only two points of any significance were deleted from Szulc's article: a reference to the CIA (which Catledge cut out for lack of evidence), and one to the timing of the invasion—Szulc

thought it was "imminent" because he found out that the U.S. government had requested radio silence for April 18. A good educated guess and no more, Catledge decided. At his orders, the story's headline was reduced in size, but remained the lead on Page One.

Did the *Times* publish "All the News That [Was] Fit to Print"? Yes, says the author. But some journalistic myths, he concludes, persist forever.

RELIGION & PHILOSOPHY

Voodoo In Haiti

"Voodoo in Haiti Today" by Amy Wilentz, in *Grand Street* (Winter 1987), 50 Riverside Dr., New York, N.Y. 10024; "An Island Between Seasons" by Bob Shacochis, in *Harper's* (Feb. 1987), 666 Broadway, New York, N.Y. 10012.

Voodoo, from the word *vodun*, for god or spirit, is Haiti's own amalgam of African animism and Roman Catholic ritual. It has been openly practiced since the late 1700s, when thousands of African Maroons (escaped slaves) fled from French colonial plantations to the hills and mounted a successful 12-year insurrection. In 1804, Haiti became the world's first free black republic.

The republic was ill-fated. Haiti's last dictators, François (Papa Doc) Duvalier, who was president from 1957 to 1971, and his son Jean-Claude (Baby Doc) (1971–86), were "hardly worse than most of the . . . strutting chanticleers" before them, observes Shacochis, an American essayist and fiction writer. Still, by 1983, a mere 0.5 percent of the population controlled nearly half the island's wealth. Rural Haitians' income per capita averaged $125 a year. Most (85 percent) Haitians were illiterate; life expectancy was only 47 years.

In such circumstances, it was not difficult for the Duvaliers to exploit voodoo. François, self-appointed "President for Life," did not inspire the people's trust, only their fear—he wore the black suit and dark glasses of voodoo's dread spirit, Baron Samedi, Lord of the Dead. His "Tonton Macoutes" (often translated as "bogeymen"), an unofficial army of thugs, spies, and soldiers of fortune, infiltrated voodoo temples and corrupted and enlisted local priests (*houngans*) and priestesses (*mambos*), turning the practice of taking offerings into simple extortion.

When Jean-Claude Duvalier fled to France in February 1986, voodoo, so long embroiled in the island's politics, became a source of direct conflict. As part of the popular *dechoukage* (uprooting), which included the 1986 uprising that brought a provisional military regime to power, voodoo temples have been sacked, voodoo drums—"an essential part of the voodoo ceremony"—have been burned or confiscated, and scores of *houngans* and *mambos* have been murdered, reports Wilentz, a *Time* staff writer.

Much of the violence has been abetted by crowds shouting "Macoute," which suggests that the Duvaliers' minions are the only targets. But many victims are not Duvalierists. According to both authors, local Protestant

RELIGION & PHILOSOPHY

Voodoo was long a major tourist attraction in Haiti. In 1969, during François (Papa Doc) Duvalier's reign, U.S. sailors watch a voodoo ceremony.

missionary sects and some Catholics appear to be turning a political-religious purge into "a chasse à voodoo." Villagers circulate tales of a local Protestant minister who hacked off a *mambo*'s legs, and a Catholic bishop who buried a voodoo shrine in cement.

Duvalier's Macoutes—voodoo's long-time corruptors and protectors—are unlikely to survive, the authors believe. But voodoo itself may be extinguished in the process.

Church and State

"Disestablished Religion in America" by Jeremy Rabkin, in *The Public Interest* (Winter 1987), 10 East 53rd St., New York, N.Y. 10022.

John Adams (1735–1826) once said that America's founding document—the oldest written constitution in force today—was "designed for a religious and moral people and no other." Rabkin, an assistant professor of government at Cornell University, argues that the nation's political stability owes more to this religious framework than is commonly supposed.

While the Framers made no mention of God, Americans appear to be the Western world's most devout people. Eighty-six percent call their religious beliefs "very important." (In Britain and Sweden, where churches are established by law, only 49 percent feel that way.) At the same time, while 77 percent of Americans claim to respect "the full authority of the Bible," only 42 percent can name the four Gospels (Matthew, Mark, Luke, and John). Just what sort of religious beliefs are these?

Reformed Protestant, answers the author: the religious strain that has dominated throughout the United States' history, and a primary shaper of the nation's values, either directly or by association. With its "disdain for ritual and liturgy" and emphasis on moral self-determination, reformed Protestantism formed the ideal complement to liberal democracy. (By the same token, 19th-century Protestant Americans' suspicions of Roman Catholicism partly arose from the sense that democratic principles were incompatible with papal edicts.)

The Constitution's commitment to separation of church and state proved decisive in forging a bond between them, says Rabkin. British philosopher David Hume (1711–76), who was much admired by James Madison, feared that disestablishment would evoke civil challenges from "charlatans practising on the passions and credulity of the populace." Eccentric sects did spring up in America after the Revolution, but none of them threatened the Republic. In fact, Protestant evangelicals saw Christianity as "the religion of liberty."

In 1840, a visiting German Lutheran minister scoffed that the typical American Protestant group behaved as if "self-sprung from the skies." By the 20th century, Protestantism's ad hoc character had become a feature of American churches in general. And, despite opposition from strict separationists, the nation remained bent on investing "public purposes with a sacred aura," routinely drawing upon ministers, priests, and rabbis to bless civic events—including sessions of Congress.

The Constitution implicitly recognized, concludes Rabkin, that "in the end our souls can neither be saved nor lost by mere governments." Nor, as it turned out, could religion alone serve America's spiritual ends.

Protecting the Dead

"On Harming the Dead" by Joan C. Callahan, in *Ethics* (Jan. 1987), The Univ. of Chicago Press, 11030 South Langley Ave., Chicago, Ill. 60628.

We should not, as the old adage says, speak ill of the dead. But can our words—or deeds—hurt the dead at all? The law says they can. So do some moral philosophers.

Callahan, an assistant professor of philosophy at the University of Kentucky, says that morality is not involved, and should not be invoked. What, she asks, does a person "possess" after his death? He can't take his reputation with him; that, says Callahan, is not something that is part of a person, but is bestowed by the opinions of others. Albert Einstein's reputation, for example, was something Einstein never controlled.

Even the discovery of an unpleasant fact after a person's death does not harm that person. Consider Jones, a prominent scientist. After his death, it is discovered that many of Jones's laboratory results are forged. This increases our knowledge of Jones, yet Jones remains the same person he was during his lifetime. His existence has not been altered by discoveries made after his death.

But don't wills reflect the wishes of the dead? That, Callahan argues, is "loose talk." When we say "Sally must pay her mother's debts," we do not mean that Sally's mother is handing Sally debts from beyond the grave, but

RELIGION & PHILOSOPHY

that Sally's mother's debts, once the property of Sally's mother, have now become the property of Sally. Only if a living heir assumes a dead person's interests—by extending a copyright, paying a debt, preserving a family heirloom—are the dead person's interests preserved.

Even so, Callahan believes that those portions of the law based on the premise that the dead *can* be harmed should be kept. No fine-spun theory of morality is necessary. Living Americans are comforted to know that, through their bequests, they can reward persons or institutions they care about. And, if the legal conceit that a dead person can be protected is also the best way to comfort surviving friends and heirs, then keeping this conceit intact "is exceedingly well justified."

SCIENCE & TECHNOLOGY

Dyslexia

"Dyslexia" by Frank R. Vellutino, in *Scientific American* (Mar. 1987), 415 Madison Ave., New York, N.Y. 10017.

In 1925, American neuropsychiatrist Samuel T. Orton suggested that a problem he termed "lying in the visual system" made otherwise intelligent children perceive letters and words in reverse—*b* for *d* or *was* for *saw*. This, he thought, would also explain why dyslexics persist in "mirror writing" when normal children abandon it after age four or five.

Orton's theory underlies many of the remedial treatments used today, such as optometric training to improve binocular coordination. Vellutino, director of the Child Research and Study Center at the State University of New York, Albany, says these treatments are futile. Far from being a visual disorder, he argues, dyslexia stems from a complex brain dysfunction: the inability to store and retrieve linguistic information properly.

In experiments with second to sixth graders, Vellutino found that dyslexics could copy words accurately even when they misnamed them. Asked to read out each of the letters, they did so—yet still misnamed the words. On the other hand, dyslexics fared no worse than normal readers in trying to reproduce words from an unfamilar language (Hebrew) after brief exposure. For all readers, in the absence of linguistic associations, Hebrew became an abstract task, like math.

Along with specific word problems, general semantic deficiencies crop up in other tests. Dyslexic children do not seem able to master phonetics. When given a series of meaningless "pseudowords," they cannot sound them out. Nor can they readily recall words just heard; their brains have not "stored" an adequate impression of how the words are formed. Indeed, these children have trouble naming many things: common objects, colors, and numerals. They may stumble, hesitate too long, even say "dog" when confronted with a picture of a cat.

Genetic research may soon unveil the mechanisms behind this strange disorder. Already certain is that males are more apt to suffer from it than females—by ratios of as high as 10 to 1. Twins are more likely to be dyslexic than other children. Researchers at the University of Colorado,

Boulder, have tentatively isolated a particular gene in families with a history of reading problems.

Until scientists gain more knowledge, Vellutino says, the best remedies are simply intensive, one-to-one tutoring and a reading program that combines "whole word" reading with "alphabet mapping," or phonetics. Dyslexics who improve invariably follow the same route: practice, then practice some more.

Computer Mumbles

"ADA's Troubled Debut" by Jonathan Jacky, in *The Sciences* (Jan.-Feb. 1987), The New York Academy of Sciences, 2 East 63rd St., New York, N. Y. 10021.

Just before dawn on July 22, 1962, the sky flashed a brilliant orange as Mariner I, America's first rocket to Venus, lifted off from Cape Canaveral. Within four minutes, it began to veer off course. The range safety officer was forced to ignite Mariner's "self-destruct" system, turning the $8 million missile into burning metal confetti. Several days later, analysts for the U.S. Air Force and NASA disclosed the problem: A period had been substituted for a comma in the launch's flight control computer program.

In the hope of forestalling such fiascos, the Defense Department has developed several strategies to improve its computer software. The *pièce de résistance* is a new programming language called ADA (named for Lord Byron's daughter, Augusta Ada). But critics, according to Jacky, an assistant professor at the University of Washington, charge that ADA's complexity makes it susceptible to the very errors it was designed to prevent.

During the mid-1970s, the Pentagon had a "software crisis" on its hands: More than 450 computer programming languages, mostly obscure, were in use, requiring operators to retrain each time they changed assignments. But ADA, conceived in 1979 as the military's sole programming language—to handle administration, aim weapons, guide missiles, navigate ships, and transmit vital communications—brought new chaos. As one programmer remarked of its 192-page manual, published in 1980: "There are some good ideas in ADA, but they are outnumbered."

The more functions a computer language performs, the more time is involved—both for hardware to process the commands and for technicians to figure out how to give them. To this overall concern about ADA—with its one million characters—critics add specific complaints as well.

For example, because ADA does not perform concurrent tasks "deterministically" (in the order in which commands are issued), it is unreliable in tightly scheduled "real-time" situations. Equally troublesome, most of ADA's software packages are geared to the large hardware used in data processing centers and laboratories—not to the small computers found in battlefield units or in guided missiles.

In quiet defiance of the "ADA-only" rule, some military organizations have begun to leave ADA behind—including the Pentagon's own Defense Advanced Research Projects Agency, which favors the artificial intelligence language, LISP. But ADA's *official* status has not changed since 1983, when a Defense official joked: "For six or seven years we have been digging a trench, and now that it's dug we expect people to jump in."

SCIENCE & TECHNOLOGY

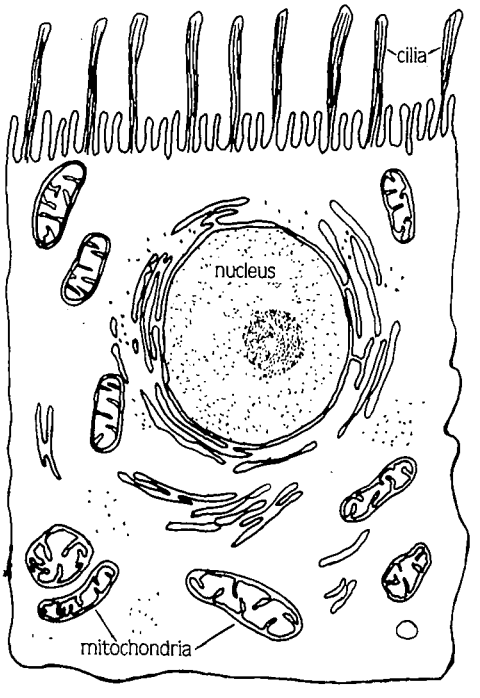
Our Cellular Ancestors

"Bacterial Bedfellows" by Dorion Sagan and Lynn Margulis, in *Natural History* (Mar. 1987), Central Park West at 79th St., New York, N.Y. 10024.

Of all the missing links in evolution, none is more mysterious than the gap between prehistoric bacterial cell life—the multicolored slime molds, protozoans, and algae that stewed in briny waters 1,500 million years ago—and nucleated cells, the basis of life on earth today. But a freak discovery by a University of Tennessee biologist 20 years ago led the way to a plausible scenario that takes up where Darwin left off.

Professor Kwang Jeon was startled that day to find his ordinarily stable amoeba collection in critical condition. Tens of thousands of bacteria had invaded the single-celled animals and threatened their lives. Yet, several months later, some amoebas returned to health—still carrying bacteria, but not as many. Rather than destroy or be destroyed, it seemed they had simply incorporated some of the invaders. Natural selection did not eliminate competitors in this case—it eliminated competition itself.

Sagan and Margulis, a professor of biology at Boston University and a science writer, respectively, believe that mitochondria, the crucial oxygen-metabolizing bodies within nucleated cells, were formed in a similar struggle early in Earth's history. An oxygen-using predator invaded an anaerobic victim, which then developed a tolerance for the attacker. "The two organisms thrived on internal leftovers—the products of each other's



Raiding bacteria may have been the ancestors of mitochondria and cilia in today's nucleated cells. But unlike most bacteria they did not kill their hosts. Instead, research suggests, the cells incorporated them to metabolize oxygen and increase movement.

metabolism," say the authors, and the surviving hosts became aerobic.

Perhaps 100 million years later, the authors speculate, a new type of organism entered the host cell—the forebear of plastids, which make food from water and sunlight. Quickly ingested by a large bacterium, like Jonah swallowed by the whale, it nonetheless kept its light-trapping properties alive. The evolving cell now had mitochondria to metabolize oxygen and plastids to provide food.

The very motions of many nucleated cells, caused by rapidly undulating whips called undulipodia (cilia and flagella), may have resulted from yet another bacterial merger, 2,000 million years ago—with tiny, whiplashing spirochetes. Had a spirochete-propelled organism been able to find more food and thus reproduce more often than its fellows, natural selection would have favored such an alliance. Thus our cellular ancestors may have evolved from "a sort of symbiotic *ménage à trois*" involving host bacteria, mitochondria, and spirochetes, the authors say.

The "traditional view of a cutthroat Darwinian world," they conclude, may soon give way to a new vision of the biosphere: "an endless dance of diversifying life forms, where partners triumph."

RESOURCES & ENVIRONMENT

Land Scam

"Crimes Against Nature" by John Baden, in *Policy Review* (Winter 1987), 214 Massachusetts Ave. N.E., Washington, D.C. 20002.

Environmentalists often urge the federal government to buy up the nation's unexploited land. Washington, they hope, will prevent private developers from despoiling the country's remaining forests, marshlands, grasslands, and mountain ranges.

But federal agencies, says Baden, director of Southern Methodist University's Maguire Oil and Gas Institute, are more eager to protect their own program budgets than preserve endangered land. Ironically, by supporting these agencies, Baden argues, U.S. taxpayers "have been financing the destruction of environments they increasingly value."

Washington first acquired many of today's federal lands during the late 19th and early 20th centuries. Progressive Era reformers believed that the public should own—and that "scientific resource managers" should oversee—the nation's best natural resources. Today, the U.S. Forest Service (established 1891), the U.S. National Park Service (1916), and the Bureau of Land Management (1946) manage roughly 85 percent of all federal territory. Washington owns 33 percent of the nation's land area—including 92 percent of Alaska and 40 percent of California.

Unfortunately, the officials who run these agencies, Baden says, are "motivated by self-interest no less than private entrepreneurs." An "iron triangle" of politicians, agency bureaucrats, and commercial interests serves itself, rather than the U.S. taxpayer or Mother Nature.

The U.S. Forest Service, for example, seems more interested in building roads for the logging and construction industries—which lobby for the

agency's budget—than in preserving the country's timberlands. Indeed, "the world's largest socialized road building company," as Baden calls the Service, has laid down some 340,000 miles of roads, often tearing away soil-holding vegetation from high, mountainous regions in the process.

Supported by U.S. taxpayers, federal agencies have also not learned how to operate economically. Last year, the U.S. Forest Service cut timber from the fragile backcountry of the northern Rockies; when the Service sold the timber, it recovered only five percent of its expenses. The Bureau of Land Management has cleared some three million acres of piñon and juniper trees in the Southwestern United States. To keep ranchers happy, it sells grazing rights for one-tenth to one-fifth of the market price.

Unlike federal officials, the nation's landowning ranchers and timbermen, Baden says, have shown that they take good care of ranges and woodlands. Because such entrepreneurs value their assets, natural resources, Baden believes, are better off in private hands.

The Seed War

"Seeds of Struggle: The Geopolitics of Genetic Resources" by Jack Kloppenburg and Daniel Kleinman, in *Technology Review* (Feb.-Mar. 1987), Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, Mass. 02138.

When Columbus returned to Spain in 1493, he brought not only news of a New World but also maize (corn) seeds. Columbus's venture sparked a continuing global hunt for useful agricultural plants. During the early 1900s, an era botanists call "the golden age of plant hunting," the U.S. Department of Agriculture sponsored 50 search operations worldwide.

The ingredient that breeders use to grow foreign species or to cross-breed for new varieties is "germplasm," the genetic component of plants. By long-standing convention, germplasm has been viewed as the "common heritage" of all nations. Yet only a few nations possess this vital resource in significant quantity; the last glaciation of the Northern Hemisphere (20–25,000 years ago) concentrated most terrestrial plant species in what is now termed the Third World.

During the past two centuries, industrial nations have created billion-dollar seed industries—soybeans, barley, wheat—by selling "elite" commercial germplasm (typically high yield, uniform quality) bred from the developing nations' "primitive" germplasm. Now, Third World members of the U.N. Food and Agricultural Organization (FAO) want firms in the United States and Europe either to make "elite" germplasm available free of charge, or else compensate them for their genetic raw material. In the scuffle, all parties are rushing to patent their germplasm, and a few nations (including Ethiopia) are refusing to export it.

The "seed war" could have severe consequences, warn Kloppenburg and Kleinman, a professor of rural sociology at the University of Wisconsin and a graduate assistant, respectively. Industrial nations must have continuing access to the thousands of "landraces" (primitive native varieties), bred by peasant farmers over millennia, to combat pests, diseases, and

environmental fluctuations that damage crops.

This need was demonstrated by America's 1970 "corn blight": 90 percent of the U.S. corn varieties carried the same disease-prone gene. Since then, a landrace of barley from Turkey that resists yellow dwarf disease has saved U.S. farmers $150 million a year. A new, more digestible soybean variety from Korean germplasm may save them $100 to $500 million a year in heat-processing costs.

The authors propose a compromise to end the seed war: Create a global network of gene banks (where germplasm is stored in a climate-controlled atmosphere) and a "gene fund" to be managed by the FAO. Western nations would contribute according to, say, the size of their seed industries. The money could be spent to conserve global plant resources and train Third World breeders to produce commercial germplasm, too.

The "common heritage" notion is no longer politically workable, say the authors. Western nations must recognize that fact—or return to a native diet of sunflowers, Jerusalem artichokes, cranberries, raspberries, chestnuts, oats, and rye.

ARTS & LETTERS

Johnson's Vision

"Samuel Johnson and the Art of Observation" by Ian Donaldson, in *ELH* (Winter 1986), The Johns Hopkins Univ. Press, Journals Publishing Div., 701 West 40th St., Ste. 275, Baltimore, Md. 21211.

Samuel Johnson (1709–84), the renowned English essayist, lexicographer, poet, and conversationalist, often scoffed at his countrymen's consuming love for foreign travel and exploration. Mere observation had "very little of intellectual" in it, he complained; scholarship and inward reflection were better paths to knowledge.

Not surprisingly, his own writing skimped on eyewitness detail. One reader of *A Journey to the Western Isles of Scotland* suggested angrily that Dr. Johnson must have "passed the Bridge of Don with [his] eyes shut." More sympathetic critics surmised that Johnson's poor eyesight, rather than somnambulance, marred his descriptive powers. (As a child, Johnson recalled crossing the road to school on his hands and knees; in later life, he often burned his wig reading too close to his candle.)

Certainly, "Blinking Sam" (as the Romantics called him) had his blind spots, concedes Donaldson, a professor at the Australian National University. Johnson failed entirely to appreciate painting, for example; he felt it could "illustrate" but not "inform."

But to fault him for insensitivity to the world around him misses the point. "The business of a poet," explains Johnson's alter ego in the novella *Rasselas*, is to examine "general properties and large appearances" rather than "the streaks of the tulip." By assuming a philosophical perspective, Johnson made a virtue of necessity.

Sickly and uncoordinated, Johnson professed a distaste for travel that

belied his keen appetite for news of faraway discoveries: One night in 1773 his startled companions watched him jump up, gather the tails of his huge brown coat to resemble a pouch, crook his hands forward, and bound across the room. Naturalist Sir Joseph Banks had just returned from Australia with a description of the kangaroo.

As a writer and thinker, however, Johnson looked inward for inspiration. His visual myopia served as a metaphor for mankind's mental myopia: "We see a little, very little; and what is beyond we only can conjecture," remarks the speaker in *Adventurer*.

Exploration and adventure are the foils by which Johnson's characters typically discover the folly of their hopes. In *The Vanity of Human Wishes*, the travelers seeking truth and happiness are all the more disappointed for having looked "from China to Peru."

Just before he died, Johnson inspected the three-volume new edition of Cook's and King's *Voyage to the Pacific Ocean*. "*Who* will read them through?" he demanded testily. One "set of Savages" was "like another." The stirrings of the civilized soul—now *there* was cause for wonder.

Natural Skyscrapers

"Naturalized Technology: Louis H. Sullivan's Whitmanesque Skyscrapers" by Lauren S. Weingarden, in *The Centennial Review* (Fall 1986), 110 Morrill Hall, Michigan State Univ., East Lansing, Mich. 48824–1036.

In 1886, the young Boston architect Louis Henry Sullivan stumbled upon an edition of Walt Whitman's *Leaves of Grass*. "You then and there entered my soul," wrote Sullivan to his new-found hero, "have not departed, and never will depart." Never shy, he enclosed a few (dreadful) verses of his own. Whitman did not write back.

Many architectural critics have played down the symbolic content of Sullivan's work, says Weingarden, an assistant professor at Florida State University. But Sullivan vehemently upheld it: "I am a poet who uses not words but building materials as a medium of expression."

Like Whitman and Ralph Waldo Emerson before him, Sullivan assigned himself the great 19th-century dilemma: how to integrate industrial "progress with a national identity rooted in the pastoral ideal." Whitman's poetic solution was to invoke opposing voices—the objective, masculine self linked to progress, the subjective, feminine self to nature—and blend them in a harmonious song to the "Kosmos."

As a pioneering architect of skyscrapers, Sullivan saw this poetic task from a builder's perspective: "Form Follows Function," the dictum he became famous for, referred to the aesthetic and symbolic functions to which the actual structure (form) must adhere. "How," as he put it, "shall we impart to this sterile pile, this crude, harsh, . . . stark, staring exclamation of eternal strife, . . . this strange, weird, modern housetop" the "graciousness of those higher forms of sensibility and culture that rest on lower and fiercer passions?"

His most Whitmanesque skyscraper, the 16-story Guaranty Building in Buffalo, N.Y. (1894–95), creates a unified visual impression while remain-

Sullivan's Wainwright Building (1890) in St. Louis:
The skyscraper, he wrote, "must be tall, every inch tall. . . . Rising in sheer exultation [so] that from bottom to top it is a unit without a single dissenting line."

ing distinctly two-voiced: utilitarian at eye level and ornamental above. Its massive skeletal steel frame is disguised but not displaced by a "skin" of rustic terra cotta. Profuse clumps of low-relief, idealized plants—pods, buds, thorns, tendrils, and leaves of grass—move vinelike in Saracenic patterns to the cornice.

Whitman and Sullivan were not soulmates in every sense, notes Weingarden. While Whitman revelled in the "Manhattan crowds with their turbulent musical charms!" Sullivan deplored the teeming urban landscape in which he worked. He wanted his skyscrapers to transcend the city; he wanted city dwellers to look high, high, up beyond the lesser rooftops.

Masaccio's Surprise

"Miracle in Florence" by Mauro Calamandrei, in *Art and Antiques* (Feb. 1987), 89 Fifth Ave., New York, N.Y. 10003.

During the 15th, 16th, and 17th centuries, almost every major Italian artist, including Botticelli, Raphael, and Leonardo da Vinci, visited Florence's Brancacci Chapel, to pay homage to the frescoes painted there. The works were, in the words of 16th-century Italian artist and art historian Giorgio Vasari, "miraculous."

Modern scholars have never seen why Vasari and his contemporaries made such a big fuss over such somber, lifeless renderings of Florentine characters and the surrounding Tuscan countryside. But recent restora-

tion, says Calamandrei, a writer for *L'Espresso*, a Rome-based newspaper, has revealed that these frescoes were richly detailed, bright, and luminous. "For the first time," he says, "we see blue skies enlivened by racing white clouds and the crisp wintry shadows cast by people and stones."

The history of these frescoes begins in 1423. In that year, Florentine merchant Felice Brancacci hired a local artist, Masolino da Panicale, and his student, Tommaso di Ser Giovanni (better known as "Masaccio," meaning "Sloppy Tom"), to paint a series of frescoes depicting the life of Saint Peter in the chapel that bore the patron's name. The work was interrupted five years later, when the two artists, apparently fleeing their creditors, departed for Rome. There, the 26-year-old Masaccio, for reasons that remain mysterious, died. Filippino Lippi finished Masaccio's frescoes in 1485.

Masaccio's frescoes were not well preserved. Smoke rising from the chapel's oil lamps covered them with a veil of soot. A fire that broke out in the chapel on January 28, 1771, did not burn the frescoes, but they were smoked, as a contemporary put it, "like a prosciutto ham."

Later efforts to restore Masaccio's work made matters worse. But the latest effort, conducted by Italy's National Institute of Restoration, has made progress. By applying a newly invented chemical paste to the wall over a layer of Japanese paper, workers have managed to peel away centuries of accumulated grime.

Thus revealed, the frescoes have given scholars a new perspective on Renaissance art. "With such radical changes in the colors, light and the quality of the details in paintings," says Calamandrei, "... we must revise our understanding of... 15th- and 16th-century Italian painting."

OTHER NATIONS

Divided Israel

"Israeli Political Reality and the Search for Middle East Peace" by Samuel W. Lewis, in *SAIS Review* (Winter/Spring 1987), 1740 Massachusetts Ave. N.W., Washington, D.C. 20036.

The Arab-Israeli conflict centers on the future of the Israeli-occupied West Bank and Gaza Strip. But peace will not be achieved in the Middle East, says Lewis, a former U.S. ambassador to Israel, until the Israelis themselves agree on who should control these territories.

Israelis have bickered over territorial issues ever since their nation's 1948 War of Independence against Arab states. In 1949, Menachem Begin, the future Likud Party leader, attacked Prime Minister David Ben Gurion for accepting an armistice that left the West Bank areas that Jews call Judea and Samaria—"the heartland of the biblical Jewish kingdom"—outside of the new nation's borders.

Israel's annexation of the West Bank and Gaza in the June 1967 Six Day War did little to reconcile Labor-Likud disputes. Since then, the Labor Party, which reigned from 1968 to 1977, has considered the possibility of

conceding the occupied territories to Jordan and Egypt, in exchange for Arab recognition that Israel has a right to exist in peace. Menachem Begin rejected the Land-for-Peace policy, however, during his tenure as prime minister (1977–84), and pushed for the creation of new Jewish settlements on the West Bank.

In the 1984 election, both major parties failed to win a decisive victory. The resulting "National Unity Government"—under which Shimon Peres (Labor) and Yitzchak Shamir (Likud) each agreed to serve as prime minister for two years—has only institutionalized Israeli differences on the Land-for-Peace policy.

Nevertheless, Shimon Peres, who served as Labor prime minister from September 1984 to October 1986, made some headway in foreign affairs. Peres persuaded Morocco's King Hassan to reject the position of hard-line Arab states and help seek a peaceful, negotiated settlement with Israel. He also convinced the Spanish government to establish, for the first time, diplomatic relations with Jerusalem. Moreover, the prime minister's "personality, eloquence, moderation, and energy," as Lewis puts it, have "refurbished" Israel's image abroad.

Despite his diplomatic skills, Peres failed to launch peace negotiations, largely because Israelis themselves could not reach a consensus on what to do with the occupied territories. Even if the premier had managed to reach a peace agreement with Jordan's King Hussein, the Labor-Likud coalition would surely have quashed it. The political standoff, moreover, reflects the sentiments among ordinary Israelis, about half of whom, according to polls, oppose a Land-for-Peace bargain. Such opinions are unlikely to change as long as some 50,000 Jews live in 100 towns and villages on the West Bank.

The current Labor-Likud government may serve the interests of Israeli politicians. But Jerusalem's "Government of National Impasse," as Lewis calls it, can do little to promote peace in the Middle East.

The New China

"China's Confident Nationalism" by Michel Oksenberg, in *Foreign Affairs* (Special Issue 1986), 58 East 68th St., New York, N.Y. 10021.

During the 1970s, the Nixon and Ford administrations "played the China card" against the Soviet Union. In other words, by establishing friendly relations with Beijing, Washington kept the Kremlin on the defensive. China was happy to help.

But China's new generation of leaders, says Oksenberg, a University of Michigan political scientist, do not want to play that game anymore. China's "confident nationalists" now want to deal with both superpowers. They believe, as Oksenberg puts it, that "China can regain its former greatness. . . . [by using] foreign technology and ideas."

That approach represents a sharp break from the past.

Under Chairman Mao Zedong (1949–76), the Chinese regime distrusted all powerful foreigners, even their postwar Soviet allies. Embittered by the struggles against Japan (1937–45), against Chiang Kai-shek and his Nationalist regime, and against the United States in Korea, Mao and his subordinates, Oksenberg says, sought mostly to end "national hu-

miliation and establish China as an equal [power] in the world."

Under Mao, China's foreign policy was characterized by "authoritative, programmatic statements" and slogans such as "World in Chaos; Situation Here Excellent" or "Down with Imperialism and Its Running Dogs." Not until after Sino-Soviet relations soured during the 1960s did Beijing make overtures to Washington—as a counter to Moscow. Worried by the Soviets' growing military presence in Mongolia and the Far East, the Chinese relished Soviet-American tension.

China's foreign relations have grown more complex in the 1980s. The Washington-Beijing-Moscow "triangle" has been replaced by a strategic quadrangle that includes Japan, Asia's strongest economic power. And a new generation of leaders, under Deng Xiaoping (premier since 1978), now conducts the nation's foreign affairs.

Having suffered through such Maoist debacles as the Great Leap Forward (1958–60) and the Cultural Revolution (1966–69), these men, says Oksenberg, "appear less interested in heroics and immediate gratification on the international scene and more preoccupied with stability and economic growth at home."

The confident current leaders are more sophisticated, less xenophobic, less paranoid. They see, for example, the Soviets mired in Afghanistan and Democrats squabbling with Republicans in Washington. They are willing to pursue their own interests, even when they irritate Americans—by protesting the Reagan administration's policy toward South Africa, for example, or by inviting Nicaragua's president, Daniel Ortega, to Beijing.

Unfortunately, Oksenberg says, history shows that reform-minded leaders in China seldom last long because "the Westernization that flourishes under their aegis creates a backlash." Americans, therefore, should not be surprised when Deng Xiaoping warns his compatriots, as he did earlier this year, to beware of "bourgeois liberalism" and "complete Westernization."

After Chernobyl

"Chernobyl and Soviet Energy" by Judith Thornton, and "Chernobyl and Ukraine" by David R. Marples, in *Problems of Communism* (Nov.-Dec. 1986), U.S. Information Agency, 301 4th St. S.W., Washington, D.C. 20547.

On April 26, 1986, 100 miles north of Kiev in the Ukraine, Unit No. 4 at the Chernobyl Nuclear Power Plant exploded, sending windborne radioactive particles as far afield as Sweden. On April 27, reported the *Komsomol* (Communist Youth League) newspaper:

"A joyless dawn broke, and with it came very difficult problems. The party gorkom [city committee] had issued a request: Komsomol members must go and cover the reactor. Sand will be needed. Find volunteers . . . It would take a lot of sand . . . A boundless sea of sand. No one needed persuading. Well, hardly anyone."

The Chernobyl explosion's economic consequences have been estimated (in *Pravda*) at two billion rubles—including loss of businesses, farms, houses, crops, and land, as well as the cost of relocating and com-

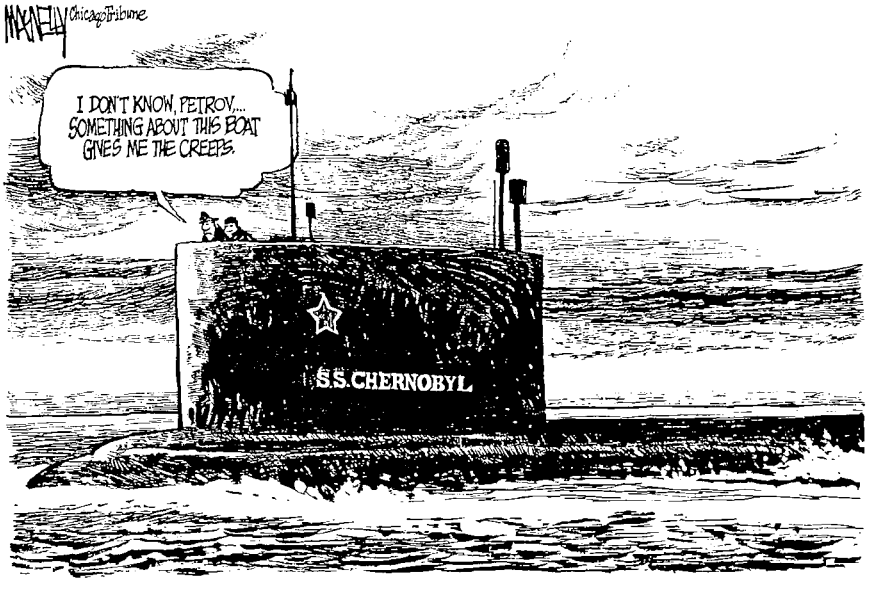
pensating some 135,000 evacuees from the 20-mile zone around the reactor. Thornton, an economics professor at the University of Washington, predicts that the impending deaths of at least 300 workers ill with radiation poisoning will cost an added 21 million rubles in loss of manpower.

The *human* consequences remain unclear. Marples, a research associate at the University of Alberta, notes that optimistic predictions made by American and Soviet scientists last August in Vienna were based only on the hazards of the explosion itself. Still at risk are thousands of Chernobyl plant employees, who only last December completed Reactor No. 4's protective concrete "sarcophagus."

Why? Unfortunately, plant authorities stopped enforcing health precautions soon after the immediate crisis ended. In June, Chernobyl employees could officially work only 30 days. Yet the 4,000 Estonians conscripted for cleanup operations in May (many taken by force at night, some ill or with wives about to give birth) worked for as long as six months. *Pravda* claimed that "the same staff" had to remain on the job until the cleanup was no longer "in a sensitive stage." By late summer, most of the 1,000 medical specialists present right after the explosion were gone.

A Kiev newspaper reported that many cleanup technicians did not receive protective clothing, despite working 10 to 12 hour shifts. Showers—a vital decontaminant—were located at a sanatorium a two-hour hike from the plant. Last October, as the Ukraine's coldest winter on record approached, most workers still lived in unheated "summer camps" named "Pioneer" and "Fairy Tale."

Environmental hazards from the Chernobyl disaster persist, says Mar-



Despite Chernobyl, the Soviets plan to increase nuclear power's share of electricity output from 10 percent in 1985 to 21 percent in 1990.

ples. In a televised address earlier this year, a Soviet Academy of Sciences official warned that 1987's heavy spring rains and flooding could wash radioactive material into the region's water supply.

The Greening of West Germany

"From Student Movement to Ecopax: The Greens" by Hans Joachim Veen, in *The Washington Quarterly* (Winter 1987), 55 Hayward St., Cambridge, Mass. 02142.

West Germany's "Green" Party first captured international attention during the 1970s as a loose middle-class citizens' network of antihighway protesters, environmentalists, and antinuclear activists. At first politically conservative, the Greens rapidly became a catchall for stray radicals—unemployed Marxist academics, assorted anarchists and liberationists.

Today, the Greens are the nation's fifth largest party, holding office in nearly every state council. They have been represented (27 of 496 seats) in the federal parliament since 1983, and gained 15 more seats in last January's elections. Have they become a serious political force?

Veen, chief of social science at the Konrad-Adenauer Foundation in Bonn, West Germany, doubts it. Despite their growing prominence, the Greens' mistrust of institutions runs deep. So does their disdain for German traditions such as "duty, industriousness, self-discipline and material and professional success."

When polled, only 30 percent of Green Party members say they have faith in the judicial system; 60 percent of the German public does. Most Greens (two-thirds) distrust the police; the same percentage of other Germans trust them. More than half of the Greens would like to disband NATO; nearly 70 percent of Germans still support it. One in three Greens claims not to "feel free" in Germany. Only seven percent of the public at large shares that feeling.

Though the Green Party's social profile is increasingly diverse, a predictable majority are young (two-thirds under 35), well educated, and urban. Many have come from the ranks of the Social Democratic Party's left wing. Others are ex-student radicals from the 1960s, who "slept through" the Greens' grassroots days but woke up when it gained notoriety.

All Greens seem to share a sense of mental isolation that, despite its modern flavor, has deep national roots. Veen recalls what Madame de Staël, in 1810, wrote of the German mind: "an immense capacity for philosophical thought which loses itself in the indeterminate, penetrates and disappears in the depths."

This "psychological predisposition," says Veen, has enabled the most radical social critics within the Green Party to formulate the basic elements of Green ideology. However, Veen speculates that during the next few years, "confrontation with the [realities] of everyday life . . . may prove to be [the radicals'] undoing."

The Greens' most troubling political flaw, notes Veen, may be the hardest to remedy. Despite their spokesmen's advocacy of "boundless self-realization," they "lack belief in a fine new future." Without such a vision, it will be difficult for the Greens to persevere.

RESEARCH REPORTS

Reviews of new research by public agencies and private institutions

"Single Mothers and Their Children: A New American Dilemma."

The Urban Institute Press, 2100 M St. N.W., Washington, D.C. 20037. 198 pp. $24.95.
Authors: Irwin Garfinkel and Sara S. McLanahan

In the United States, the number of single-parent households is increasing at an alarming rate.

Between 1960 and 1983, the proportion of all American children growing up in female-headed households increased from 8.2 to 20.5 percent. Today, 51 percent of black children in the United States are being raised in families without fathers. And half (five million) of all female-headed families are living in poverty.

What has caused the increase? Some liberal sociologists have blamed this "feminization of poverty" on feckless fathers and wage discrimination against female workers. Conservatives have argued that welfare programs such as Aid to Families with Dependent Children (AFDC) have discouraged fathers and mothers from staying together, because the benefits provided to single mothers exceed what working husbands and wives could expect.

Garfinkel and McLanahan, professors at the Institute for Research on Poverty at the University of Wisconsin, Madison, believe that both liberal and conservative explanations for the rise in single motherhood are insufficient; changing sexual mores also played a key role.

Single motherhood, the authors stress, is a self-perpetuating phenomenon: Single mothers are very often the children of single mothers. The phenomenon is not limited to blacks. White daughters of single parents, for example, are 53 percent more likely than their counterparts in two-parent families to marry as teenagers. They are 164 percent more likely to have a premarital birth, and 92 percent more likely to dissolve their own marriages—if they marry. Single motherhood, as the authors put it, "mushroom[s] over time," as the daughters of single mothers come to outnumber their parents.

Single-mother households become poor and stay poor, the authors say, for three reasons. First, women earn less than men. Second, they get only "meager benefits" from welfare. Third, only 40 percent of white fathers and 19 percent of black fathers pay any child support. If every American father who should pay child support did so at the levels now set by the state of Wisconsin (ranging from 17 percent of the father's income for one child to 34 percent for five or more children), the authors point out, the number of poor people would drop by 24 percent and the AFDC caseload by 25 percent.

Welfare programs, Garfinkel and McLanahan say, are not the primary cause of single parenthood, but they do contribute to its perpetuation. Citing negative income-tax experiments of the 1970s, the authors suggest that increases in welfare benefits were responsible for a nine to 14 percent rise in single motherhood from 1960 to 1975—whether brought about by the choice not to marry or through divorce. Changes in welfare spending, they say, "greatly affected both the economic well-being and the dependence of poor mother-only families, but had modest effects, at most, on their prevalence."

Garfinkel and McLanahan conclude that strengthening child support enforcement would do more for poor single mothers than "workfare" or welfare reform. They also favor "child allowances," a $300 to $400 annual grant for *every* American child under 18. Such subsidies, they say, "would diminish the discrimination in favor of [children living in single-parent homes] and perhaps reduce their prevalence."

"The Swedish Economy."

Brookings Institution, 1775 Massachusetts Ave. N.W., Washington, D.C. 20036.
324 pp. $32.95.
Authors: Barry P. Bosworth, Gary Burtless, Robert J. Flanagan, Edward M. Gramlich, Robert Z. Lawrence, Alice M. Rivlin, and R. Kent Weaver

During the 1930s, American journalist Marquis Childs praised the Swedish welfare state, calling it the "middle way." Here was, he believed, an ideal blend of socialism and capitalism, of compassion and productivity. During the 1970s, however, the Swedish economy, now afflicted by falling productivity and the highest tax rates in Western Europe, acquired a new nickname: "the Swedish disease."

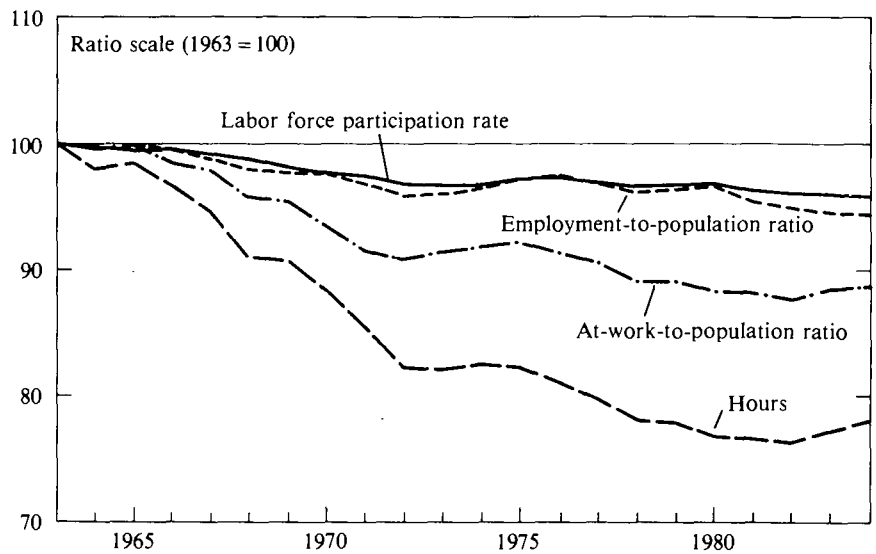
What went wrong?

The authors, economists and political scientists at Stanford University, the University of Michigan, and the Brookings Institution, suggest that related political and economic factors caused the disease.

The Swedish welfare state was built on two stable, mutually supporting pillars: the Social Democratic Party and the Landesorganisationen (LO), the Swedish Confederation of Trade Unions. At its peak in 1950, some 80 percent of Swedish workers belonged to the LO, which supported the Social Democratic party and pressed its leadership for extensive social welfare benefits. Thanks in part to LO support, the Social Democrats stayed in power from 1932 to 1976.

During the 1970s, however, the pillars began to tremble, as the weight of government spending grew heavier. In 1960, Swedish taxes consumed 27 percent of the nation's gross domestic product. By 1975, that figure had climbed to 44 percent (versus 30 percent in the United States). By the late 1970s, the average Swede paid 55 percent of his income in taxes (his U.S. counterpart paid about 27 percent).

As both tax rates and social benefits soared, many Swedes decided they were better off not working. Many retired early; others survived on generous unemploy-



Rising absenteeism has widened the gap between the average number of Swedish males on payrolls and the number actually on the job during a given week. Result: The total of man-hours worked has plunged.

ment payments. Brookings economist Gary Burtless calculates that, between 1963 and 1981, man-hours worked per capita rose by one percent in the United States, and fell 11 percent in Sweden.

Employers, meanwhile, found themselves burdened by high "solidaristic" wages and growing contributions to various social insurance schemes. The social security tax they had to pay equalled 37 percent of the employee's wage. Several export-oriented Swedish manufacturers could not easily pass on their rising costs to overseas customers, and, during the 1980s, closed down—notably the Uddevalla Varvet and Kockums shipyards.

In 1979, the Social Democrats (ousted in 1976 by conservatives) came back, but failed to make substantive reforms. To invigorate the economy, Swedish politicians must cut the $54.5 billion budget and find new sources of savings and investment. Social Democrat Ingvar Carlsson, prime minister since the death of Olof Palme in 1986, has trimmed some welfare benefits. He has let some inefficient, government-subsidized factories go under. But Brookings political scientist R. Kent Weaver believes that as long as labor can hold the Social Democrats hostage, the party will not be able to end the present doldrums.

To enact more productivity-oriented policies and reform existing bureaucracies, the Social Democrats, Weaver believes, will have to reach out to the more conservative Center and Liberal Parties—a strategy, he admits, that entails great political risks. "For the Social Democrats," he says, that shift "would mean surrendering the image that they are the only true defenders of the welfare state, an image that probably works to their electoral benefit."

"Japanese Education Today."

U.S. Dept. of Education, U.S. Government Printing Office, Washington, D.C. 20402.
95 pp. $4.75.
Authors: Robert L. August, William K. Cummings, Betty George, Robert Leestsma, Lois Peak, Nobuo Shimahara, and Nevzer G. Stacey

Many American educators have observed that Japanese schools still enjoy what U.S. schools lost long ago: strict discipline, moral education, demanding classes and texts, and intense parental involvement. "Our American education ideals," say the authors, all associated with the U.S. Department of Education's Office of Educational Research and Improvement, "may be better realized in Japan than in the United States."

Americans, the authors note, largely shaped the Japanese educational system after Tokyo's defeat in World War II through the creation of the United States Education Mission. This group restructured Japanese precollegiate education on the U.S. model, setting up six-year elementary schools, three-year junior high schools, and three-year high schools.

Within this structure, however, the Japanese took their own approach. They rejected what Americans favor most: local control and diversity, preferring centralization and conformity instead.

In Japan, the Ministry of Education, or Monbusho, today rules supreme. The Monbusho selects textbooks, sets national education standards and curricula, administers teacher colleges in Japan, and runs 74 schools overseas—including Japanese elementary and secondary schools in New York and Chicago.

The Japanese system, consequently, is far more uniform than its heterogeneous American counterpart. In most U.S. high schools, students may choose from a wide variety of electives (such as music and fine art). But in all Japanese towns and cities, the regime is nearly identical. English instruction, for example, increases from three hours per week in every junior high school to between six and eight hours per week in high school.

Unlike many Americans, Japanese educators believe that codes of conduct can be taught. Japanese students spend at least one hour a week on "moral education," learning self-control, harmony with nature, and what the Japanese call "the need for rational and scientific attitudes toward human life." Schoolwide activities reinforce rules taught in classes. Japanese ninth graders, for example, take an annual field trip to a distant city "to train [them] in public manners and group etiquette."

Japanese schools are also competitive. Students do a lot of homework. They spend up to four years studying for college entrance examinations. Acceptance into the right university (particularly Tokyo University, or Todai, the "Harvard of Japan") can ensure a successful job hunt. "Four hours pass, five hours fail," goes one student slogan—that is, you will fail if you sleep five hours a night. Many youths who fall behind in their studies attend one of many increasingly popular *juku*—private, profit-making prep schools.

In contrast to American students, however, Japanese youths tend to "ease off" in college. Because they are rarely flunked out, Japanese undergraduates spend much of their time cutting classes and joining clubs. (Ahead lie the rigors of job and career.) "The squandering of four years at the college level on poor teaching and very little study," as Harvard's Edwin O. Reischauer has observed, "seems an incredible waste of time for a nation so passionately devoted to efficiency."

Like their American counterparts, Japanese educators believe that their system needs improvement. Japan's National Council on Educational Reform, which was appointed by Prime Minister Nakasone Yasuhiro in 1984, declared that Japanese education was in a "state of desolation," and called for decentralizing the bureaucracy and making Japanese public schools less regimented—and thus somewhat more American in style.

Even so, Americans, the authors suggest, can learn much from the Japanese. U.S. Secretary of Education William Bennett, for example, has observed that Japanese public schools work well because they are "clear about their purposes" and because they are places where "expectations and standards matter."

"Reassessing Nuclear Power: The Fallout from Chernobyl."

Worldwatch Institute, 1776 Massachusetts Ave. N.W., Washington, D.C. 20036.
71 pp. $4.00.
Author: Christopher Flavin

The April 1986 explosion of a nuclear reactor at Chernobyl in the Soviet Ukraine killed 29 people and exposed from two to three hundred others to massive doses of radiation. The Chernobyl plant, however, did not confine its damage to the Ukraine or even to the Soviet Union. Indeed, it may have done its greatest damage to the scientist's dream of a world powered by nuclear energy.

Flavin, a senior researcher at the Worldwatch Institute, points out that nuclear power had been in decline long before the Chernobyl disaster. In the United States, power companies have canceled 55 planned nuclear power plants since 1980 without proposing any new ones. Mexico, in the past six years, has abandoned plans for 18 nuclear power plants. Several less populous nations—Australia, the Philippines, and Greece—have opted to abandon nuclear power entirely. "If Chernobyl is compared with a heart attack," Flavin observes, "it is clear that the ailment struck a patient already afflicted with cancer."

Economics, not politics, has brought the nuclear industry to its knees. Oil and coal prices have dropped in the past decade, making fossil fuel plants far more attractive financially than they were in the

1970s. Nuclear reactors are not only more capital-intensive than their nonnuclear counterparts, but also more expensive to keep secure. "The threat of terrorism," Flavin writes, "has turned nuclear power complexes into modern fortresses."

Not surprisingly, state-owned corporations—which operate according to bureaucratic, not market, imperatives—have built most new nuclear power plants in the West. France's state-owned utility, Electricité de France (EDF), has enabled the nation to produce two-thirds of its electrical power with nuclear energy. And EDF has planned on building two to four new reactors by 1990—reactors that, Flavin contends, the country neither needs nor can afford. The utility is already $32 billion in the red.

Most European countries, however, are less committed than France is to nuclear power. The Netherlands has canceled plans for two plants, halving the Dutch nuclear energy effort. Plans for eight nuclear power plants in Yugoslavia have been put on hold, following some recent "protests in social republics." In Sweden, a government commission proposed advancing from 2010 to 1997 the date when all existing Swedish reactors will be dismantled. Austria ordered its only nuclear reactor, at Zwentendorf, shut down. Peter Jankowitsch, the Austrian foreign minister, explained the decision to the International Atomic Energy Agency: "The Faustian bargain of nuclear energy has been lost."

The Soviets have not changed any of their plans to build new nuclear reactors. But in the West, most governments seem to have come to the conclusion, Flavin says, that "the global nuclear endeavor is simply not working."

Several early astronomers, depicted in this 19th-century painting. From left: Tycho Brahe, Claudius Ptolemy, St. Augustine, Nicolaus Copernicus, Galileo Galilei (with pointer), and Andreas Cellarius, author of Harmonia Macrocosmica. *At center is Urania, one of the nine Greek Muses.*

Astronomy

Feb. 23, 1987: Ian Shelton, a Canadian astronomer working with a 10-inch telescope at the Las Campanas Observatory in northern Chile, notes a new bright object in the sky. That large spot of light, visible even without a telescope in a section of the Large Magellanic Cloud, roughly 163,000 light years from Earth, turns out to be a supernova—the first exploding star able to be seen by the naked eye since 1885.

Scientific observation of this recent celestial event, using the latest telescopes and astronomical instruments, has brought astronomy much public attention. Although most historians believe that astronomy is the oldest physical science, its great breakthroughs, being highly technical and somewhat arcane, are often overlooked by nonscientists. But it is a science with a unique history. Since ancient times, people have used the stars to help devise calendars, to navigate ships across oceans, to forecast the weather, and to foretell the future. Because stars and planets appear to revolve around the Earth, it took civilized man several thousand years of recorded observation to discover the truth behind that illusion.

It was not until the 16th century, when Nicolaus Copernicus suggested that the Earth revolved around the Sun, that astronomy in the modern sense began. He could not prove his assertions. That task lay ahead, for scientists like Tycho Brahe, Johannes Kepler, Galileo Galilei, and Isaac Newton. They could not have made progress without the aid of telescopes, invented during the early 17th century. From then on, a pattern emerged: Astronomical knowledge and instruments would advance together, aiding each other along the way. It is a pattern that continues today.

Here, James Trefil describes the history of the telescope, and the West's transition from skywatching to astrophysics. George Field explains the latest theories of star formation, the emergence of our solar system, and the structure and origin of the universe. And Eric Chaisson and Field discuss what man ultimately seeks from the stars.

FROM ASTRONOMY TO ASTROPHYSICS

by James Trefil

Nicolaus Copernicus (1473–1543) was a Pole, a churchman, an intellectual recluse, and a somewhat enigmatic figure. Much is unknown about him, yet he sparked a scientific revolution that powerfully influenced the subsequent five centuries. Today, looking back at his life and work, it is difficult to comprehend the magnitude of the Copernican Revolution, how momentous a change it really was for 16th-century Europe. But altering civilized man's view of the cosmos is exactly what he did.

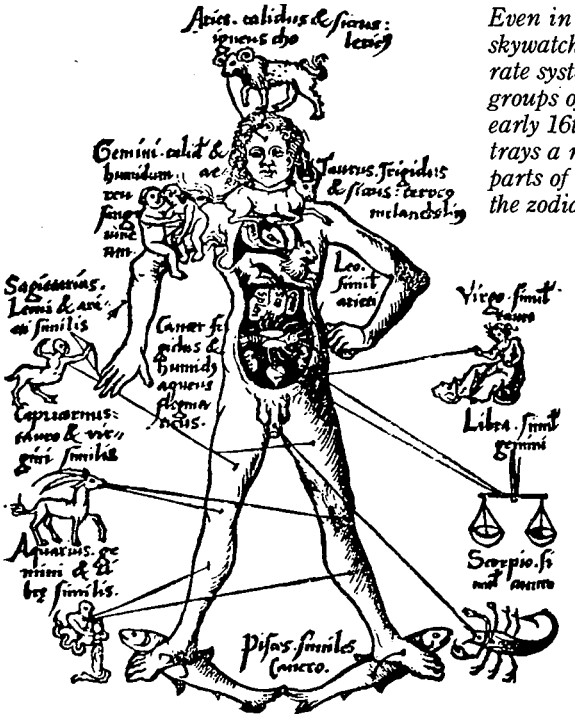
Guided by his uncle, a Roman Catholic bishop, Copernicus was elected to a position as canon (business manager) at the Cathedral of Frauenburg in his native Poland. He traveled widely, studied in Italy, and was a model scholar and churchman. From roughly 1512 on, he developed a scheme of a planetary system in which the planets moved and the Sun stood still. He confided his manuscript to a printer only in 1540, at age 67. As the story goes, he received a copy of his published book on the day he died, three years later.

The book, *On the Revolutions of the Celestial Spheres*, is an odd mixture of revolutionary and traditional ideas. Since Claudius Ptolemy (circa A.D. 100–178), the ancient Greek astronomer who advocated a geocentric model of the universe, Europeans had envisioned the Sun, stars, and planets embedded in concentric spheres around the Earth, with God, in effect, cranking the mechanism from the outside.

Copernicus realized that the daily motion of the stars across the sky resulted from the Earth's rotation, and that the complex motions of planets were the natural effect of their movement around the Sun. His system, of course, was not identical to the modern one. To account for the true planetary orbits, Copernicus had to put his planets on epicycles (small circles centered on the rims of larger ones). The centers of the larger circles lay not in the Sun, but at a point in space between the Sun and the Earth. Even if it could not be proved, his view had an immense allure for adventuresome minds.

Copernicus's scheme was only somewhat simpler than Ptolemy's, but it prompted astronomy students (at least from 1543 on) to realize that they could question traditional wisdom. Human reason was freeing itself from burdens of the past—another major step for Europeans who had just experienced the throes of the Reformation, Martin Luther's break with the monolithic authoritarianism of Rome.

Another consequence of the Copernican system—one often



Even in medieval Europe, skywatchers developed elaborate systems for interpreting groups of stars. At left, an early 16th-century artist portrays a relationship between parts of the human body and the zodiac.

overlooked—is that it expanded mankind's concept of the universe. Formerly, with a seemingly stationary Earth, the realm of the stars lay just beyond Saturn's orbit; the entire universe seemed only as big as the solar system. But with Earth orbiting the Sun, the stars had to be far away to appear stationary. In one fell swoop, Copernicus moved the Earth from the center and set it moving in a new heaven of wider horizons. He and Christopher Columbus were contemporaries. Each man revealed a new world to Europe—but Copernicus was charting a realm whose outer boundaries have yet to be discovered.

As it happened, *On the Revolutions of the Celestial Spheres* spread quickly throughout Europe, encountering far less ecclesiastical opposition than Galileo would later face. For one thing, Copernicus was well connected in the church. For another, the unsigned preface of his book presents the Copernican system as a mathematical exercise, not necessarily a statement about the real world. This pretension left plenty of maneuver room for theologians and scholars.

Among Copernicus's readers was the Danish nobleman Tycho Brahe (1546–1601), who had a lifelong obsession with measuring the heavens accurately. During the 16th century, observation was not much more accurate than it had been during the time of Ptolemy.

Tycho, born before the invention of the telescope, pushed the accuracy of naked-eye astronomy to its limit. He built astronomical instruments, such as a huge brass quadrant and a four-cubit sextant, to reduce errors associated with reading small scales. He compensated for the expansion and shrinkage of his brass instruments due to temperature changes, devising tables to correct for these effects. He even built an underground observatory to reduce wind vibrations.

In part, the quest for precision grew out of the desire to distinguish between the Copernican and Ptolemaic systems, and because people of the mid-16th century had witnessed some unusual events in the heavens. On November 11, 1572, for instance, a new star appeared in the constellation of Cassiopeia—one so bright that during the next month it could be seen in daylight. Repairing to his beautifully crafted instruments, Tycho took a series of readings. He established beyond a doubt that the object (now called Tycho's supernova) moved less than the most distant planet in the sky and was therefore beyond the sphere of the stars. This feat established the 25-year-old Dane as one of Europe's premier astronomers.

So impressed was King Frederick II of Denmark that he installed Tycho on the Baltic island of Hven and provided the money to construct the world's largest astronomical observatory. There Tycho built instruments and gathered data unprecedented in both volume and accuracy.

All was well, until Tycho ran afoul of Frederick's successor, Christian IV, over a number of issues—such as whether or not Tycho had the right to throw peasants into his private dungeon. So the astronomer packed up his data, instruments, and court jester, and quit Hven for the court of Emperor Rudolf II in Prague.

Tycho's Undoing

All told, Tycho lived an unusual life. At an early age, he was kidnapped by his wealthy and childless uncle Jorgen, who raised him in a castle in Tostrup. Sent to the University of Copenhagen to study jurisprudence, Tycho—profoundly impressed by an eclipse of the Sun in 1560—instead spent his time studying the stars. Prone to emotional outbursts, at the age of 20 he dueled a fellow student over the question of who was a better mathematician. During the battle, Tycho lost a piece of his nose and had to wear a gold alloy prosthesis.

James S. Trefil, 48, is professor of physics at the University of Virginia. Born in Chicago, Illinois, he received a B.S. (1960) from the University of Illinois, a B.A. and an M.A. (1962) from Oxford University, and an M.S. (1964) and a Ph.D. (1966) from Stanford University. He is the author of Meditations at Ten Thousand Feet *(1986). This essay is drawn from* Space, Time, Infinity *by James S. Trefil.*

Even his death was bizarre. At a banquet attended by much of Prague's nobility, he partook copiously of Bohemian beer. Not wishing to appear impolite—so the story goes—he ate and drank without excusing himself. Bladder stones may have been his undoing; he fell into a fever that night and died 11 days later.

Tycho's data tables went to an impecunious Austrian mathematician he had hired after his arrival in Prague—Johannes Kepler.

Kepler (1571–1630) was a mystic by nature. But, when confronted with all the data that Tycho had collected over a lifetime, he felt compelled to question some of his basic assumptions. Instead of trying to force Tycho's data into preconceived patterns, Kepler returned to the basics and considered which shapes best described the motions of the known planets.

Galileo as Martyr

Kepler's results are stated in what are now known as Kepler's first and second laws of planetary motion. The first law says that a planet's orbit assumes the shape of an ellipse—rather than a circle—with the Sun at one focus; the second law indicates that planets move faster when near the Sun than they do when farther away. In other words, as a planet passes near to the Sun it "swings around," speeding up as it does so.

Kepler published these two laws in 1609. A third and final law was published in 1619, relating the length of a planet's "year" to its distance from the Sun. Thus it became possible to shed excess conceptual baggage that scientists had developed to justify a false notion, namely, that celestial objects move along circular orbits.

Following the observational work of Copernicus, Tycho, and Kepler, Galileo Galilei (1564–1642) was the first to study the sky through a telescope.

Ironically, Galileo is one of those men in history who is famous for the wrong reasons. Because of his notorious trial in 1633 by the Roman Inquisition he has, perhaps undeservedly, become enshrined as a "martyr of science." Legend has it that he stood alone as a champion of the heliocentric universe against the forces of dogmatism and authority. This is unfortunate, because Galileo did many other things during his lifetime that were worthy of lasting fame. He was, for example, the founder of modern experimental physics. He also made the first break with naked-eye astronomy by starting a systematic study of the heavens with a telescope. He was largely responsible for bringing the ideas of Copernicus to the attention of the intellectual community of 17th-century Europe. It was this seemingly heretical activity, of course, that eventually caused him to draw the attention of the Inquisition.

The son of a musician in Pisa, Galileo studied at the local univer-

GOING BACK TO STONEHENGE

Today most people take the sky for granted. Not so the ancients. They used the sky as clock, calendar, navigational aid, and oracle.

Among the oldest observatories, according to British astronomer Gerald S. Hawkins, is Stonehenge—a series of concentric circles, marked by large stones, standing on a plain near Salisbury, England. In 1963, Hawkins argued that Stonehenge enabled skywatchers, perhaps as early as 3100 B.C., to mark the solstices (when viewed correctly, the Sun rises over a 35-ton Heel Stone), the lunar cycles, and eclipses. Similar ruins stand around the world, in places as disparate as Scotland, Kenya, and the central United States.

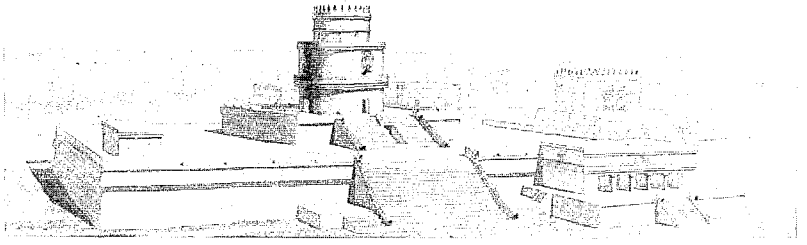
Cro-Magnon people were probably the first humans to note the stars. Animal bones with markings that correspond to lunar phases, dated 9,000 to 30,000 years old, have been found in Europe. Between 3000 B.C. and 2000 B.C., Babylonians in Mesopotamia devised the first systematic calendar, based on 235 lunar months (29.5 days apiece) in 19 solar years. Between 1646 and 1626 B.C., they made the first detailed astronomical records, and later (circa 400 B.C.) used mathematics to predict celestial events. They were astrologers too. Atop immense, stepped, mud-brick towers, such as the ziggurat of Ur in southeastern Iraq (construction began in 2100 B.C.), Babylonian priests prayed to the Moon god Nanna-Sin while surveying stars.

Ancient Egyptians also were stargazers. Many of their great monuments—such as the Great Pyramid of Cheops and the temple at Karnak—are aligned with key positions of the Sun, Moon, and stars. Yet, despite Egypt's creation of a "modern" calendar (12 30-day months, plus five extra days), the Babylonians surpassed the Egyptians in astronomical sophistication.

The Greeks were the first scientists, not only recording celestial motion but wondering why stars and planets moved along particular paths. They sought physical rather than religious explanations. Thales of Miletus (circa 585 B.C.) predicted eclipses; Pythagoras (circa 580–500 B.C.) and his school deduced that the Earth is round, and Eratosthenes of Cyrene (circa 276–194 B.C.) devised a method for measuring its circumference at the equator—250,000 stadia (the width of a stadium, 607 feet), a figure quite close to the actual 24,902 miles. By the second century A.D., Claudius Ptolemy summarized four

sity and embarked on a career teaching mathematics. As the story goes, his early interest in physics is associated with observations conducted at the Pisa cathedral. He noted that a cathedral lamp required the same amount of time to complete a swing no matter how wide the range of the swing. Later, Galileo suggested that this principle could be used to develop a pendulum clock. His studies of physics and mathematics helped him to win a position in the Medici court in Florence in 1610.

While in Venice in 1609, Galileo learned of the recent invention



The Mayan Caracol of Chichén Itzá, as it may have appeared circa 1000 A.D.

centuries of Greek astronomy in his treatise *Almagest*. As early as 720 B.C., Chinese astronomers kept watch for "portentous" events: eclipses, comets, meteors, planetary alignments. But their observations were not "scientific"; they tended simply to record, not analyze, unusual phenomena.

In Central America, circa 1000 A.D., Mayan astronomers on the Yucatán Peninsula constructed an observatory, the Caracol of Chichén Itzá. It demonstrates in its architecture alone—through alignments with certain stars and planets—a knowledge of solstices, lunar cycles, and the motions of the Morning and Evening Star (Venus). Their astronomical records, detailed on the bark leaves of an almanac called the Dresden Codex (it is now in a Dresden museum), reveal great sophistication: They calculated the length of a 365-day solar year, a 29.5 day lunar cycle, and the cycles of Venus within minutes of their true periods.

Throughout North America, Indian tribes, too, practiced astronomy. Atop Medicine Mountain, in Wyoming's Bighorn Range, lies a circular arrangement of "loaf-sized" rocks. This "medicine wheel," in which 28 35-foot-long lines of rocks, seemingly spokes, reach out from a central hub to a surrounding circle of rocks, is believed to have been used for astronomical purposes. Similarly, the Hohokam Indian structure at Casa Grande near Phoenix, Arizona, contains 14 windowlike openings, eight of which are aligned with the rising and setting Sun during solstices and equinoxes. Other Sun-marking sites exist at Chaco Canyon, New Mexico, and Hovenweep, Utah. And, at Cahokia, Illinois, the American "woodhenge"—concentric circles comprised of 49 poles, with the largest circle measuring 410 feet across—is thought to have been a tool for measuring solstices and equinoxes, and possibly to predict eclipses.

of the telescope in the United Netherlands. He devised a superior lensmaking technique and produced a telescope capable of magnifying an image 32 times. It was an immense step forward. Astronomers could thereupon examine the heavens with more than the power of the unaided human eye. He opened a window on the cosmos and was not slow to exploit it.

During the years after the building of his telescope, Galileo and others saw many new things. Mountains loomed on the Moon where no mountains were supposed to be. The apparently unblemished Sun

had spots. Venus was seen to go through phases as does the Moon. Galileo observed the four largest moons of Jupiter and caught a hint of Saturn's rings. As has happened ever since, whenever a new window on the sky is opened, the first glimpse shows an undreamed-of richness and complexity.

Why were these discoveries so important? The first two—lunar mountains and sunspots—showed that the Greek ideal of heavenly perfection was incorrect. Also, the fact that Venus could be observed to pass through Moonlike phases proved that at least one other planet orbited the Sun. And Jupiter's four moons belied the assumption that everything orbited Earth. These facts had enormous psychological impact during the 17th century.

Enter Newton

Galileo announced the first of these findings in his book *The Starry Messenger*. He called Jupiter's satellites the Sidera Medici (Medicean Stars), attempting to flatter his hoped-for patrons, the Medici family. The ploy worked. He received support from Florence, and today those satellites are called the Galilean Moons.

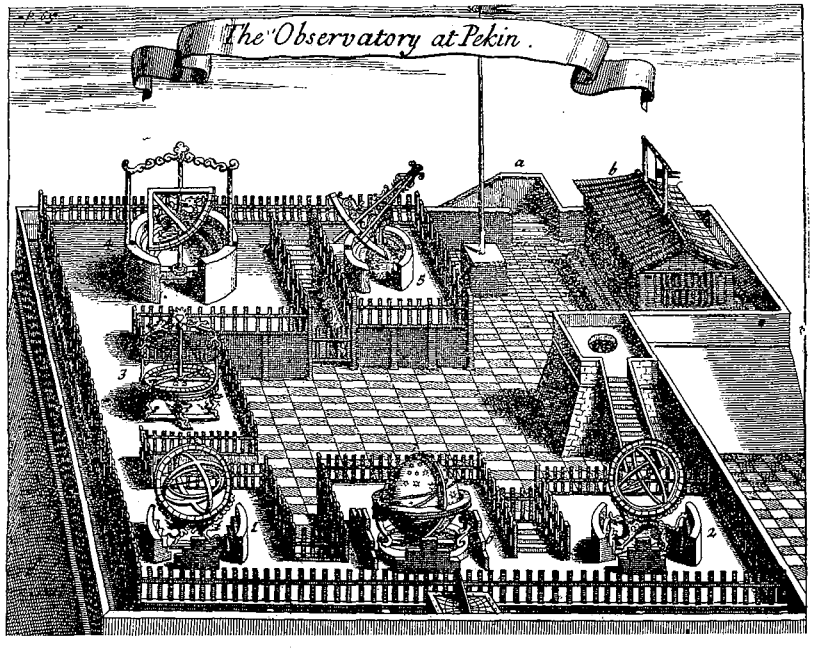
Furthermore, the maestro had a way with words, writing—unlike Copernicus and Kepler—in the vernacular, Italian in this case. Through his writings, Copernican ideas spread throughout Europe. Galileo's trial did not curb the spread of these ideas—indeed, its only effect was to guarantee that the center of astronomical studies would move across the Alps to the Protestant countries of Europe and eventually to England.

In the same year that Galileo died, 1642, Isaac Newton was born. It is a coincidence, of course, but one that symbolizes the continuity of the development of scientific ideas about the universe during the 17th century.

The scientific revolution of the 17th century culminated in the work of Isaac Newton, who developed a view of the universe still held today. His most important contribution to astronomy is the law of universal gravitation, which states that any two objects in the universe will experience a force of attraction proportional to their masses and to the distance between them. The laws that Kepler deduced from Tycho's data can also be derived from Newton's work.

In later years, a legend grew about how Newton realized that one gravitational law governed the entire universe. The part that sticks in the public fancy is the fall of an apple in an orchard.

To understand Newton's insight in that orchard, one must remember that, until his time, the science of astronomy and the science of mechanics (which dealt with the motions of things on Earth) were totally separated. No one had yet connected the stately turning of the planets with the fall of an apple on Earth. Newton's gift to humanity



17th-century Chinese skywatchers at the Imperial Observatory observed the stars with astronomical instruments, some imported from Europe.

was to show that such artificial distinctions do not hold in nature—that the universe is a single, seamless web, and that the forces guiding the Moon also cause apples to fall.

To demonstrate the unity of the gravitational force, Newton imagined what would happen if a cannon were placed on a mountaintop, firing successive projectiles, with an increase in the charge of each shot. Eventually, with just enough gunpowder, the cannonball would fly around the world, overcoming gravity's downward pull and maintaining a constant altitude.

This hypothetical missile, he concluded, was behaving like the Moon, or any other satellite. In his own words, "[I] compared the force requisite to keep the Moon in her Orb with the force of gravity at the surface of the Earth, and found them to answer pretty nearly." In effect, Newton had seen that the Moon and the Earth continually fall toward each other, offset by their orbital motion. With this realization, any simple distinction between terrestrial and celestial science—a notion accepted since ancient Greece—crumbled. Using calculus, a method that he originated, Newton worked out the planets' orbits and demonstrated that they followed Kepler's laws.

His vision of the solar system in perpetual motion led naturally to a model of the universe resembling a geared clock. Once the solar

system had been created, its future history lay ordained. But a debate ensued along these lines: mathematician G. W. Leibniz argued that God had made an automated universe; theologian Samuel Clarke contended that God was continually adjusting the works. Either way, the Creator had more leisure than with Ptolemy's system, which ascribed to God (or appointed angels) the turning of cranks. Newton believed that God created a mechanistic universe and then fine-tuned the machinery while it operated.

It is difficult to overemphasize the importance of this new scientific movement, and of Newton's place as its prime mover. He completed the work begun by Copernicus and his successors.

In fact, the Newtonian Synthesis gave rise to another powerful idea: Events anywhere in the universe can be studied in laboratories on Earth. And, if nature's laws are constant, then all events of the past—right back to the creation of the universe—are accessible to investigation.

It is comforting, in the face of such advances in scientific knowledge, to reflect on how it all started. An obscure Polish scholar was able to set in motion a scientific revolution capped by, of all things, a view of space and time based on an inspired interpretation of a fallen apple in an English orchard.

On to Mount Palomar

During the 200 years that followed Newton's discovery of the workings of the solar system, astronomers developed two improved tools. First, bigger, and sometimes better, telescopes allowed astronomers to collect more light from objects farther away. And second, improved theoretical tools, based on calculus and Newton's laws, enabled scientists to analyze (and therefore predict) the behavior of more complex celestial phenomena. The delicate interplay of instrumental and theoretical advances was like a waltz through history—first one partner would lead, then the other.

Galileo turned a primitive telescope toward the heavens. But to go beyond Galileo, it was necessary to build better telescopes. This was no easy task.

Newton saw no future in the type of telescope used by Galileo. Called the refractor, it uses a series of lenses to collect and focus incoming light. Unfortunately, it also suffers from a defect known as "chromatic aberration," in which colored fringes appear around an image's edges. Consequently, Newton built a telescope without lenses. Such a *reflector* telescope uses curved mirrors, made of polished metal, to focus light at the back of the instrument. However, his first models had little more power than did Galileo's refractor.

By the mid-18th century, techniques for fashioning mirrors from metal had been perfected. By the 20th century, mirrors were ground

from glass and then coated with reflective metal. Today, such highly efficient light collectors are the workhorses of astronomy. The most famous (and most productive) of these giants is the 200-inch telescope located at the Hale Observatory on Mount Palomar near San Diego, California.

Completed in 1948, Hale's main mirror is 17 feet (five meters) across and weighs 14.5 tons. Technicians ground away more than five tons of glass from the original 20-ton disk to form a concave surface, which became reflective when polished and coated with a thin layer of aluminum. To construct the immense disk, molten Pyrex glass was poured into a form, then allowed to cool for eight months to keep the glass from cracking.

The telescope itself is so big that at one time an astronomer sat inside it to observe the stars. Today, however, a computer monitors observations. It is so well balanced that an electric motor no more powerful than one found in a food processor can rotate it. Although the Soviets now have a larger optical telescope operating in the Caucasus Mountains, technical troubles have limited its usefulness.

Improved telescope designs enabled astronomers to expand their inventory of the solar system. William Herschel (1738–1822), born in Germany, was a musician-turned-astronomer who lived in England during the 18th century. He built his own reflecting telescopes because he could not afford to buy one made by craftsmen. Believing that studying the heavens was one way to peer into the mind of God, Herschel set out to catalogue everything in the sky.

Finding Neptune

On March 13, 1781, Herschel observed a fuzzy object, hitherto unknown. His telescope allowed him to see that this new object was not just a point (as most stars appear), but something with an extended structure. Since the object moved against a background of fixed stars, it had to be a planet or a comet. And, given that 2,000 years of skywatching had turned up only six planets, European astronomers looked carefully before concluding that Herschel really had found another planet—one located too far from the Sun to be seen by the naked eye. It was christened Uranus, and became the first planet discovered in modern times.

Astronomers throughout Europe worked to chart its orbit. It quickly became apparent that applying Newton's law of gravitation to the new planet did not give a correct description of its path in the sky. Working independently, an English and a French astronomer came to the same conclusion. In 1845, John Couch Adams and Urbain-Jean-Joseph Le Verrier showed that this orbital discrepancy could be explained if there were yet another planet beyond Uranus. On September 23, 1846, astronomers in Berlin saw it—the planet

NEW EFFORTS IN ASTRONOMY

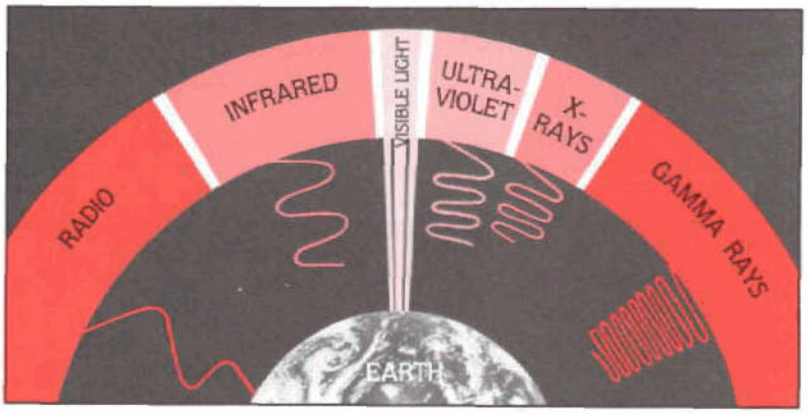
Since the discovery in 1932 that radio waves emanate from the Milky Way's center, astronomers have been scanning the "invisible" universe. That task requires special instruments. Because only visible light, radio waves, and some infrared radiation can penetrate the atmosphere, special devices are sent into space aboard satellites. Below, some details about the latest efforts to analyze specific kinds of electromagnetic radiation:

- RADIO WAVES (wavelength: one millimeter to 10 meters): The first radio telescope—a bowl-shaped antenna measuring 9.4 meters across—was built in Illinois in 1937. Today, "interferometry"—a computerized system that merges signals from an array of radio telescopes—allows astronomers to simulate one enormous dish. The Very Large Array in New Mexico synchronizes 27 radio telescopes to form images equivalent to those of one 24-kilometer dish. Currently, the National Science Foundation is building the Very Long Baseline Array; with 10 antennas spanning Hawaii to St. Croix, its "baseline" will measure 7,500 kilometers.
- INFRARED RADIATION (wavelength: one micron to one millimeter): Infrared radiation carries crucial data about star and planet formation. NASA's Kuiper Airborne Observatory, a 0.9 meter telescope aloft at 41,000 feet, has charted infrared sources since 1975. More impressive, the joint U.S.–Dutch–British Infrared Astronomical Satellite mapped more than 250,000 sources during 1983. On the drawing board for the 1990s are two space-based observatories: NASA's $600 million Shuttle Infrared Telescope Facility and the European Space Agency's Infrared Space Observatory.
- VISIBLE LIGHT (wavelength: 300 nanometers to one micron): Delayed because of space shuttle troubles, NASA's $1.5 billion Hubble Space Telescope awaits launch in 1988. Its 2.4-meter telescope will capture visible, infrared, and ultraviolet radiation, detecting objects 50 times fainter and seven times farther away than those detectable by Earth's best telescopes. Still, ground-based observatories with larger apertures remain important in spectral analysis. By the mid-1990s, Hawaii may house two giant optical telescopes; the $87 million Keck Telescope, using a honeycomb design, will join 36 mirrors into a single 10-meter mirror, while the proposed $125 million National New Technology Telescope will achieve a 15-meter aperture—the world's largest.
- ULTRAVIOLET RADIATION (wavelength: 10–300 nanometers). The

we now call Neptune.

While the discovery of Uranus depended on the development of better telescopes, the discovery of Neptune depended on the ability of theoreticians to predict the orbit of the new planet. In fact, once told of its general location, observers at Berlin took less than one night to pinpoint Neptune. The ninth planet, Pluto, was also found through computation and observation.

About the same time that Herschel was expanding our perception of the solar system, the return of a comet in 1758 as predicted



A schematic diagram of the electromagnetic spectrum.

first ultraviolet telescopes were hoisted aloft on high-altitude balloons. Today, the International Ultraviolet Explorer, a U.S.–European satellite launched in 1978, examines radiation from intergalactic matter and the outer layers of stars. Soon, NASA's Extreme Ultraviolet Explorer, now being developed, will study high-energy ultraviolet rays, so far uncharted.

- X-RAYS (wavelength: .01–10 nanometers). So energetic are x-rays that studying them requires a unique telescope design: cylindrical mirrors to deflect x-rays into focus. Between 1978 and 1981, the orbiting Einstein Observatory satellite used this method (as did its European counterpart, Exosat) to collect data on pulsars, neutron stars, and galactic nuclei. The latest x-ray space observatory is Japan's Astro-C, launched in February 1987 (approximate cost: $40 million). By 1995, NASA hopes to place in orbit the Advanced X-Ray Astrophysics Facility, a $1 billion telescope 100 times more sensitive than the Einstein Observatory.
- GAMMA RAYS (wavelength: less than .01 nanometers): Gamma rays are more energetic than x-rays, and difficult to measure. Thus the European gamma ray observatory, Cos-B, took seven years (1975–82) to make a gamma ray chart of the sky. In 1990, NASA plans to launch a $500 million space-based Gamma Ray Observatory, 10 times more sensitive than Cos-B, which will carry instruments supplied by the United States and Germany.

served to provide dramatic confirmation of the clockwork universe developed by Newton. In 1682, Edmund Halley (1656–1742) had observed a large comet approach the Sun and swing away. Looking at historical records, he found that a bright comet with roughly the same orbit had appeared in 1531 and 1607. Using Newton's laws and the positions of the planets, Halley calculated the orbit of the comet and predicted that it would again be near the Sun in 1758. Its appearance, on Christmas Day of that year, provided a major verification of Newton's description of the universe.

With telescopes and satellites routinely probing the farthest reaches of the universe, one would expect few surprises in the relatively mundane study of our own neighborhood in space. Not so. In 1978, scientists at the U.S. Naval Observatory in Flagstaff, Arizona, obtained high-grade photographs of Pluto, showing that the planet has a moon. It was christened Charon, after the boatman charged with conducting souls of the dead to the underworld, Pluto's realm. This discovery allowed astronomers to estimate the mass of Pluto, a value insufficient to explain all of the vagaries of the orbits of Neptune and Uranus. Thus, there still may be pages to be written in the story of the solar system—a possible 10th planet.

Seeing the Spectrum

Beyond our own star system lie other stars, perhaps with their own planets. From a science concerned with determining *where* stars and planets are, the new discoveries changed the focus of astronomy to the question of *what* they are. A new science, astrophysics, emerged as a complement to astronomy. It seeks to reveal the nature of the stars through an understanding of the laws of physics.

The basis for this new departure in man's view of the heavens was a famous experiment by Isaac Newton. He noted that a glass prism held up to a beam of sunlight broke the light into its constituent colors—a "spectrum" of sunlight.

For a long time, this peculiar property of light was merely a nuisance to lensmakers. Then, in 1802, physician William Hyde Wollaston found narrow bands of missing color in the spectrum of sunlight. By 1814, a physicist, Joseph von Fraunhofer, made the first map of these lines, which now bear his name. Their origin remained a mystery until 1859, when Gustav Kirchhoff, working with Robert Bunsen at Heidelberg, showed that the lines were caused by familiar chemical elements in the Sun's outer atmosphere that absorb certain wavelengths of light.

Such "spectral analysis" works something like this: Each kind of element (e.g., hydrogen, nitrogen), when pushed to an "excited" state, emits a unique spectrum of light—a kind of atomic fingerprint. In fact, burning an element gives off a specific "emission spectrum," while passing light *through* an element causes certain colors to be absorbed, creating an "absorption spectrum." The correspondence between atoms and their unique spectra is daily evident: A neon light glows red; sodium-vapor street lamps emit yellow light; mercury-vapor lamps are bluish-white. Each element has its own colors.

Discovering this connection between atoms and light was enormously important. As early as 1868, bright lines were observed in the Sun's spectrum—lines that had no counterpart in any known element on Earth. Scientists concluded that a new element was

present on the Sun, one that they named helium (from the Greek word for Sun, *helios*).

There was, as far as anyone could tell, no helium on the Earth. In 1895, however, helium was discovered in certain uranium-bearing minerals. Once again, it turned out that the Earth was not as different from the rest of the universe as some people had thought.

From these early days, the technique of identifying chemicals by their light spectra has penetrated every corner of modern technology. Spectroscopy is today used in industrial quality control (to monitor the presence of impurities), in medicine (to identify substances taken from the body), and in many other areas where one must determine the chemical constituents of materials. It even figures in courtroom dramas, where substances identified by this sort of analysis are accepted as legal evidence.

Once scientists had proven that known elements make up the Sun and other stars, another question arose: How could the stars shine so brightly for so long? Astrophysicists had calculated that, even if the Sun were made of pure anthracite coal, it could have shone for only 20,000 years—instead of the 4.5 billion years so far.

Throughout the last decades of the 19th century, scientists tried to determine the Sun's fuel source. The answer came from a completely unexpected quarter—the study of radioactive materials. By the 1930s, a number of things had become clear: First, certain nuclear processes alter the weight of atoms; second, the weight change is related to energy by means of Einstein's famous formula, $E = mc^2$. Arthur (later Sir Arthur) Eddington, working in England during the 1920s, had suggested that the conversion of mass to energy might be the process that provided the Sun's energy. But no one knew enough about nuclear physics at that time to consider Eddington's suggestion as anything more than an educated guess.

In fact, the Sun shines through a fusion process in which lighter elements are transmuted into heavier ones, liberating energy. Detailed knowledge of this phenomenon grew out of a small conference held in Washington, D.C., in April 1938. The gathering had aimed to unite astrophysicists and nuclear physicists. The former knew about stellar structure; the latter understood something of the reactions taking place in stars. The interchange must have been extraordinarily effective: Shortly thereafter Hans Bethe of Cornell University worked out the earliest model of fusion in stars.

The theory was so successful that Bethe was awarded a Nobel Prize for physics in 1967. His idea of nuclear reactions in our Sun allowed scientists to begin to understand the very fires of creation.

THE UNIVERSE AND MAN

by George B. Field

What are stars? Why do those tiny points of light sparkle with different colors? How far away are they?

Astronomers use physics and mathematics to create new images of stars. For them, the delight of seeing stars on a clear, dark night is enhanced by searching for a unified understanding of the universe.

Key discoveries opened the study of the universe as a whole. At the beginning of this century, astronomers had a limited sense of the size of the universe. Then, in 1924, Edwin Hubble (1889–1953) proved that the Great Nebula—what appeared to be a cloud of gas in the constellation Andromeda at the edge of our galaxy—was actually an "island universe" far outside the Milky Way. Whereas the Sun is roughly 28,000 light years* from the center of the galaxy, it is two million light years from the Andromeda nebula. The Andromeda nebula and our galaxy are very similar with respect to size, shape, and luminous power. A giant wave propagates in the interstellar gas of each galaxy to form "spiral arms" that look like hurricane clouds.

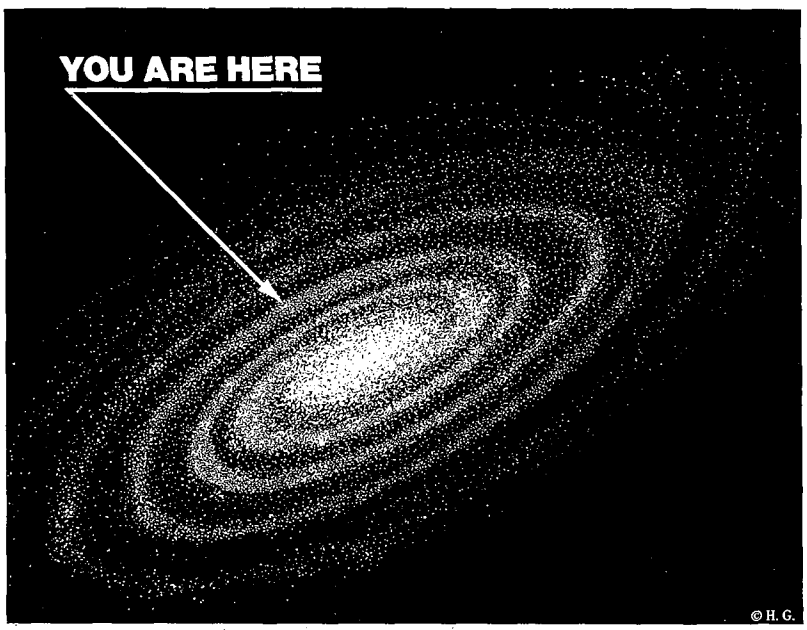
Beyond the Andromeda nebula, there are thousands of spiral galaxies like it, as well as galaxies of another kind, called elliptical galaxies. Galaxies tend to form groups of a dozen or so, and clusters of a thousand or more. The clusters are not isolated in space, but are connected by large sheets of matter composed of hundreds of small groups of galaxies.

The motion of a galaxy can be determined from the wavelengths of its spectral lines. In any given cluster, galaxies move at up to a thousand kilometers per second with respect to one another. Clusters would disintegrate were it not for the gravitational attraction of the matter in the cluster. This effect enables one to calculate the masses of clusters. While it might be expected that the masses of clusters are equal to the sum of the masses of the visible galaxies in them, there is at least 10 times as much invisible matter in clusters of galaxies as there is visible matter.

All groups and clusters of galaxies are receding from us, so the entire universe is expanding. In 1929, Hubble discovered that the velocity of a group or cluster is proportional to its distance from us, increasing by between 16 and 32 kilometers per second for each million light years of distance.† The most distant known clusters

*A light year is the distance that light, or any form of electromagnetic radiation, travels in a year—roughly 10 trillion kilometers.

†This velocity, called the Hubble constant, is difficult to determine and is not accurately known.



An artist's conception of the Milky Way galaxy. The arrow designates the Sun. This drawing is based on a photograph of M31 Andromeda, a nearby spiral galaxy believed to look very much like the Milky Way.

recede from us at more than half of the speed of light; one known galaxy is receding at 92 percent of the speed of light.

The radiation of even more distant objects, presumably moving extremely close to the speed of light (299,792 kilometers per second), shifts to such long wavelengths that those objects are almost impossible to detect. The region out to this point is referred to as "the observable universe"; its radius is 10 to 20 billion light years.

What is the universe made of? It is apparent that the visible matter of galaxies is largely stars. The Sun and stars are made of hydrogen and helium gases, along with much smaller amounts of heavier chemical elements like carbon, oxygen, silicon, and iron. Astronomers can understand the sizes, luminous powers, and temperatures of stars in terms of what happens when a large mass of gas slowly contracts, releasing gravitational energy, both heating the center of the star and causing it to radiate. When the central temperature reaches about 10 million degrees, hydrogen nuclei begin to combine to form helium nuclei, releasing nuclear energy that compensates for the loss of radiation, so the star ceases to contract and settles down for millions, or even billions, of years.

The ordinary matter that constitutes the Earth, Sun, and stars is

made up of chemical elements, whose nuclei carry a positive electrical charge together with corresponding numbers of negatively charged electrons. There may also be "strange matter" in the universe, another kind of matter that has not yet been detected in terrestrial laboratories.

Is the invisible matter in galaxies just ordinary matter that emits very little radiation, perhaps because it exists in the form of very faint stars? There are several theories.

In 1922, Russian mathematician Alexander Friedmann (1888–1925) worked out models for the universe, according to which four-dimensional space-time* is curved by the effects of gravitation. The more matter there is in space, the greater its gravitational effect and the greater the curvature of space-time. If there is a critical density of roughly 10^{-29} grams of matter per cubic centimeter, then the universe is described by a special Friedmann model in which it is infinitely large and forever expanding, but expanding with ever-decreasing speed. If the amount of matter is less than this critical value, then space is curved outward and also expands forever, but with constant speed. If the amount of matter is greater than the critical value, then space is curved inward and its volume is finite.

In this last model, the gravitational force continually reduces the expansion velocity, ultimately reversing the expansion and causing the universe to collapse. All of the Friedmann models start with a "big bang" at the origin of time, when the universe was infinitely compressed. From the rate of expansion, this must have occurred 10 billion to 20 billion years ago.

Expansion of the Universe

Friedmann models are supported by astronomical evidence, including Hubble's discovery of the expansion of the universe. In 1965, there was further confirmation when Arno Penzias and Robert Wilson discovered faint cosmic background radiation, left over from the big bang, at radio wavelengths. That radiation is shifted into the radio band by the expansion of the universe.

During the 1940s, George Gamow (1904–68) and his collaborators reasoned that the highly compressed matter of the big bang must have been hot; at 100 seconds after the big bang, the tempera-

*The term "space-time" refers to Albert Einstein's demonstration of the fact that space and time are not distinct entities. Rather, they are inextricably linked in a single four-dimensional continuum.

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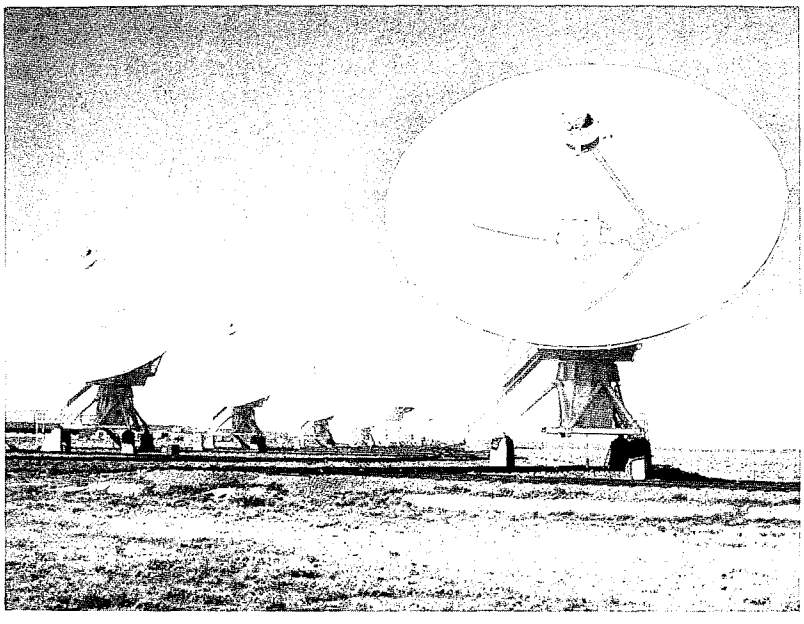


The Very Large Array, located near Socorro, New Mexico, consists of 27 25-meter reflector antennas, arranged in a Y-shaped pattern. Two arms are 13 miles long, the third is 11.8 miles long.

ture would have reached one billion degrees, so hot that atomic nuclei would readily react with one another to form new chemical elements. The predicted amounts of the light elements (hydrogen, helium, and lithium) produced during the first three minutes depend on the amount of ordinary matter at that time. The observation of the intensity of the background radiation, combined with measured abundances of light elements, leads, via the theory of nuclear reactions, to the estimate that the density of ordinary matter in the universe is only 10^{-30} grams per cubic centimeter—about 10 percent of the critical density in the Friedmann models.

In 1981, Alan Guth pointed out that if Grand Unified Theories (GUTs)* of elementary particles are correct, then the behavior of the extremely early universe could have differed dramatically from the Friedmann model for a very short time. Some 10^{-35} seconds after the creation, when the temperature was 10^{27} degrees, the universe would have suddenly "inflated" by a factor of at least 10^{20}, thereafter resuming its Friedmann expansion. Inflation predicts that the amount

*Since the early 20th century, physicists have been attempting to find an overarching theory that links such disparate forces as gravity, magnetism, and the nuclear binding forces. To date, no GUT has been perfected.

of matter in all forms must equal the critical value. Since ordinary matter contributes only 10 percent of that critical value, strange matter must make up the other 90 percent. Grand Unified Theories also predict that particles (such as axions or photinos) can exist that could constitute the required strange matter.

The big bang involved densities and temperatures far beyond those obtainable in the laboratory, but it happened long ago. The universe still behaves wildly at certain times and places. Some elliptical galaxies that appear normal in photographs, such as Messier 87 in the Virgo cluster of galaxies, are sources of radio emission. A tiny but powerful energy source lurks in the center of the galaxy, shooting out jets of fast particles that are detected by radio astronomers.

Extreme Conditions

During the 1960s, radio astronomers noticed pulses coming repeatedly from one part of the sky. Today hundreds of "pulsars" are known. They are explained by the rotation of a star on which a "hot spot" emits radiation into a small part of the sky, so that a pulse is seen each time the hot spot comes into view. The times between pulses are usually only a few seconds. A star like the Sun would fly apart if it rotated that fast, and even the compact white dwarf stars (to which most stars contract in the course of their evolution) would fly apart, so pulsars are neither ordinary stars nor white dwarfs. But neutron stars, made of nuclear matter from which all energy has been removed in the course of stellar evolution, are much more compact and stable, and can withstand the rapid rotation required to explain pulsars. It is believed that the collapse of the inner part of a star to form a neutron star is the cause of the stellar explosions observed as supernovas. Indeed, there is a pulsar in the Crab Nebula spinning 33 times per second, the remains of a stellar explosion in A.D. 1054 that was observed by Chinese court astronomers.

When nuclear fuel is exhausted, the core of a massive star collapses to form a neutron star weighing 1.4 times as much as the Sun; its radius is only a few kilometers. The energy released in a fraction of a second by the gravitational compression of matter is in the form of elusive particles called neutrinos. Some of them are absorbed by the layers above, heating them to about a billion degrees and causing a whole variety of reactions to occur among the atomic nuclei present. When this matter is flung into space, it contains heavy elements in agreement with the amounts observed in the galaxy.

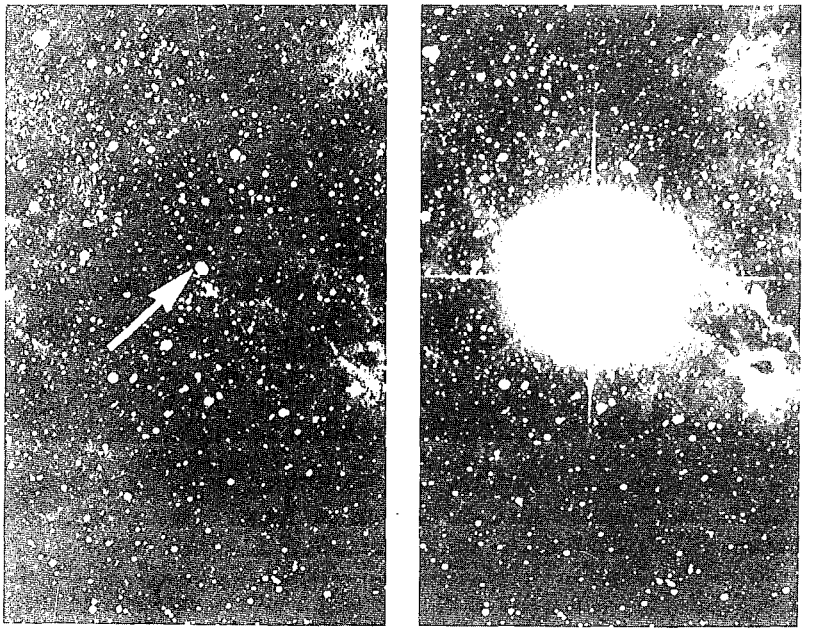
If the core of a star that has run out of fuel is more massive than a neutron star, then it cannot resist the inward pull of gravitation, and collapses to a point. Near it, space-time is so curved that light rays actually bend back upon themselves and spiral into the star. The complete lack of all radiation from such an object is the basis for its

much-publicized name, "black hole."

X-ray astronomers have found sources in which a compact star in orbit around a normal star steals gas from it, heating the gas enough to emit x-rays. One can deduce the mass of the compact star. In several cases, the result is 1.4 times the mass of the Sun, agreeing with the theoretical prediction for neutron stars. But in three known unusual x-ray sources, the mass of the compact object is much greater than that of a neutron star, so it must be a black hole. As a black hole steals gas from its companion, it draws the gas into a tight orbit around the black hole, moving at nearly the speed of light. Friction heats the gas to x-ray temperatures, and this attracts the attention of astronomers just before it plunges into the black hole.

In order to account for the huge amounts of radiation observed from the centers of active galaxies, one needs a mass so large that it would inevitably collapse to form a black hole. Active galaxies behave somewhat like stellar x-ray sources. A black hole in an active galaxy has a mass 100 million times greater than that of the Sun, and produces correspondingly large amounts of energy.

Typically, each cubic centimeter of interstellar space contains about one atom or molecule, but the distribution of gas is far from



"Before" and "after" photographs of stars in the Large Magellanic Cloud, 163,000 light years from Earth, where astronomers in Chile noted a supernova on Feb. 24, 1987. The "before" picture was taken three years ago.

uniform. Much of the volume is taken up with extremely tenuous gas heated to nearly a million degrees by supernova explosions, but there are dense clouds of gas that have temperatures only 10–100 degrees above absolute zero.* In these clouds, hydrogen atoms are combined into H_2 molecules. Scattered throughout the clouds are dust particles only 1/100,000 of a centimeter across, detected as they scatter and absorb the light from stars beyond them. They appear to have cores of ordinary rock, surrounded by mantles containing relatively light and abundant chemical elements, such as carbon, nitrogen, oxygen, and hydrogen.

In the densest clouds, interstellar gas and dust are gravitationally collapsing onto various centers of attraction. The distances involved—light years—are enormous, so collapse takes millions of years. Current measurements suggest that the final result will be the birth of a new star. Hundreds of new stars may be born from the collapse of a single cloud.

Our own star, the Sun, was born this way about 4.5 billion years ago, when an interstellar cloud was momentarily squeezed to higher density by the pressure of a nearby supernova explosion, initiating its collapse. Just as a figure skater spins more rapidly as she draws in her arms, the collapsing cloud began to rotate more rapidly. Collapse toward the axis of rotation slowed down but continued, and eventually a disk of gas was formed. The gas at the center became the Sun, and the disk became the birthplace of the planets.

The Solar System

The dust drifted through the gas toward the midplane of the disk, enriching the medium to the point that the dust particles began to collide and stick to one another. The large particles collided in turn, until finally bodies a kilometer across had accumulated. These bodies collided with each other and stuck, building up to about the size of the inner planets (Mercury, Venus, Earth, Mars) and the cores of the outer planets. The giant planets of the outer solar system (Jupiter, Saturn, Uranus, Neptune) gravitationally attracted additional material from the surrounding medium, becoming much larger than the inner planets.

The decay of radioactive elements incorporated in the inner planets slowly heated their interiors to the melting point. Heavy materials like iron flowed to the center, while volatile materials composed of hydrogen, carbon, nitrogen, and oxygen were vaporized, coming to the surface in the form of gases such as molecular hydrogen, water vapor, carbon dioxide, methane, and ammonia. These gases escaped from Mercury, as it is so close to the Sun that its

*Absolute zero, or 0° Kelvin, is equal to -273° Celsius. It is the temperature at which matter has no thermal energy.

RESEARCH: DOLLARS AND PEOPLE

Studying the stars is a costly affair.

For 1987, the U.S. Congress allocated roughly $514 million for astronomy research; most dollars will go to the National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF). NASA will spend $402 million, largely on satellite projects, including the Hubble Space Telescope (annual cost: $98 million) and the Gamma Ray Observatory ($49 million). The NSF, with a modest $80 million budget, will finance research and the operation of ground-based observatories, such as the Very Large Array near Socorro, New Mexico, and the National Observatories at Kitt Peak, Arizona, and Green Bank, West Virginia. Some private organizations also support astronomy. One example: the Keck Foundation, which in 1985 donated $70 million to build a 10-meter optical telescope in Mauna Kea, Hawaii.

The United States is the biggest spender on astronomy, but not the only spender. The European Space Agency (ESA), a consortium of European programs, spent $107 million for space science in 1986. ESA's science budget is only a fraction of NASA's (one-seventh in 1985), limiting the Europeans to one medium-sized project every two years; nevertheless, it produces first-rate results, such as its 1986 Giotto mission to intercept Halley's comet. Moreover, several European nations allot additional money for home-based astronomical research. Outlays for 1982: France, $31.5 million; Great Britain, $12.1 million; Holland, $6.3 million; and West Germany, $5.8 million. In 1985, Japan's Institute of Space and Astronautical Sciences devoted $70 million to astronomy, recently launching Astro-C, an x-ray mission. Although the USSR outspends America on space programs (including military outlays), Moscow's financial commitment to astronomy is less than Washington's. Yet the Soviets do maintain several ground-based observatories, including large telescopes at Zelenchukskaya and Pulkovo. And Soviet satellite astronomy has burgeoned since 1982, when Salyut-7 carried aloft two French astronomical instruments. Among the USSR's more elaborate projects is ASTRON, a joint French-Soviet ultraviolet and x-ray satellite launched in 1983.

Why is there so much American interest in astronomy? For one thing, the United States is home to more than 3,000 professional astronomers and an estimated 250,000 amateurs, according to the U.S. Astronomical League. Of the professionals, one-third obtained their doctorates during the 1960s. Today there is a glut—more trained astronomers than available jobs. But it is a "graying" profession, and, at least according to one University of Wyoming study, the late 1990s will see a shortage of trained astronomers.

Nowadays American astronomers perform research by committee, lobby for funds from Congress, and manage large-scale staffs. In doing so, they are acquiring a high-tech image, observe astrophysicist Wallace Tucker and Karen Tucker. No longer does the public view the contemporary astronomer as "a solitary person shivering through the night in a lonely vigil at a telescope on some desolate mountaintop."

surface is too hot to retain them, but Venus, Earth, and Mars did retain them. In trying to understand the origin of life, it is of great interest to know how the atmospheres of these three planets evolved.

Earth's temperature allowed water to condense as a liquid, forming the oceans. Carbon dioxide in the atmosphere then dissolved in the oceans, and combined with minerals to form limestone, thus limiting the carbon dioxide in the atmosphere to low levels. Because Venus is closer to the Sun, its temperature remained above the condensation point for water, and carbon dioxide remained in the atmosphere. Because carbon dioxide absorbs infrared radiation emitted by a planetary surface heated by the Sun, the surface temperature rose. In the case of Venus, it is high enough to melt lead.

On Mars, the amount of carbon dioxide is too small for this to be a significant effect, and because of Mars's greater distance from the Sun, the temperature is so low that water remains frozen. The fact that water is liquid was crucial for the origin of life, as the chemical reactions involved took place in aqueous solution.

Life on Earth

It is believed that ultraviolet light from the Sun broke the molecules in Earth's atmosphere into smaller pieces—such as OH, CO, and NH—that reacted with each other to form more molecules, like hydrogen cyanide (HCN) and formaldehyde (H_2CO), which then dissolved in seawater. With the ebb and flow of tides over millions of years, some of these molecules were deposited on the surfaces of rocks in tidal pools. On rocks having specific surface structures, the warming by sunlight polymerized the molecules to form such complicated molecules as amino acids, nucleic acids, sugars, and bases. One of the nucleic acids, adenine, combines with phosphates dissolved in water to form ATP (adenosine triphosphate). This molecule is rich in energy, and today is used by living organisms to transport energy from place to place.

Nucleic acids, together with bases, sugars, and dissolved minerals, polymerized to form DNA, the molecule containing the genetic code. Fatty acids dissolved in the seawater coalesced to form minute droplets, thereby concentrating other molecules enough to permit further reactions among them. DNA began to use the energy supplied from sunlight by ATP to build up protein molecules from amino acids. Most of the proteins were useless, but in rare instances they reinforced the structure of the droplet, enabling further reactions. In this way the DNA could effect its own survival. A handful of "successful" DNA molecules were able to replicate themselves, thus initiating the process of biological reproduction. This is one idea as to how the first cells were created from nonliving matter.

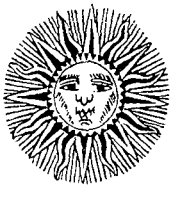
The big bang, inflation of the universe, the origin of matter, the

formation of the light elements, the formation of our galaxy, the synthesis of heavy elements in supernova explosions, the coalescence of materials to form interstellar dust, the collapse of a cloud to form the solar system, the formation of the individual planets, the origin of the oceans and atmosphere of Earth, and specific chemical processes all preceded the origin of life.

There is no reason to think that any of these processes differed dramatically anywhere in the universe, so our solar system is probably not unique. There could well be other "Earths" where the temperature is moderate and water is in liquid form. Could there not be life on these planets, and even intelligent life as well?

Today astronomers study the evolution of the universe by literally looking back in time. Taking advantage of the fact that light travels at a finite speed, we observe everything as it was in the past. An image of Uranus, radioed back by the Voyager II spacecraft, reveals the state of that planet as it was over two hours ago. A large telescope reveals the state of a distant galaxy 100 million years ago. The hiss of the cosmic microwave background radiation reveals the state of the universe 10 billion to 20 billion years ago. Sometime between then and now, galaxies formed out of primordial gas, the first stars formed and supernovas exploded, the first planets were formed from the fresh heavy elements, and the first life originated.

If these processes really are universal, they probably occurred in an orderly time sequence. If astronomers had instruments of unlimited power at their disposal, they would see galaxies forming at enormous distances, while, at somewhat smaller distances, the first stars and supernovas could be seen. Finally they would find a sphere a few billion light years away where life emerged. The Milky Way galaxy has already traveled this path all the way to the evolution of intelligence, so the universe has, in a sense, become aware of itself. Is it surprising that some of us are intrigued by the stars?



BEYOND ASTRONOMY

by Eric J. Chaisson and George B. Field

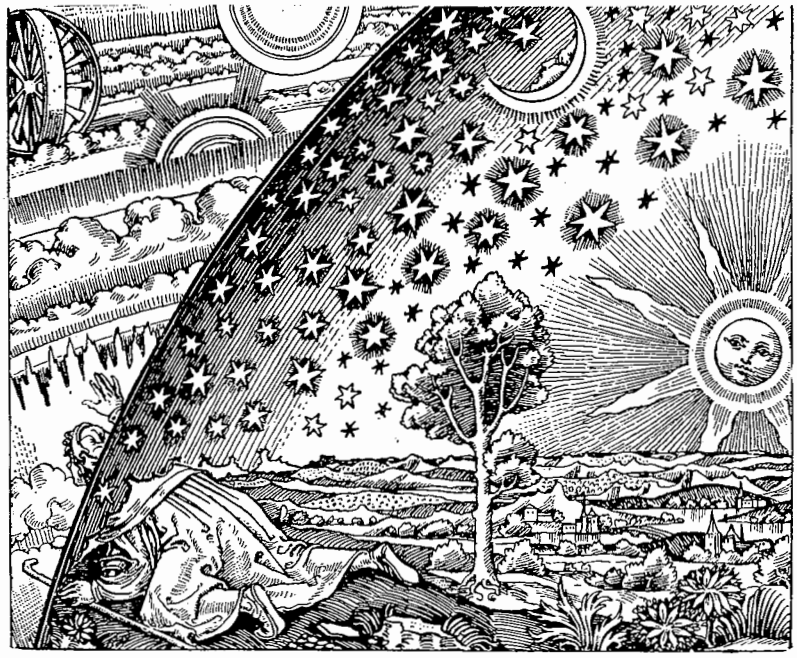
> You see then, studious reader, how the subtle mind of Galileo, in my opinion the first philosopher of the day, uses this telescope of ours like a sort of ladder, scales the furthest and loftiest walls of the visible world, surveys all things with his own eyes, and, from the position he has gained, darts the glances of his most acute intellect upon these petty abodes of ours—the planetary spheres I mean,—and compares with keenest reasoning the distant with the near, the lofty with the deep.
>
> *From* Dioptrics *by Johannes Kepler, Augsburg, 1611.*

Nature offers no greater splendor than the starry sky on a clear, dark night. Silent, timeless, jeweled with the constellations of ancient myth and legend, the night sky has inspired wonder throughout the ages—a wonder that leads our imaginations far from the confines of Earth and the pace of present day, out into boundless space and cosmic time itself.

Astronomy, born in response to that wonder, is sustained by two of the most fundamental traits of human nature: the need to explore and the need to understand. Through the interplay of curiosity, discovery, and analysis—the keys to exploration and understanding—answers to questions about the universe have been sought since the earliest times, for astronomy is the oldest of the sciences. Yet, not since its beginnings has astronomy been more vigorous or exciting than it is today.

Indeed, we are at the dawn of a new age in space science. Astronomy no longer evokes visions of plodding intellectuals peering through long telescope tubes. Nor does the cosmos any longer refer to that seemingly inactive, immutable regime captured visually by occasionally gazing at the nighttime sky. Modern astrophysics now deciphers a more vibrant, evolving universe—one in which stars emerge and perish like living things, galaxies spew forth vast quantities of energy, and life itself is understood as a natural consequence of the evolution of matter. Yet, amid the cosmic symphony of visible and invisible matter strewn across the universe, we humans seemingly play no special role. The rock called Earth is merely a platform on which to develop new technologies and sciences, all of which tend to reinforce the magnificent mediocrity of human life in the universe.

New discoveries always not only advance knowledge, but also raise new questions. Astrophysicists will encounter many new prob-



Man attempts to peer beyond the confines of Earth's skies—a classic theme here depicted by artist Camille Flammarion in a 19th-century woodcut.

lems in the decades ahead, but this should neither dismay nor frustrate us, for this is precisely how science operates. Each discovery adds to our storehouse of information, generating a host of questions that lead in turn to more discoveries, and so on, resulting in a rich acceleration of basic knowledge.

Through modern astronomical research, we now realize that we are connected to distant space and time not only by our imaginations but also through a common cosmic heritage: Most of the chemical elements comprising our bodies were created billions of years ago in the hot interiors of remote and long-vanished stars. Their hydrogen and helium fuel finally spent, these giant stars met death in cataclysmic supernova explosions, scattering afar the atoms of heavy elements synthesized deep within their cores. Eventually this matter collected into clouds of gas in interstellar space; these, in turn, slowly collapsed to give birth to a new generation of stars. In this way, the Sun and its complement of planets were formed nearly five billion years ago. Drawing upon the matter gathered from the debris of its stellar ancestors, the planet Earth provided the conditions that ultimately gave rise to life. Thus, like every object in our solar system,

EXTRATERRESTRIAL LIFE?

In 1894, Boston astronomer Percival Lowell titillated America with his "proof" that life exists on Mars. Telescope images of channels on Mars's surface, he argued, were evidence of a Martian civilization.

There is no life on Mars. But there might be life elsewhere.

Though often regarded as the province of dreamers (or Hollywood producers), the Search for Extraterrestrial Intelligence (SETI) is a serious scientific enterprise. In 1982, Congress authorized the National Aeronautics and Space Administration (NASA) to spend $1.5 million on SETI—a big turnaround, since Congress had previously scuttled SETI.

E.T.

Why the reversal? One factor was *Astronomy and Astrophysics for the 1980s*, a report issued in April 1982 by the National Academy of Sciences recommending a SETI program. Then, in August 1982, the International Astronomical Union created a SETI commission. In addition, 68 scientists from 12 nations published a SETI Manifesto, calling for "a coordinated, worldwide, and systematic search for extraterrestrial life." As a result, for fiscal 1987, NASA will spend roughly $2.2 million on SETI.

Proponents of SETI argue that, since life *did* evolve on Earth, it probably has done so elsewhere. The best estimates indicate that roughly 10 million stars in the visible universe have planets that potentially could support life.

To find out if anyone is out there, in 1959 astronomers Giuseppe Cocconi and Philip Morrison proposed listening for extraterrestrial radio signals. Then, in 1960, Cornell astronomer Frank Drake first eavesdropped on two nearby stars, Tau Ceti and Epsilon Eridani—but to no avail. By 1973, Ohio State University had begun round-the-clock monitoring of extraterrestrial radio signals, on 50 channels. Today, the Harvard-Smithsonian Project Meta uses an 84-foot radio telescope at Massachusetts's Oak Ridge Observatory to scan eight million radio channels. And, at the University of California, Berkeley, astronomers are searching 128,000 radio channels "piggybacked" from other experiments at the National Radio Astronomy Observatory in West Virginia.

On the SETI drawing board: NASA's "multi-channel spectrum analyzer." If built, it will monitor 10 million radio channels as part of the Microwave Observing Project. The total cost: $70 million over 10 years.

A few astronomers are even sending out messages to distant galaxies. In 1974, astronomers at Arecibo, Puerto Rico, transmitted signals to the Great Cluster of Hercules, 21,000 light years away. (A reply is expected in 42,000 years.) Even the Pioneer 10 and 11 and Voyager I and II space probes, launched during the 1970s, carried "greeting" plaques, solar system maps, and video disks. But such "shots in the dark" are not popular. Why? Most astronomers, says Berkeley's Stuart Bowyer, prefer projects that "bear fruit during their lifetimes."

each living creature on Earth embodies atoms from distant realms of our galaxy and from a past far more remote than the beginnings of human evolution.

Although ours is the only planetary system we know for sure, others may surround many of the hundreds of billions of stars in our galaxy. Elsewhere in the universe, beings with an intelligence surpassing our own may also at this moment gaze in wonder at the nighttime sky, impelled by even more powerful imaginations. If such beings exist—possibly even communicating across the vast expanses of interstellar space—they, too, must share our cosmic heritage.

Emerging largely from our studies of the invisible universe, this recognition of our cosmic heritage is a relatively recent achievement in astronomy. However, it is but one of many such insights that our generation alone has been privileged to attain. Indeed, our descendants will likely regard our generation as the one that broached the electromagnetic spectrum beyond visible light, thus not only providing a whole new glimpse of our richly endowed universe, but perhaps more significantly recognizing life's integral role in the cosmos.

In all of history, there have been only two periods in which our perception of the universe has been so revolutionized within a single human lifetime. The first occurred nearly four centuries ago at the time of Galileo; the second is now under way.

Eric J. Chaisson, 39, is senior research physicist at the Massachusetts Institute of Technology and professor of astronomy at Wellesley College. Born in Lowell, Massachusetts, he received a B.S. from the University of Lowell (1968), and an M.A. (1969) and a Ph.D. (1972) from Harvard University. His most recent book is The Life Era *(1987). This essay is drawn from* The Invisible Universe *(1985) by Eric J. Chaisson and George B. Field.*

BACKGROUND BOOKS

ASTRONOMY

Human beings have long endeavored to form a coherent picture of the universe—as much of it as any age could fathom—and of man's place in it.

That picture began to take shape during the end of the Ice Age, perhaps as long as 30,000 years ago, according to Evan Hadingham in **Early Man and the Cosmos** (Univ. of Okla., 1985). Moving with ease from Eskimo moonwatchers to Pueblo Indian sunwatchers, he provides a colorful chronology and comparisons of a dozen primitive skywatching societies.

Two similar treatments, James Cornell's **First Stargazers** (Scribner's, 1981), and **Astronomy of the Ancients** (MIT, 1981), edited by Kenneth Brecher and Michael Feirtag, expand on astronomy's archaeological aspects. In addition to describing ancient Egyptian and Babylonian astronomy, Cornell explains the relevance of specific ancient observatories in the Far East and Africa; Brecher's and Feirtag's collection of eight essays by leading archaeoastronomers focuses on such matters as the first scientific instruments and the medicine wheels of the Plains Indians. Providing a close look at particular cultures, **Native American Astronomy** (Univ. of Tex., 1979), edited by Anthony F. Aveni, and **At the Crossroads of the Earth and the Sky: An Andean Cosmology** (Univ. of Tex., 1981) by Gary Urton suggest that the term "primitive" does not always fit early societies.

The invention of specialized tools, such as telescopes, has played a crucial role in the evolution of astronomical knowledge. Focusing on the relationship between theoretical and technical advances in astronomy, Cornell's Martin Harwit, in **Cosmic Discovery: The Search, Scope, and Heritage of Astronomy** (MIT, 1984), shows how theories and instruments tend to improve together. Using charts and graphs, he demonstrates the rapid progress in astronomy since World War II, noting, among other things, the major astronomical discoveries by people not trained as astronomers—physicists, chemists, engineers, and even theologians.

What are those discoveries? By far the best way to comprehend the majesty of the cosmos, and to understand what astronomers have found, is to see what they see. **The Cambridge Atlas of Astronomy** (Cambridge, 1985), edited by Jean Audauze and Guy Israël, provides 432 pages of color photographs, charts, and diagrams of objects millions of light years from Earth. Included: Venus's landscape, Jupiter's moons, the Magellanic Clouds, gaseous nebulae, clusters of galaxies, neutron stars, and pulsars. **The Cambridge Photographic Atlas of the Planets** (Cambridge, 1982), edited by Geoffrey Briggs and Fredric Taylor, and **Colours of the Stars** (Cambridge, 1984) by David Malin and Paul Murdin, supply greater detail.

Many of these spectacular images are products of recent journeys into space. Indeed, **Astronomy from Space: Sputnik to Space Telescope** (MIT, 1985), edited by James Cornell and Paul Gorenstein, provides 10 essays by research astronomers on such topics as exploration of the Moon, ultraviolet and x-ray charting of the sky, the geology of the planets, and the future of space astronomy. Wallace Tucker's and Karen Tucker's **Cosmic Inquirers** (Harvard, 1986) describes the difficult technical labor that goes into designing and carrying out big expensive projects, such as the construction of the Very Large Array in New Mexico or the launching of the Ein-

stein X-Ray Observatory.

The fruits of these and other large-scale research projects are well illustrated (240 pages of color plates) in **The New Astronomy** (Cambridge, 1983) by Nigel Henbest and Michael Marten. Equally useful summaries are Paul W. Hodge's **Galaxies** (Harvard, 1986), James Elliot's and Richard Kerr's **Rings: Discoveries from Galileo to Voyager** (MIT, 1984), and Wallace Tucker's and Riccardo Giacconi's **X-Ray Universe** (Harvard, 1985).

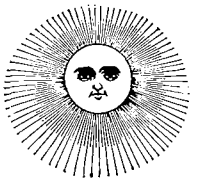
Closer to home, **The Milky Way** (Harvard, 1941, 1981) is Bart J. Bok's and Priscilla F. Bok's classic anatomy of our galaxy, which Ovid in the *Metamorphoses* called "the Palatine of the Great Sky." This streak across the night sky, composed of the light from millions of distant stars, can best be viewed in the United States and Europe, the Boks note, "in the late summer on a moonless night an hour or so after sunset."

Skywatchers may also spot a shooting star. Known technically as "meteoroids," according to Robert T. Dodd in **Thunderstones and Shooting Stars: The Meaning of Meteorites** (Harvard, 1986), they continually bombard the Earth, ranging widely in size and kind from small pieces of "fluffy dust" to 100,000-ton chunks of metal.

Despite the recent leaps in knowledge about the universe and its origin, most astronomers (like most scientists) maintain that the more they learn, the more they realize they do not yet know. Hence **Revealing the Universe: Prediction and Proof in Astronomy** (MIT, 1982), edited by James Cornell and Alan P. Lightman. Thirteen scholar-essayists consider not only such matters as "the mystery of the x-ray burst sources" but also various unanswered questions now facing astronomers: Are there more than nine planets in the solar system? In what form is the universe's "hidden mass"? And could the theory of stellar evolution be wrong?

Such questions form a seemingly endless chain. In fact, physicist Werner Heisenberg observed in **Physics and Philosophy: The Revolution in Modern Science** (Harper, 1958) that "natural science does not simply describe and explain nature; it is part of the interplay between nature and ourselves; it describes nature as exposed to our method of questioning."

Astronomers utilize a specific method of questioning, one that focuses on *how* cosmic events occur. As to *why* they occur—the bigger picture—those questions fall under the rubric of "cosmology," what astronomer Edward R. Harrison calls "the science of the universe." In **Cosmology** (Cambridge, 1986), Harrison notes that cosmologists deal with such matters as the large-scale structure of the universe, its distant and receding horizons, the interplay of cosmic forces, and the nature of space and time. But, whereas "most sciences tear things apart into smaller and smaller constituents, for the purpose of examining the world in progressively greater detail . . . cosmology is the one science devoted to putting the pieces together into a 'mighty frame.'"



HOW NIETZSCHE CONQUERED AMERICA

Ideas have consequences. They also have pedigrees. But by the time an idea gains wide acceptance, its origins may be murky, even invisible. Today, it is safe to say, few Americans suspect that an underlying premise of their own current popular culture—the notion that right and wrong are matters of individual judgment—stems from a late 19th-century revolution in German philosophy. The chief revolutionary: Friedrich Nietzsche (1844–1900). In his view, as the strictures of traditional religion faded, all moral absolutes had become relative. Philosopher Allan Bloom here argues that Nietzsche's famed "transvaluation of all values" has infiltrated the New World via academe, with unhappy effects most Americans only dimly comprehend.

by Allan Bloom

When, early in his first term, President Reagan called the Soviet Union "the evil empire," right-thinking persons joined in an angry chorus of protest against such provocative rhetoric. At other times, Mr. Reagan has said that the United States and the Soviet Union "have different *values*" (italics added), an assertion that the same people greet at worst with silence and frequently with approval.

I believe Mr. Reagan thought he was saying the same thing in both instances. The different reaction to his different words introduces us to the most astonishing phenomenon of our time, all the more astonishing in being almost unnoticed: There is now an entirely new language of good and evil, originating in an attempt to get "beyond good and evil" and preventing us from talking with any conviction about good and evil.

Even those who deplore our current moral condition do so in the very language that exemplifies that condition. The new language is that of *value* relativism. It constitutes a change in our view of things

A drawing of Friedrich Nietzsche by David Levine.

moral and political as great as the one that took place when Christianity replaced Greek and Roman paganism.

A new language always reflects a new point of view. The gradual, unconscious popularization of new words, or of old words used in new ways, is a sure sign of a profound change in peoples' articulation of the world. When Anglican bishops, a generation after the publication of Hobbes's *Leviathan* in 1651, spoke of the "state of nature," "contracts," and "rights," it was clear that Hobbes's words had conquered the ecclesiastical authorities. They were no longer able to understand themselves as they once had. It was thenceforward inevitable that the modern archbishops of Canterbury would have no more in common with the ancient ones than does the second Queen Elizabeth with the first.

What was offensive to contemporary ears in Mr. Reagan's use of the word "evil" was its cultural arrogance, the presumption that he, and America, know what is good not only for themselves but for the rest of the world. The political corollary is that he is not open to negotiation with the Soviets. The opposition between good and evil is not negotiable and is a cause of war. Those who are interested in "conflict resolution" find it much easier to reduce the tension be-

tween "values" than the tension between good and evil.

The term "value," meaning the subjectivity of all belief about good and evil, serves the simple quest for self-preservation. And this longing to shuck off constraints and have one peaceful, happy world is the first of the odd affinities between our American world and that of turn-of-the-century German philosophy in its most advanced form, given unconscious expression by the critics of the president's speech (and, on other occasions, by the president himself!).

But there is a second side to the coin. People deeply committed to "values" are admired. Their intense belief, their caring or concern, their believing in *something*, is the proof of autonomy, freedom, and creativity. Such persons are the contrary of easygoing, and they have standards, all the more worthy because they are not received from tradition, and are not based on a reality all can see. Nor are they derived from thin rationalizing confined to calculation about material interests. The heroic and artistic types, antibourgeois to the core, dedicate themselves to ideals of their own making.

Thus our use of the new "value" language leads us in two opposite directions—to follow the line of least resistance, or to adopt strong poses and fanatic resolutions.

But these are merely different deductions from a common premise. Values are not the product of reason, and it is fruitless to seek them in order to find the truth or the good life. The quest begun by Odysseus and continued over three millennia has come to an end with the observation that there is nothing to seek. This alleged fact was announced by Friedrich Nietzsche just over a century ago when he said "God is dead."

Good and evil now for the first time appeared as "values," of which there have been a thousand and one, none rationally or objectively preferable to any other. The salutary religion-based illusion about the existence of good and evil had been definitively dispelled. For Nietzsche this was an unparalleled catastrophe; it meant the decomposition of culture and the loss of human aspiration. The Socratic "examined" life was no longer possible or desirable. The philosophical way of life had become simply poisonous. In short, Nietzsche

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with the utmost gravity told modern man that he was free-falling in the abyss of nihilism. Perhaps after having lived through this terrible experience, people might hope for a fresh era of value creation, the emergence of new gods. Or so Nietzsche thought.

Modern democracy was, of course, the target of Nietzsche's criticism. As he saw it, rationalism and its egalitarianism were the contrary of creativity; daily life was for him the civilized *reanimalization* of man; nobody really believed in anything anymore, and everyone spent his life in frenzied work and frenzied play so as not to face the fact, not to look into the abyss.

Nietzsche's call to revolt against liberal democracy was ultimately more powerful than Marx's. And Nietzsche added that the Left, socialism, was not the opposite of the special kind of Right that was capitalism, but rather its fulfillment. The Left meant equality, the true Right inequality. Nietzsche's call was from the Right, but a new Right transcending both capitalism and socialism.

But in spite of this, the latest champions of modern democratic or egalitarian man find much that is attractive in Nietzsche's understanding of things. It is the sign of the strength of the notion of equality and of the failure of Nietzsche's war against it that he is now more influential on the Left than on the Right.

This may at first appear surprising. Nietzsche, after all, looks toward the extraordinary, not the ordinary, the unequal, not the equal. But the democratic man requires flattery, like any other ruler, and the earliest versions of democratic theory did not provide it. Political thinkers and politicians, notably Alexis de Tocqueville, justified democracy as the regime in which very ordinary people were protected in their attempt to achieve very ordinary and common goals. It was also the regime dominated by public opinion, where the common denominator set the rule for everyone. Democracy presented itself as decent mediocrity superior to the splendid corruption of older regimes.

But it is quite another thing to have a regime—the one Americans now have—in which all the citizens can be thought to be at least potentially autonomous, creating values for themselves. A value-creating man is a plausible substitute for a good man, and some such substitute becomes practically inevitable in a society dominated by pop relativism. Very few people, finally, can think of themselves as either evil or nothing. The respectable and accessible nobility of man is to be found not in the quest for or discovery of the good life but in creating one's own "life-style," of which there is not just one but many possible, none comparable to another.

All this has become everyday fare in the United States. The

most popular schools of psychology and their therapies take value positing as the standard of healthy personality. Woody Allen's film comedy is nothing but a set of variations on the theme of the man who does not have a real "self" or "identity," and feels superior to inauthentically self-satisfied people because he is conscious of his situation and at the same time inferior to them because they are "adjusted." This borrowed psychology turns into a textbook in Woody Allen's film *Zelig* (1983), which is the story of an "other-directed" man, as opposed to an "inner-directed" man, terms popularized during the 1950s by David Riesman's *Lonely Crowd*, borrowed by him from his analyst, Erich Fromm, who himself absorbed them from a really serious thinker, Nietzsche's heir, Martin Heidegger.

I was astounded to see how doctrinaire Woody Allen is, and how normal his way of looking at things—which has immediate roots in the most profound German philosophy—has become in the American entertainment market. One of the links between Germany and the United States, psychologist Bruno Bettelheim, actually plays a cameo role in *Zelig*.

Zelig is a man who literally becomes whoever or whatever is expected of him—a Republican when with the rich; a gangster when with Mafiosi; black, Chinese, or female when with blacks, Chinese, or females. He is nothing in himself, just a collection of roles prescribed by others. He inevitably enters into psychiatric treatment, where we learn that he was once "tradition-directed," i.e. from a family of silly, dancing, rabbinical Jews.

"Tradition-directed" means to be guided by old values, usually religious, which give a man a role that he takes to be more than a role, that is, a reality and a place in the world. It goes without saying that, in Allen's view, a return to that old mode of adjustment and apparent health is neither possible nor desirable. One is supposed to laugh at the dancing Jew, although it is not clear whether from the point of view of alienation or health.

Zelig's own health is restored when he becomes "inner-directed," when he follows his real instincts and sets his own values. When Zelig hears people say that it is a nice day, when it manifestly is, he responds that it is not a nice day. So he is immediately clapped in a mental institution by those whom he previously tried to imitate and with whose opinions he is now at war.

Woody Allen's haunted comedy diagnoses our ills as stemming from value relativism, for which the cure is value positing. And his great strength is in depicting the self-conscious role-player, never quite at home in his role, interesting because he is trying so hard to be like the others, who are ridiculous because they are unaware of

their emptiness. But Allen is tasteless and superficial in playing with his Jewishness, which apparently has no inner dignity for him. And where he fails completely is in his presentation of the healthy inner-directed man, who is neither funny nor interesting.

If Allen's art is ultimately shallow and disappointing, it is because it tries to assure us that the agonies of nihilism are just neuroses that can be cured by a little therapy and a little stiffening of our backs. Erich Fromm's *Escape from Freedom* (1941) is Dale Carnegie with a bit of middle-European cultural whipped cream on top. Get rid of capitalist alienation and Puritan repression, and all will be well as each man chooses for himself.

In politics, in entertainment, in religion, everywhere, we find the language connected with Nietzsche's value revolution, a language necessitated by a new perspective on the things of most concern to us. Words such as "charisma," "life-style," "commitment," "identity," and many others, all of which can easily be traced to Nietzsche, are now practically American slang, although they, and the things to which they refer, would have been incomprehensible to our fathers, not to speak of our Founding Fathers.

A few years ago I chatted with a taxi driver in Atlanta who told me he had just gotten out of prison, where he served time for peddling dope. Happily he had undergone "therapy." I asked him what kind. He responded, "All kinds—depth-psychology, transactional analysis, but what I liked best was Gestalt." Some of the German ideas did not even require English words to become the language of the American people.

What an extraordinary thing it is that high-class talk from what was the peak of Western European intellectual life, in pre-Hitler Germany, has become as natural as chewing gum on American streets. It indeed had its effect on this taxi driver. He said that he had found his identity and learned to like himself. (A generation earlier he would have found God and learned to despise himself as a sinner.) The problem lay with his sense of *self*, not with any original sin or devils in him. We have here the peculiarly American way of digesting Continental despair. It is nihilism with a happy ending.

This popularization of German philosophy in the United States is of peculiar interest to me because I have watched it occur during my own intellectual lifetime, and I feel a little like someone who knew Napoleon when he was six. I have seen value relativism and its concomitants grow greater in the land than anyone could have imagined. Who in 1920 would have believed that Max Weber's technical sociological terminology would someday be the everyday language of the United States, the land of the Philistines, itself in the meantime be-

come the most powerful nation in the world? The self-understanding of hippies, yippies, yuppies, panthers, prelates, and presidents has unconsciously been formed by German thought of a half-century earlier; Herbert Marcuse's accent has been turned into a Middle Western twang; the *echt Deutsch* label has been replaced by a *Made in America* label; and the new American life-style has become a Disneyland version of the Weimar Republic for the whole family.

So my studies have led me ineluctably back to the half-hidden and thrilling origins of all this, providing me a standpoint from which I look in both directions, forward to our evolving American life and backward to the profound philosophical tradition, with the most ambiguous intellectual, moral, and political consequences. Knowledge of this fascinating intellectual history is required in order to understand ourselves. It will also allow us to consider real alternatives—if only intellectual historians could be persuaded that the intellect has an effect on history, that, as Nietzsche said, "the greatest deeds are thoughts," that "the world revolves around the inventors of new values, revolves silently." Nietzsche was such an inventor, and we are still revolving around him, although rather squeakily.

I got my first look at this scene at the midpoint of its development, when American university life was being revolutionized by German thought, which was still the preserve of earnest intellectuals. When I came to the University of Chicago in the mid-1940s, just after the war, terms like "value judgment" were fresh, confined to an elite and promising special insight. There were great expectations in the social sciences that a new era was beginning in which man and society would be understood better than they had ever been understood before. The academic character of the philosophy departments, with their tired and tiresome methodology and positivism, had caused people interested in the perennial and live questions about man to migrate to the social sciences.

There were two writers who generated real enthusiasm—Sigmund Freud and Max Weber. (Karl Marx was revered but, as had been true for a long time, was little read and did not provide inspiration for dealing with the problems really facing us.) Although it is even now still insufficiently appreciated, Freud and Weber were both thinkers who were profoundly influenced by Nietzsche, as is obvious to anyone who knows Nietzsche and knows what was going on in the German-speaking world at the turn of the century. In a strange way, during the first three decades of the 20th century, they divided up Nietzsche's psychological and social concerns between them. Freud concentrated on the id, or unconscious, the sexual as the motor of the most interesting spiritual phenomena, and the related ideas of sub-

limation and neurosis. Weber was most concerned with the problem of values, the role of religion in their formation, and community. Together Freud and Weber are the immediate source of most of the language with which we are now so familiar.

Everyone knew that they were German thinkers, and that the professors teaching them at Chicago, Columbia, and other universities were a mix of German refugees from Hitler (notably those allied with the Frankfurt-based Institute for Social Research during the 1920s) and Americans who had either studied in Germany prior to Hitler or who had learned from these emigrés. It was not a problem to any of them that these ideas were German. Freud and Weber were part of that great pre-Hitlerian classical tradition, which everyone respected. Nietzsche himself was not at that time very respectable because his thought seemed to have some discomfiting relation to fascism, and many of those who had favored Nietzsche in the Anglo-Saxon world (where he had had his greatest direct influence on artists) had not been sufficiently alert to the dangers of fascism and anti-Semitism (although Nietzsche himself was the very opposite of an anti-Semite). The fact that German thought had taken an anti-rational and anti-liberal turn with Nietzsche, and even more so with Heidegger, was evident. But this was simply repressed, and a blind eye was turned to their influence on their contemporaries.

My professors, many of whom were to become very famous, did not tend to be philosophical. They did not dig back into the sources of the new language and categories they were using. They thought that these were scientific discoveries like any others, which were to be used in order to make further discoveries. They were very much addicted to abstractions and generalizations, as Tocqueville predicted they would be. They believed in scientific progress and appeared (there may have been an element of boasting and self-irony in this) to be convinced that they were on the verge of a historic breakthrough in the social sciences.

These teachers were inebriated by the unconscious and by "values." And they were also sure that scientific progress would spur social and political progress. All were either Marxists or New Deal liberals. By the late 1940s, as they saw it, the war against the Right had been won domestically at the polls, and abroad on the battlefield. The question of principle had been resolved. Equality and the welfare state were now a part of the order of things, and what remained was to complete the democratic project. Psychotherapy would make individuals happy, while sociology would improve societies.

I do not believe any of these professors noticed the darker side of Freud and Weber, let alone the Nietzsche-Heidegger extremism

lying somewhere beneath the surface. Or rather, if they did notice, they found it of autobiographical rather than scientific interest. It is amazing to me that the irrational source of all conscious life in Freud, and the relativity of all values in Weber, did not pose a problem for them and their optimism about science.

Freud was very dubious about the future of civilization and the role of reason in the life of man. He certainly was not a convinced advocate of democracy or equality. And Weber, much more thoughtful than Freud about science, morals, and politics, lived in an atmosphere of permanent tragedy. His science of society was formulated as a doubtful dare against the chaos of things, and values certainly lay beyond its limits.

This is what the very precarious, not to say imaginary, distinction between facts and values meant. Reason in politics leads to the inhumanity of bureaucracy. Weber found it impossible to prefer rational politics to the politics of irrational commitment; he believed that reason and science themselves were value commitments like any other commitments, incapable of asserting their own goodness, thus having lost what had always been most distinctive in them.

Weber, along with many others in Germany under Nietzsche's influence, saw that all that Western democrats cared for was threatened by his insight and that we were without intellectual or moral resources to govern the outcome. Weber realized that we require values, which in turn require a peculiar human creativity that is drying up and in any event has no cosmic support; scientific analysis itself concludes that reason is powerless, while dissolving the protective horizon within which men can put a value.

None of this was peculiar to Weber or comes simply from his distressed personality, which he had at least partly because of the bleak perspective that lay before him. There is no doubt that "value relativism," if it is believed in, takes one into very dark regions of the soul and very dangerous political experiments.

But on enchanted American ground the tragic sense has little place. The early proponents of the new social science, such as sociologist Talcott Parsons, gaily accepted the value insight, sure that their own values were just fine.

It was not until the 1960s that the value insight began to have its true effects in the United States, as it had had in Germany 30 or 40 years earlier. Suddenly a new generation that had not lived off inherited tradition, that had been educated in philosophical and scientific indifference to good and evil, came on the scene representing value commitment and taught their elders a most unpleasant lesson.

The image of this astonishing Americanization of the German

pathos can be seen in the smiling face of Louis Armstrong as he belts out the words of his great hit "Mack the Knife." As most American intellectuals know, it is a translation of the song "Mackie Messer" from *The Threepenny Opera* (1928), a monument of Weimar Republic popular culture, written by two heroes of the artistic Left, playwright Bertolt Brecht and composer Kurt Weill. There was a strange nostalgia among many of the American intelligentsia for this moment just prior to Hitler's coming to power, and Lotte Lenya's rendition of this song has long stood with Marlene Dietrich's singing "Ich bin von Kopf bis Fuss auf Liebe eingestellt" in the *Blue Angel* as the symbol of a charming, neurotic, sexy, decadent longing for some hazy fulfillment not quite present to the consciousness. Less known to our intelligentsia is a story in Nietzsche's *Thus Spake Zarathustra* (a book well known to Brecht) entitled "On the Pale Criminal," which tells of a neurotic murderer eerily resembling Raskolnikov in *Crime and Punishment*, who does not know, cannot know, that he committed a murder out of a motive as legitimate as any other and useful in many important situations, but delegitimized in our pacific times: He lusted after "the joy of the knife."

This scenario for "Mack the Knife" is the beginning of the supramoral attitude of expectancy, waiting to see what the volcano of the id will spew forth, which appealed to Weimar sophisticates and their American admirers. Everything is all right as long as it is not fascism! With Armstrong taking Lenya's place, as Mai Britt took Dietrich's, it is all mass-marketed and the message becomes less dangerous, although no less corrupt. All awareness of foreignness disappears. It is thought to be folk culture, all-American, part of the American century, just as "stay loose" (as opposed to uptight) is supposed to have been an insight of rock music and not a translation of Heidegger's *Gelassenheit*. The historical sense and the distance on our times, the only advantages of Weimar nostalgia, are gone, and American self-satisfaction—the sense that the scene is ours, that we have nothing important to learn about life from the past—is served.

This image can be seen in our intellectual history, if only one substitutes Mary McCarthy for Louis Armstrong and Erich Fromm for Lenya, and so on through the honor roll of American intellectuals. Our stars are singing a song they do not understand, translated from a German original. They are having a huge popular success with unknown but wide-ranging consequences, as something of the original message touches something in American souls. But behind it all, the master lyricists are Nietzsche and Heidegger.

My insistence on the Germanness of all this is intended not as a know-nothing response to foreign influence, the search for a German

FIRST HAPPINESS, THEN VIRTUE

Friedrich Nietzsche once accused a fellow philosopher of sentimentality, charging that "preaching morals is as easy as giving reasons for morals is difficult." Beginning with his first book, *The Birth of Tragedy* (1872), Nietzsche devoted his entire career to examining the foundations of Western morality.

The man who would proclaim the death of God as well as the end of Western metaphysics was himself the son of a Lutheran minister. Born in Rocken, Prussia, in 1844, he was, by all accounts, a precocious if frail youth and, later, a painfully shy recluse known for his quiet, professorial manner. Illness plagued the mature Nietzsche, and the strong medications he took for his migraines and insomnia only made him weaker. After briefly teaching philology in Switzerland, he spent most of his life searching for salubrious climates in which to write. Nietzsche's personal preoccupation with health unquestionably contributed to his conviction that the real goal of philosophy was to create a stronger people, epitomized by his ideal, the Superman. Tragically, in 1889, he went mad and remained so until his death in 1900. The ironies were not limited to his lifetime. Later named as one of the ideological forerunners of Nazism, he had, in fact, bitterly attacked anti-Semites, including his former mentor, composer Richard Wagner.

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It is fair to say, however, that Nietzsche invited misinterpretation. His 10 great books—including *Human, All-Too-Human* (1878), *Beyond Good and Evil* (1886), and *Toward a Genealogy of Morals* (1887)—were full of charged images and symbols, by turns lyrical and rigorously analytical, and almost always deceptively ironic. To make matters worse, he preferred quick aphoristic observations, held together by a subtle, almost invisible structure, to straightforward linear argument. And many of his notions were not merely reactionary but provocatively so: "Go to woman? Take thy whip!"

There is no simple distillation of Nietzsche's philosophy. He believed that Western culture was at a stage of crisis; that men and women now lived under a moral code—an amalgam of Judeo-Christian teachings and progressive liberal principles—that ran directly counter to human instincts; that democracy, by ennobling the average, was fundamentally decadent; and, therefore, that a revolution in thinking, reinstating the noble as the good, was the West's only hope for regaining its vitality. But each of these notions was hedged by subtle qualifications. Philosopher Walter Kaufman, perhaps Nietzsche's most vigorous proselytizer in America, explains: "Morality and religion teach that if you are good, you will be happy. Nietzsche argues that virtue is the effect of happiness or that vice is bred by unhappiness—a commonplace in the 20th century but not in the 19th."

Yet those American academics who transformed Nietzsche into an advocate of egocentric hedonism did him a disservice. In fact, Nietzsche maintained that true happiness could be attained only through accomplishment, through heroic self-transformation by means of creative work. And he held that only the most self-disciplined and imaginative would succeed.

intellectual under every bed, but to heighten awareness of where we must look if we are to understand what we are saying and thinking, for we are in danger of forgetting.

The great influence of a nation with a powerful intellectual life over less well-endowed nations, even if the armies of the latter are very powerful, is not rare in human experience. The most obvious cases are the influence of Greece on Rome and of France on Germany and Russia.

But it is precisely the differences between these two cases and the example of Germany and the United States that make the latter so problematic for us. Greek and French philosophy were universalistic in intention and fact. They appealed to the use of a faculty potentially possessed by all men everywhere and at all times. The adjective in *Greek* philosophy is only an inessential tag, as it is in *French* Enlightenment. (The same is true of *Italian* Renaissance, a rebirth that is proof of the accidental character of nations and of the universality of Greek thinkers.) The good life and the just regime they taught knew no limits of race, nation, religion, or climate.

This relation to man as man was the very definition of philosophy. We are aware of this when we speak of science, and no one seriously talks of German, Italian, or English physics. And when we Americans speak seriously about politics, we mean that our principles of freedom and equality are rational and everywhere applicable. World War II was really an educational project undertaken to force those who did not accept these principles to do so.

But German philosophy after Hegel (1770–1831) cast doubt on them, and there was some relationship between German politics and German thought. That school of 19th-century thought called historicism has taught that the mind is essentially related to history or culture. Germanness is, according to later German philosophers, an essential part of them. For Nietzsche and those influenced by him, values are the products of folk minds and have relevance only to those minds. The possibility of translation itself is doubted by Heidegger. For him the Latin translations of the Greek philosophical terms are superficial and do not convey the essence of the translated text.

German thought tended not toward liberation from one's own culture, as we had earlier thought, but toward reconstituting the rootedness in one's own. Thus we Americans are like the millionaire in *The Ghost (Geist) Goes West* who brings a castle from brooding Scotland to sunny Florida and adds canals and gondolas for "local color." We chose a system of thought that, like some wines, does not travel; we chose a way of looking at things that could never be ours and had as its starting point dislike of us and our goals. The United

States was held to be a nonculture, a collection of castoffs from real cultures, seeking only comfortable self-preservation in a regime dedicated to superficial cosmopolitanism in thought and deed.

Our desire for the German things was proof we could not understand them. Whether "value relativism" is harmonious with democracy is a question that is dealt with by never being raised. Social scientists deny that thought, especially serious thought, could have had anything to do with Hitler's success in 1933. But the pre-Hitler Weimar Republic also contained intelligent persons who were attracted, at least in the beginning, to fascism, for reasons very like those motivating the Left's ideologues—that is, by reflections on autonomy and "value creation." Once one plunges into the abyss, there is no assurance whatsoever that equality, democracy, or socialism will be found on the other side.

Why, then, could *ideas* contrary to American *ideals* so easily take root? Pierre Hassner, a French political scientist, once asked whether the fantastic success of Freud in America was due simply to the fact that so many of his disciples took refuge from Hitler there and were very effective propagandists, or whether there was some special need for Freud in a country he did not much care for.

As a Chicago boy, I was always particularly struck by the fact that Marshall Field III, the scion of the great merchandising family, the archetypical success story of what Weberians call the Protestant Ethic, was psychoanalyzed by Gregory Zilboorg, one of the earliest influential Freudians in the United States, and emerged as an ardent supporter of left-wing causes who lost fortunes on liberal newspapers. There was evidently much more going on in the store's basement than we had suspected. Was there something that the American self-understanding had not sufficiently recognized or satisfied?

Once Americans had become convinced that there is indeed a basement to which psychiatrists have the key, their orientation became that of the *self*—the mysterious, free, unlimited center of our being. The dominant idea of our time is that all our beliefs issue from the self and have no other validation.

Although nihilism and its accompanying existential despair are hardly more than a pose for Americans, the language derived from nihilism has become a part of their educations. As a result, Americans today pursue happiness in ways determined by that language. They possess a whole arsenal of terms for talking about nothing—caring, self-fulfillment, expanding consciousness, and so on, almost indefinitely. Nothing determinate, nothing that has a referent, as we saw in Woody Allen and Riesman.

There is a straining to say something, a search for an inward-

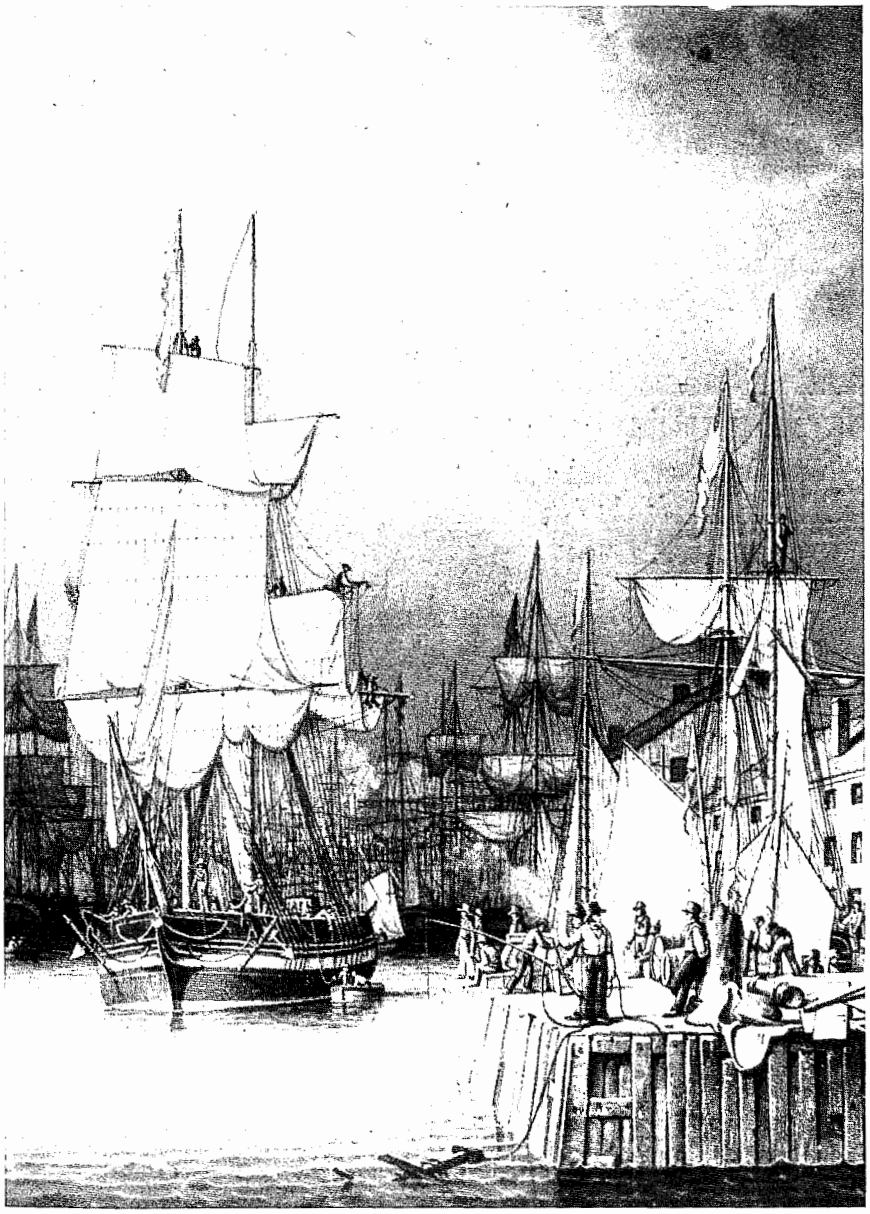
ness that one knows one has, but it is still a cause without an effect. The inner seems to have no relation to the outer. American nihilism is a mood, a mood of moodiness, a vague disquiet. It is nihilism without the abyss.

Nihilism as a state of soul is revealed not so much in the lack of firm beliefs as in a chaos of the instincts or passions. People no longer believe in a natural hierarchy of the soul's varied and conflicting inclinations, and the religious and social traditions that provided a substitute for nature have crumbled.

Nietzsche believed that the wild costume ball of the passions was both the disadvantage and the advantage of modern life. The evident disadvantage was the decomposition of unity or "personality," which in the long run would lead to psychic entropy. The advantage Nietzsche hoped for was that the richness and tension present in the modern soul might be the basis for comprehensive new worldviews that would take seriously what had just been consigned to a spiritual ashcan.

This richness, according to Nietzsche, consisted largely in thousands of years of inherited and now unsatisfied religious longing. But this does not exist for young Americans today, because their poor education has impoverished their longings, and they are hardly aware of the great pasts that Nietzsche was thinking of. What they do have now is an unordered tangle of rather ordinary passions, running through their consciousnesses like a monochrome kaleidoscope. They are egotists, not in a vicious way, not in a way of those who know the good, just, or noble and selfishly reject them, but because the ego is all there is in present theory, in what they are taught.

We are a bit like savages who, having been discovered and evangelized by missionaries, have converted to Christianity without having experienced all that came before and after the revelation. The fact that most of us never would have heard of Oedipus if it were not for Freud should make us aware that we are almost utterly dependent on our German missionaries or intermediaries for our knowledge of Greece, Rome, Judaism, and Christianity; that, however profound that knowledge may be, theirs is only one interpretation; and that we have only been told as much as they thought we needed to know. It is an urgent business for one who seeks self-awareness to think through the meaning of the intellectual dependency that has led us to such an impasse.



A Boston wharf, in an 1832 painting by Robert W. Salmon. "There are classes of men in the world," wrote Herman Melville, who first went to sea as a ship's boy in 1839, "who bear the same relation to society at large that the wheels do to a coach: and are just as indispensable. Now, sailors form one of these wheels."

The Maritime World

Samuel Johnson once defined the merchant as "one who trafficks to remote countries." Seaborne "trafficking" has grown, to wide benefit. However, world trade is now a sore subject to Americans. Big trade deficits ($170 billion in 1986) have stirred fears in Washington for U.S. "competitiveness." Congressmen seek import curbs; in April the Reagan administration placed sanctions on Japan for "dumping" microchips. What is *not* on many American minds is something vital to international trade: merchant shipping. Changes in the maritime world are part of the reason why U.S. wheat and Caterpillar tractors sell in Europe, as do European and Japanese cars in the Americas, Argentine beef in Italy, Australian iron ore in South Korea. Here, Clark G. Reynolds analyzes the great maritime nations of the past; James M. Morris traces the United States' rise and decline as a maritime nation.

TRADERS

by Clark G. Reynolds

The empire of Atlantis, wrote Plato in the *Critias* (circa 370 B.C.), gained its wealth from trading across the seas with many lands. Its merchant vessels were protected by a great fleet of warships.

But Atlantis's power, Plato emphasized, was not abused. The Atlanteans possessed "in every way great spirits uniting gentleness with great wisdom." They "were obedient to the laws." Gold and other riches "seemed only a burden to them." Not "intoxicated by luxury," they were "sober, and saw clearly that all [their] goods are increased by virtue and friendship with one another."

While Atlantis was probably mythical, the *idea* of a benevolent maritime empire was not. Most likely, Plato was idealizing his own city-state of Athens at its peak, during the fifth century B.C. Or perhaps he was reporting the story, passed on to him by the Egyptians, of the first great seagoing peoples: those of Minoan Crete and the southern Aegean islands more than 1,000 years earlier. These soci-

eties were all what Thucydides, using the Greek word for the sea (*thalassa*), called thalassocracies.

What was special about them? Their singular characteristic, Plato thought, was a sense of virtue. Its erosion brought decline.

Atlantis, Plato observed, sank beneath the waves after "human nature got the upper hand" and the people "behaved unseemingly" by trying to conquer the sea *and* the land.

As for Athens, Isocrates, a contemporary of Plato, noted that the city-state "readily obtained command of the sea." But "arrogance" bred by maritime success eventually cost the Athenians their supremacy. They "no longer kept the laws which they had inherited from their ancestors nor remained faithful to the ways which they had followed in times past."

How Athens Fell

Athens's maritime era began with the leadership of the statesmen Themistocles and Pericles. After Athenian-led Greek forces repulsed a Persian invasion fleet at Salamis in 480 B.C., the Aegean Sea was ruled by the Athenians' galleys—long, slender craft, each propelled by 170 oarsmen, which were built and manned by volunteers.* Naval supremacy enabled Athenian merchants to create a sophisticated maritime trading network. Colonies and enclaves arose along Mediterranean shores from Iberia to the Nile. Traders aboard Athens's squat, sailing round-ships bought (and sold) grain and oil from Iberia, lead, salt, and ivory from North Africa, and fruit, cattle, and copper from the Levant. From Black Sea ports they brought wheat and alluvial gold from the Russian rivers.

Trading profits built temples and financed the arts. Philosophers gravitated to the thriving Athenian democracy, bringing with them new ideas from Persia, Egypt, and even more remote Western Europe. "Our city is open to the world," proclaimed Pericles, who proudly declared that Athens stood as "an education to Greece." Recalled Isocrates: "We helped the common people and were declared enemies of narrow oligarchies, for we thought it monstrous

*Galley "slaves" did not appear in significant numbers until the mid-15th century A.D., when the French, short on manpower, forced war prisoners, criminals, and other *misérables* to pull ships' oars. Such crews appeared only on Mediterranean galleys, which were last rowed into combat in 1717. The Spanish employed galleys on the Mississippi River as late as 1804.

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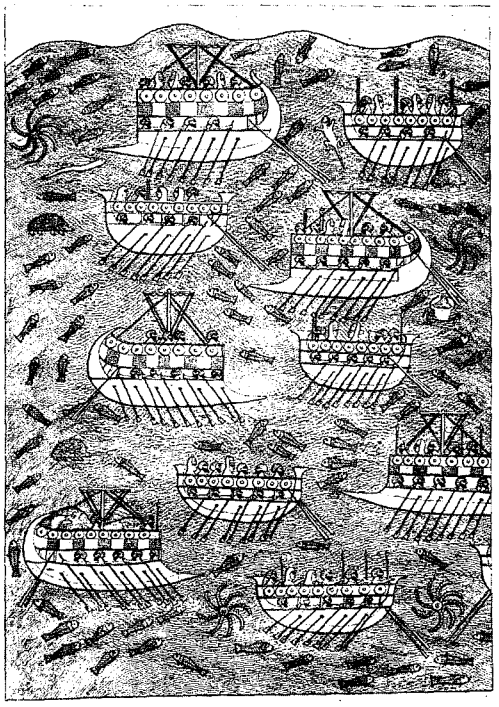


Phoenician galleys, circa 700 B.C. Those with pointed bows are warships. The others are transports. When the Phoenician traders developed "sail power," they continued to favor beamy, rounded hulls. The best known of their merchantmen was called a gaulos—*a tub.*

that the many should be subject to the few."

Yet the strategic burdens of empire finally undermined the Athenian state. Its allies revolted against the tribute it levied for the defense of the Aegean. Athens moved to crush the rebel island- and city-states one by one. Eventually, Sparta, Athens's oligarchic rival, began the Peloponnesian War (431–404 B.C.). Athenian leaders undertook major campaigns by sea and by land; they rejected their own long-standing laws and customs and appointed dictators to head the state. Finally, after 27 years of conflict, warships of the painstakingly created Spartan navy surprised and destroyed the Athenian fleet of 180 galleys at Aegospotami near the Hellespont.

Despite this traumatic defeat, Athenian mariners and ships continued to engage in trade and to fight for various masters. And Athenian ideas survived. They transformed the conquering empires of Alexander the Great and Rome into Hellenized societies and, indeed, shaped Western civilization. No other society would so combine the advantages of maritime trade, democracy, and intellectual élan until an upwelling of interest in both classical culture and seaborne commerce began in Italy nearly 2,000 years later, a phenomenon now known as the Renaissance.

Seen through modern eyes, Athens had a special advantage:

insularity. Isolated on a mountainous peninsula, Athenians enjoyed what historian C. Vann Woodward called "free security." Athens had little need of a costly standing army, or of authoritarian rule. The city-state, perhaps 55,000 souls in all, spawned free institutions—not perfect, but unique in the ancient world. Democracy could mature in safety, a prerequisite of all democratic states since then. And free enterprise—as opposed to royal monopoly—led to the rise of a trading class virtually unknown in the authoritarian, agrarian oligarchies and kingdoms (e.g., Sparta, Macedonia, Persia). These societies of landed aristocrats and peasants had exposed borders to defend; to survive, they required warrior-rulers. By contrast, the thalassocracy of Athens was a civilian enterprise.

Looking Beyond Land

Rome, founded as a republic, developed from a warrior state into a far-flung empire because of the threat of enemies on its land frontiers. Rome's conquest of the Mediterranean by the mid-first century B.C. was wrought not by war fleets but by the legions. They seized ports by advancing overland and waged infantry battles at sea, boarding enemy ships for hand-to-hand combat. As historian Lionel Casson noted, the Romans were "an anomaly in maritime history, a race of lubbers who became lords of the sea in spite of themselves." Like the Spartans, they built a navy reluctantly. Rome's warriors suffered grievous disasters on open water, especially at the hands of the Carthaginians, before they made the "middle sea" a *mare nostrum* at the time of Christ. Thereafter, Rome left maritime pursuits to the empire's seafaring subjects, notably the Greeks.

Rome's landowning aristocrats disdained engaging in commerce on land *or* sea. Ordinary citizens saw service on merchantmen or warships as beneath their dignity. For centuries, the fleet's main role was to transport the army. Even when special anti-pirate squadrons had to be deployed after the first century A.D., these forces were controlled by the army.

Yet Rome maintained its power at sea as an imperial necessity. Wrote Vegetius: "None will attack or insult" a state known to be ready at sea "to avenge any affront."

Late in the Middle Ages, new maritime city-states emerged, this time on the Italian peninsula. By the end of the 12th century, the ships and merchants of republican Venice, Genoa, and Pisa (and, later, Florence) were competing for the growing trade of the Mediterranean world. Despite religious differences and costly wars, Italian ships carried goods as well as armed crusaders throughout the flourishing trade triangle of the European Christian West, the Byzantine Christian East, and the Islamic Ottoman Empire.

Why these people, these few Italian city-states, and not others?

Fernand Braudel (1902–86), the great French dean of the *Annales* school of "total history," observed that the Mediterranean shores did not inevitably spawn a "chosen country of seafarers." Far from being "inhabited by the profusion of seagoing peoples" found in northern Europe, such as the Dutch and the English, the middle sea produced mariners only "in small numbers and in certain regions." The Mediterranean was agrarian, "overwhelmingly a world of peasants, of tenant farmers and landowners." But the Italian city-states, notably Venice, looked beyond the land—for the greater challenges and rewards that only the sea offered.

Their maritime proclivities were crucial to the evolution of the West. "Without the economic underpinning and the artistic and intellectual stimuli arising" from seaborne trade, observed historian William H. McNeill, "the flowering of city-state culture in Italy which we call the Renaissance could not have occurred."

Florence and Genoa pioneered in credit, insurance, and the creation of large business firms. Yet only Venice became a full-fledged thalassocracy. Why?

The Venetians tended to regard themselves as the new Romans. In fact, they were the new Athenians. Located on an archipelago of islets within a great coastal lagoon, their city was largely protected from landward intruders. Their huge war galleys policed the Adriatic Sea and in 1204 captured Constantinople. Thus the Byzantine Aegean came under Venetian jurisdiction.

Pepper, Cotton, Grain

Gradually, between the late 14th and the late 16th centuries, Venice wrested markets and colonies from Genoa, Pisa, and Florence. It became the complete commercial state. Its republican government rested upon a capitalist system. Unique in its time, it was run by patrician merchants from a group of 150 noble families. Though Venice, like Athens, was not democratic in the modern sense, its leading citizens—the Contarini and Tiepolo families, among others—did not abuse their power. They passed laws to protect all citizens and thereby enjoyed the tacit consent of the governed. Said a motion before the ruling council during the 15th century: "The principal foundation of our city and its singular ornament is justice." Philippe de Commynes, the French ambassador in 1494–95, hailed Venice as "the most triumphant city I have ever seen." It "governs itself with the greatest wisdom."

The trust and esteem Venice enjoyed stemmed from its union with the sea. Each Ascension Day the ruling *doge* (duke) tossed a gold ring into the crowded lagoon and proclaimed: "We wed you, o sea, as a sign of true and perpetual dominion." This dominion, commercial rather than military, extended to England and Flanders in the

WHY THE EUROPEANS WERE FIRST

The Age of Discovery—of Columbus's ventures to the New World (1492–1504), Da Gama's voyage to India (1497–99), the circumnavigation begun in 1519 by Magellan—gave Western Europeans a preeminence in long-distance maritime conquest and commerce that endured for centuries. Historians have long pondered the causes and effects. There were many able mariners around. Why did the Europeans alone seek mastery of the seas?

Technology played a role. The caravel, the small (50 tons or so), three-masted sailing craft dating from about 1430 that enabled Portuguese captains to venture down Africa's coast and far into the Atlantic, combined the features of two European designs. From the ships of northern German traders came the centerline rudder, which allowed nimble maneuvering and precise course-steering. From the Mediterranean came the lateen rig; its triangular sail, first developed in India, could do what the square sail could not: propel a craft into the wind. Thus variously equipped, Europeans were able to utilize the patterns of winds and currents of the Atlantic and other oceans.

o

But Europeans were not the only sailors, as they saw when they reached China and Japan. Many theories were advanced as to why Oriental seamen seemed to stay close to home. A Spanish cleric concluded in 1577 that the Chinese were "afraid of the sea, being people not accustomed to take risks." An Englishman wrote that the capacious but squat, flat-bottomed junks suffered "the inconvenience of falling much to leeward with a side wind"—i.e. they could not sail across or into a breeze as well as deep-draft European craft.

In truth, non-Europeans accomplished striking feats. The Chinese had compasses by the 11th century, and by the 14th had junks with four decks and six masts. A 15th-century admiral, Cheng Huo, led seven long voyages, the last a two-year expedition to Hormuz in the Persian Gulf. Venetians told of an Arab ship that probed the "Sea of Darkness," as the Arabs called the Atlantic, sailing out 2,000 miles "between sea and sky" in 40 days. Japanese junks crossed to Acapulco, Mexico, three times during the 17th century.

Yet the Europeans, as historian Fernand Braudel noted, "remained alone in the race" to rule the seas. The reason, he suggests, was need. China and the Islamic world were self-sufficient and rich; they even had colonies. "The West, by comparison, was still 'proletarian.'" But after the 13th century, pressures for a better material life transformed the West's psychology:

"What historians have called the hunger for gold, the hunger to conquer the world or the hunger for spices was accompanied in the technological sphere by a constant search for new inventions and utilitarian applications—utilitarian in the sense that they would actually serve mankind, making human labor both less wearisome and more efficient. The accumulation of practical discoveries showing a conscious will to master the world and a growing interest in every source of energy was already shaping the true face of Europe and hinting at things to come, well before that success was actually achieved."

One major result, Braudel concludes, was "victory over the ocean."

Atlantic and inland via the Po Valley rivers to the Alps.

In 1423, when Venice's population was about 100,000, the city boasted nearly 3,500 merchant vessels, both galleys and sailing craft. Often these vessels were accompanied by armed galleys, whose oarsmen were drawn from a pool of free Venetians, all doing their citizen's duty. Those who built the ships at Venice's vaunted Arsenal, perhaps the largest industrial establishment anywhere in its time, were skilled freemen, not slaves.

For three centuries, Venetian ships carried the bulk of the cargo of the Mediterranean world. Ships not privately owned were leased out by the state. Later, as the need arose, the government granted construction and freight subsidies to patrician shippers. Cargo-laden galleys moved in annual convoys along prescribed routes; larger armed sailing cogs journeyed alone to markets of opportunity. The captains visited Venetian trading posts (e.g., Corfu, Crete, and other Aegean islands) and foreign ports. Even among the infidel Turks, their agents abroad enjoyed a privileged status.

Venice became an emporium. Venetian merchants did not necessarily have to travel to European markets, because other Europeans came to *them*. Germans, for instance, would deliver to Venetian traders bars of iron, textiles, and ever-increasing amounts of silver. In exchange, the Venetians would supply the Mediterranean commodities they controlled—pepper, spices, Syrian cotton, grain, wine, salt.* The German goods, in turn, were bartered through the Venetian trading network; in Tunis, silver was exchanged for African gold.

An Aversion to Risk

The Venetians invested their immense profits in inland trade, which brought Venice dominion over northern Italy. And they committed their earnings—"sparing no expense," boasted a government report—to gild their city. Palaces like the Contarini family's 15th-century Ca' d'Oro rose along the Grand Canal to complement opulent basilicas like the one in the Piazza San Marco. Rich patrons made Venice the center of Renaissance painting. Though devout Catholics, the Venetians kept their government secular. They could trade with the Turks, and even subjugate the Byzantine Christian empire, without qualms. Restless Venetians like Marco Polo (1254?–1324) journeyed as far as China in search of new trading opportunities.

This freest and most joyous of Italian city-states experienced a decline only after its resources were drained by wars against the Turks and by resistance to invasions of Italy by continental powers, beginning with Charles VIII's France in 1494. The plague took its toll

*A key food preservative in pre-refrigeration days. Venice's rulers controlled salt-marsh acreage on the Adriatic Sea and in Cyprus so vast that each year more than 40,000 horses were brought in from Hungary, Croatia, and Germany just to load salt aboard Venetian vessels.

of shipbuilders and crewmen. And, as time went on, it seemed that investments in property ashore required less work and risk than the sea trade; private commercial banks disappeared. After the 1570s, the ships and agents of merchants in northern European cities like Amsterdam opened new markets in the Far East and the Americas, geographically removed from the Mediterranean-based Venetians.

By 1610 Nicolò Donà, one of the leading patrician merchants, was wistfully recalling the days when "all was grandeur, utility, emolument, commodity, honor," when all Venetians were "interested in sea voyages, in business, in everything appertaining to the . . . greater good of the fatherland."

The Venetian thalassocracy had become a minor power. Even so, it never suffered a tyrant or a popular revolt. It never fell victim to conquest until 1797, and then only to Napoleon's armies.

The employment of Italian bankers and seafarers by the rising new continental power, Spain, contributed to one of the great accidents of historical timing. Located at the confluence of the Mediterranean and northern European sea routes, and without serious maritime competitors, Spain hired skilled foreigners, notably Christopher Columbus of Genoa, to explore new trade routes abroad. These great

Long after her great days of commerce and empire, Venice's wealth and physical splendor attracted artists. Canaletto's 18th-century painting Sta. Maria Della Salute and the Grand Canal *hangs in the Louvre in Paris.*

navigators found the New World, whose riches—gold, silver, spices—Spain's financial councillors placed in the royal coffers. Neighboring Portugal used its own modest maritime population to reach the Far East and to establish a trading monopoly—spices, tea, textiles—over the Indian Ocean.

But neither Spain nor Portugal developed a maritime commercial base. Typical 16th-century continental states, they encouraged no middle class of businessmen to invest the gains from their overseas domains in local trading or manufacturing enterprises. The gold and silver from the Americas and profits from the Eastern spice trade were variously squandered by the aristocracy, consumed by the Spanish army in continental campaigns, and spent on manufactured goods from northern Europe.

Gradually, Spain's Italian financial advisers, shippers, and sailors were replaced by Dutchmen. By the end of the 16th century, an Englishman, Sir Walter Raleigh, was noting just how much King Philip II depended upon the Netherlanders: "Were it not for them he were never able to make out such armies and navies by sea."

Less than a century after Columbus opened America to Spanish exploitation, the Renaissance reached the Netherlands and England. First Amsterdam and then London became the financial and trading centers of a new northern European capitalism, linked closely to the individualistic spirit of the Protestant revolt against Catholicism and Spain. Dutch and English warships and armed merchantmen repelled the Spanish Armada in 1588 and then attacked Spanish and Portuguese trading monopolies around the world.

Mare Liberum

The Dutch were foremost. To the seven tiny United Provinces of the northern Netherlands, especially Holland and its port of Amsterdam, belonged the commerce of the 17th century. The coastal republic's insularity was provided by the Rhine, Scheldt, and Meuse estuaries and rivers. The southern Netherlands (modern Belgium) and the port of Antwerp had been vulnerable to Spanish incursions. To the east lay the fragmented German duchies. The other potential threat, France, was inhibited by its own internal strife, and by an alliance prudently arranged by the Dutch.

The Dutch created an exuberant republic, then an empire, based entirely on overseas trade. They adopted certain Venetian banking practices. However, unlike Venice, the Netherlands was dominated by a genuine nonpatrician class of urban merchants—the first modern nation-state rooted in bourgeois capitalism. The merchants formed private joint-stock companies to branch out from the close-to-home Baltic trade and North Sea fisheries and fill the commercial vacuum left by Venice and Antwerp. The same genius that enabled

AMSTERDAM: THE ENTREPÔT SYSTEM

The Dutch sailed to maritime supremacy after 1600 with a fleet that in numbers equalled those of *all* of its European rivals, and channeled the bulk of Europe's trade in and out of a single port. Even as late as 1786, a total of 1,504 vessels—more than four a day—arrived at the busy quays of Amsterdam. The ships, all but 44 of them Dutch, bore commodities and finished goods from Prussia, Russia, Sweden, Denmark, northern Germany, Norway, Italy, Portugal, Spain, the Levant, the Barbary Coast, France, and the Americas.

The roomy, round-sided Dutch *fluyt* (flyboat) was simply built and needed only a small crew—thus lowering the costs of wages and food, the main expenses on long trips. A French study noted that while a 400-ton French ship could have 25 in crew, a Dutch craft that size might have 12. Dutch seamen made do with beer, rye-biscuit, and "a great deal of dried fish without seasoning, which costs far less than meat," but French sailors required "bread, wine, biscuit made of pure wheatmeal," fresh and salt meat, butter, peas, beans, eggs, cod, and herring (which had to "be well-seasoned, and even then they will only accept it on meatless days"). The "hotter" French had four meals a day; the Dutch with "a cooler temperament eat two or three."

The well-managed Dutch fleet, observed Fernand Braudel, served a singular entrepôt system:

"In Amsterdam, everything was crammed together, concentrated: the ships in the harbour, wedged as tight as herrings in a case, the lighters plying up and down the canals, the merchants who thronged to the Bourse, and the goods which piled up in warehouses only to pour out of them. No sooner had a fleet arrived, relates a 17th-century eye-witness, 'than through the good offices of the brokers, the entire quantity of merchandise is bought at the first meeting of merchants at the Bourse, the ships are unloaded within four or five days and ready to set sail on a new voyage.' It would certainly take a little longer to find buyers. But the warehouses . . . could absorb and then disgorge any amount of goods. There was an extraordinary volume of property, materials, goods and services on the market, all available at a moment's notice. At a given command, the entire machine went into action. This was the means whereby Amsterdam maintained her superiority—an abundance of ever-ready goods and a great mass of money in constant circulation. . . .

"'Since I have become particularly acquainted with Amsterdam,' writes a contemporary in 1699, 'I compare it to a fair where merchants from many parts bring their merchandise which is sure to find a customer; as in ordinary fairs the merchants one meets there do not use the things they sell, so the

the Dutch to harness the north coast gales with windmills also produced small, unarmed, cheaply built cargo craft that sailed in escorted convoys. Larger "Indiamen" carried their own cannon to far seas, leading Dutch efforts that supplanted the Portuguese traders in South Asia and established a trading monopoly with Japan.

By 1650, the Dutch monopolized the shipping trade of most of

Dutch, who collect goods from every corner of Europe, keep for their own use only what is strictly necessary for life and sell to other nations the products they consider superfluous and which are always more expensive'....

"Storage and warehousing lay at the heart of Dutch commercial strategy. [When in 1665 there was talk of seeking a northern passage to the Indies,] the East India Company tried to block the proposal. Why? [If] the venture were successful, the trip would be reduced by six months and the Company would not have time, before the expedition returned, to dispose of the 10 million florins' worth of goods which piled up every year in its warehouses....

A Dutch flyboat

"[The stockpiling of goods] was the solution to trading problems which all, or almost all, derived from the intermittent nature of arrivals and departures, from the delays and uncertainty of orders and information. [A Dutch merchant with a substantial and varied inventory was able to] react quickly to any opening on the market as soon as it appeared. And if Amsterdam called the tune for European prices, as all the documents tell us, it was because of the abundance of reserve stocks which the city's warehouses could at any moment release or hold back.

"The Amsterdam entrepôt trade verged on a monopoly. And if the Dutch really were 'The Carryers of the World,'... this was not, as [historian] Le Pottier de la Hestroy thought because 'all the other nations were willing to suffer it to be so,' but because they were unable to prevent it. The Dutch system was built on a network of commercial relations... which combined to produce a series of virtually obligatory channels for the circulation and redistribution of goods. It was a system that could only be maintained by constant vigilance, by a policy designed to thwart all competition, and by subordinating the whole of the Dutch economy to this essential objective....

"[Amsterdam's role in] collecting, storing, selling and re-selling the goods of the universe [came to seem] pernicious.... In 1721, Charles King, in *The British Merchant*, expresses surprise that English goods bound for France should be embarked on Dutch vessels, unloaded at Amsterdam, and from there conveyed by the Meuse or the Rhine! They would have to pay duty on the way in and out of Holland, then the tolls on the Rhine or Meuse, and finally customs duties at the French frontier. [Finally it became] clear that the diversion via Amsterdam lengthened and complicated the circuit. When, in the 18th century, Amsterdam's power to attract and divert goods towards herself had waned, the direct dispatch of merchandise would eventually prevail."

Europe, including much of Spain's. By 1680, the United Netherlands had perhaps 55,000 men at sea, out of a population that never quite reached two million. Dutch merchant ships, numbering about 2,000, were protected by the world's best-trained battle fleet. Europe's monarchies were duly dazzled. As late as 1728, English novelist Daniel Defoe was moved to comment that "the Dutch must be under-

stood as they really are, the Middle Persons in Trade, the Factors and Brokers of Europe.... The Dutch *buy* to *sell* again, *take* in to *send* out." They are "supply'd from All Parts of the World, that they may supply All the World again."

Thanks to their naval might, the Dutch were able to rewrite international law. The Iberians had closed distant seas to rival traders; the Dutch opened them. Their great jurist, Hugo Grotius (1583–1645), argued for *mare liberum*, the right of free men to trade across free seas. Dutch armed merchantmen, and English and French too, established colonies and trading stations in the Far East and the Western Hemisphere. The trade of the colonists, like that of Spanish and Portuguese colonials, was not free. Under an exclusive arrangement that became known as the "mercantile system," goods could only be traded with the mother country or other colonies under the same flag. But the colonials did not object, as long as they prospered.

Pax Britannica

Dutch political liberalism inspired the Western world. Amsterdam became Europe's most cosmopolitan city—"an inventory of the possible," said French philosopher René Descartes. A Dutch town, Leyden, was a refuge for many of the English Puritan Separatists and other Pilgrims who in 1620 sailed on the *Mayflower* to start at Plymouth, Massachusetts, the first New England colony. Wrote Sir William Temple of the Dutch at their peak in 1672: "Men live together like Citizens of the World, associated by the common ties of Humanity, and by the bonds of Peace, Under the impartial protection of indifferent Laws, With equal encouragement of all Art and Industry, and equal freedom of Speculation and Enquiry."

Decline came only when maritime England and continental France each overcame internal quarrels and mounted separate offensives against the Dutch. After two naval wars, England and the Netherlands locked horns again during the 1670s. This time, the French attacked the United Provinces. The Dutch opened the dikes to flood the land—which stopped the invaders, but devastated the economy. Thereafter, the Dutch could no longer compete with larger rivals. Like the Venetians in their waning years, Dutch businessmen found banking and local property investments far safer than the sea trades. After 1730 the Netherlands became a minor power.

During the 1680s and 1690s, England and France vied to be the maritime successors to the Dutch. But France's King Louis XIV soon succumbed to the geostrategic straitjacket of every continental power. The continuing defense of land frontiers drained off the money and talent in this most absolute of monarchies. The French navy, merchant marine, and colonies never matched England's. France's possessions—and her merchant vessels—became British

targets of opportunity in the many Anglo-French wars down to 1815.

France remained an autocratic state, with a regime that jailed Voltaire and drove Rousseau into exile. During the 17th century, maritime supremacy passed to the island race of England.

British activities at sea had slowly grown over the centuries, but were limited by the peculiar contradiction of a monarch ruling over and regulating a trading society. This was finally resolved by the Glorious Revolution of 1688, when the prodemocratic Whig Party transformed England into a constitutional monarchy and significant power passed to Parliament. The landed aristocracy then joined the once-reviled merchant class in joint-stock trading and colonial enterprises. After 1707, when England united with Scotland to become Great Britain, the trade-oriented Whigs led what quickly became the ultimate thalassocracy, a bastion of both democracy and capitalism.

As an island nation, Britain had only to maintain her fleet to insure survival, and beginning about 1650, the Royal Navy gained dominance at sea.* By the 1720s, the port of London, with more than 500,000 inhabitants, was the hub of a nation dominated by ocean commerce. Architects, artists, and literati, patronized and enjoyed by the wealthy and the humble alike, extolled the trading spirit—what poet Edward Young in 1728 called the *Universal Passion*:

> While I survey the blessings of our isle,
> Her arts triumphant in the royal smile,
> Her public wounds bound up, her credit high,
> Her commerce spreading sails in every sky...

The ports of Europe, colonies in India and America, and entrepôts around the globe fed the British carrying trade of the 18th century. Her merchant marine swelled—to 2,300 ships by the 1770s. And by then, the British had long since traded their belief in freedom of the seas for "mercantilism." They sought and gained trade routes monopolized by British shippers—*mare clausum*. Even the successful revolt of her 13 North American colonies did not seriously diminish Britain's commercial supremacy at sea.

That supremacy was not primarily maintained by technological prowess. The basic design of the European ocean ship had not much changed since the 15th-century appearance of the carrack, a three-masted vessel with a centerline rudder at the stern. Even at the end of the 18th century, the British Indiamen that sailed to East Asia were not much larger than 1,900 tons. That is, they were about the

*Largely by firepower. The problem of sailing warships, lack of punch, was first solved during the reign of King Henry VIII (1509–47), whose admirals advanced them in lines of battle so that their cannons could fire "broadsides." These ships-of-the-line grew steadily in both firing range—which reached 3,000 yards by 1800—and size. The 55-gun *Royal Prince*, built in 1610, displaced 1,330 tons; the 100-gun *Victory*, Admiral Horatio Nelson's flagship at the 1805 battle of Trafalgar, where a French-Spanish defeat ended all dispute over the Royal Navy's supremacy, was a 3,500-tonner.

size of their Dutch competitors and somewhat smaller than the giants of the 16th century, Portuguese carracks of up to 2,000 tons that carried 800 crew and passengers. (Not until about 1840 would iron frames permit larger hulls for merchant ships.)

But unlike their counterparts in Venice and the Netherlands, Britain's middle-class merchants were not simply traders. At home, they invested in the technology (e.g., the steam engine) and quantity-production techniques that launched the Industrial Revolution in the British Isles during the 1780s, decades before the embattled and bankrupted continental states could follow. After the duke of Wellington's defeat of Napoleon at Waterloo in 1815, Britain stood alone as a creditor nation.

By the mid-19th century, the British had colonies on every continent and island outposts in every ocean. Under the Pax Britannica, Britain maintained the peaceful balance of power needed to insure her own prosperity. Her instrument for deterring general war in Europe and for policing the sea-lanes remained the Royal Navy. Thanks to its strength, the British again adopted the principle of free trade, of open competition, at which they remained masters.

Windows into the Mind

It was happenstance that oceans covered 71 percent of the earth's surface. One result, as social geographer Ellen Churchill Semple observed in her *Influences of Geographic Environment* (1911), is that man's progress over the ages has been "attended by an advance from smaller to larger marine areas.... Every great epoch of history has had its own sea, and every succeeding epoch has enlarged its maritime field."

Typically, the agrarian and continental societies were closed off, tightly ruled by the kings and clergy who held power in them. One thread that linked all the *maritime* societies was the trait that Thucydides ascribed to Athens: They were "open to the world."

Semple suggested that "the distinctive value of the sea is that it promotes many-sided relations as opposed to the one-sided relation of the land," where people knew only those of their kind, living in similar ways. "Had the proportion of land and water been reversed," Semple argued, "the world would have been poorer." As British historian J. H. Plumb observed, science and philosophy were both stimulated by the great expansion of human knowledge wrought by the seafarers: "trans-ocean trade brought more than a profit; it made windows into the mind."

The people drawn to the emerging seacoast cities in Europe were rather special. Those best able to escape serfdom and other restrictions of feudal agrarian economies were craftsmen, traders, and sailors. These were, as historian G. Krogh-Jensen described

them, "free men, bold and wise, courageous and reliable, unimpressed and not without a sense of humour." In their drive to achieve independence, observed Frederic C. Lane, writing of Renaissance Italy, such cities spawned "new classes—merchant capitalists, shopkeepers, craftsmen, and day laborers." All shared immersion in a vigorous, rapidly changing "commercialized atmosphere" then unknown in other societies.

As ships became more seaworthy and trading ventures became more ambitious, that atmosphere became more common. The remarkably swift 17th-century colonization of the New World, as J. H. Elliott noted in *The Old World and the New* (1970), "gave Europeans more room for manoeuvre. Above all, it promoted movement—movement of wealth, movement of people, movement of ideas, . . . and a climate of thought which encouraged confidence in the possibilities of success."

Yet the Dutch maritime reign was brief. The French challenge was not sustained. (Nor was the German challenge that developed at the turn of the present century.) Blessed in its insularity, Britain, which gained thalassocratic status during the 17th century, would maintain that status well into the 20th—outdistancing the Athenians, the Venetians, and all other predecessors.

Why?

In *The Influence of Sea Power upon History* (1890), Alfred Thayer Mahan observed that the "many wants" of the British, "combined with their restless activity and other conditions that favored maritime enterprise, led her people abroad. . . . Their needs and genius made them merchants and colonists, then manufacturers and producers; and between products and colonies shipping is the inevitable link. So their sea power grew."

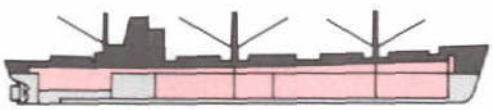
So much did it grow, in fact, that the Britons allowed a newcomer to compete freely under their strategic umbrella. The flag that the newcomer's ships carried was known as the Stars and Stripes.

TRANSITION: DOWN TO THE SEA IN

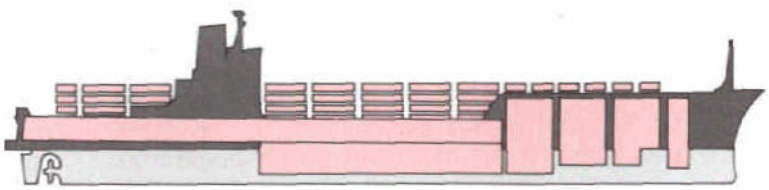
The drawings here show how, over 400 years, shipbuilders have advanced the "more is more" principle. In ships, greater size means more cargo capacity and—often but not always—more speed. Sixteenth-century Portuguese caravels were slow and small. Clipper ships like *Cutty Sark*, an 1869 British adaptation of a U.S. design, were fast but short on cargo space. The 2,701 U.S.-built World War II Liberties were slow but commodious, as the cargo areas (pink-shaded) indicate. The modern ships below have carried the evolution further. Most are specialized, shuttling particular cargoes (e.g., "Roll-on/Roll-off" trailers) to designated ports. But tramps such as *Anax* remain ready, like their classic forebears, to take almost anything anywhere.

CARAVEL
Portugal

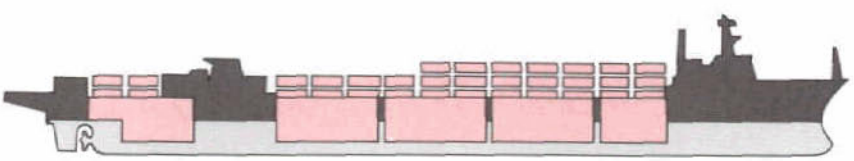
0 feet 150



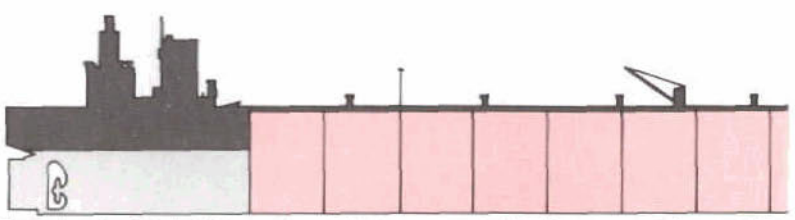
TRAMP *Anax* (Greece)
Capacity: 14,910 tons; 15 knots



ROLL-ON/ROLL-OFF–CONTAINERSHIP *Australian Emblem* (Austr.)
Capacity: 18,575 tons (vehicles, containers); 21 knots



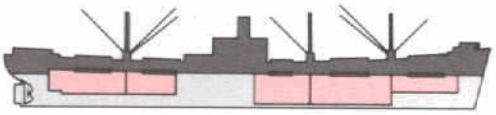
BARGE CARRIER *Lash Italia* (U.S.)
Capacity: 29,820 tons (90 barges); 21 knots



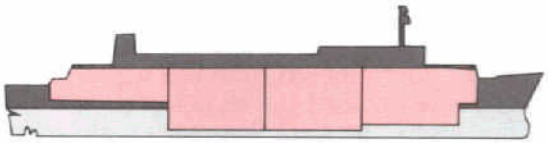
*Except where otherwise indicated, tonnage figures cited in these essays are deadweight tons, a measure of cargo capacity by weight (as opposed to, say, volume). Speed is in knots, or nautical miles per hour, a nautical mile being 6,076 feet. One knot is about 1.15 statute, or land, miles per hour.

EVER BIGGER, MORE SPECIALIZED SHIPS

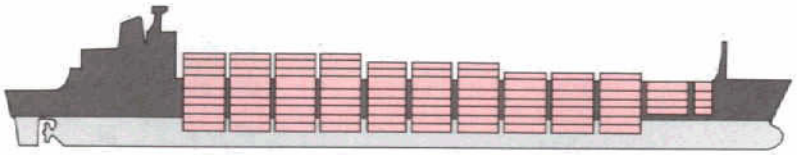
CLIPPER *Cutty Sark* (Brit.)
Cargo capacity: 650 tons (of tea);
maximum speed 17.5 knots*



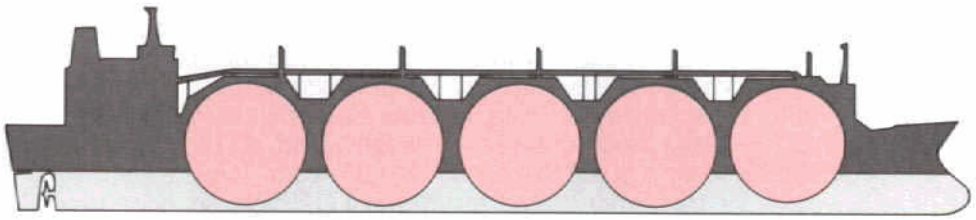
LIBERTY *John C. Freemont* (U.S.)
Capacity: 9,146 tons; 11 knots



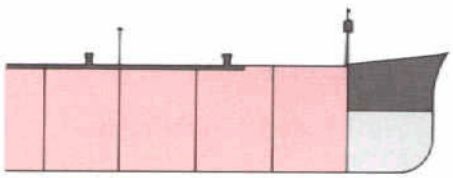
CAR CARRIER
Toyota Maru (Japan)
Capacity: 2,080 autos;
20 knots



CONTAINERSHIP *Dart Atlantic* (Brit.)
Capacity: 4,500 20-foot containers; 23 knots



LNG CARRIER *Hoegh Gandria* (Nor.)
Capacity: 128,000 cubic meters of liquefied natural gas; 20 knots



SUPERTANKER *U.S.T. Pacific* (U.S.)
Capacity: 372,000 tons of oil; 15.9 knots
This class of Ultra Large Crude Carriers (ULCC) can carry 550,000 tons or more, and are the largest ships afloat.

AMERICA'S STEPCHILD

by James M. Morris

They were "the most beautiful creations of man in America. With no extraneous ornament except a figurehead, a bit of carving and a few lines of gold leaf, their one purpose of speed over the great ocean routes was achieved by perfect balance of spars and sails to the curving lines of the smooth black hull.... These were our Gothic cathedrals, our Parthenon."

So wrote historian Samuel Eliot Morison, recalling one of the early achievements of American technology: the clipper ship.

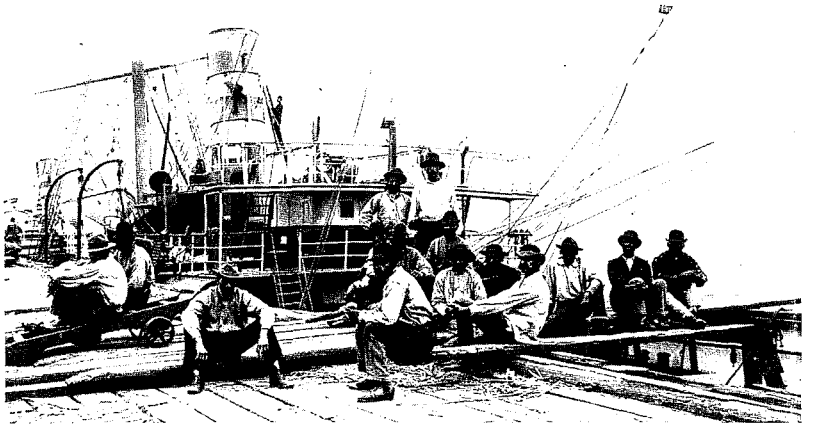
During the two decades before the Civil War, such designers and builders as Donald McKay in East Boston and John W. Griffiths in New York launched about 500 of these lean, heavily canvassed greyhounds. They helped win for the United States a dominance in ocean trade long held by British packets. At 265 feet, McKay's *Sovereign of the Seas* was the largest merchant ship ever when launched in 1852. On one voyage she briefly achieved a speed of 22 knots, the record for a sailing ship. Other clippers set marks for sail that still stand.

In 1846, the first clipper, *Rainbow,* reached New York from Canton in 88 days. In 1851, *Flying Cloud* took men and cargo headed for the California gold fields from New York to San Francisco via Cape Horn in 89 days; a *New York Commercial* editorial observed that such speed, over a course that once took a minimum of 180 days to sail, pointed "unmistakably to the preeminence upon the ocean which awaits the United States of America."

In 1854, bound for Liverpool from Boston on her maiden voyage, *Lightning* clocked a day's average speed of 18.2 knots; no steamship would exceed that for another 35 years. *James Baines* set records for runs from Boston to Liverpool (12 days, six hours) and Liverpool to Melbourne (63 days, 18 hours). In 1860, *Stag Hound,* whose launching at the McKay yard drew more than 10,000 spectators, won a prize offered by *New York Herald* publisher James Gordon Bennett by getting the news of Abraham Lincoln's first inaugural address from New York to Britain before the mail steamer *America.*

Yet the clippers' hour was short. "They flashed their splendor around the world," noted Morison, "then disappeared with the finality of the wild pigeon."

So, coincidentally, did one of the United States' earliest prides: its number-one ranking among merchant fleets. Soon the fleet became "America's cross-eyed stepchild," as an early Maritime Commission chief, Emory S. Land, called it 50 years ago. So it remains



U.S. ports grew as links to a rich hinterland. King Cotton brought the ships and stevedores in this photo (circa 1895) to New Orleans. Today, the city, 110 miles up the Mississippi, counts on Midwestern grain as its main export.

today—the *first* important U.S. export industry to wither away.

Despite bouts of global recession during the 1970s, world trade has expanded since World War II. Jet aircraft notwithstanding, most goods in international trade are still moved by ship. Some 25,000 oceangoing vessels now shuttle among the ports of the world under the flags of 115 nations. No country accounts for more trade than the United States; its annual imports and exports total more than 640 million tons by weight, and some $600 billion by value. Yet the Stars and Stripes is hard to find at sea nowadays.

In terms of total tonnage, the privately owned U.S.–flag merchant fleet ranks sixth—after Greece, Japan, Britain, Norway, and the Soviet Union, and just ahead of France, Italy, Spain, and West Germany. In terms of numbers of ships, the U.S.–flag fleet of 477 vessels ranks a mere 14th, trailing Spain and China. Of these ships, at least a fifth are laid up, idled by the worldwide oversupply of vessels that followed the construction boom of the 1970s. For the first time, the U.S. Navy (600 ships) is larger than the U.S.–flag merchant fleet.

As recently as the mid-1970s, 19 U.S. lines operated cargo ships on regular schedules. Now only eight "liner" firms remain. Among the proud names that have disappeared from shipping: American Export-Isbrandtsen, Pacific Far East Lines, Grace Lines, and Moore-McCormack. United States Lines, once the nation's largest, went bankrupt in 1986. The 10 top shipping nations move, on average, 32 percent of their exports and imports in their own-flag ships.

The Soviets lead with 50 percent, trailed closely by Greece, Spain, Japan, and Norway. The U.S. figure—four percent—is the lowest.

Of course, the U.S.-*owned* fleet is larger than the U.S.-flag fleet. American operators, such as oil companies and tramp ship owners, account for much—perhaps as high as 31 percent—of the shipping tonnage registered in "flag of convenience" countries such as Liberia and Panama. When the flag-of-convenience ships (some 400 in number) are added to the U.S.-flag fleet, the tonnage under U.S. "beneficial ownership" rises, from three to nine percent of the world total. But most flag-of-convenience ships are specialized—e.g., tankers that supply nearly all of the country's imported oil, and "bulkers" that carry coal, grain, and other commodities.

Beating the British

In commercial shipbuilding, the United States ranks 10th, after Romania, Spain, Poland, Yugoslavia, and China. (Japan and South Korea now have more than 60 percent of the business.) U.S. yards have few domestic commercial orders, and have not built a ship for a foreign customer in 27 years; 33 yards have closed just since 1982. At the 74 remaining yards, employment—at about 100,000, the lowest since the early 1970s—now depends on Navy work. The merchant marine itself, which employed more than 100,000 seamen during the 1960s, now provides 29,100 jobs. (By contrast, the government reckons total employment at the nation's "eating and drinking places" at almost six million.) There is only one shipper among the 50 largest U.S. transportation companies: the Overseas Shipholding Group, which operates three times as many foreign-registered vessels as it does ships under the U.S. flag.

How did the nation's maritime weakness develop? The answer is both simple and complex.

Early America was a maritime nation. Historian Frederic C. Lane has likened it to Venice. To its people, settled along the Atlantic coast, "the sea was a source of wealth, contributing to the expansion of the rest of the economy."

The early colonists, few of whom were seamen when they left England, found the Atlantic crossing a terrible trial. The 105 fortune-seekers who established the first permanent English colony at James-

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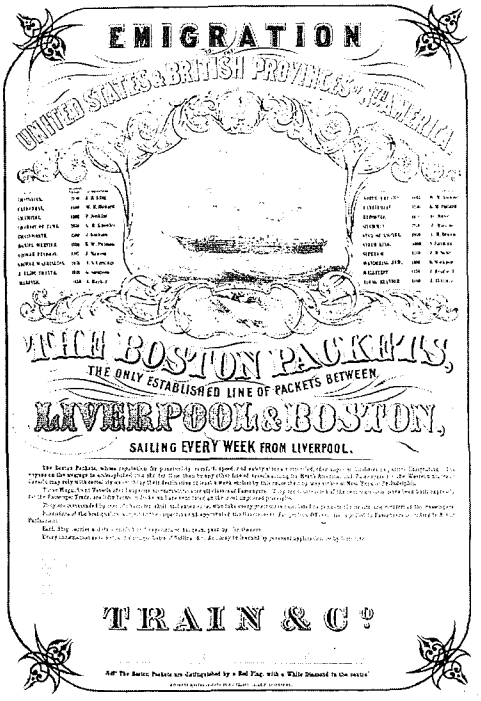


The packets of Boston's Train Line, created in 1844, offered transatlantic immigrants "comfort, speed, and safety"—a large promise. Sea life is "an acquired taste," Ralph Waldo Emerson wrote of a crossing he made in 1847. "Nobody likes to be treated ignominiously, upset, shoved against the side of the house, rolled over, suffocated with bilge, mephitis and stewing oil."

town, Virginia, in 1607 were the survivors of a five-month journey on three small ships during which 39 people died, probably from scurvy and dysentery.* But the colonists soon became mariners of necessity. The first American seagoing vessel, the 30-ton bark *Blessing of the Bay*, was launched in Medford, Massachusetts, in 1631 to haul timber and fish among colonial ports. Travel by water was often easier than by land; it took couriers on horseback 29 days to bring the news of the Declaration of Independence from Philadelphia to Charleston.

Though the Southern colonies developed a plantation economy, ships were vital to it. American schooners carried indigo and cotton from Charleston, Savannah, and other ports to the British West Indies, using their speed to avoid royal revenue ships. Virginia planters built wharves on the James, York, Rappahannock, and Potomac rivers, where ships were loaded with hogsheads of tobacco to be sold in

*During the early 17th century, the crossing from Portsmouth, Southampton, and other English ports took at least three months by the island-hopping (Azores or Canaries, and the West Indies) southern route, and eight to 10 weeks by the shorter, stormier northern route. Water ran out, food (biscuits, salt meat, dried fish, beans, cheese) spoiled, and illness took many lives. Francis Higginson, one of the 16,000 Puritans who made the Great Migration to Massachusetts during the 1630s, wrote that "waves tossed us horridly" and crewmen scared passengers with their shouts "to one to another to pull at this or that rope." One voyager told of hunger so great that rats that "had been our plague" became "our prey." Still, by 1700, scores of vessels made the crossing each year, carrying some 3,000–5,000 people.

England and returned with Chippendale furniture and books for the owners' mansions. During the month of December 1774, 42 overseas arrivals and departures were recorded in Annapolis, Maryland. (A typical log entry: "Ship *Richard Penn*, Isaac All, Master, 200 tons, 10 men, for Leghorn [Italy] with 12700 bushels of wheat, 20 barrels of flour.") When it was incorporated in 1779, Alexandria, Virginia, then a tobacco-and-grain port on the Potomac, had its seal show "a ship in full sail with a balance equally poised above the ship."

The Northern colonies, cursed with thin soil and a short growing season, were even more dependent on the sea. As Massachusetts's Josiah Quincy said, "New Englanders would rather see a boathook than all the sheep crooks in the world."

To survive, the earliest New England colonists took to fishing. Soon, they began to trade. William Pepperell of Portsmouth, New Hampshire, who kept 100 vessels fishing off Nova Scotia, sent others as far as Spain and Portugal to barter cod for salt, iron, rope, wine, and fruit. Eventually, despite a poor harbor, harsh weather, and a certain Puritan hypocrisy—kissing in public was forbidden, but smuggling went on unchecked—Bostonians took the lead. With 7,000 inhabitants in 1690, Boston was the colonies' largest town, and its leading citizens were merchants.

Most of them owned shipyards, warehouses, wharves, and vessels. By 1700, they were sending their captains as far as the eastern Mediterranean and Madagascar in the Indian Ocean. Boston's 2,000-foot Long Wharf, built in 1710, and other docks became a transport hub. Coasters brought tobacco, cotton, and turpentine from Virginia; Cape Cod shallops arrived with whale oil, rum, and West Indian sugar. Boston ships took these cargoes, and wheat, rye, and furs, to London, returning with linen, woolens, shoes, and dry goods. American vessels were faster and less costly than British ships; Boston merchants could carry goods more cheaply than their London rivals.

A 'Civilizing Effect'

The Revolution all but ended commerce with the West Indies, but something new helped keep the young Republic's merchants alive: the "China trade."

New York would not blossom as the major U.S. port until the 19th century, but investors there owned the first ship to carry the U.S. flag to the Far East. Cheered by *The Independent Gazette*, which praised the owners' "ambition to discover new resources of wealth" by the "extension of our commerce," the 360-ton *Empress of China* sailed to Whampoa and back in 1784–85 to trade ginseng and other cargo for tea, spices, silk, and china. The voyage returned a $30,000 profit on an investment of $120,000.

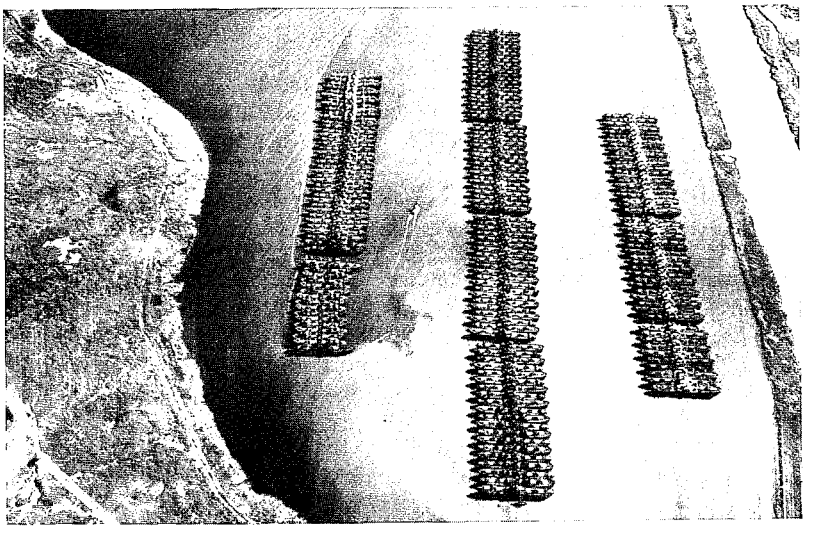
A Philadelphia-built ship, *Canton*, made the next trip. But the

New Englanders would not be outdone. In December 1785, the first American shipping millionaire, Elias Hasket Derby of Salem, Massachusetts, sent the 300-ton *Grand Turk* on a 17-month round-trip to Canton. His profit: 100 percent.

In time, merchants in Salem and nearby Boston virtually monopolized the U.S. Far Eastern trade—Boston's ships sailing west via Cape Horn, Salem's going east around Africa's Cape of Good Hope.

For a couple of decades, Salem became one of America's richest cities. Many of its wealthy captains learned to trade as youths in Derby's countinghouse. Five young Crowninshields commanded ships for Derby before the age of 20. At age 19, John Boit, Jr., took the 84-ton sloop *Union* to Canton and back. At 22 in 1787, Derby's son Elias, Jr., just out of Harvard, took *Grand Turk* on a voyage to Canton. But he found that he could sell his cargo—17,000 pounds of tobacco, 2,482 gallons of rum, 610 firkins of butter, 300 barrels of fish—on Mauritius. The island was short of ships, too, so he sold *Grand Turk*, worth $6,500, for $13,000.

The trading fever in New England was such that a Southerner dourly remarked that "every little village on every little creek with a sloop that can hold five Yankees was now planning to embark on the far eastern trade." But besides helping the Republic through a hard economic time, the distant commerce paid other dividends. For New Englanders, as Williams College's Benjamin W. Labaree noted, trade



By early 1947, 1,681 ships, built for World War II, lay idle in nine Reserve Fleet anchorages like this one at Beaumont, Texas. They were the survivors; in 1941–45, 733 U.S. merchant ships were lost; 5,638 crewmen died.

HOW SHIPPING WORKS: AN UNFORGIVING BUSINESS

Sea transport is the cheapest way of moving things that man has ever devised.

For scheduled "liners"—ships serving designated ports and charging set rates—a good profit may be 1.5 cents to 2 cents per pound of cargo. For "tramp" ships—typically hired for a single voyage, like moving vans, often to haul low-value commodities such as ore and grain—margins are even thinner. A pound of sugar can be shipped a quarter of the way around the world for under a penny. A rough rule: Tramps move goods at one percent of the cost of aircraft, five percent of that of trucks, and 10 percent of that of trains.

Thus oceans are no barrier to international trade. They facilitate it.

Early European merchants traveled with their wares; only beginning in the 14th and 15th centuries were bank credit and bills of lading devised to allow goods to be brought to market by third parties. Today, most cargoes are carried by liners and tramps. But all shippers compete for cargo. That is why, notes Lane C. Kendall in *The Business of Shipping* (1986), they all share an "almost instinctive hostility toward regulation."

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After the Suez Canal opened in 1869, owners of the new steamships, which could use the narrow waterway, fell into a rate war on the London-Calcutta route with owners of sailing vessels, which still had to round Africa to reach Asian ports. The war (and the Age of Sail) ended after a conference at which the steamer men agreed to offer "loyalty rebates" to customers who used their ships regularly. Shipowners continue to form "conferences" to set rates and share trade on routes. Yet an essentially free market persists. Supply and demand, observes Kendall, markedly influence "the rise or fall of freight rates from day to day and from cargo to cargo."

Rates are low partly because so many operators, large and small, seek cargoes. Among the world's 4,000-odd tramps, a typical owner's "fleet" is two to four ships. Except in times of war or famine, shipping is a buyers' market.

Example: A Chicago exporter wants to send wheat from New Orleans to France. His shipping agent in New York canvasses local ship brokers, then cables an agent at the Baltic Exchange in London, where most tramp charters are made. A Norwegian shipowner has a ship available; *his* agent relays to Chicago an offer to move 60,000 tons of wheat for $15 a ton—which is soon bargained down to $13.25 a ton. Out of his charter fee the Norwegian must cover his costs (fuel, wages, insurance, interest) and pay commissions to the brokers (for each, one and a quarter percent of his net earnings). But a profit should remain. Occasionally, shipowners carry cargo at a loss, to gain *some* cash to meet expenses.

The need to cut costs has led to greater ship size and speed. The faster the ship, the more voyages it can make over its normal 20–25-year life.

For decades, merchant ships were small and slow. The World War II Liberties steamed at 11 knots; until about 1960, most dry bulk cargoes, such as iron ore, wheat, and coal, were moved in ships with no more than 15,000 tons of freight capacity. Then, growth began. "Bulkers" rose to 50,000 tons,

then 150,000 tons. Supertankers debuted in 1955, when an American, Daniel K. Ludwig, built the 84,000-ton *Universe Leader* in Kure, Japan (and thus also launched the Japanese as builders of big ships). In 1956, Aristotle Onassis ordered a 100,000-tonner. By 1974, there were 388 tankers of 200,000 or more tons afloat, and 493 on the way.

Size entranced owners and their eager bankers: One 200,000-tonner cost less to build and operate than two 100,000-tonners. And the 1967 Arab-Israeli war, which closed the Suez Canal for eight years, made billionaires out of owners of supertankers. For one Persian Gulf trip for Shell, an Onassis 200,000-tonner garnered some $4 million, nearly a third of its construction cost.

Baltic Exchange (est. 1744)

But shipping fortunes change. The tanker boom ended when oil prices rose after the 1973 Middle East war. Idle ships that cost $80 million or more still crowd Piraeus, Norwegian fjords, and other anchorages.

Other operators have had woes, too. In 1972, Sea-Land introduced 33-knot containerships (almost as swift as the record-holding liner *United States*); after 1973, when fuel surpassed crew wages as the chief ship-operating cost, the eight vessels proved uneconomical and were sold to the U.S. Navy. Then, in 1984, Sea-Land founder Malcom McLean, as owner of U.S. Lines, received 12 South Korean–built containerships of unprecedented size, 950-footers designed for round-the-world service at an economical 18 knots. But the market was—and is—glutted; since 1976 the number of containerships vying for cargo has grown from 480 to 1,080. Result: U.S. Lines' 1986 bankruptcy.

Shipping is an unforgiving business. There is no blue-water trade route where a carrier is without competition. No single nation's shipowners rule the waves as Britain's did before World War I. But for some countries—e.g., Britain, Norway, Greece, Italy, and Japan—shipping (an "invisible export") is a key source of foreign exchange. Especially in nations whose own commerce is modest (e.g., Norway, Greece), shipowners seek profits in "cross trades" involving cargo movements between countries other than their own. Some nations, not including the United States, encourage multinational maritime ventures. Atlantic Container Lines, formed in 1967 by six operators (Swedish, Dutch, French, and British), runs 10 ships between U.S. and European ports.

And a "harsh fact," notes Kendall, is that "there is no patriotism among shippers anywhere." They use "the carrier who provides the best service at the lowest cost, without regard to the flag under which the ship sails."

had a "civilizing effect, for the life of the Yankee mariner became part of the wider world around him—the world of the Carolinas and Cadiz, of the Chesapeake, the Caribbean, and London itself."

The federal government took its first steps to protect U.S. shipping in 1789–90. To pressure the British and other Europeans to lower bars to U.S. shipping, Congress levied high duties on foreign vessels carrying trade between U.S. ports.*

During the decades before the Civil War, the merchant marine flourished. The clippers, and hundreds of other U.S. vessels, carried the flag not just to Canton, but to Macao, Hong Kong, Hakodate, and Honolulu, to Cuba, Puerto Rico, and Brazil, and to London, Liverpool, and Le Havre. Americans continued to build better ships at lower cost than the British, and to innovate. Robert Fulton's Hudson River paddlewheeler *Clermont* introduced steam power to water transport in 1807. Twelve years later, *Savannah* became the first ship to use steam engines (intermittently) in an Atlantic crossing.

Fleeing the Flag

Packet service—the transport of passengers, mail, and cargo on a regular schedule—was begun in 1817 by four Quaker entrepreneurs who started the New York–based Black Ball Line, a fleet of fast transatlantic square-riggers. Rivals appeared—the Red Star Line, the Swallowtail Line, and the Boston and Liverpool Line, whose ship *Emerald* made a record 17-day passage home. The Atlantic packets, as Ralph D. Paine observed in *The Old Merchant Marine* (1919), "brought a different order of things, which was to be continued through the clipper era." Painting and other maintenance was done only in port; at sea the ships were "remorselessly driven for speed."

East Coast ports flourished. As late as the 1820s, more than half of the nation's urban population resided in just four harbor cities: New York, Philadelphia, Baltimore, and Boston. Fostered partly by larger, faster ships and improved communications (e.g., the transatlantic cable and the Suez Canal, both inaugurated in 1869), trade expanded throughout the world. And of that commerce, the U.S. share climbed—from about six percent during the 1820s to around 10 percent during the 1880s. During the early 19th century, two-thirds of America's trade, measured by value, was carried in U.S. ships. New York, linked after 1825 to the Great Lakes and Western states and territories by the Erie Canal, became the premier U.S. port. Within 15 years, nearly half of the United States' foreign trade moved over New York's crowded wharves.

*Then, in 1813, "coastal trade" was reserved exclusively for ships built in the United States and flying the U.S. flag. The curbs against U.S. shipping in Europe were eventually relaxed, but the U.S. coastal trade restriction continued, and indeed was expanded to cover trade with Hawaii, Alaska, Puerto Rico, and other possessions.

Shipowners: Aristotle Onassis (1906?–1975) and Stavros Niarchos, with Eugénie Livanos Niarchos (left) and Tina Livanos Onassis; Hong Kong's Sir Y.K. Pao; Americans Malcom McLean and (right) Daniel K. Ludwig.

Yet over a 60-year period ending in 1914—during which the nation's foreign commerce increased by almost 800 percent—the amount of U.S. trade carried aboard U.S. ships fell to 26 percent. In 1882, a congressional committee investigated the slump. Testified a Boston captain, John Codman: "We have lost our prestige and experience; we are no longer a maritime nation." The old ship-masters "are dead, and they have no successors."

The reasons for the sharp 19th-century decline of the U.S. merchant marine are debatable. But some factors appear clear.

The very success of U.S. shipowners and builders early in the century brought future problems. The British government moved to help its shippers regain supremacy. A subsidy was granted to the Peninsula and Oriental Line in 1837; by 1840, Cunard and two other major lines were also receiving help. The subsidies worked; after 1840, dominance in transatlantic services passed to British lines. The U.S. Congress made an attempt to respond, but abandoned subsidies during the 1850s. For all the ingenuity of U.S. naval architects, the British were the first to make wide use of steam and iron. The first

ship to cross the Atlantic under steam power *alone*, in 1833, was Canadian; two British paddlewheelers followed in 1838.

Then came the Civil War.

Upwards of 1,000 ships—a third of the U.S. tonnage in foreign trade—"fled the flag," i.e. were transferred to foreign registry to escape Confederate raiders and high insurance rates. When the war was over, Congress, led by Westerners who cared little about shipping as long as vessels were around to carry their states' wheat abroad, would not let the "runaways" regain U.S. registry. This, combined with the earlier loss of many ships and the cotton trade during the war, was a blow. The industry never really recovered.

$30 a Ton

Shipping was left behind in the transportation revolution that transformed the United States in the postwar decades. It was railroads that now intrigued Wall Street and Washington. Some of Boston's old China traders became investors in Western roads. By 1884, the Northern Pacific, the Southern Pacific, and the Santa Fe all reached the West Coast, spurred by federal land grants (20 square miles for each mile of track laid). The U.S. total, 35,000 miles of track in 1865, more than quintupled by 1900, exceeding Europe's.

Many of the newcomers to shipping were railroad barons. By the 1890s, James J. Hill was running steamers from Seattle to Japan and China to feed his Northern Pacific system. Collis P. Huntington of the Southern Pacific ran the Pacific Mail Line (it was scuttled in 1915, by a law requiring its low-wage Oriental crews to be replaced by Americans). When someone suggested to J. P. Morgan that the U.S. merchant marine, suffering from rate wars and British dominance, could be the core of an international shipping trust, he replied: "It ought to be." But it was not. Morgan's International Mercantile Marine Company merged several U.S. shippers and acquired two British lines, White Star (the 1911 builder of the *Titanic*) and Leyland. Yet his dream faded. The British government blocked the sale of Cunard, and Kaiser Wilhelm would not let the Hamburg-American Line go. Morgan wanted his trust's ships to fly the U.S. flag.

The decline continued. As manning and building costs rose—reflecting climbing U.S. wages and living standards—U.S. shipowners failed to modernize. As late as 1892, more U.S. tonnage was powered by sail than by steam.

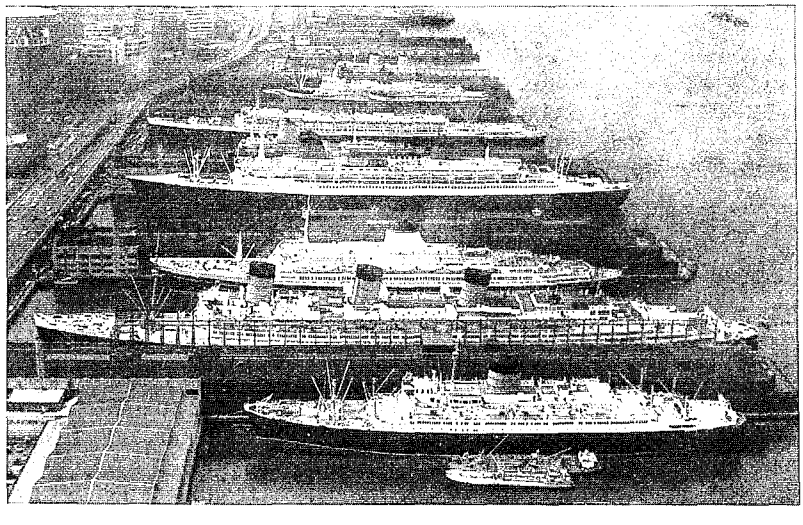
Congress responded with a number of subsidy schemes, and a cargo-preference law (1904) requiring military shipments to be transported in U.S. vessels. But all failed to modernize the merchant marine. America simply could not compete with British and other shippers who enjoyed better technology and lower costs.

Not until World War I broke out in Europe was the merchant

marine revived—temporarily. Congress reversed its no-return policy, and U.S. shipowners rushed to hoist the Stars and Stripes to gain the neutral status that America had before it entered the struggle.

The war underscored the importance of shipping to defense. At the outbreak of hostilities, the U.S. Navy possessed only three transports. President Woodrow Wilson had signed the Shipping Act of 1916 setting up an Emergency Fleet Corporation to build and operate a merchant fleet, because the weakened U.S. industry could not do the job. Before the war was over, old yards were reactivated, new ones built, $3.3 billion spent, and 178 new vessels joined the vaunted "bridge of ships" to Europe. Even so, about half of the 2,000,000-plus U.S. troops sent "over there" sailed on British transports. And after the 1918 Armistice, there was little need for the U.S. ships, which were soon sold off to American and foreign operators at discount rates—$30 per ton for vessels built at $250 per ton. Although the Merchant Marine Act of 1920 aimed at creating new shipping lines around the world, it failed. Despite a mail subsidy scheme enacted in 1928, the merchant marine fell to new lows.

The Depression spawned what remains the blueprint for federal maritime policy, the Merchant Marine Act of 1936. Sponsored by two shipyard-state men, Representative Schuyler Otis Bland (D.-Va.) and Senator Royal S. Copeland (D.-N.Y.), considered in haste by a Congress eager to adjourn for party nominating conventions, and signed by President Franklin D. Roosevelt as a job-creating measure,



Passenger liners in New York, 1964. In foreground: Sylvania, Queen Mary, Leonardo da Vinci, France, Bremen, United States. France *is now* Norway, *a cruise ship. Only* Queen Elizabeth II *offers transatlantic service today.*

the act was at best an expedient.

Congress cited a need to maintain an adequate merchant marine in foreign trade for *both* commercial and defense purposes. The act also, as *Fortune* editors warily observed, injected into U.S. business "an entirely new principle" on a "gigantic scale. This is the principle of the direct subsidy." To receive it, owners of cargo ships had to employ U.S. crews and observe U.S.–based minimum wage and manning scales.* If subsidies did not create a robust merchant marine, the government could build and charter ships to private operators.

Jumbos, Boxes, Ro/Ros

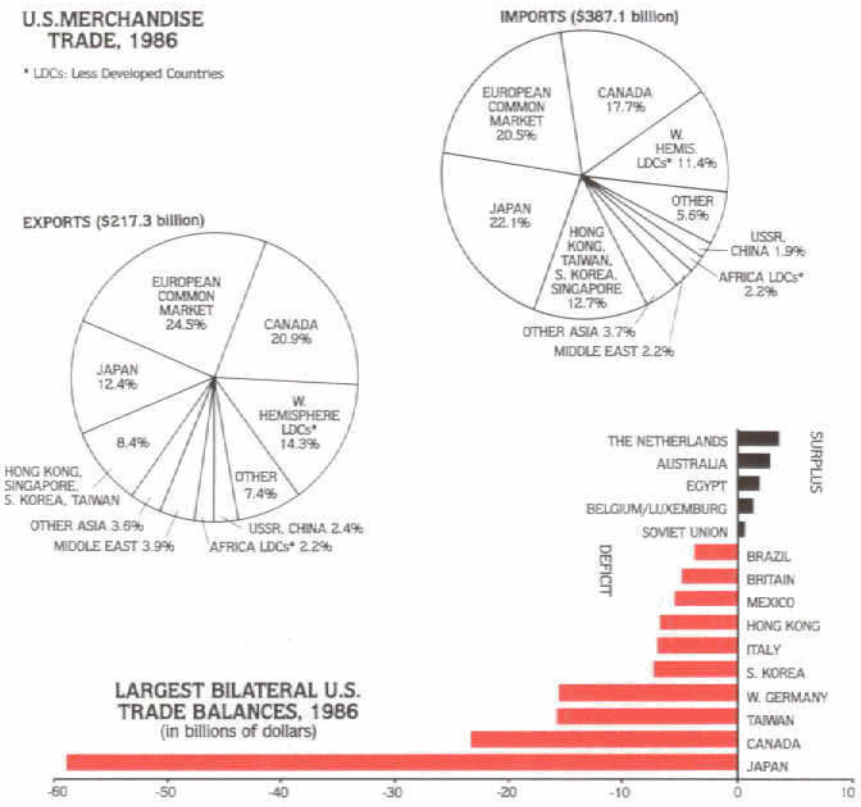
Under its ebullient first chairman, Joseph P. Kennedy, the new Maritime Commission set out to build 500 ships in 10 years.

World War II changed that plan. The Maritime Commission orchestrated the greatest shipbuilding effort in history: the construction of almost 6,000 vessels—including 2,700 Liberty ships and 400 Victory ships—for the merchant marine. But once again, when the war was over, the government had excess ships on its hands. Some were placed in Reserve Fleet anchorages. Others were sold off at bargain prices, 843 going to U.S. buyers, 1,113 to foreigners. It was this selloff that allowed such European opportunists as Aristotle Onassis and Stavros Niarchos (at that time, sons-in-law of Greek shipowner Stavros Livanos) and Costa "Goldfinger" Lemos to establish Greek dominance in world shipping during the 1950s.

Little could be done to revive the U.S. high-seas fleet. But the government tried anyway—by extending subsidies to bulk carriers and tramps and by offering construction-loan guarantees of up to 100 percent for all types of ships. Still, the merchant marine could not meet lower-cost competition. But not until 1954, when a post–Korean War shipping slump sent the ranks of idle U.S.–flag vessels soaring, did Congress pass a Cargo Preference Act requiring 50 percent of all overseas shipments paid for by federal funds or federal loans to be moved in U.S. vessels. Since this included foreign aid cargoes, such as wheat for drought areas, the law has greatly aided the merchant marine, at high cost to taxpayers.

Still, the decline continued. And the competing Greeks were followed by low-cost operators in Norway and then in Taiwan, Hong Kong, and Japan. By 1969, U.S. ships were carrying only 4.6 percent of U.S. trade. Not enough cargo liners, bulk carriers, and tankers were being built to compete for a fair share of America's oceangoing

*The government promised payments to offset the higher cost of U.S. ship construction over foreign building, to provide low-cost building loans, and to foot the bill for features (e.g., facilities for troops) built into ships to assure suitability for military use. Owners were offered cash to make up for high U.S. wages and operating costs on their U.S.–flag vessels in foreign trade. To date, taxpayers have subsidized the building and reconstruction of some 237 vessels, at a cost of $3.8 billion. At present, about 110 U.S.–flag ships receive annual operating subsidies, averaging $3.5 million per ship.



The U.S. share of world merchandise exports, 18 percent in 1960, fell to 11.4 percent in 1985. On the rise: West Germany (9.8) and Japan (9.4).

trade. President Richard M. Nixon, who took office when war (in Vietnam) was again straining the capabilities of the U.S. merchant marine,* formulated a modern definition of sea power: "the ability of a nation to project into the oceans in time of peace its economic strength, in time of emergency its defense mobility." The Merchant Marine Act of 1970, signed with fanfare, further extended ship construction aid. But the timing was unfortunate: The post-1973 global economic slump took its toll on *all* international shipping.

The merchant marine entered the 1980s in the same weak position it had occupied since early in the century. American-flag shipping, while it does well in coastal and inland waters, cannot compete on the oceans. The persistent vision held by U.S. shipowners,

*The job of supplying U.S. forces in Vietnam in 1965–72 required a fleet of 350 cargo ships that shuttled between the United States and ports in and around Indochina. Many were old vessels drawn from the reserve fleets, and most were undermanned. Often, military cargoes had to be entrusted to European and Far Eastern shippers who, ironically, had also served North Vietnamese ports.

shipbuilders, and others of American vessels carrying 50 percent of the nation's goods in foreign trade remains as chimerical as ever.

Yet Americans remain the most inventive of maritime folk.

During the early 1950s, U.S. operators such as Daniel K. Ludwig took the lead in "jumboizing" older ships—adding new sections to increase cargo capacity and, therefore, economy. Others launched entirely new kinds of ships, such as liquefied natural gas (LNG) tankers. Some designers and owners produced the first of what became revolutionary ways to end one of the oldest and costliest traditions of shipping: the slow, piece-by-piece loading and unloading of cargo by dockside stevedores. *Comet*, launched in 1958 by Philadelphia's Sun Shipbuilding and Dry Dock Company, was the first "Roll-on/Roll-off" ("Ro/Ro") ship—a vessel whose cargo is carried in trucks and trailers that are driven aboard at one port and driven off at their destination. The "lighter-aboard-ship"—or LASH—vessel developed during the 1960s by a U.S. naval architect, Jerome L. Goldman, employs the same principle with barges. Loaded and sealed barges can be towed down the Mississippi River, lifted aboard LASH ships in New Orleans, and then taken to Rotterdam or other ports. There they are refloated for movement up European rivers to their destination—without ever being opened or sitting at a dock.

One of the great revolutions in commercial transport began on April 27, 1956, when a dockside crane in Newark, New Jersey, loaded 58 containers aboard a converted tanker, *Ideal X*, for shipment to Houston. This was the idea of Malcom McLean, a trucking company founder, who bought the Pan Atlantic Steamship Corporation to try a new concept of point-to-point delivery of goods. In just 12 years, the "container revolution" launched by McLean's Sea-Land Service spawned uniform international standards allowing the boxes to be moved by road, rail, and ship just about anywhere. Containerizing freight means fast handling, less damage to goods, and less pilfering. Most merchandise moved by sea is now packed in containers.

The Siberian Bridge

One result: Major harbors no longer resemble the crowded warrens of piers, sheds, and carts that Herman Melville and Joseph Conrad knew. There are more than 2,000,000 containers in commerce today, and their handling requires space—acres of open surface. In established port cities, the action has gravitated to new, more distant facilities away from the old waterfront. Ships are thus not as visible to people as they used to be.

Containers led to "land bridges." When a shipment would be very lengthy by sea alone, the boxes may be moved across land masses by rail, at a typical cost saving of about 20 percent. Between 1967 and 1972, two such routes were established. Containers of

goods from Japan can be shipped to the Soviet port of Nakhodka, near Vladivostok, for loading aboard trans-Siberian trains. Some containers might be taken to northwest Russian ports, to be lifted aboard ships bound for northern Europe; others may go to Black Sea ports for transshipment to Italy, Spain, or France. About 100,000 containers are moved over the Siberian land bridge each year. On the also-busy North American land bridge, containers can be moved by rail between Atlantic and Pacific, or Gulf, ports in four days or less.

The major U.S. ports—New York, Philadelphia, Baltimore, Hampton Roads, Charleston, Savannah, Mobile, New Orleans, Galveston-Houston, Los Angeles, San Francisco, and Seattle—compete hard to accommodate the growth of transportation "intermodalism." The next step may be the wide adoption of another U.S. innovation: "RailRoaders," trailers with retractable highway wheels that can be moved by rail not on flatcars like present-day containers, but on their own attachable railroad bogeys. Such trailers could easily be loaded aboard Ro/Ro vessels or other ships.

Chasing Cargo

All of these developments have involved one of the fastest-growing merchant marines: that of the Soviet Union.

Run by the Merchant Marine Ministry, the 2,514-ship Soviet commercial armada is designed not only to earn foreign exchange in peacetime but also to serve the military in logistical, surveillance, and auxiliary missions in time of war or Cold War. Almost two-thirds of all Soviet foreign trade is carried by ship. Half of this is carried by Soviet vessels, the rest by chartered foreign-flag ships. With more than 45 Ro/Ro vessels having decks and ramps built to support tanks; with at least half a dozen barge carriers that can offload military equipment without shore facilities; with 40 ports able to handle containers; with more than 100 containerships (most of them self-unloading); and with over 2,000 "breakbulk" ships with their own cargo-handling equipment on board capable of supporting the Soviet military or those of client states—plus about 50 ships engaged in intelligence collection and 2,700 fishing vessels equipped for that, too—the Soviet merchant marine is a valuable commerical *and* military asset. And it turns a profit.

Soviet shipbuilding is proceeding rapidly, aided by construction programs in the East European satellites and directed by Moscow's Ministry of Shipbuilding. Ten to 20 vessels are launched each year, about a third for export—to Cuba, Algeria, West Germany, and Scandinavia. Like the Soviet merchant fleet, Soviet shipbuilding receives strong government support and is moving to become a major power in seaborne commerce during the late 20th century.

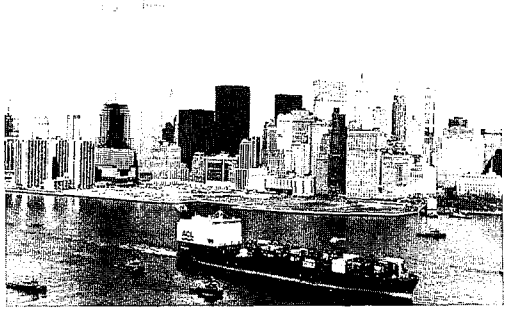
As do their Far Eastern, Western European, and Third World

NEW YORK: A CHANGING 'CITY OF SHIPS'

New York Harbor, 4 A.M., Wednesday, March 4, 1987.

While most of the metropolitan area's 17.5 million residents slept, crews were busy on many of the 39 ships shown on our map of the Port of New York (which encompasses parts of New Jersey—and Albany, N.Y.). Of these ships, whose particulars are listed on the back of the map, seven were arriving, steaming in or approaching the Ambrose Channel; captains try to pick up pilots at Ambrose Light before dawn, so that their ships can berth before 8 A.M., when longshoremen start work. The cold months are the most active; gas, shipped by pipeline, has won much of the heating-fuel market, but oil tanker traffic is still heavy, although gasoline was the dominant cargo on this day.

The port remains the nation's biggest in terms of cargo value ($49.9 billion in 1986); it also claims to lead in cargo weight (close to 55 million tons), although Los Angeles–Long Beach and Houston are close. But 40 years ago, half the nation's foreign trade passed through New York; now 10 percent does. During 1947, 10,806 ships called; this year, 6,000 will. And while ships are now larger, they are less visible. Transatlantic liners no longer loom proudly over the docks on Manhattan's West Side. The old slips and yards on the Hudson's New Jersey



shore are being razed for offices and apartments. The harbor's center of activity has moved to the 2,100-acre Port Newark–Elizabeth complex in New Jersey. Begun during the 1960s, and now the world's largest container terminal, it handles 70 percent of the port's cargo.

One casualty has been the longshoreman. In 1960, the port had 32,000 dockworkers; today the International Longshoreman's Association (ILA) has 6,500 men on its rolls, and at any given time only 4,500 actually work for their pay ($17 an hour). Under a deal struck in 1964 to win ILA acceptance of containers, those who are not working are paid anyway, at an annual cost to shippers of nearly $70 million.

The first European to visit the area, Italian explorer Giovanni da Verrazano, anchored near the Narrows in 1524. When the city was the U.S. capital (1789–90), President George Washington angled in the harbor for fish called "spots." Alexander Hamilton wrote the first *Federalist* paper aboard a Hudson River sloop. As early as 1820, the metropolis, with 150,000 people, was America's largest. In an 1865 poem, Walt Whitman called it a "City of Ships." Irish-born William Grace, New York's first immigrant mayor (1881–86), was a shipowner. Playwright Eugene O'Neill shipped out as a seaman from New York; boxers James J. Braddock and Gene Tunney worked on the docks.

But if New Yorkers were once "men fixed in ocean reveries," as Herman Melville, a customs inspector in Manhattan, observed in *Moby Dick* (1851), that seems less true now. The port is number one in *import* traffic, but export traffic, partly due to the decline of manufacturing in the U.S. Northeast, is a fading enterprise. One sign of that is the stacks of emptied containers that pile up around the port. More than 1,000,000 boxes are brought to New York annually. To avoid sending many of them on still empty, shippers use them to send scrap metal, rags, and such to Taiwan and other countries for recycling. Today, New York's top-volume export item is, of all things, wastepaper.


N
(ALBANY)
Potomac
Potomac Trader
Western Trias
D. Fortunee
THE BRONX
East River
LAGUARDIA AIRPORT
Passaic River
Hackensack River
Union City
Hudson River
MANHATTAN
NEW JERSEY
Hoboken
Balao
QUEENS
East R.
Newark
Jersey City
World Trade Ctr.
Peggy Dow
NEW YORK
Ascanius
Rio Esmeraldas
Asian Express
PORT NEWARK
Bonde
Export Patriot
Ocean Wind
PORT ELIZABETH
Atlantic Saga
Newark Bay
Governors Is.
Statue of Liberty
Dart Britain
Twin Drill
General A. F. Cebesoy
Pytheus
RED HOOK
General Vargas
Sirius
Bayonne
Neptune Garnet
Elizabeth
OMI Champion
Stolt Jade
Delaware Trader
Nicopolis
Nora Maersk
Kill van Kull
STAPLETON
BROOKLYN
Jamaica Bay
Exxon San Francisco
Paula Maersk
Verrazano-Narrows Bridge
STATEN ISLAND
Cielo di Salerno
Robert E. Lee
Coney Island
I.T.B. Baltimore
Arthur Kill
Rockaway Pt.
Lower New York Bay
AMBROSE CHANNEL
Perth Amboy
Golden Crown
Spirit of Liberty
SANDY HOOK CHANNEL
George C
Hilco Sprinter
CCNI Austral
Ambrose Light
Pt. Comfort
Sandy Hook Light
Sandy Hook
Borinquen
World Prodigy
Exxon Boston
Ming Moon
NEW JERSEY
0 1 2 3 4 5
nautical miles
Atlantic Highlands

A GUIDE TO THE SHIPS

The ships shown on our chart of New York Harbor—officially, the Port of New York & New Jersey—are listed here according to their approximate location at 4 A.M. on March 4, 1987. Not shown are U.S. Navy warships and auxiliaries, and idled private cargo ships in lay-up (11 in all, at Hudson River piers and at Brooklyn docks).

HARBOR APPROACHES
(Lower New York Bay/Ambrose Light vicinity)

Inbound (shown schematically):

Robert E. Lee (flag: U.S.). LASH barge carrier, 40,921 tons. Waterman-Isthmian Line. Arriving from New Orleans to load barges containing machinery, manufactured goods, and chemicals for delivery to Pakistan, India, Jordan, the Sudan, and Bangladesh.

George C (Greece). General cargo, 15,050 tons. Constellation Navigation line. From Izmir, Turkey, and other Mediterranean ports. Delivering 27 containers—apple juice concentrate, cotton cloth, chick peas, dried apricots—at Port Elizabeth. Next stops: Morehead City, N.C., and Richmond, Va., to unload 4,000 tons of tobacco from Turkey, Yugoslavia, and Lebanon.

Hilco Sprinter (Norway). Refrigerator ship, 12,475 tons. Ecuadorian Line. From Puerto Bolívar to unload 204,305 boxes (43 lbs. each) of bananas at Port Newark.

CCNI Austral (West Germany). Containership, 7,780 tons. Compañía Chilena de Navegación Interoceanica. From Santiago, via other South American ports, to discharge and load containers in Albany.

Borinquen (U.S.). Containership, 16,977 tons. Navieras de Puerto Rico liner. From San Juan, Puerto Rico, to discharge and load containers at Port Elizabeth. Next stops: Miami, San Juan.

World Prodigy (Greece). Tanker, 30,200 tons. Owned by Stavros Niarchos. From Immingham, England, with 240,085 bbls. of unleaded gasoline.

Ming Moon (Taiwan). Containership, 31,000 tons. Yang Ming Line. From Taiwan, Hong Kong, and ports in South Korea and Japan, via Los Angeles, Houston, and Savannah. Next stops: Wilmington (Del.), Baltimore.

Outbound (shown schematically):

Exxon Boston (U.S.). Tanker, 172,800 tons. Departing with fuel oil loaded at Marcus Hook, Pa., and at Exxon terminal in New Jersey for Wilmington, N.C.

Spirit of Liberty (U.S.). Tanker, 38,200 tons. Returning to a U.S. Gulf of Mexico port, having delivered 283,955 bbls. of unleaded gasoline at Citgo terminal, Linden, N.J.

PERTH AMBOY TO ELIZABETH, N.J.
(Arthur Kill oil terminal area)

Golden Crown (Greece). Bulk carrier, 21,700 tons. At Outerbridge Terminal, Perth Amboy, N.J., delivering salt from Chile.

I.T.B. Baltimore (U.S.). Tug/barge tanker, 47,247 tons. At Hess terminal, Port Reading, N.J., delivering gasoline, diesel fuel, and jet fuel.

Cielo di Salerno (Italy). Tanker, 29,400 tons. At GATX terminal, Carteret, N.J., delivering 217,186 bbls. of unleaded gasoline from Santos, Brazil.

Paula Maersk (Denmark). Tanker, 47,000 tons. At Northville Industries terminal, Lindenhurst, N.J., delivering 330,696 bbls. of leaded and unleaded gasoline from Amsterdam.

Exxon San Francisco (U.S.). Tanker, 75,600 tons. At Exxon terminal, Bayway, N.J., delivering some 500,000 bbls. of Alaskan crude from Chiriquí Grande, a port on Panama's Caribbean coast. The oil had been brought from Valdez, Alaska, to Panama's Pacific coast by other tankers too large to use the Panama Canal, and moved to Chiriquí Grande by pipeline.

PORT NEWARK/PORT ELIZABETH

Atlantic Saga (Sweden). Roll-on/Roll-off–containership, 16,005 tons. Atlantic Container Lines. Last port: Bremerhaven. Delivering excavators, farm tractors, and a 42-ton crawler used in mining.

Export Patriot (U.S.). Containership, 16,345 tons. Farrell Lines. From Mediterranean ports with assorted goods—Egyptian cotton, flax, and basil; Israeli wines, spirits, chemicals, and steel plate; Turkish glassware and clothing; Greek olives, olive oil, dried fruit, wine, and paint; Italian clothing, plastics, furniture, shoes, and food products; Spanish olives, vegetables, wine, and furniture. Next stops: Baltimore, Norfolk, Charleston.

Bonde (Singapore). Bulk carrier, 37,519 tons. Service between New York and Turkey.

Ocean Wind (Greece). Bulk carrier, 36,700 tons. Westwind Shipping Corporation. Service between New York and Venezuela.

Asian Express (Liberia). Car carrier, 30,744 tons. Manager: Orient Overseas Management & Finance Ltd., Hong Kong. Delivering Nissan autos from Yokohama.

Ascanius (Liberia). Bulk carrier, 37,600 tons. Steel products from Antwerp.

Rio Esmeraldas (Ecuador). Refrigerator ship, 9,300 tons. Ecuadorian Line. Delivering some 150,000 boxes of bananas and plantains from Puerto Bolívar and Guayaquil, Ecuador.

BAYONNE

Delaware Trader (U.S.). Tanker, 50,057 tons. At Belcher Oil Company terminal delivering 40,000 tons of heating oil from Houston.

OMI Champion (U.S.). Tanker, 37,900 tons. At I.M.T.T. terminal loading 225,000 bbls. of heating oil for Providence, R.I, and Boston.

Stolt Jade (Liberia). Chemical tanker, 38,000 tons. Stolt Tankers International. Delivering diisobutylene, fatty alcohol, food-grade phosphoric acid, methyo ethyo ketone, and diisopropyo ether at Powell Duffryn Terminals Inc.

Neptune Garnet (Singapore). Containership, 43,403 tons. Neptune Orient Lines. At Global Terminal discharging and loading containers. Round-the-world liner sailing east from Singapore, Hong Kong, and ports in Taiwan, South Korea, and Japan, to Long Beach, Calif., Charleston, Norfolk, New York, and Halifax. Ship returns to Singapore via Suez Canal.

Dart Britain (Britain). Containership, 18,643 tons. Dart Containerline. At Global Terminal, delivering some of 1,160 containers (assorted cargo) loaded in Britain, Belgium, West Germany, and France. Last port: Le Havre. Other U.S. stops: Baltimore, Norfolk, Charleston.

Research: Joyce McIlroy, The Maritime Association of the Port of New York / New Jersey

STATEN ISLAND
(Stapleton quarantine anchorage)

Nora Maersk (Denmark). Tanker, 68,800 tons. Heating oil from Argentina for Castle Coal & Oil Company, Astoria, Queens.

Nicopolis (Liberia). Tanker, 60,525 tons. Bound for a Port Reading oil terminal.

RED HOOK/BROOKLYN

Pytheus (Greece). Cement carrier, 41,400 tons. Anchored at Bay Ridge Flats, south of Governors Island; from Le Havre to deliver bulk dry cement to American International Cement Corporation plant.

General Vargas (Philippines). Bulk carrier, 11,900 tons. At Bay Ridge Flats; from La Romana, Dominican Republic, to deliver 6,000 tons of raw sugar for refineries in Brooklyn (Amstar, the Domino brand distributor) and Yonkers (Refined Sugars Inc., which sells to supermarket chains and other customers).

Sirius (West Germany). General cargo (tonnage unavailable). Arrived from St. John, New Brunswick, Canada. At Red Hook loading containers for Buenos Aires.

General A. F. Cebesoy (Turkey). General cargo, 12,477 tons. Turkish Cargo Line. At Red Hook; carrying various goods from Turkish ports to U.S. East Coast cities.

Twin Drill (Panama; U.S.–owned). Dive-support ship, 453 tons. International Underwater Contractors, Inc. Twin-hulled base for commercial/scientific submarine and diving operations; recently employed for work on cooling-water discharge system at Long Island nuclear power plant. At Red Hook awaiting next job.

EAST RIVER

Peggy Dow (Netherlands). Refrigerator ship, 10,572 tons. Unloading bananas from Guayaquil, Ecuador, and La Ceiba, Honduras.

Balao (Liberia, Norwegian-owned.) Bulk carrier, 26,700 tons. At National Concrete plant, delivering 21,422 tons of cement from Alicante and Valencia, Spain. Next stop: New Orleans, to load grain for Belfast, Northern Ireland.

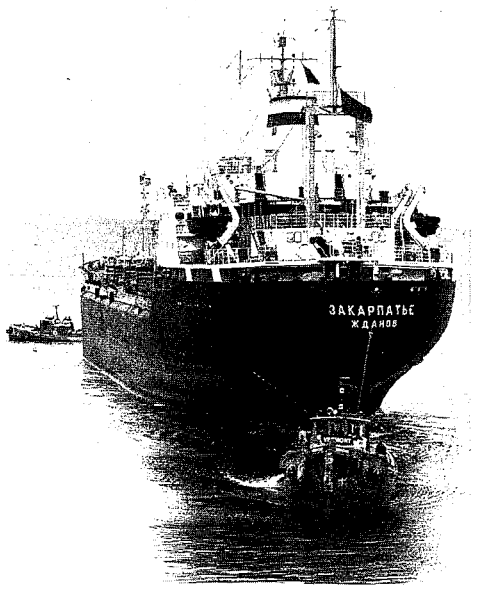
ALBANY, N.Y.
(124 nautical miles, or 142.5 statute miles, up Hudson River from southern tip of Manhattan; ships are shown schematically.)

Potomac (Belgium). Refrigerator ship, 9,852 tons. Delivering 176,583 boxes of bananas loaded in Turbo, Colombia, and Puerto Limón, Costa Rica.

Potomac Trader (U.S.). Tanker, 50,100 tons. Delivering 306,377 bbls. of fuel oil from St. Rose, La., to Albany's Glen Mont Power Station. Next port: Pajaritos, Mexico, to load crude for the U.S. Strategic Petroleum Reserve.

Western Trias (Greece). Bulk carrier (tonnage unavailable). Delivering "clinkers," a cement byproduct, from Mexico.

D. Fortunee (Cyprus). Bulk carrier, 37,609 tons. Loading Midwestern grain brought to Albany by land (truck or train). Destination: Portugal.



The bulker Zakarpat *at Duluth in 1973, after the Nixon administration opened 40 U.S. ports to Soviet merchantmen. Since 1981, such visits have required prior clearance, a rule meant to show U.S. pique over repression in Poland. Soviet ships still arrive to pick up what Lenin called "the currency of currencies" (grain) and to compete for other U.S. trade.*

counterparts, Soviet officials view a merchant marine and shipbuilding base as vital to national well-being, and their policies are formulated accordingly. For example, East Bloc shippers, like some of their Western counterparts, are encouraged to form closed "conferences" (associations of shippers) on trading routes, for the purpose of excluding competitors, setting rates, coordinating schedules, and reserving sizable amounts of East Bloc trade for East Bloc ships.*

Maritime matters have faded from U.S. public consciousness. The earliest U.S. newspapers were devoted to shipping and trade; now only one daily, the *Journal of Commerce*, covers the field in detail. A 1986 strike by East Coast and Gulf Coast dockworkers, the first such walkout in 15 years, got modest coverage in the mainstream press. Yet shipping, if not the U.S. industry itself, remains vital to the U.S. economy. Directly or indirectly, some five million nonfarm workers depend on foreign trade for their livelihood; 80 percent of new manufacturing jobs created today are linked to exports. The products of one of three acres planted by American farmers are sent abroad. Most of such vital commodities as bauxite, nickel, zinc, tin, cobalt, manganese, and chromium come from overseas. Does it matter what flags fly on the ships that move all this?

*Besides subsidies in various forms, foreign shippers benefit from the freedom to form rate- and schedule-setting conferences. U.S. antitrust laws going back to 1916 allowed American participation in such conferences, but that freedom has been weakened by court decisions. By law, U.S. shippers may not merge, consolidate, or pool their efforts, as their foreign competitors can and often do.

That is difficult to say. The cost to the U.S. economy of reliance on foreign-flag shipping—in terms of lost jobs and tax revenues—defies accurate calculation. But the gains, in terms of reduced transporation costs, are probably as great or greater than those losses. Though President Ronald Reagan took office promising to renew the merchant marine, an administration "working group" has produced no results. Indeed, apparently in a spirit of ending the "throwing of good money after bad," the administration has requested no construction subsidy funds since 1981. It has also prepared legislation that would allow subsidized U.S.–flag operators to use foreign-built ships in foreign trade, and end the tax penalty that such shipowners must pay for repair work in overseas yards.

Various congressmen have been pressing plans to aid the industry. Two bills, sponsored by Representatives Walter B. Jones (D.-N.C.) and Mario Biaggi (D.-N.Y.), would have the government spend $850 million to build new vessels for charter—a measure that would give temporary respite to perhaps six to eight hard-pressed major yards. Others have urged laws requiring U.S.–flag carriage of imported Japanese autos, and the negotiation of cargo-sharing agreements with trading partners that would put more U.S.–flag ships to work. But even if the United States were to make the merchant marine a truly favored industry, as most other countries do, there is no guarantee that its fundamental problem of high costs can be solved. World seaborne trade has increased by about 32 percent since 1970, but the amount of shipping chasing all that cargo has expanded by more than 100 percent.

Adam Smith's Attitude

In military terms, the need for a sizable U.S.–flag merchant marine is less ambiguous. When a U.S. Army mechanized division is moved overseas, it requires 100,000 tons of "sealift" to make the move and 1,000 tons of cargo per day to sustain itself. A conflict in the Indian Ocean on the scale of the Korean or Vietnam wars would require support from at least 350 cargo ships. By the Navy's reckoning, about 300 U.S. government- and civilian-owned ships are available for military support duty on short notice. But the Navy also counts on being able to employ other ships whose actual availability is rather questionable—such as 364 U.S.–owned flag-of-convenience ships, whose nominal countries of ownership have agreements with the United States to hand over the vessels in time of national emergency, and 400 NATO-ally vessels.

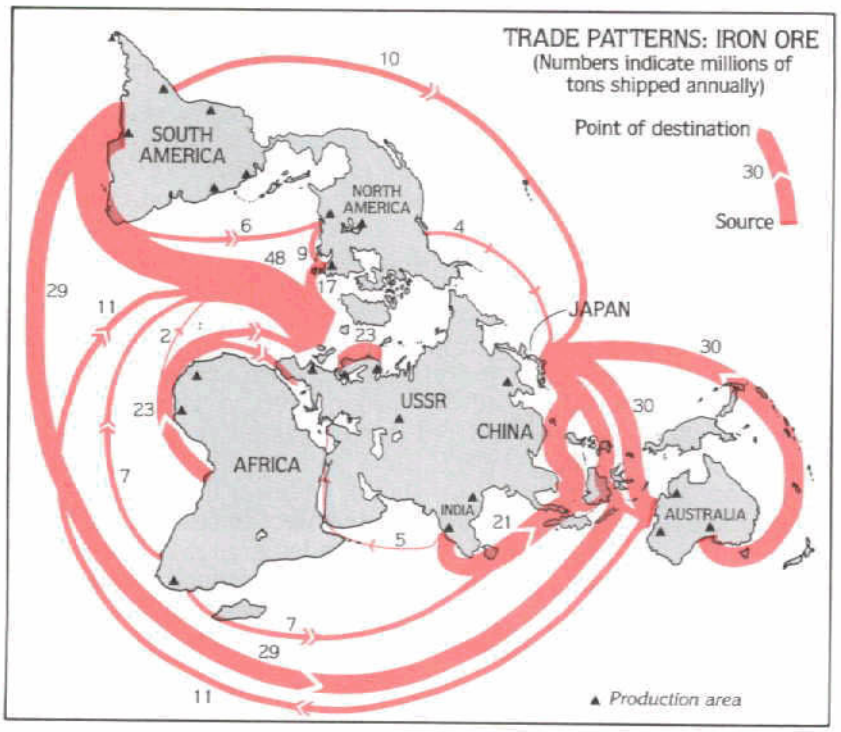
Tellingly, the Navy has begun buying or chartering more ships on its own, among them large, fast container and LASH ships converted to Ro/Ro vessels. No one has a firm answer to another question: If 75 percent or more of the U.S.–owned commercial fleet is

supporting a war effort overseas, how will oil and other essential supplies be brought to America?

The great rise in international trade began about 1870, when the coupling of steam power with screw propellers pushed the cost of ocean transport down—a move toward efficiency that has continued. Indeed, some economists, among them Walter Isard, have argued that innovations in sea (and, later, air) transport have been *the* major stimulus to world trade. Ironically, it was around this time, the late 19th century, that the U.S. merchant marine first became the high-cost industry that it remains today.

But the merchant marine's ills, and the flickering federal interest in addressing them, reflect a larger phenomenon: Since the opening of the West, Americans as a whole have had scant interest in foreign trade.

Scalded by the "beggar thy neighbor" high-tariff policies that spread and deepened the Depression worldwide, since World War II the goal of "free trade" has been warmly embraced by policymakers



The leading dry *bulk cargo in world trade, ahead of coal and grain, is iron ore. Its volume reflects steelmakers' needs. (Top importers: Japan and West Germany.) Oil, however, accounts for nearly half of* all *cargo tonnage.*

in the United States and elsewhere. Indeed, the tariff reductions that have resulted from such initiatives as the Kennedy Round negotiations of the 1960s have led to a marked expansion in commerce among nations. But, oddly, for all the official U.S. interest in trade, Americans themselves have long seemed to view markets abroad with something of the offhandedness of the great Scottish classical economist Adam Smith (1723–90), who dismissed foreign trade as "a vent for surplus."

To be sure, Americans remained successful in overseas markets far into the 20th century. Economist Sir Geoffrey Crowther was moved to remark in 1957, when the U.S. balance of payments was still well in the black: "There are so many American goods that the world wants, whatever they cost." But the competition of innovative, lower-cost suppliers elsewhere took its toll. In 1971, for the first time since the 1890s, Americans imported more goods than they sold abroad, inaugurating today's large trade deficits. Nonetheless, the nation still refuses to get excited about competing for overseas markets, as witness the pressure in Congress for protectionist measures, and the fact that the United States has yet to implement the metric system, as other trading nations (even the British) have.

The United States' very size, otherwise economically advantageous, may be a disincentive. In general, the larger a country, the less it depends on others, either as markets or as sources of goods and raw materials. Thus, imports and exports account for only eight percent of the United States' gross national product, and even less for the Soviet Union. The figures are much higher for smaller nations: the Netherlands, 89 percent; South Korea, 63; Denmark, 54; Sweden, 52; West Germany, 46; Britain, 38; Japan, 37; Australia, 24.

The modest importance of trade to the United States today is a dramatic change from the situation 200 years ago, when the nation was small and essentially spread out along one coast. Back then, historian Richard C. Parnell has noted, even in farming-minded Connecticut "men were convinced that the state's wealth lay bound up in" shipping. During a single two-day period in 1787, for example, in just one Connecticut city, New Haven, no fewer than 10 ships set sail to take horses and other items to the West Indies.

Today, few Americans see the sea trades as much more than a "stepchild," as Admiral Land said—in a way, the nation's first smokestack industry to fall behind in the competitive world arena.

MONEY AND SAILORS

by Timothy M. James

On the oil route from Valdez, Alaska, to the Lower 48, the captain of one U.S. 120,000-ton tanker, in his early 30s, annually earns pay and benefits totaling more than $80,000—and for every two-and-a-half months at sea gets two months off. With overtime, an able-bodied seaman can earn $45,000.

High pay is one reason why the total cost of a typical unionized crew (39 men) on a U.S.-flag ship is about $8,000 a day, twice that of a Japanese crew and six times that of a Chinese crew. Another factor is union-set manning levels. A U.S. general-cargo ship has 34 to 36 crewmen; a similar West German vessel has 22. All this boosts the average yearly payroll for a U.S. ship to some $3 million. The total for, say, a Norwegian ship: $1.3 million.

Moreover, U.S. ship-construction costs are almost triple those elsewhere. A U.S.-built 40,000-ton containership would cost about $90 million; a Far Eastern yard would charge $33 million. To help U.S. shipowners keep the Stars and Stripes at sea in the face of foreign competition, the U.S. government manages subsidy programs that last year, despite Reagan cuts, disbursed $288 million.

Of all merchant marine subsidy programs, the U.S. system is the most open and comprehensive. Other countries provide direct and indirect aid in many forms. For instance, low-cost financing for 80 percent of construction costs is common. U.S. shipowners get similar financing aid, plus other help that is rare elsewhere, notably cash to offset their foreign rivals' lower building and operating costs. Shipping earns needed foreign currency for such nations as Denmark, Norway, and Sweden, but they give no operating subsidies to ocean shippers. Shipowners must pare expenses to make profits.

The Merchant Marine Act of 1936 helped to lift U.S. expenses. President Franklin D. Roosevelt assured Congress that a subsidy "honestly" called "by its right name" would "maintain a reasonably adequate merchant marine." What it did was invite cost increases.

The law's offer of aid to help U.S. owners meet foreign competition while paying "fair and reasonable" wages to U.S. crews intrigued the maritime unions that emerged during the 1930s. Some leaders, such as Paul Hall of the Seafarers International Union, came to oppose subsidies, preferring cargo-preference laws to increase jobs. But, especially after World War II, other powers, notably Joseph Curran's National Maritime Union, viewed the 1936 law as a lever

for higher wages. Subsidized owners did not resist.

The prewar earnings of U.S. seamen were about 50 percent above those of Europeans, but under those of the average U.S. factory worker. By the mid-1960s, the earnings of a working able seaman were about twice the average U.S. manufacturing wage and three to five times the pay of a European sailor.*

Today, nearly 90 percent of the operating-subsidy money paid to five federally aided liner firms [U.S. Lines (S.A.), American President, Waterman, Farrell, and Lykes] offsets high wages. The payments average $35,000 per crewman. As early as 1966, a Brookings economist, Samuel A. Lawrence, noted the subsidy's "tendency to create costs," despite Washington's "hopeful expectations."

Compared to other federal handouts, notably agricultural subsidies ($25.8 billion in fiscal 1986), the maritime aid program is miniscule. Support for it is fragmented. Testifying in Congress during the early 1960s, Defense Secretary Robert S. McNamara refused to "overstate" military transport needs, so as not to provide "an umbrella under which a huge ship construction program" might be launched. Today, farm lobbyists oppose the 1954 law reserving 50 percent of federally financed shipments (e.g., foreign-aid grain) for costly U.S.-flag vessels. And the maritime "industry" is divided. Shipowners favor, and shipbuilders oppose, the Reagan proposal to end the penalty for repairing U.S.-flag ships abroad.

For defense reasons, at least, few policymakers argue that the United States should emulate Canada, which after World War II chose to do without a blue-ocean fleet and now relies on competition among foreigners to keep shipping costs down. But the U.S. merchant marine's parlous condition, despite subsidies, is all too plain, and not just in the dwindling numbers of ships and jobs. The age of U.S.-flag vessels is higher—17 years for those in private hands and 33 in the government-owned fleet—than the world average of 14 years. At present, half of the eight surviving U.S.-flag liner firms do not earn enough money to invest in the construction of new ships. So much for Washington's prime goal since 1936: renewing and sustaining a U.S. merchant marine.

*A Maritime Administration report shows that in 1981 able seamen on U.S.-flag ships earned a monthly base wage averaging $1,204 (not including overtime) and employer-provided fringes (such as pension contributions) worth $1,599. Officers fared even better, particularly in the fringe department: Chief mates got a monthly base wage of $3,058 and fringes worth $5,292; for captains, the figures were $5,634 and $9,795. Overall, U.S. crew costs now exceed those of other nations with relatively high living standards by margins as high as 3 to 1.

Timothy M. James, 46, is deputy editor of the Wilson Quarterly.

BACKGROUND BOOKS

THE MARITIME WORLD

Men first went down to the sea not in ships, or even boats. They used whatever expedients they could find to get themselves across deep water.

Some of these expedients are still in use, historian Lionel Casson notes in **Ships and Seamanship in the Ancient World** (Princeton, 1986). "A New Zealand aborigine today paddles over lakes astride a bundle of reeds, an Iraqi herdsman crosses streams on an inflated goatskin, a Tamil native does his fishing drifting with a log under his arms while a Sindhi does his lying prone over an openmouthed pot."

The movement of goods called for ingenuity. The 5th-century B.C. Greek historian Herodotus, Casson recounts, admired the portable river craft of Assyrian merchants. Made of hides sewn over a frame of willow branches, they carried donkeys as well as cargo. "After arriving at Babylon and disposing of the cargo, the frames of the boat... they auction off, load the hides on the donkeys, and walk back to Armenia."

The intertwined roots of commerce and seafaring are described in Fernand Braudel's magisterial two-volume **The Mediterranean and the Mediterranean World in the Age of Philip II** (Harper, rev. 2nd ed., 1977) and his three-volume **Civilization and Capitalism: 15th–18th Century** (Harper, 1985, 1986). Other broad-gauge works are John H. Parry's **Spanish Seaborne Empire** (Knopf, 1966); and C. R. Boxer's **Dutch Seaborne Empire: 1600–1800** (Knopf, 1965) and **The Portuguese Seaborne Empire: 1415–1825** (Knopf, 1970).

G. V. Scammell's **World Encompassed: The First European Maritime Empires, c. 800–1650** (Univ. of Calif., 1981) chronicles—in one volume—the sorties of Norsemen from the "womb of nations" (now Norway, Denmark, and Sweden) into what had been Roman Europe, beginning around 750 A.D., and the English triumphs over the Spanish and Portuguese empires. With Sir Francis Drake's 1577–80 global circumnavigation, Scammell observes, the Europeans "brought together for the first time in enduring association, and with enduring consequences, many of the peoples inhabiting the earth."

In **How the West Grew Rich: The Economic Transformation of the Industrial World** (Basic, 1986), Nathan Rosenberg and L. E. Birdzell, Jr., detail how "maritime trade was at once a major field of economic growth and a field intractably resistant to medieval principles of political control." There was no law at sea. But while many mariners were privateers and some buccaneers, one country's villain was another's hero. "Drake was a pirate to the Spaniards, but when he returned to England from his [circumnavigation], Queen Elizabeth knighted him" on his flagship, *The Golden Hind*. His voyage yielded "a profit of 4700 percent to the holders of shares in the joint stock company that financed his voyage." One was the queen.

The United States' maritime experience is woven into many broad histories, such as Samuel Eliot Morison's **Oxford History of the American People**, 3 vols. (New American Library, 1972) and D. W. Meinig's **Atlantic America, 1492–1800** (Yale, 1986).

Surveys include James M. Morris's **Our Maritime Heritage: Maritime Developments and Their Impact on American Life** (Univ. Press of America, 1979), and **New England and the Sea** (Mystic Seaport Museum, 1972) by Robert G. Albion, William A. Baker, and Benjamin W. Labaree. For other views, there are port histories, such as Robert G. Albion's **Rise of New York Port**

(Northeastern, 1984). Richard C. McKay's **Some Famous Sailing Ships and Their Builder, Donald McKay** (Putnam's, 1928; 7C's Press, 2nd rev. ed., 1969) profiles the clipper designer, as Alan Villiers's **Way of a Ship** (Scribner's, 1975) does life aboard the windjammers.

The functioning of marine transport, and of federal maritime policy, is dealt with in Clinton W. Whitehurst, Jr.'s **U.S. Merchant Marine: In Search of an Enduring Maritime Policy** (Naval Institute Press, 1983) and Lane C. Kendall's **Business of Shipping** (Cornell Maritime Press, 5th ed., 1986). Samuel A. Lawrence's **United States Merchant Shipping Policies and Politics** (Brookings, 1966) examines both the industry's weakness and ill-fated government remedies.

Though now tamed by adversity, maritime unions, as Lawrence recalls, evolved from advocates of seaman's needs during the 1930s into a factor in the industry's slide after the postwar glory days—when, for a time, 60 percent of all shipping tonnage flew the U.S. flag. As late as the mid-1960s, 28 unions were fighting for members and influence in the U.S. foreign-trade fleet, though it represented only 50,000 jobs.

A dozen major strikes over economic issues afflicted the fleet between 1947 and 1964. Then as now, Lawrence notes, shipping was vulnerable, being "the only important segment of U.S. industry which sells virtually its entire product in the international market."

As W. Elliott Brownlee points out in **Dynamics of Ascent: A History of the American Economy** (Knopf, 2nd ed., 1979), the Europeans and the Japanese have long been far more dependent than Americans on foreign trade. The "internal focus" of U.S. commerce was deeply rooted before World War I, when international trade accounted for only 11 percent of the nation's output.

In **Foreign Trade and the National Economy** (Yale, 1968), Charles P. Kindelberger argues that the U.S. trade problem is, to an extent, a "question of horizon." Businessmen, he observes, are inclined to consider that "domestic trade is among 'us'; foreign trade is between 'us' and 'them.' As communication improves in breadth and speed, the scope of 'us' expands. But 'they' will probably continue to exist." Of necessity, to merchants in smaller nations—Belgium or Japan, say—the commercial horizon is wider than it is for large-nation traders such as Americans.

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Richard Rosecrance traces America's trade difficulties to other causes. In **Rise of the Trading State: Commerce and Conquest in the Modern World** (Basic, 1986), he argues that the Industrial Revolution broke "the link between territory and power," enabling nations "to gain economic strength without conquering new lands," i.e. via trade. But since 1945 the world has been poised between two approaches to international relations: "a territorial system which hearkens back to the world of Louis XIV and which is presided over by the USSR and to some extent the United States, and an oceanic or trading system." The trading system, a legacy of maritime Britain, is today "organized around the Atlantic and Pacific basins."

The leaders of Japan and the Western European nations, seeing that "self-sufficiency is an illusion," emphasize trade. The Soviets, consumed by territorial concerns, are fated to decline, according to Rosecrance. With more flexibility, America may, if its leaders are wise, follow "the Japanese model."

In **Ships' Cargo/Cargo Ships** (MacGregor, 1979), an illustrated series of essays on the maritime scene edited by Henri Kummerman and Robert Jacquinet, Captain F. S. G. Frota, Brazil's leading private shipowner, fears for the "beautiful" freedom-of-the-seas prin-

ciple. To build up their own fleets, many Third World governments have adopted cargo-preference rules, endorsed by the United Nations Conference on Trade and Development in 1974, limiting the trade moved by "third flag" ships.

Biographies also mirror the shifting fortunes of maritime enterprise. James Dugan's **American Viking** (Harper, 1963) notes how Danish-born Hans Isbrandtsen (1891–1953), a foe of federal meddling and champion of individual enterprise ("When the devil wanted nothing to happen, he appointed a committee"), ran Isbrandtsen Lines without subsidies but lost money only once in 38 years. Lawrence A. Clayton's **Grace** (Jameson, 1986) focuses on another rugged individualist, an Irish-born New Yorker, William R. Grace (1832–1904), who started as a chandler in Peru.

Aristotle Onassis (Times Books, 1978) by Nicholas Fraser and other London *Times*men, and Jerry Shields's **Invisible Billionaire** (Houghton, 1986) tell how two later empire-builders, the Golden Greek and his reclusive U.S. rival, Daniel K. Ludwig, prospered by capitalizing on both U.S. maritime policy and flag-of-convenience ownership.

As it has in shipping company boardrooms, life at sea has changed. In **The Atlantic Crossing** (Time-Life Books, 1981), Melvin Maddocks recalls Herman Melville's tales of the terrors crewmen faced on 19th-century packets: Reefing sails aloft meant hovering "like a judgment angel between heaven and earth, both hands free, with one foot in the rigging and one somewhere behind you in the air." If such perils are history, so is much of the romance of seafaring.

Noël Mostert's **Supership** (Warner, 1978) tells of life aboard *Ardsheil*, a 214,000-ton British tanker that hardly quivers at sea, with a crew of 43—British deck and engineering officers, Indian, Pakistani, and Chinese seamen and stewards. The living quarters in the superstructure have a "sealed-in mood." On deck, "only at the few wooden rails aboard did one touch something of the old fabric of ships."

Romance of a sort surfaces in **Steaming to Bamboola: The World of a Tramp Freighter** (Congdon & Weed, 1983), which Christopher Buckley spun out of a classic experience: a young man's voyage on an old freighter.

As crotchety as *Ardshiel* is efficient, Buckley's *Columbianna* has sailed "more or less everywhere in the small world of tramps." A 523-foot converted World War II troopship, her "history was written into her hull, a patchwork of dings and cicatrices from 35 years of banging into things on the watery hither-and-yon." Buckley joined the crew of 37 in Charleston for a trip to Bremerhaven (*not* "Bamboola," which was a Chinese steward's name for Bermuda), with military supplies.

In 100-plus voyages "across the pond," *Columbianna*'s captain had seen myriad cargoes—tanks, cannon, cork, coal, coke, laxatives ("in bottles which the crew mistook for booze, and drank"), tin ingots, flour, corn, locomotives, missiles. But for all its hard use, the ship "had a battered, queenly aspect missing in the new streamlined containerships, supertankers, and certainly the Liquefied Natural Gas (LNG) carriers."

Indeed, "surrounded by Portuguese men-of-war when she broke down and floated in mid-ocean, or coming up the Mississippi out of a fog bank, or nudged by Dutch tugs into a lock, she looked like what she was, an old tramp steamer, ready, as one of the crew said, to take on any port in the world, [even if] living on borrowed time."

CURRENT BOOKS

SCHOLARS' CHOICE

Recent titles selected and reviewed by Fellows and staff of the Wilson Center

THE FATAL SHORE
by Robert Hughes
Knopf, 1987
688 pp. $24.95

The prison, as we know it and depend on it to keep our societies secure, has a recent history. It is about as old as the factory, of which it is a grim, almost parodic counterpart. The first modern penitentiary, built with the intent to reform, opened in Philadelphia in 1790. Sequestering prisoners in closely controlled spaces and scheduling their every activity, it was designed to bring order and right thinking into miscreants' lives. At about the same time, France began to plan similar correctional institutions, abandoning the chamber-of-horror punishments that had long served the Old Regime. The British, however, had already developed an alternative to either traditional punishment or modern correctional discipline. They had taken to exiling convicted felons—"transportation to a place beyond the seas," as the judge's formal sentence expressed it.

It turns out that the history of transportation, like possession of the America's Cup, is one of the things that Americans and Australians have in common. Until the American Revolution, most British felons sentenced to transportation were shipped to labor-hungry Maryland and Virginia, where they were sold as servants, bound for the time of their sentences. After 1775, the rebellious colonies refused to receive any more of these social outcasts, and soon the London "hulks"—rotting old ships in which prisoners were held pending transportation—were packed with larcenists, burglars, and an assortment of petty criminals.

The British government solved the problem in 1786 by sending shiploads of convicts to Australia, giving rise to a vast penal settlement. The story of Britain's decision, and of the novel society that resulted from it, is the subject of Robert Hughes's masterful overview.

To the telling of his tale, the author, a native of Australia and art critic for *Time*, brings both an intimate sense of his subject and a painterly eye for the revealing detail. Indeed, Hughes is such a spellbinding chronicler that is easy to lose sight of his larger intent. Several American reviewers (including one of Hughes's *Time* colleagues) have given the impression that his book is about a colony-wide jail, equating all punishment systems with prison systems. The penitentiary simply cannot be created on a continental scale. What Hughes shows, in fact, is that Britain, the first nation to develop the modern factory, was also the first to develop an alternative to the prison, and that it did so largely to avoid the expense.

To be sure, the emergence of actual prisons within the penal settlement is an important part of Australia's unfolding history. Hughes tells of such places in some of the most gripping chapters of his book. Norfolk

Island, for example, a wild, green-clad rock out in the Pacific, became a hellhole for incorrigible criminals, known for its floggings, hangings, rampant homosexuality, and suppressed rebellions. Its gruesomeness made all the more impressive the accomplishments of a Scottish penal reformer named Alexander Maconochie, who served as prison commandant from 1839 to 1843. By instituting a system of trust that foreshadowed the modern parole system, he managed to bring peace and order to the prison. Authorities, however, questioned his methods and removed him. They had an additional motive; they wanted Norfolk Island to remain a grim deterrent to all would-be wrongdoers.

But the hellholes were only a small part of the system, as Hughes makes clear. Most transportees were assigned, rather like indentured labor in North America, as servants to farmers and others (ex-convicts, mainly) who were developing the country. With good reason, Hughes claims that "the assignment system was by far the most successful form of penal rehabilitation that had ever been tried in English, American or European history." And he buttresses his claim with excellent recent scholarship on the subject. John Hirst's *Convict Society and its Enemies* (1983), for instance, shows what kind of tradeoffs between work and incentives were made by the assigned convicts and their masters. Portia Robinson's *Hatch and Brood of Time* (1985) uses the 1828 census to establish the uprightness of the first generation of Australia's native-born whites. Long a source of wonder to visitors, this success story resulted from the fact that the ex-convict parents of first-generation whites settled down to responsible family lives and became hard-working yeomen and artisans. This remarkable self-reform contradicted contemporary assertions, repeated in history books down through the years, that convicts were, and always would be, thieves and whores.

In 1868, writes Hughes, "when the last convict ship discharged its Irish prisoners . . . in Western Australia, transportation was part unpleas-

ant memory and part unhealed wound." Ironically, the end of the convict system, like its beginning, was linked to a major development in American history—abolitionism. Those free settlers who wanted to end transportation in order to claim Australia for themselves denounced the system as a "slave system," which it definitely was not. The critics of transportation, as Hughes relates, drew on antislavery rhetoric and imagery to discredit it. And, until the 1980s, those images have largely determined the way early Australian history was presented.

Although he takes full account of the tales of atrocities, Hughes offers a truer picture of the human story of successes, as well as the tragic failures, that were all part of a remarkable penal experiment that gave birth to a new nation.

—Rhys Isaac '87

REVOLUTION AND THE WORD: The Rise of the Novel in America
by Cathy N. Davidson
Oxford, 1987
322 pp. $22.95

Central to the formation of the new American Republic was the founders' belief that the ideas that would unite the nation would be diffused to its citizens through the medium of the printed word. But at the close of the 18th century, most Americans had not yet grasped the distinctive nature of printed matter. A goodly number of readers still believed that words delivered orally could be put into print without altering their essential character. Most such readers had in mind the sermon, by definition an oral performance. Thanks to the printing press, American preachers had long been able to address an audience beyond the walls of the local meetinghouse. Similarly, politicians believed, the new nation's expanding printing industry would now make it possible for political ideas to reach beyond the local forum and thus help shape a national citizenry.

The realization that print affected subject matter precisely because it was aimed at a wider, less visible audience was slow to arrive. Benjamin Franklin grasped it before most others. He observed, for instance, that in transcribing legal discourse into books "You must abridge the Performances to understand them; and when you find how little there is in a Writing of vast Bulk, you will be as much surpriz'd as a Stranger at the Opening of a *Pumpkin*." Accordingly, he strove to achieve conciseness without density. Learning from such proto-novelists as John Bunyan, he introduced dialogue, anecdote, and drama into his treatises. This not only made his works more readable but allowed him to address new subjects and issues as well. And indeed it enabled him to reach a new kind of audience—an audience of what he called "leather-apron men," small-tradesmen and artisans.

Chief among the new things that print made possible was the genre

that took its very name from this circumstance, the novel. But the novel met with an uneasy reception in America, particularly among the country's recognized spokesmen and leaders. It was, of course, written by a single person, but that person, unlike the sermonizer or social philosopher, disappeared into the multiplicity of the characters' voices and actions. Eschewing an authoritative voice and transferring control to the response of the common reader, the novel appeared democratic to the point of anarchy. Not surprisingly, ministers, politicians, and teachers were wary; they complained that novel-reading wasted time, enfeebled the intellect, corrupted morals. But behind their litany one detects a deeper, if not quite articulated, concern: The novel dealt with feelings and ideas outside of the authorized channels for such communications and hence was out of control, socially subversive.

LA LECTURE

Despite their large social implications, American novels that shaped a wide readership at the end of the 18th century have received only scant attention from literary critics and historians. The novels seem to be wretched stuff: maidens seduced and abandoned; Gothic goings-on in a country that had no castles; lampoonings of village politics so broad that even a royalist would be hard put to draw comfort from them. To her great credit, Cathy Davidson, a professor of English at Michigan State University, has not let established—and, as she shows, highly politicized—notions of artistic merit stand in the way of a much-needed examination of these early novels of sentiment, horror, and social satire. In ***Revolution and the Word***, she convincingly demonstrates their significance to their age while at the same time making the better ones, if not exactly inviting reading, at least accessible to us. It is a notable achievement.

There is, to be sure, some small price to pay for what Davidson supplies. Since her study is based on a synthesis of critical methods—feminist approaches to the history of women, the ethnography of readership, theories of interpretive communities—the early chapters are somewhat clogged by her effort to accommodate them all. Once under way, however, her argument, presented with wit as well as intelligence, goes from strength to strength.

"The early novel," writes Davidson, "constituted a definition of America different from the official one that was being worked out at the end of the Revolutionary War. . . . The novel, I would insist, addressed the gaps in independence. The revolution that did not occur for many Americans on the level of the political and legal system did occur, to a greater or lesser extent, within a fictive world of words."

Chief among those for whom the revolution "did not occur" were

women, the central subjects, principal audience, and most popular writers of the period's novels. Davidson pays shrewd attention to other circumstances, but the main thrust of her work clearly grows from recent insights provided by historians of women. Sometimes this leads her to force her rhetoric. For example, she sees the "elite" who were troubled by the novel as far more monolithic than the evidence supports. Conversely, she understates the latent conservatism of sentimentality, regardless of the objects, or messages, to which it is attached. But her consideration of the novels themselves is quite remarkable.

Davidson has not only read, and read well, most of the novels of the period, but has looked at hundreds of copies of the same novel in order to glean from the margins a sense of what their various readers prized. The result is an impressive ethnography of readership built on such evidence as a jotted response to a given moment in a novel as well as on shrewd inferences drawn from the successive signatures or embellishments found in spaces outside the text. Davidson's discussion of such ephemera and more traditional evidence, such as the diaries and letters of novel readers and changes in the illustrations of frequently reprinted work, brings us closer to the actuality of the popular audience than anyone would have thought possible.

To enable us to appreciate the experience of the early American novels' first readers is a valuable accomplishment. One need require no more. Yet a nagging question persists: Does this mean we can now open the better of these novels and react to them with neither boredom nor a patronizing smile?

The first party to attempt an answer is Oxford University Press, which in conjunction with the publication of this impressive critical history is issuing two early best sellers, both introduced and edited by Davidson: *Charlotte Temple* (1791) by Susanna Rowson and *The Coquette* (1797) by Hannah W. Foster. Both novels read well. They will not take their place at the checkout counter, nor will they bump *The Scarlet Letter* from the reading list of college surveys of American literature. But they read more sensibly and a good deal more eloquently than a drugstore romance and they deserve to stand as first in any serious sequence that includes *The Scarlet Letter*. Perusing them with the aid of Davidson, we find ourselves not just understanding how others nourished their imaginations on such fare but joining them in that experience.

Welcome as such dividends may be, however, *Revolution and the Word* is finally separable from them. Revising our notions of early American culture, it compels us to recognize the hidden sources of our aesthetic judgments.

—Larzer Ziff '87

NEW TITLES

History

PAGANS AND CHRISTIANS
by Robin Lane Fox
Knopf, 1987
799 pp. $35

How did Christianity conquer Rome? Many historians hold that it had the good fortune to appear at a time—the second century A.D.—when an anxious people would believe almost anything. Lane Fox, an Oxford classicist, challenges that neat formula. He notes, for instance, that during the "Antonine age of anxiety" (the reign of Pius Antoninus, A.D. 138–161), the Roman Empire enjoyed unprecedented peace and prosperity. And pagan religions were anything but moribund.

Lane Fox recreates the vitality of the late pagan world, where wealthy citizens vied for the honor of financing festivals and games dedicated to local civic deities. Not merely religious spectacles, such festivals also provided occasions for commerce, legal proceedings, and oracular readings.

Christianity did not step into a world devoid of ethics, as Lane Fox makes clear. Venerable Greek concepts of honor and shame guided pagans' behavior. To be sure, slavery was "entrenched in the social order," and even the most virtuous saw man's lot as fixed and unequal. Christianity offered no broad remedies, promising "to reform the heart, not the social order." Many early Christians proved to be zealous self-reformers. Prizing virginity and abstinence, some extremists—"over-achievers," Lane Fox calls them—had to be restrained by law from becoming "eunuchs for the sake of the Kingdom of Heaven."

After the year 250, turbulent politics and natural disasters thinned the ranks of the rich. Funding a festival could as often as not ruin the donor. When Constantine, the first Christian emperor (306–337), exempted Christians from this civic duty, he had to issue two subsequent edicts condemning religious conversions undertaken solely for financial purposes.

Lane Fox's witty, leisurely history may succeed too well in debunking the usual explanations for Christianity's success: It leaves the reader wondering why any but the grimmest "over-achiever" would have abandoned the bright world of the pagan gods for what the author terms "a dangerous, enfeebling myth."

RUSSIAN STUDIES
by Leonard Schapiro
edited by Ellen Dahrendorf
Viking, 1987
400 pp. $24.95

Shortly after Tsar Alexander II emancipated the serfs in 1861, a portentous debate opened up between two of Russia's leading men of letters. One was exiled political journalist Alexander Herzen; the other, novelist Ivan Turgenev. Herzen, a moderate socialist, believed that Russia possessed spiritual and moral qualities that made it different from the liberal nations of Western Europe. Following its own path, probably with the aid of a revolution, it would fulfill its destiny and become a society superior to those of the West. Turgenev disagreed. He argued that the European way of modest reform, institution-building, and confidence in law was the only sensible course for Russia. In novels such as *Smoke* (1867), he mocked radicals who embraced revolutionary ideas and hazy notions about Russia's uniqueness.

To Schapiro (1908–83), the terms of this debate had special meaning. Not only did "they underlie the eternal search for the right and true path of progress upon which successive generations of Russian intellectuals embarked," they also provided a focus for his work, which ranged from political analysis to biography. A professor of politics at the London School of Economics, Schapiro viewed the history of Russia as a tragedy stemming largely from its failure to develop a strong legal tradition. That perception, as these 24 essays show, colored his reading of events and major figures, from Lenin, the consummate "man in a hurry," to Stolypin, the reformist prime minister (1906–11) who dominated Russia's brief constitutional period. Above all, Schapiro made his readers appreciate the gap in political cultures between the Soviet Union and the West—a gap so wide that no change of Kremlin leadership is likely to be able to close it.

Contemporary Affairs

THE JAGUAR SMILE:
A Nicaraguan Journey
by Salman Rushdie
Viking, 1987
171 pp. $12.95

Whom to believe about contemporary Nicaragua? American conservatives see a Cuban-style regime, bent on exporting Communist revolution to its Central American neighbors. Leftists regard Sandinista Nicaragua as a near-ideal state whose few imperfections result from U.S. economic and military pressures. Rushdie, an Indian-born novelist and sometime political journalist, offers a more

balanced, albeit sympathetic, perspective.

El escritor Hindu traveled in Nicaragua for three weeks in July 1986 as a guest of the Sandinistas. He describes his book as a "portrait of the moment . . . but, I believe, a crucial and revealing one." The International Court of Justice had just ruled in June against the legality of U.S. aid to the *contras*; President Daniel Ortega had recently closed the liberal newspaper *La Prensa*.

In a series of brief, tightly constructed chapters, Rushdie locates the contradictions of this "martyr country," where, he notes, "to understand the living . . . it was necessary to begin with the dead." As a writer, he found Sandinista censorship to be one of the most unpalatable contradictions. Although the president and the minister of culture are poets, and the vice president is a novelist, this "government of writers had turned into a government of censors."

The government is also notorious for its mistreatment of the Miskito Indians, who inhabit the vast Atlantic coast province of Zelaya. Rushdie found that, while the charges were largely true, Managua's scheme to grant limited autonomy to the region has already lessened local resentment. Ultimately, the Sandinistas win Rushdie's cautious endorsement for resolving the nation's most glaring contradiction: During the 46-year reign of the Somozas, most Nicaraguans lived like exiles in their own country. The revolution is thus "an act of migration," an ongoing process in which Nicaraguans are struggling to "invent their country, and, more than that, themselves."

A CONFLICT OF VISIONS: Ideological Origins of Political Struggles
by Thomas Sowell
Morrow, 1987
273 pp. $15.95

"Conflicts of interests dominate the short run, but conflicts of visions dominate history." Hence the need, argues Sowell, a Hoover Institution economist, for every generation to rethink the age-old controversy about the nature of man.

Visions—what "we sense or feel *before* we have constructed . . . a theory"—tend toward two extremes: At one end, notes Sowell, are those who share a "constrained" vision of man as inherently limited; at the other, those who see human potential as unlimited. The former, including thinkers such as Adam Smith, Edmund Burke, and Milton Friedman, believe that society must guard man against his own shortcomings. The latter—

Jean Jacques Rousseau, Thomas Paine, and John Kenneth Galbraith, among others—hold that society must be structured so as to encourage the individual's fullest development.

Readers familiar with Sowell's work will not be surprised that he tends to favor the constrained vision. He martials support for his "gut feeling" from history as well as from philosophy. The triumph of the unconstrained vision, as during the latter stages of the French Revolution, often leads to "surrogate decision-making," whereby the "enlightened few" end up making choices for the good of the "benighted masses."

Advocates of the constrained vision trust in processes and restriction on power more than in man's intentions: Peaceful nations must be militarily strong to be secure; judges must apply rules rather than prescribe social conditions; economies must evolve independently. Unconstrained thinkers seek to influence the course of events through judicial activism (the Warren Court), manipulation of the economy (New Deal policies), or compensation for particular groups (affirmative action).

Sowell's instructive presentation allows for complexities, including the "hybrid visions" of thinkers such as Karl Marx and John Stuart Mill. Marx, says Sowell, "spoke of 'the greatness and temporary necessity for the bourgeois regime'—a notion foreign to socialists with the unconstrained vision, for whom capitalism was simply immoral."

WITNESS TO A CENTURY: Encounters with the Noted, the Notorious, and Three S.O.B.s
by George Seldes
Ballantine, 1987
544 pp. $19.95

All centuries have their wars, catastrophes, and heroes, but none has been as painstakingly documented as the 20th. Perhaps one of its most peripatetic witnesses, and certainly one of its longest-lived, is reporter George Seldes, now 96, who took his first job with the *Pittsburgh Leader* in 1909 and quickly plunged into the main events of his day. He covered the battles of World War I, Russia shortly after the revolution, the Spanish Civil War, and the rise of Hitler and Mussolini, corresponded with J. Edgar Hoover, and became an admirer of Tito. His memories range from presidents to buffoons. Among the latter was the bombastic Mussolini: "I am a fatalist," he told Seldes in 1924. "I believe in the star of destiny. . . . I am not afraid of death." While a special student at Harvard in 1912, Seldes came to know John Reed as a "ribald minnesinger" and was sur-

prised when this prankster-playboy became a revolutionary. (He was less surprised to learn that Reed, ever the eccentric, openly debated "the real meaning of Marxism with Zinoviev and other notables of the 1917 Revolution.")

Seldes does not dwell only on personages. He candidly exposes the press at its worst. At the end of World War I, Field Marshall Paul von Hindenberg confessed to Seldes and three other reporters that Germany had been beaten "fairly in the field." But the story was suppressed by General John J. "Black Jack" Pershing, the U.S. field commander, with the backing of several members of the press corps who had been scooped on the story. Immediate publication of the confession, Seldes believes, would have made a lasting impression, thus undercutting Hitler's later contention that Germany had lost because of betrayal by businessmen and Jews at home.

Seldes's urge to set the record straight led him to found his own newsweekly, *In fact*, which he edited from 1940 to 1950. Attacking everything from Representative Martin Dies's House Un-American Activities Committee to cigarette advertising, he was often derisively called a "muckraker." But Seldes wears the label with pride.

Arts & Letters

KARL KRAUS: APOCALYPTIC SATIRIST: Culture and Catastrophe in Habsburg Vienna
by Edward Timms
Yale, 1986
443 pp. $32.50

Writing in Vienna near the end of the Habsburg Empire, Karl Kraus (1874–1936) produced satire as savage and finely tuned as that of the great Jonathan Swift. Kraus's target was formidable: the culture and society of Vienna at the turn of the century—the world of Sigmund Freud, painter Oskar Kokoschka, novelist Robert Musil, and others whose work presaged the major artistic and intellectual developments of the 20th century.

Kraus's journal, *Die Fackel* (The Torch), was avidly read, even by the people it attacked. "Psychoanalysis is that mental illness of which it believes itself to be the cure," ran one of Kraus's more famous apothegms (although, says Timms, the satirist did not ridicule all of Freud's ideas). Bureaucrats, military officers, industrialists, and Jews all figured as frequent butts of Kraus's scorn. Contempt, in the last case, bordered on self-loath-

ing. Born a Jew, he converted to Catholicism. Unfortunately, his jibes fed a virulent anti-Semitic current in Austrian life that was exploited early on by politician Karl Lueger and later by the infamous ex-Vienna resident, Adolf Hitler.

Above all, notes Timms, a Cambridge Germanicist, Kraus was concerned with language, particulary as it was used and abused by the Austrian press. His parodies were often indistinguishable from the newspapers' daily offerings; occasionally, he would simply reprint passages from the news, allowing absurdity, or pomposity, or pseudosignificance to speak for itself. There was, however, no irony intended when Kraus denounced Austrian (and other European) journalists for their role in the outbreak of World War I: "The war guilt of the press is not that it set the machinery of death in motion, but that it hollowed out our hearts so that we could no longer imagine what it was going to be like!"

JANE AUSTEN
by Tony Tanner
Harvard, 1986
291 pp. $20.00 cloth, $8.95 paper

Daughter of an English country vicar, novelist Jane Austen (1775–1817) lived through the French Revolution, the rise and fall of Napoleon, the flowering of Romanticism in the arts, and the beginnings of the Industrial Revolution. Charlotte Brontë—a sister novelist and slightly later contemporary—judged her cloistered, static, and completely unaware of social and political change. Tanner, a professor of English at Cambridge, attacks this persistent myth.

Each Austen novel, he says, turns on "the relationship and adjustment between individual energy and social forms." And those forms, Tanner shows, are far from static. The works of her youth—*Sense and Sensibility, Pride and Prejudice, Northanger Abbey*—reflect an 18th-century Rationalist perspective. Individuals in these novels strive against the "potential instability" of emotion in an effort to maintain "the required stabilities of society." Marriage, the inevitable outcome of an Austen plot, provides the resolution of this struggle—and therefore of the 18th-century woman's basic life problem.

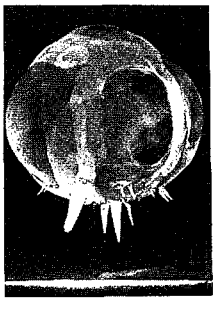
Later in her life, when writing *Persuasion*, Austen's faith in the dominant class was shaken, inclining her more toward a Romantic regard for feeling. Anne, *Persuasion*'s heroine, finds herself

in a corrupt "old order of society" that prizes only "rank and consequences." Eventually, she abandons "prudence" to follow her heart, marrying the man of *her* choice.

In her last and unfinished novel, *Sanditon*, Austen leaves both Rationalism and Romanticism behind. Instead, she paints a portrait of a crass seaside resort, a developer's dream, dedicated to "distraction and amusement and idleness . . . fabricated out of words, money—and sand." This literary leap carried her far beyond the rural harmony presented in *Emma* and foreshadowed the Dickensian hard times soon to come.

Science & Technology

THE MAKING OF THE ATOMIC BOMB
by Richard Rhodes
Simon & Schuster, 1987
886 pp. $22.95



In 1900, English scientist Frederick Soddy recorded the spontaneous transmutation of thorium gas into helium. From this observation, Soddy worked out the principle of radioactive half-life. It was, he later recalled, like the opening of a new world: "For more than two years, scientific life . . . became hectic to a degree rare in the lifetime of an individual."

Soddy's work made scientists rethink their concept of the atoms as stable components of elements. Over the next 45 years of research chronicled here by author Rhodes, the discoveries of a few remarkable men would unleash the most destructive force the world has known. The path from Soddy's laboratory to the first explosion at the Trinity test site in New Mexico seems all but inevitable, but Rhodes makes dramatically clear the importance of the special genius of men like Denmark's Niels Bohr, who developed the model of the atom with its orbiting electrons, and Hungary's Leo Szilard, who in 1933 envisioned the possibility of splitting atoms with neutrons.

Drawing on recently released government documents, interviews, and memoirs, Rhodes plumbs the motives of those who wanted to make the bomb. Scientific curiosity was a factor, as Robert Oppenheimer, director of America's Manhattan Project, admitted. But politics and survival were paramount. Throughout World War II, Britain, Germany, Japan, Russia, and America all sought to come up with the winning weapon first. Bohr, like other physicists who fled to the United States, had

witnessed Hitler's ravages in Europe. Edward Teller, a Hungarian Jew who had lived through the 1918 Hungarian Revolution, was as hostile to Communists as he was to Nazis.

Rhodes draws few conclusions about the subsequent arms race, but he pointedly cites the question Bohr asked when he arrived in Los Alamos in 1943: "Is it really big enough?" Big enough, that is, according to Rhodes, "to challenge mankind to find its way beyond man-made death to a world more open and more humane."

THE SOCIETY OF MIND
by Marvin Minsky
Simon & Schuster, 1987
339 pp. $19.95

How does the human mind work? How can that lump of individually unthinking cells that we call the brain possibly contain intelligence?

Minsky, a noted artificial-intelligence researcher, has spent much of his life trying to duplicate human thought processes in machines. His work clearly informs his answers to questions about the mystery of mind.

Like a computer, he says, the mind is built of "mindless stuff, from parts that are much smaller and simpler than anything we'd consider smart." Dubbing these particles or miniprocesses "agents," Minsky uses them as the basic mental units in his model of the brain. Alone, each agent can perform only one simple task. Together in "societies," agents produce intelligence—acts of thinking, decision-making, remembering.

Minsky's book is itself a society: groups of one-page essays on topics ranging from the learning process to language skills. Do we have one self or many? Minsky contends that "we construct the myth that *we're* inside ourselves." "What is consciousness? It is a series of "great machines . . . countless processes of which we're never much aware." Memories? "Fragments of our former states of mind," invoked by an agent or agents associated with those former experiences.

Above all, Minsky wants to lay to rest mankind's age-old belief in souls, spirits, the spark of genius. A human being's value, he believes, lies in his or her "vast, constructed crust"—the complex interplay of mental agents. People may not even have a monopoly on self-awareness. Machines designed to keep good records of their activities are, says Minsky, "potentially capable of far more consciousness than we are."

PAPERBOUNDS

SIMONE WEIL: An Anthology. Edited and introduced by Sian Miles. Weidenfeld & Nicolson, 1987. 290 pp. $8.95

Born in Paris in 1909 into a middle-class Jewish family, Simone Weil attended France's prestigious *Ecole Normale Supérieure* and worked variously as a teacher, an industrial worker, and a farm laborer before heading off to fight in the Spanish Civil War in 1936. She died of tuberculosis in 1943, having spent her last years in London working for the French provisional government. During her short, busy, and chaotic life, Weil managed to write—brilliantly, according to minds as diverse as Jean-Paul Sartre and T. S. Eliot—about religion, politics, society, the plight of the modern industrial laborer, literature, and even mathematics. The thread uniting her work was Weil's relentless quest for knowledge of God. Her undogmatic, antimystical approach involved a dismantling of the prideful self as the first step toward a spiritual life. "There is," she wrote, "absolutely no other free act which it is given us to accomplish—only the destruction of the 'I.'" Presenting 18 samples of Weil's work, Miles, a professor at Keele University in England, shows how Weil's quest has become a convincing theology for 20th-century skeptics.

AMUSING OURSELVES TO DEATH: Public Discourse in the Age of Show Business. By Neil Postman. Penguin, 1987. 184 pp. $6.95

American TV can't be all that bad, its defenders say. They point to the fact that even its critics cite good programs—documentaries, high-culture drama imported from Britain, educational programs. Postman, a professor of communications at New York University, is unmoved. It's the medium, not the subject, that matters, he insists, echoing the late Marshall McLuhan. And the medium is rapidly lowering the level of the "public discourse" in America. Even those shows widely hailed for their instructional value, such as "Sesame Street," do little more than encourage children "to love television," says Postman. If people learn by what they do, young Americans are learning to watch TV. The result: a "shrivelled" culture, where complexity, the real give-and-take of argument, and any sense of context or history beyond the presented image are fatally absent.

HONOR AND VIOLENCE IN THE OLD SOUTH. By Bertram Wyatt-Brown. Oxford, 1987. 270 pp. $7.95

"I wish to live under no other government," wrote Robert E. Lee just days before the South's secession, "& there is no sacrifice I am not ready to make for the preservation of the Union save that of honor." Honor made him a Confederate, of course. But why? In this abridgement of his prize-winning *Southern Honor: Ethics and Behavior in the Old South*, University of Florida historian Wyatt-Brown masterfully dissects the complex social code that bound, and gave meaning to, the lives of white Southerners, rich as well as poor. He looks at the connections between honor and the various notions of family, chivalry, and hospitality, as well as its problematic ties to the practice of slaveholding. Most revealingly, Wyatt-Brown shows how honor figured in the ritualized violence of the South, those grim public spectacles of tarring-and-feathering or lynching. Whole communities, he notes, eagerly took part "to protect traditional values and conventions against forces outside as well as within. . . ."

Ah Bing and Her 'Sisters'

Since the "normalization" of Sino-American relations in 1979, most U.S. scholarship on China has focused on politics and economics. But historians have also learned much about how ordinary Chinese variously have coped with the rigors of everyday life. Here, journalist Alice Greenway describes the plight of rural women in Canton before World War II, and how one woman, Ah Bing, joined others, through a network of "sisterhoods," in vows of spinsterhood to escape forced marriage and poverty.

by Alice Greenway

In 1932, Ah Bing was a 16-year-old girl from Lunan, a small village in southern Guangdong (Canton) Province, China.

In that year, she journeyed to the city of Shih-lung, to perform a deeply solemn ceremony in the Buddhist temple there. First, she tied up her long black hair in a single bun. Then, in the presence of other girls and older women, she knelt before a statue of Kuan Yin, the Buddhist goddess of mercy, and vowed never to marry.

"If I marry," Ah Bing said, "give me nothing, give me trouble, make me unhappy, and don't give me any sons."

In performing this ritual, Ah Bing became a ***sou hei*** woman—literally, "one who dresses her own hair" (unlike traditional brides, who have their hair dressed for them). To her mother's deep disappointment, Ah Bing left Lunan, and joined a Buddhist sisterhood in Shih-lung, in Tung Kuan county.

During her adult life, Ah Bing lived and worked not only in her native China, but in Singapore, Hong Kong, and the United States. Throughout, she kept her vows to Kuan Yin.

I had known Ah Bing since 1967, when my family moved to Hong Kong. I was just three years old at the time. As an ***amah*** or domestic servant, Ah Bing helped my parents care for the house and raise me

Rural women in China, as this Yüan dynasty (1279–1368) painting of an autumn rice harvest shows, have long done much of the hard field labor.

and my two sisters. In conversations during the 20 years that she lived with us, Ah Bing shared with me the story of her life.

Ah Bing's story reveals much about life in early 20th-century China. It details how Chinese society in general, and the institution of marriage in particular, favored men over women. Her personal history also reflects the suffering that so many women endured, and suggests why so many Chinese women from her area (one out of every 10 in Tung Kuan county) chose not to marry.

Some Chinese commentators have hinted that such single women were sexually promiscuous, or lesbians perhaps. But Ah Bing's story suggests that in choosing a single life, these women were nothing of the sort. They were just trying to make a better life for themselves.

It was not easy to survive, after all, in China during the 1930s. Already, the country had experienced tremendous political upheaval. The revolution of 1911 not only overthrew the Ch'ing dynasty (1644–1912), but inaugurated one of the most strife-ridden periods in Chinese

history. Neither the republican government (1912–28) nor General Chiang Kai-shek's Kuomintang regime (1928–49) managed to win the support necessary to subdue competing warlords at home or resist aggressors from abroad. The Japanese invaded Manchuria in 1931 and eventually pushed deep into southern China. The political chaos presented ordinary rural folk like Ah Bing with hardships and opportunities that they had not known before.

Daughters for Sale

Not all hardships, of course, were new. Chinese society had long regarded females as second-class citizens. Poor families, for example, often earned money by selling their most disposable possessions, such as their young daughters. "In my village, they didn't drown girls, they sold them," Ah Bing once said. "If the father or brother was sick, they would sell a daughter, and use the money to take care of him."

In fact, Ah Bing's mother had tried to sell her daughter three times. "When I was eight years old, or 10 maybe, my mother decided that she had too many girls, so she tried to give me away to a friend," Ah Bing said. "It's the same as if your mother had a dress that she didn't want, and someone else did. She would give it to them." The two older women, however, could not agree on the transaction. Ah Bing's mother finally gave her daughter away to Ah Bing's married cousin, who lived with his family in the nearby city of Kunchow. "I stayed with them for two or three years," Ah Bing said. "They were rich, but didn't have any children. My main job was to fetch water."

As adults, Chinese women did not necessarily enjoy any more freedom than they did as children. Parents and matchmakers arranged marriages, with little if any consultation with the bride-to-be. Men and women married not because they loved each other, but to unite families and continue the family line.

The girl's parents obviously wanted a healthy, wealthy, and handsome son-in-law. "Parents would have to be careful that the man was good," Ah Jen, Ah Bing's friend, once told me. "Especially that he was clean. They would have to make sure that he had good skin, that he wasn't a leper."

Needless to say, the ideal groom was rarely available. Ah Bing, like many Chinese women, feared that she would be matched with an opium addict. Opium addiction was common, and an addict could consume all of the family's resources in financing his habit. He might even resort to selling his hapless spouse into prostitution.

A Chinese wife faced several other threats. Some suffered the

Alice Greenway, 23, is a reporter for the South China Morning Post *in Hong Kong. Born in Washington, D.C., she received a B.A. from Yale University (1985). This article was drawn from a longer essay, which won her Yale's Robert D. Gries Prize for historical writing.*

Ah Bing (left) and Ah Jen at the Kowloon Railroad Station in Hong Kong. Last year, the two "sisters" visited the colony, where they met in 1950.

humiliation of having to compete with one, two, or even three concubines for their husband's attention. And those who lived with the husband's family often labored under the demanding strictures of overbearing mothers-in-law.

Ah Bing recalled, for example, how her niece Ah Sun was driven out of the house by her husband's mother: "Ah Sun's mother-in-law talked too much, never letting Ah Sun sleep, making her work all the time, and then telling her that she was lazy," Ah Bing said. "So, Ah Sun left her husband and son, and ran to Hong Kong without telling anyone. Her mother-in-law bought her husband a girl to be his second wife. The new wife takes care of Ah Sun's boy. Ah Sun sends them cloth, sugar, and oil from Hong Kong."

Chinese women could not easily escape their troubles; by law, they could not ask for a divorce. A man could divorce his wife for barrenness, adultery, jealousy, loquacity, theft, incurable disease, or disobedience to his parents. Chinese society protected women only by prohibiting a man from divorcing his wife if she had mourned his parents for three months, if she had no relatives to return to, or if she had married him when he was poor and he was now rich. If a husband did divorce his wife, he owed her no means of support.

Considering Ah Bing's family life, it is easy to see why she did not favor getting married. Two of her three brothers and a brother-in-law were opium addicts. Two of her four sisters were left behind by husbands who went abroad to find work. "At that time, there were not enough jobs for people," Ah Bing said. "That's why so many people went to Hong Kong." As the men departed to take jobs abroad, Chinese wives often ended up supporting their children and aged parents by themselves. As a result, the status of women rose during the 1930s. Many were able to earn relatively respectable wages working in garment factories, and in other small cottage industries.

Even so, Chinese women did not readily choose a life of spinsterhood. In China a woman was expected to fulfill her roles as a wife, mother, and daughter-in-law. By deciding to remain single, she would sacrifice her place in the home, the support of her family, and the possibility of future ancestor worship. She was not even permitted to die in the family's house, for fear that her hungry ghost would remain, causing crop failures, business losses, infertility, injuries, or even death. Single Chinese women often led degrading lives, sometimes as beggars and prostitutes.

Ah Bing, however, had an alternative. After taking her vows before the statue of Kuan Yin, she could live with other *sou hei* women in a Buddhist *chai t'ang*, or vegetarian hall, in Shih-lung. Ah Bing estimated that about 70 such establishments for spinsters were scattered around Guangdong Province, providing single women with a place to stay, and with a network of friends.

The Patron Saint

Only four or five women lived in Ah Bing's *chai t'ang* house, which could accommodate up to 15 guests or visitors. Separate rooms provided space for cooking, eating, sleeping, and praying. "The women who lived there were mostly older ladies who sewed and did inside work," said Ah Bing. "In the morning, we would chant, and I also prayed to a statue of Kuan Yin every day before meals. I asked Kuan Yin to make me clever."

Life at the *chai t'ang* was not easy. Every morning, Ah Bing said, she and the other women "had to polish the tables, the kitchen, the floors until everything was clean. We couldn't go to work until we had finished all the work at the Kuan Yin house, which was at about five o'clock." Ah Bing also had to work outside the house to support herself. "Another girl and I found jobs on the other side of the canal, making tiles for roofs," she explained. "At six-thirty, we would reach the canal and a boat boy would take us across in a *sampan*. We returned at five o'clock at night, and then had to cook dinner and clean up. It was hard work. We made about 30 to 40 cents a day."

Kuan Yin, the patron saint of spinster houses, and the goddess

"who looks down upon the world and hears its cries," played a central role in these women's lives. She was the female manifestation of the the bodhisattva Avalokitesvara—a merciful Buddhist savior, who postponed his entrance into Nirvana to alleviate suffering. Kuan Yin was called upon by midwives who delivered babies and performed abortions. Her closeness to the people made her even more popular than the Buddha himself. According to the *sou hei* women who prayed to her, Kuan Yin had taken a vow of chastity at an early age. She held fast to that vow, despite the torments visited upon her by a disappointed father. In the end, she prevailed and was worshipped.

The *sou hei* women observed other Buddhist traditions too. To join a Buddhist "family" in a *chai t'ang*, a spinster had to pay obeisance to a *shih-fu*, or teacher, don Buddhist robes, and declare her faith in the Buddha and the Buddhist scriptures.

Emigrating to Singapore

The family that she joined reflected all of the patriarchal aspects of the traditional family. *Shih-fu* connoted a male figure, and was considered such, even if the teacher was female. Likewise, the *shih-fu* called his or her disciples "sons," their peers "uncles," and the *shih-fu*'s *shih-fu* "grandfather." "Because you are not married, you make a temple family," recalled Ah Bing's friend Ah Jen. "In the temple, you have a father, an uncle, and a son. You are called gentlemen, because if you are not married, you are like a man."

To make a better living, Ah Bing went to Singapore, when she was 20 years old, in 1936. At that time, many Chinese men and women were emigrating to the British crown colony to find work. Ah Bing's sisterhood helped her go to Singapore by providing contacts there.

A young sailor, Ah Bing explained, gave her a boat ticket to Singapore. "He was a friend of an old lady at the Kuan Yin house. He was what we call a *seui haak* [male sailor]. The sailors brought news of job opportunities, and acted as guides, messengers, and as money lenders for women traveling from Canton and abroad. The boat to Singapore took seven days and seven nights. When I got there, they locked me and some other girls up in a room. I was young, and they thought I was being sold. After three days, they gave us our papers and let us go."

Ah Bing was only one of many women who journeyed to Singapore during the first half of the 20th century, when the population of Chinese women there tripled. The decision to leave China was a momentous one. Few of the female émigrés had traveled farther from their homes than the distance to the nearest market town. Many of the women were unmarried or had left their families behind, and, once in Singapore, they often formed sisterhoods that were modeled after the Buddhist *chai t'ang*.

After her voyage, Ah Bing lived in one of the many boarding

Ah Bing and her great-niece, Ah Fun, in front of Ah Bing's house in Lunan last year. When Ah Bing was young, many Chinese girls sewed clothes for small textile firms. Today, Ah Fun earns about $1 a day working in a blue jeans factory.

houses that lined the streets of Singapore's Chinatown. Within this district, the Cantonese lived in a neighborhood called Water Buffalo Cart. "I stayed at the coolie [laborer] house," Ah Bing recalled. "They gave me food and help. They didn't sell people. Only women lived there. They helped me find a job."

Once Ah Bing found work, as an ***amah***, or domestic, she stayed at her employer's house, but continued to pay "one dollar Singapore money" each month to maintain membership in the boarding house.

"I would come back to visit, or if I was sick," Ah Bing recalled. "I got very sick from the water in Singapore. I had big feet, and my legs were swollen. At one point, I didn't eat for seven days. My ***shih-fu*** told me that if I didn't eat meat, I would soon get better. That is when I began my present diet.

"About 70 people belonged to the coolie house, but many slept at their employers' houses. Some people lived at the coolie house and went to work daily. Some old ladies who had retired lived there too. If they died, their families would have them buried. If they had no families, they usually had some money saved, or else we could sell their earrings and rings to pay for the funeral."

In Singapore, the women's boarding houses functioned as both an

informal employment agency and as a trade guild. Employers, most of whom were English, often found *amahs* by going to a boarding house. Members of the house kept tabs on both employers and employees. An English employer who abused or exploited an *amah* would have difficulty finding another, because her "sisters" would boycott English housewives who had gained a bad reputation.

Working for the Japanese

The sisters also looked out for one another after the Japanese captured the British colony in February 1942. "When the Japanese came, a Chinese lady told me to go away. 'If you are staying with the English,' she said, 'they [the Japanese] will cut off your head.' I didn't want to leave. If the Japanese bomb the house, I thought, I will hide under a table.

"[The next morning] when I woke up, two friends came to my house. It was six o'clock in the morning. 'Run, run,' they said. 'The Japanese are coming today. No one is at the coolie house anymore. Don't care about your money.' Two weeks later I returned. The house was demolished. I was still owed one month's pay, a little less.

"Then I got a job working for some Japanese people. I cooked and cleaned. They were all good people. Same as all other people, some were good and some were bad. I cannot be angry, because there are plenty of good Japanese people. How do you know who bombed your house? When the English came, I had to find a new job. Aya! I forgot how long the Japanese stayed! They left Singapore on the eighth month, and on the twelfth month, I went to Canton for Chinese New Year. I didn't want to live in Singapore any more. I stayed at my mother's house for 10 days, and then I went to the Kuan Yin house for three to four months. Then I went to Hong Kong."

Ah Bing left China, for Hong Kong, in 1946. There, she joined seven other women in a smaller version of the large sisterhoods, called *sahp jimui*, or "10 sister groups," and went to work as an *amah*. Members of this small sisterhood included widows, *sou hei* women, and *mh lok ga* women, who were married but had chosen not to live with their husbands. Many of these women shared the same dialect and background, but not the same religious beliefs. Thus, the *sahp jimui* were not organized along religious lines. But like the Buddhist *chai t'ang*s, they provided women with companionship and helped them find jobs. The women also vowed that they would support one another for as long as they lived.

Ah Bing's oath was tested when her sworn sister, Ah Sui, was hit by a car. "She had no mother or father," Ah Bing said. "We promised to take care of each other if we got sick. When a car hit her leg, I took care of her. I had to stop my job. I washed and cooked for her, and I got a doctor to come look at her. No money, never mind. I had enough

saved up from before."

The boarding houses and *sahp jimui* were not the only kinds of sisterhoods located abroad. Buddhist *chai t'ang*s thrived in Hong Kong's New Territories (mainland areas and surrounding islands that the British acquired in 1898), and on the colony's remote islands. One scholar estimated that in 1981 there were about 250 *chai t'ang*s in Hong Kong, each with between 25 and 40 full- and part-time members.

Ah Bing belonged to the Chung San *chai t'ang* in the New Territories. "I sent $5,000 [Hong Kong dollars] to Chung San so I could stay there and get food," she said. "I went once a year on New Year's, and sometimes for Kuan Yin's birthday. On New Year's we would eat and talk and laugh and play *mahjong*, a betting game. We also chanted, and made offerings to Kuan Yin of apples, oranges, and grapes, and we would pray to the ancestors. At night, we all slept inside. It was a big compound, with three or four houses, one of which had two floors."

Mao Burns the Altar

In 1967, Ah Bing came to work as an *amah* for my family, which was then living in Hong Kong. Since my father was a foreign correspondent, we moved often, and Ah Bing moved with us—first to Thailand, then, among other places, to Washington, D.C., and, in 1973, back to Hong Kong. The only place Ah Bing did not enjoy was Israel, where she complained that there were not "any Chinese things, no oysters, no mushrooms. I had a hard time finding things to eat."

In 1978, our family moved back to Massachusetts, and Ah Bing came with us. Over the years, Ah Bing and my mother managed to find jobs for Ah Bing's Chinese friends, Ah Gai, Ah Doi, and Ah Jen. Working in the suburbs west of Boston, they formed a sisterhood. In their free time, they traveled to Boston's Chinatown, celebrated the Chinese New Year and Moon Festival, and prepared large Chinese meals for themselves and their compatriots.

Much has changed in China since the 1930s. When the Communists took over in 1949, they abolished the sisterhoods. In a singularly unrevolutionary move, they sent the sisters back to their homes, and married life. While there are still sisterhoods in Hong Kong and Singapore, Chinese women are not permitted to emigrate. "Mao took away the Kuan Yin house," Ah Bing said. "He burned the altar. Mao Zedong said that people who don't eat meat are silly, [and that] if you don't eat meat, he wouldn't let you eat rice either. Mao said young girls must marry. For the older ones it was too late."

The Communists considered the sisterhoods, like all religious organizations, backward and feudal. This was ironic, since the sisters had, in fact, reacted against the traditional position of women. In a time of great disruption and turmoil, these women chose an alternative to married life that had allowed them to be self-sufficient.

While Ah Bing and other spinsters had departed from Chinese ways, their practices were also deeply rooted in tradition. The decision not to marry, for example, was bound up with popular sentiment in favor of chastity, and supported by Buddhist and Taoist beliefs about abstinence. The *sou hei* ceremony—in which a spinster dressed her own hair, as a bride had her hair dressed for her—exemplified the mix of the old and the new.

Ah Bing did not see herself as part of a "women's movement." Without being an activist or a proselytizer, she did gain a degree of autonomy unknown to most Chinese married women. Within the limited range of options available to her, she did dramatically improve her station in life. She outlived her four sisters and three brothers, and was able to look back on a life of extraordinary variety and accomplishment.

Ah Bing traveled widely, and managed to save her money. While her first house in Shih-lung was confiscated by the Communists, she and six friends held on to their apartment in Hong Kong, and Ah Bing had a two-story house built for herself in her native village of Lunan. In addition, she enabled her relatives back home to gain a higher standard of living. "Because of Ah Bing, our family is one of the richest in the village," Ah Lung, one of Ah Bing's nephews, told me recently. "She has helped us buy houses, clothes, color TV sets, and bicycles. She has also enabled our children to go to school, and to celebrate births and weddings in proper form."

Ah Bing died last February, and was buried in Lunan. Ironically, she left all of her property and money to seven men—five nephews, a male friend, and a brother-in-law.

Despite her achievements, Ah Bing never relinquished the Buddhist belief that life entails mostly hardship and suffering. "You can tell when a newborn baby did not want to be born, because its bottom is blue from being spanked by the Gods," Ah Bing once told me. "But when I die," she said, "they can spank me as many times as they like. I am never coming back."

San Antonio's Battle Over Fluoridation

"Public Opinion," observed Mark Twain, "is held in reverence. It settles everything. Some think it is the voice of God." Indeed, Americans hold the "voice of the people" in high esteem. Since the Progressive Era, ballot initiatives have gained favor as alternatives to the legislative process. Last year, U.S. voters cast ballots in hundreds of state and local referendums. Here, Jack H. Scudder and Neil Spitzer report on one referendum campaign over an odd, recurring struggle in American politics: fluoridation of the local public water supply.

by Jack H. Scudder and Neil Spitzer

In September 1985, most politicians and journalists in San Antonio forecast a stormy autumn. During the coming two months, wrote Kemper Diehl, a columnist for the San Antonio *Express-News*, local citizens would witness a "political circus" with many "bizarre sideshows." Indeed, warned Mike Tolson of the San Antonio *Light*, San Antonians would have to endure a barrage of "wild rhetoric, misinformation, frequent silliness, and general jabberwocky."

What lay ahead? The city had already held its mayoralty election (in April). The next congressional race would not take place for a year. And a controversial plan to cover the winding San Antonio River and turn it into a sewer had long lain dormant.

Messrs. Diehl and Tolson were referring to something familiar in the city's political history: a November referendum that asked the voters of San Antonio to decide whether the city should, for reasons of dental health, add fluoride to its public water supply.

The two seasoned newspapermen knew that the fluoride question would not come and go quietly. San Antonians had fought two fluoride battles before. In April 1966, the city council passed an ordinance that instructed the city fathers to fluoridate the city's main water supply. After a bitterly fought campaign, San Antonians defeated fluoridation, 68 to 32 percent. In 1977, the council again considered fluoridating the city's water supply, but the "antis" raised such a fuss that the council refrained from even calling the matter to a vote.

Moreover, Diehl and Tolson knew that San Antonians value their pure springwater, which bubbles out of south-central Texas's rolling hill country. As it flows toward the Gulf of Mexico, much of the water seeps into a porous lime-

Neither preachers from heaven nor demons from hell could make most San Antonians care about fluoride. Fewer than one in five went to the polls.

stone outcrop called the Balcones Escarpment, which stretches across southern Texas—nearly all the way from Austin to the Rio Grande. This 500-foot-thick layer of limestone comprises the Edwards Aquifer. Water pumped from the aquifer serves as the sole source of drinking water for over one million people who live in and around the city of San Antonio.

Thus, the members of the San Antonio city council must have known they were being watched when they voted 7 to 4, on May 30, 1985, to raise the level of fluoride in the water supply from the existing 0.3 to 0.8 parts per million (ppm).* Even so, the council and the city's other politicians expected that the residents of San Antonio—like the residents of 1,457 other Texas hamlets, towns, and cities—would soon be drinking fluoridated water.

Much had changed, after all, since San Antonians had rejected fluoride, by a 2 to 1 margin, in 1966. Since then, hundreds of reputable studies had confirmed that raising the level of fluoride in public drinking supplies to about 1 ppm safely inhibits tooth decay by as much as 50 to 60 percent, especially among young children. And since then, the American Medical Association, the American Dental Assocation, the U.S. Public Health Service, and the World Health Organization had reaffirmed their earlier endorsements of water fluoridation.

Moreover, water fluoridation had become a common practice. Some 63 percent of all Americans (and 70 percent of all Texans) served by public water supplies drank fluoridated water. They in-

*Fluoride appears naturally in many water supplies, including San Antonio's (at 0.3 ppm).

cluded the inhabitants of 41 of the nation's 50 largest cities—among them Dallas and Houston.*

Since 1966, San Antonio had also matured into a progressive Sunbelt city, eager to adopt modern ways. During and after World War II, San Antonio's five military installations (Kelly, Lackland, Randolph, and Brooks Air Force Bases, and Fort Sam Houston) expanded rapidly, pumping billions of dollars into the local economy. In 1968, the University of Texas decided to locate its new Health Science Center in northwest San Antonio. The center's five schools (of medicine, nursing, dentistry, biomedical sciences, and allied health sciences), together with several other hospitals, formed the South Texas Medical Center, which comprised one of the nation's leading "biomedical hubs." Like San Antonio's burgeoning military complex, the growing medical center provided jobs to thousands of college-educated professionals who would settle in nearby Oak Hills, Elm Creek, and other well-to-do neighborhoods.

In all, San Antonio's population climbed by 20 percent during the 1970s. With a population of 921,693, San Antonio now ranks as Texas's third (and the nation's 10th) largest city.

Mayor Cisneros Speaks

In many respects, San Antonio's popular, well-educated 38-year-old mayor, Henry Cisneros, personified the city; he was, like 53 percent of all San Antonians, Mexican-American. He was also, like the city, on his way up. Since his first election in 1981, Mayor Cisneros had managed to unify the city's sometimes fractious Hispanic and Anglo communities. He did so under the banner of making San Antonio a good place to do business. "His issues are not ethnic," wrote journalist Paul Burka in the *Texas Monthly*. "He would rather talk about economic development and jobs than bilingual education or discrimination."

Cancer, Poison, Fluorosis

Cisneros believed that San Antonio should fluoridate its water supply, because that was something that progressive, forward-looking, and health-conscious cities did. "How will medical experts across the country react," the mayor asked, "if we turn out to be the only major Texas city to reject a proven health measure like water fluoridation?"

The campaign to fluoridate San Antonio's water supply got under way in 1984, when dentists, dental students, and other members of the city's Oral Health Association who were concerned about the above-average incidence of dental cavities in the community began to lobby for fluoridation. The following spring, they prodded city councilman Ed Harrington to bring water fluoridation up for discussion at the council's May 23, 1985, meeting. With their eyes on that meeting, local civic groups sought to rally support for fluoride. On May 8, the trustees of San Antonio's prestigious Target '90 Commission—which some 400 community and business leaders formed in 1983 to help promote the region as a high-tech "silicon prairie"—met to consider endorsing fluoridation. Councilwoman Helen Dutmer, from the city's Third District, voiced her dissent.

"I do not feel it's the government's responsibility to dispense medication," said the representative of the city's

*The nine largest U.S. cities without fluoridation in 1987: Los Angeles, San Diego, San José, Phoenix, Tucson, Newark, Honolulu, Portland (Oregon), and San Antonio.

Jack H. Scudder, 67, is president of Scudder/Western Research, Inc., a newspaper research company based in Nampa, Idaho, and the former editor of the Idaho Free Press. *Born in Minneapolis, he received a B.A. (1942) from the University of Minnesota. Neil Spitzer, 30, is an associate editor of the* Wilson Quarterly.

Mayor Henry Cisneros (left) favored fluoride, but let a usually mild-mannered councilman, Ed Harrington (center), who reveled in the fight, take on Councilwoman Helen Dutmer (right) and other fluoride foes.

largely white, blue-collar southeast corner. "And if you don't believe it's a medication, just try and buy it at the drugstore without a prescription."

Nevertheless, the Target '90 Commission's trustees voted overwhelmingly to endorse fluoridation. And two weeks later, on May 22, the city's largest daily newspaper, the San Antonio *Express-News* (circulation: 180,365), added its approval. "The opponents of fluoridation," the paper said, "have had numerous opportunities to tell their horror stories, none of which has come true in the other cities with fluoridated water."

At the May 23 council meeting, representatives of the Health Science Center, the Oral Health Association, and the American Heart Association spoke in favor of fluoridation. A visiting University of Kansas chemist, Dr. Albert Burgstahler, argued, however, that fluoride caused mottling of the teeth and had proved harmful to flowers and hamsters. Despite his testimony, the council decided to vote on an ordinance calling for the fluoridation of the city's water supply, at its next meeting, on May 30.

On the eve of the May 30 vote, the profluoride forces garnered support from the San Antonio Community of Churches and the St. Philip of Jesus Health Center. With Mayor Cisneros joining the majority, the city council approved, 7 to 4, an ordinance that directed the Water Board to "provide for fluoridation of all water supplies within its distribution system."

With so many reputable national and local organizations supporting their cause, fluoride proponents, at this point, seemingly needed to overcome only what the *Express-News* called "a few fanatical opponents."

One of them was Mary Hicks, a 60-year-old partner in Park Laboratory Company, a small San Antonio business that sold arnica salve, oil of peppermint, roseated oil, eardrops, liniment, tonics, laxative tea, and other such medications.

Hicks, who had earned a bachelor's degree in bacteriology, opposed fluoride primarily for health reasons. Fluoride is a poison, she argued, "used for etching glass, killing rodents, with cumulative effects on the body." A long-time antifluoride activist, she prepared a loose-leaf scrapbook, crammed with antifluoride articles, divided into different categories—such as "cancer," "poison," and "fluorosis"—which she copied and sent to other sympathizers.

Hicks was joined in the battle by Kay

Walker, a 38-year-old San Antonio public relations consultant. Walker, who formed the "Right to Choose" Committee in July 1985, opposed fluoridation because she believed it denied people the right to choose their own medication. "I oppose fluoridation of *all* our water because we all consume different volumes of water, [and] thus can't control our dosage," she said. "I attended the council meeting where fluoridation was discussed and was upset by the ramrod methods. I felt the council was arrogant and pompous."

A third enemy of fluoride was San Antonio's self-described "irascible old coot," C. A. Stubbs. He opposed fluoride on fiscal grounds. As president of the Bexar County Homeowner-Taxpayer Association (HTA), the 62-year-old Stubbs argued that San Antonians should not have to pay the initial $703,000 capital outlay, plus $261,000 in annual service costs, for something that they could well do without. Sporting a Stetson, Buddy Holly glasses, and Western tie, Stubbs complained that "they want to spend money for the arts, for fluoride, while critical shortages exist in police and fire protection."

Activating Enzymes

Together, Hicks, Walker, and Stubbs comprised what turned out to be a formidable antifluoride team. Observed Councilwoman Dutmer: "Stubbs had the people, and Mary [Hicks] had the information," while Walker added organizational skills and marketing talent.

The fluoride opponents also gained the help of several out-of-state reinforcements, such as Dr. John Lee, a Mill Valley, California, physician. A celebrated fluoride foe, Lee flew to San Antonio in March 1985 to add credibility to their cause. At a press conference held in the downtown El Tropicano Hotel, Lee claimed that the city's death rate from cancer and heart disease would jump by 10 percent within five years if fluoride were added to the water.

"It is not clear from any available evidence that fluoride does any good at all, but it is clear that it is toxic," Lee observed. "I have studied this 1,000 percent more than any doctor or dentist you will ever meet, and their viewpoints are not acceptable."

In a 35-minute antifluoride tape that he had made—and Mrs. Hicks copied and distributed—Lee argued that "our bodies' enzymes are inhibited by fluoride. The only enzyme not inhibited by fluoride is the respiratory enzyme in cancer cells. They are activated by it."

Quackery over Science

Even so, Hicks, Walker, and Stubbs seemed to have little chance of reversing the city council's May 30 decision. But the three antifluoridationists persevered.

Their first mission was to collect enough signatures to put the council's ordinance up for a popular vote on the November ballot, along with 14 unexciting proposed amendments to the state constitution. Working out of Stubbs's small HTA headquarters, Hicks's home, and Walker's garage, the triumvirate dispatched some 250 neighborhood volunteers—mostly students and working-class housewives—to collect signatures. Mayor Cisneros urged San Antonians not to sign the petition; such a referendum, he said, would cost the taxpayers $200,000 and divide the city. Stubbs and Hicks protested: "It is [the profluoride people] who threw down the gauntlet that is dividing this city."

In any case, by going from door to door, and by approaching shoppers on downtown street corners and fans at sports events, the volunteers collected, in eight weeks, more than the 40,488 signatures needed to put the fluoride ordinance on the November ballot.

As in most autumn political contests, the fluoride campaign began in earnest around Labor Day. The antifluoridationists peppered San Antonians with

leaflets, doorknob hangers, and bumper stickers. One persuasive antifluoride leaflet pictured a skull next to a water faucet, and read: "It's Your Water, Your Health, Your Taxes, and Your Freedom." The pamphlet warned that "the number of mongoloid children born to younger mothers [has] been found to be higher in fluoridated than in nonfluoridated cities."

Profluoride volunteers, meanwhile, delivered a four-page leaflet to some 130,000 homes in the city. The leaflet listed 70 local, national, and international organizations that had endorsed fluoridation, ranging from the San Antonio Dental Society to the U.S. Department of Defense. It also cited a 1978 *Consumer Reports* study, which found fluoride safe and effective. "The survival of this fake controversy," declared the tabloid, quoting the study, "is one of the major triumphs of quackery over science in our generation."

AIDS, Too

The antis waited until one month before the vote before bringing in their heavy artillery: Dr. John Yiamouyiannis, a biochemist from Delaware, Ohio, and the author of *Fluoride, the Aging Factor* (1983). An articulate veteran of many fluoride battles in other cities, and a roving spokesman for the antifluoride cause, Yiamouyiannis charged that fluoride attacked the body's immune system and was responsible for colds, premature aging, arthritis, birth defects, and even cancer. In *The Aging Factor*, he contended that fluoride kills 30,000 to 50,000 Americans every year.

In San Antonio, as elsewhere in the past, the Ohio biochemist established himself as a skilled political tactician. He offered, for example, a $10,000 reward to anyone who could disprove any one of 10 antifluoridation claims—that fluoride causes genetic damage, cancer, skin eruptions, gastric distress, etc.

Mayor Cisneros dismissed the contest

The fluoride battle, as one San Antonio reporter observed, helped elevate tax opponent C. A. Stubbs from a "gadfly" to "Big Spoiler."

as "gimmickry," but it proved effective in gaining free local media coverage. There was little chance that anyone would actually win the booty. Challengers had to pay $50 just to enter the contest, and the judges were none other than Mrs. Helen Dutmer and Dr. Yiamouyiannis.

As time went on, both sides bought television and radio air time. But the fluoride battle of 1985 was also fought through the city's two daily newspapers, the *Express-News* and the *Light*. Both papers provided detailed campaign coverage, and voiced, on their editorial pages, their support for fluoride.

In fact, *Express-News* columnist Paul Thompson became one of fluoride's most enthusiastic advocates—and one who never minced words. "The anti-fluoride crowd this week launched the battle for your mind by bringing to town their top

national 'mouth'—John Yiamouyiannis, an Ohio biochemist," Thompson wrote on October 4. Yiamouyiannis, he went on, was "purely and simply . . . a hired gun paid to go around the country, linking fluoride in public drinking water to cancer, mongoloid infants, other birth defects and—eek!—to the unspeakable new human scourge known as AIDS."

Taking God's Side

In the best "equal time" tradition, the papers gave the antifluoridationists ample opportunity to fire back by publishing their letters to the editor. One antifluoridationist wrote to the *Express News* that "fluoridation not only hardens teeth, it also hardens the arteries and brains." Another said that "it is not the business of government to force-medicate the populace via the water supply"—an argument, the writer went on, that Councilman Ed Harrington's and columnist Paul Thompson's "dwarfed, pickled brains" were simply not capable of comprehending.

Soon, Councilwoman Helen Dutmer, who had voted against the fluoride ordinance, rejoined the debate. Dutmer sent a letter to the *Express-News* after that paper reported on a study showing that elderly people living in Kuopio, Finland, suffered from less osteoporosis, a disease that weakens the bones, because they drank fluoridated water. "Why did you have to go to Europe for your study?" Dutmer wrote in early October. "Because it's the same old fun and games. Who is going to either go, or bother to contact some obscure city in Europe to verify your claims?"

But events seemed to favor Mayor Cisneros and other fluoride proponents during the campaign's final week. On October 28, they scored a major coup when Robert Bernstein, Texas's commissioner of health, announced that the state had approved a $500,000 grant to San Antonio to help offset the costs of fluoridation—thus undermining the antis' "fiscal waste" argument. San Antonio's Catholic archbishop, Patrick F. Flores, also endorsed fluoride and sent a letter to all priests and nuns in the area. Fluoride is "a natural substance which was discovered in water," he wrote, "so it may be said that God put it there."

On October 29, San Antonio's ABC affiliate, Channel 12, sponsored a televised debate that the mayor and his allies hoped would seal their victory. Unfortunately for them, the station manager required that all debaters be residents of San Antonio—which disqualified Surgeon General C. Everett Koop, a prestigious figure, whom profluoridationists had wanted to have debate on their behalf. Dr. Yiamouyiannis, the antifluoride star, of course, was not a resident of San Antonio either. In fact, he had lived in Delaware, Ohio, for 16 years, and was even a candidate for a local school board there.

But on the day before the debate, Dr. Yiamouyiannis telephoned the Delaware Board of Elections, and asked that his name be withdrawn from the ballot there. Just hours before the debate, he showed up at the Channel 12 office, with a new San Antonio voter registration card, and took his place in the TV studio—a move that stunned and outraged his adversaries.

A Dead Rat

During the debate, Mrs. Henry Cisneros, the mayor's wife, sought to assure viewers that fluoride was safe. "Henry and I wouldn't dream of putting something in our water that was harmful to us, our children, or our parents," she said. "We've used Colgate and Crest at home for years," she went on, holding two tubes of toothpaste aloft, "and they both have fluoride in them."

San Antonio's newest resident countered quickly. "What we're talking about here is not just rubbing it on your teeth, as Mrs. Cisneros suggests," Dr. Yiamouyiannis said. "We're talking about con-

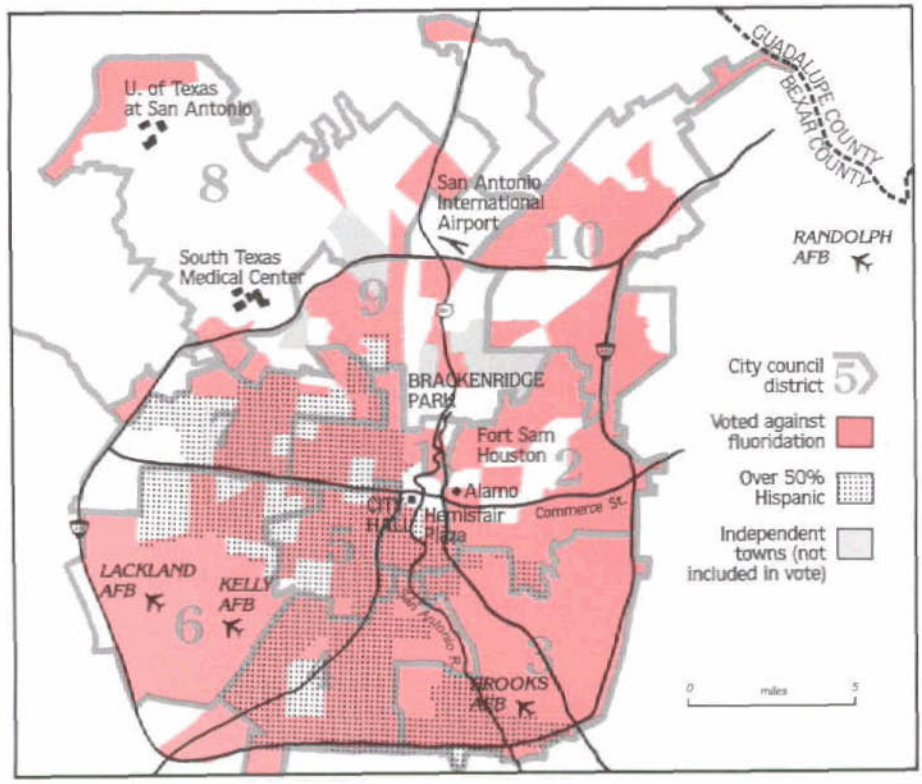
suming it. And if Mrs. Cisneros had a small child who consumed a whole tube of fluoridated toothpaste, that child would be dead."

In his concluding remarks, Dr. Yiamouyiannis advised viewers: "If in doubt, vote 'No.'"

Most postdebate analysts agreed that the antis had scored at least a minor victory, sowing confusion and doubt among the citizenry. "Though neither side made any sincere attempt to answer the questions asked," observed David Hawkings of the *Light*, "most observers said that [Yiamouyiannis & Co.] took the night with their barrage of assertions. To the other side, those [assertions] were cheap and unfair scare rhetoric, but they were also charges difficult to refute in 30 seconds or less."

Several unseemly incidents took place during the campaign's final days. On October 28, the leading profluoride councilman, Ed Harrington, received a parcel in the mail containing a dead rat. An attached anonymous note read: "We fed this rat fluoride water, and look what happened, you dirty commie." Another fluoride proponent, Dr. Elaine Neenan, complained that the tires on her car had been slashed.

For the most part, however, the two



The fluoride battle split the city between north and south. The profluoridationists scored victories in city council Districts 8, 9, and 10—but not by enough to offset losses everywhere else. The antis won by just 3,096 votes.

sides observed the civilities. Stubbs, Hicks, and Yiamouyiannis appeared on local so-called redneck radio call-in shows; most of their callers were sympathetic to the anti cause.

Sensing that the contest was close, fluoride proponents took to the airwaves during the campaign's final days. In fact, throughout the entire campaign, they outspent their opponents, $85,917 to $3,095, on television and radio commercials. Both Surgeon General Koop and Mayor Cisneros pressed their arguments in simple, 30-second TV spots that were aired during local newscasts at 6:00 P.M. and 10:00 P.M. Urged Cisneros: "It's needed, effective, safe. Vote 'yes' for fluoridation November 5."

The two newspapers saved their strongest words on fluoride for the end. The *Light* published a series of six short articles, called "Facts on Fluoride." One "fact," for example, stated that "there are well-meaning people who are opposed to fluoridation, primarily because they have become frightened by the scare tactics and organized efforts of antifluoridationists." The *Express-News*, which editorialized five times on behalf of fluoridation during the campaign, told its readers, two days before the election, that their votes would determine "whether a group of loosely organized naysayers and fearmongers will be allowed to strike a major blow against the great progress that has been made over the past few years."

The People Speak

On November 5, 1985, 85,821 San Antonians went to the polls.

The result was no testimonial to the widely touted power of the media, or to the influence of high-status "opinion leaders." The fluoridation ordinance was defeated, by 52 to 48 percent of the votes cast.

The vote divided along socioeconomic lines. Fluoride won among well-to-do Anglos on the north side, and lost among Hispanics and blue-collar Anglos. Some 55 percent of all precincts with Anglo majorities voted for fluoride; 73 percent of all precincts with Hispanic majorities voted against fluoride—as did *every* Anglo-dominated precinct in Councilwoman Dutmer's so-called redneck district.

"The people have spoken, and I can accept that," said Mayor Cisneros. "Tomorrow we'll bounce back and go on." Perhaps because of the dead rat, Councilman Harrington was less gracious, echoing *Consumer Reports* in calling the defeat "another triumph of quackery and fear over science."

Not Life or Death

The result left many observers puzzled: With so much support from the nation's most reputable health organizations, from the local press, from City Hall, and from dozens of respectable community groups, how did fluoride proponents manage to lose?

Some observers blamed Communities Organized for Public Service, an influential local Mexican-American political group that decided not to take a stand on the issue. A Spanish-language newspaper might have rallied Mexican-Americans behind fluoride—but, perhaps surprisingly, no such paper exists in San Antonio. The fact is that the city's Mexican-Americans rarely take full political advantage of their numbers. They represent 53 percent of the population, but only 40 percent of registered voters. And, despite Mayor Cisneros's pleas, just 11.8 percent of eligible voters in Mexican-American precincts did their duty at the polls on November 5.

Even so, fluoride proponents could not fairly blame the defeat on any one group. Opinion surveys showed that San Antonians favored fluoridation by hefty margins, but only 18.9 percent of *all* eligible voters went to the polls; fluoridation was not a "salient" life-or-death issue to those who favored it. The results followed a familiar pattern in American vot-

ing, especially in referendums and primary elections: When apathy is high and turnout is low, the more energetic, more zealous side usually prevails.

The antifluoride message was easier to sell; moreover, the antifluoridationists were fervent believers. The health professionals' sober recitals of the dental benefits of fluoride proved a poor match for the more emotional salvos of the antis who decried fluoride as a "poison" that could damage the immune system, hasten aging, and even cause cancer.

The antis, as columnist Paul Thompson noted, managed to instill a powerful negative emotion in the electorate. "There were the phalanxes of senior citizens all over town," he wrote, who were "literally terrified of fluoride as a result of the propaganda incessantly spewed on four of the leading radio talk shows."

Going Home

That fluoride even became an issue seemed to benefit the antis' cause. "The mere fact that the debate even took place," as Michael Easley, then chief of the Ohio Department of Health's Division of Dental Health, has observed, "conveys to the public that a legitimate scientific controversy exists." Doubtful or confused voters generally cast a "safe" ballot—against change, against fluoridation.

Upper-middle-class fluoride proponents also made a key strategic error when they tried to do something that almost always backfires in American politics: sneer at the opposition. That tactic won the antis not only sympathy, but also the "underdog" vote. Paul Thompson's heated columns—he once called Dr. Yiamouyiannis a "roving, pseudo-scientific swami and hired gun"—probably helped the Ohio biochemist and his cause. Dr. Yiamouyiannis's ally, C. A. Stubbs, later claimed that each Thompson column produced a platoon of new "anti" volunteers.

Finally, the antifluoridationists won because many San Antonians, like many Americans elsewhere, distrust or resent governmental authority. To many residents, voting against fluoride, as county elections administrator Marco Gomez later noted, meant voting *for* "freedom of choice." Gomez summed up many voters' attitude toward the council: "How dare you [pass the fluoride ordinance] without letting the public speak?"

For all of these reasons, the seemingly quixotic antifluoride cause succeeded in San Antonio. (Indeed, of the roughly 2,000 referendums on fluoridating water that have been held in the United States since 1950, 60 percent have been won by the antis.)

Mrs. Hicks, Mrs. Walker, and Mr. Stubbs were elated by their upset victory. "This should send a great message to our political leaders," said C. A. Stubbs, "that it is not a right and proper thing to try to steamroller something over the people."

John Yiamouyiannis was so pleased on election night that he said he might run for mayor. But it was not to be. A few days later, San Antonio's newest resident abandoned his briefly adopted city and returned home to Delaware, Ohio, another place where the drinking water has yet to be fluoridated.

COMMENTARY

We welcome timely letters from readers, especially those who wish to amplify or correct information published in the Quarterly *and/or react to the views expressed in our essays. The writer's telephone number and address should be included. For reasons of space, letters are usually edited for publication. Some of those printed below were received in response to the editors' requests for comment.*

The Constitution and the President

Contemporary events justify an elaboration of a point Jack Rakove had opportunity only to mention in "Philadelphia Story" ["The Constitution," *WQ*, Spring '87]: executive power.

Before the Revolution, Americans looked upon the royal governors much as the English Whigs looked upon the Stuart kings, as objects of aversion and distrust.

The colonial experience caused the makers of the first state constitutions to incorporate "every conceivable provision for reducing the executive to a position of complete subordination [to the legislature]": short terms of office, strict limitations on reelection eligibility, election by the legislature, and requirements similar to this one written into the Virginia constitution of 1776:

> "He shall . . . exercise the executive powers of government, according to the laws of this Commonwealth; and shall not, under any pretence, exercise any power or prerogative, by virtue of any law, statute, or custom of England."

Such provisions were to be found in almost all early state constitutions. New York alone provided for a powerful executive, and it was the New York constitution that the Framers adopted as a model—a telling fact.

The Framers knew what some members of Congress today are unwilling to admit—that much as one might like it, the conduct of foreign affairs, especially, cannot be subjected to the rules of law.

Hence, the president derives his powers directly from the Constitution, not from the Congress, and exercises them subject only to the constraints imposed by the Constitution, constraints enforced by the electorate or by those who preside at a trial of impeachment.

The president *would* resemble a Stuart king except that he can be removed from office, and Congress, not he, is given the power "to declare War [and] grant Letters of Marque and Reprisal."

Walter Berns
John M. Olin University Professor
Georgetown University

The Other 'Chief Architect'

Alone among the great figures of his age, James Wilson's many contributions to American political and constitutional thought have been badly neglected.

Acknowledged by Bryce and other scholars to be the "most learned" member of the Philadelphia Convention, Wilson [a delegate from Pennsylvania] was in many ways its chief architect—a role usually assigned to James Madison.

While the Jeffersonians were confusing state sovereignty and narrow particularism with democracy, Wilson realized that the principles of modern democracy must recognize the homogeneity of the nation, that a government really emanating from the people must be given the power, dignity, and vigor to execute the people's will.

For Wilson, the comparison of a soundly constructed government to a pyramid had deep meaning. He reverted to the metaphor time after time—a strong government must have a broad base. Thus, he was a proponent of representation by population and the direct election of both houses of Congress.

He stunned his colleagues by proposing not only that the executive consist of a single person, but that there be direct election to the office. On this issue he stood virtually alone and had to settle for the compromise of the electoral college system.

Wilson was the most influential delegate in shaping the American presidency—an office which would not be used to the fullest until another political scientist, scholar, and statesman named Wilson became the 28th president of the United States more than a century later. Woodrow Wilson was also an ardent democrat and nationalist, squarely in the traditon of the "earlier Wilson."

Considering James Wilson's successful proposals on such other questions as the admission of Western states and the mode of ratifying the finished document, historian Page Smith's assertion that Wilson espoused more of those principles that have since become prominent features of American democracy than any other delegate seems apt.

As the first "founding father" in American history who was a staunch advocate of both democracy and nationalism, Wilson deserves to be regarded in relation to the Constitution as Jefferson is to the Declaration and Washington to the Revolution.

Lawrence J. DeNardis
Guest Scholar
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Former U.S. Representative (R.-Conn.)

Editor's Note

A reader has noted that the preamble to the Bill of Rights was omitted from the text of the U.S. Constitution published in the Spring '87 *WQ*.

No "official" version of the Constitution exists. The version printed in the *WQ* is that used by both the Supreme Court and the National Archives. Scholars disagree as to whether the Bill of Rights' "preamble" (essentially a letter of transmittal from Congress to the states) should be included in the Constitution's text. But, in part because the remaining 16 amendments also are prefaced with letters of transmittal, it is generally thought that inclusion of the "preambles" lengthens the text unnecessarily.

Dutch Austerity and Industry

It was a pleasure to read Thomas Rochon's "Beyond Perfection" ["The Dutch," *WQ*, Spring '87]. However, I am not entirely comfortable with his characterization of the postwar welfare state.

Reading through the article, one gets a pervasive impression of a society gone slack, drawing far too much from an overly generous welfare state, in place since the end of World War II.

In fact, the measures taken after the war provided little more than bare subsistence.

Through the 1950s, Dutch trade union federations acceded to income policies that kept wage increases to a bare minimum, and only in the mid-1950s were any increases in real incomes permitted. Wage restraint was part of a broader social bargain that provided workers with jobs and a guarantee of a minimum level of subsistence.

Many of the present difficulties reflect these earlier bargains. Restraining wages in the 1940s and 1950s was a useful device for encouraging investment, but full employment was achieved by attracting labor-intensive industries. By the early 1960s, workers had tired of restraint.

Trade unions [were forced] to negotiate higher wages, and the country shifted rapidly from a low-wage to a high-wage economy.

Industries established in the 1950s were no longer viable in the international economy of the 1970s. In addition, the energy-intensive petrochemical industries built up in and around Rotterdam were failing.

Although social welfare measures were extended in the mid-1970s, by the end of the decade there was increasing recognition that the country was in trouble.

Restructuring programs were in operation in several sectors, and industries such as shipbuilding and textiles were being stepped down under plans negotiated by unions, management, and government.

Typically, these tried to rationalize production and provide retraining or adequate benefits for displaced workers. In some cases

restructuring worked, in others (i.e., shipbuilding) it was a massive, expensive failure.

Industrial decline, then, rather than reaction against the welfare state, set the stage for the austerity programs of the 1980s.

Steven B. Wolinetz
Associate Professor of Political Science
Memorial University of Newfoundland

A Tolerant Nation

It is a long cultural distance from my uncle's middle-class home near Leiden to the prostitutes, ***krakers***, and Provos of Amsterdam whom Thomas Rochon discusses in the ***WQ***.

In my uncle's home, the Protestant ethic dominates—with its emphasis on conservative social values, hard work, and common sense. By contrast, parts of Amsterdam seem an anarchist's dream.

Yet these two conflicting stereotypes live together in a degree of harmony unknown throughout most of the world.

The reason... is tolerance. It is the glue that has held the Dutch together and protected them for centuries.

The 17th-century philosopher Benedict de Spinoza... noted that "the terms 'good' and 'bad' indicate nothing positive considered in themselves... for one and the same thing can at the same time be good, bad and indifferent." If it is hard to distinguish the difference, you might as well tolerate it.

A relatively homogeneous people united by a continuous need to protect its crowded nation from the sea found tolerance to be a historical necessity.

In 1588, after fighting the Spanish Inquisition, the Dutch formed a republic amid the autocracies of Europe. In the Netherlands, Catholics and Protestants remained politically divided but at peace.

Today, tolerance has strong egalitarian dimensions in Dutch politics and economics.

And tolerance in the international scene developed into what Joris Voorhoeve calls the "neutralist-abstentionist tradition."

Thus, when Anthony Bailey envisioned the Dutch bicyclist in a self-contained bubble, at once tolerating his environment and shielding himself from it, Bailey [also] envisions the Dutch nation throughout most of its history.

Hans Binnendijk
Director, Center for the Study of Foreign Affairs
Foreign Service Institute
U.S. Department of State

Corrections

A footnote on page 117 of the Spring '87 ***WQ*** in Jack N. Rakove's article on the U.S. Constitution, "Philadelphia Story," incorrectly stated that only once has a presidential candidate prevailed in the electoral college without winning a majority of the popular vote. In fact, 15 presidents have won election in this way. However, only ***two*** have prevailed in the electoral college without winning a ***plurality*** of the popular vote: Rutherford B. Hayes in 1876 and Benjamin Harrison in 1888.

Two typographical errors occurred on page 166 in a review of John Strohmeyer's ***Crisis in Bethlehem***: Worldwide output of steel is 900 million tons per year, not 90 million tons; the world's annual demand for steel is 600 million tons, not 60 million tons.

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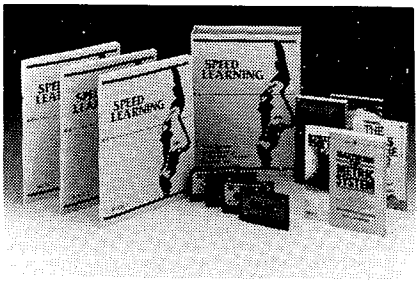

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Issues of the Information Age:

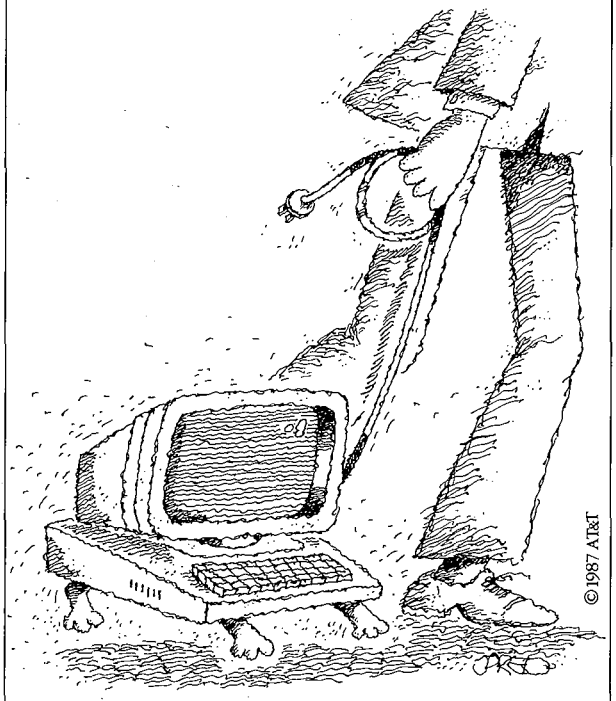
The paradox of power.

The Information Age, for all its potential, has brought with it a new kind of problem. Often, the machines that contribute so much to the flood of information do little to help most of us cope with it. They are difficult to use, rigid in their demands, almost arrogant in their inability to work with any but their own kind. They are the muscle-bound tools of specialists.

In our view, the problem is not that the machines are too powerful for the rest of us. They are not powerful enough.

This is the paradox of power: the more powerful the machine, the less power it exerts over the person using it. We define a more powerful machine as one that is more capable of bending to the will of humans, rather than having humans bend to its will. The definition is deeply ingrained in AT&T. The telephone is such a powerful device precisely because it demands so little of its user.

AT&T foresees the day when the Information Age will become universal. People everywhere will participate in a worldwide Telecommunity. They will be able to handle information in any form—conversation, data, images, text—as easily as they now make a phone call.



That day is coming closer. One example: scientists at AT&T Bell Laboratories are developing "associative" memories for computers, further enabling the machines to work with incomplete, imprecise, or even contradictory information. That's perfectly natural for a human. What makes it a breakthrough is that these computers won't ask you to be anything else.

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